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, 642-7084

Professors:
William M. Banks, iil, Ed.D. University of Kentucky.

Afro-American Contributions and Issues. There are
4B courses offer students a general background in
African history and culture from precolonial times
to the present. The 5A and SB courses offer students
a general multidisciplinary background in Afro-
American history, African history

Lecturers:
Albert J. Johnson, Ph.D. University of California, Los
Angeles. English

Roy I. Thomas, M.A. New York University. Afro-American
literature and culture

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
issues in the teaching of writing. The 4A and
4B courses offer students a general background in
Afro-American history and culture from precolonial times
to the present. The 5A and 5B courses offer students
a general multidisciplinary background in Afro-
American life and culture from a humanities and
social science perspective.

The social science portion of the curriculum is built on
a body of specific methodological and interdisci-
plinary approaches to Afro-American life (100-119),
a historically oriented study of black social institutions
(120-128) and a more in-depth study of social science
disciplines from an Afro-American perspective (130-
139).

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 African-American literature are offered.

The 160 series of the curriculum is especially devoted to
the application of social policy as it affects con-
temporary black communities. This series is
especially important to students who are preparing for
professions in social welfare, mental health, etc.
The assignments will focus on individual and
group independent study.

In each of the number series, the course ending
with 9 (e.g., 159) is designated 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.
A. AAS 101A-101B: Research Methods in Afro-
American Studies.
B. Any one of the following comparative courses:
   (1) AAS 111: 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 130: Afro-American Communities and Cultures; 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 124: Education and Identity; (6)
   AAS 132A: Psychology and Black People; (7) AAS 137: Urban Afro-America; (8) AAS 144: Religion
   and Culture in Black America.
D. AAS 116 and 117: Colonialism, Slavery and Afro-
American Life Before 1865; Afro-Americans in the Industrial Age, 1865-1970.

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.
A. AAS 116 and 117: Colonialism, Slavery and Afro-
American Life Before 1865; Afro-Americans in the Industrial Age, 1865-1970.
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 151A: Black American Plays from
   1865 to 1959; AAS 151B: Contemporary Black American Plays; (4) AAS 152A: Afro-American Short
   Stories; (5) AAS 152B: Black American Novels and Narratives.
C. Any one of the following sequence: (1) AAS 152A: Black American Essays: The Nature and Tra-
   dition; (2) AAS 152B: Black American Poetry: 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 130: Afro-American Communities and Cultures; (2)
   AAS 143A: Performance of Afro-American Literature; (3) AAS 143B: Performance of Afro-American
   Drama; (4) AAS 143C: Black Theater Workshop; (5) AAS 153A: Images of Black Women in Literature:
   Slavery to 20th Century; (6) AAS 153B: Contemporary Im-
   ages of Black Women in Literature; (7) AAS 154: History of Black People Around the World Through
   Literature; (8) AAS 155: Literature of the Caribbean; (9) AAS 156: Literature of Black Africa; (10) AAS
   122: Afro-American Religion: Historical Perspectives; (11) AAS 144: Religion and Culture in Black America;
   (12) AAS 145: Afro-American Societies and Cultures; (13) AAS 141: Black Art in the New World; (14)
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 require-
ment 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 senior standing with a GPA of 3.30 or higher in all
University work, as well as a 3.50 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. Requirements for each area of concentration follow.

One lower division Afro-American studies course and five upper division courses are required. Stu-
dents must be enrolled at least as a 3.00 GPA or higher in the Afro-American Studies major. Students in the
program must complete two consecutive semesters of Afro-American Studies upper division courses as part of the minor.

Requirements for Minor: Humanities Concentration
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, Colo-
   nialism, Slavery and Afro-American Life Before 1865; or
   AAS 117: Afro-American Communities and Cultures
   1865-1970; (2) One of the Survey courses: AAS
   150A, 150B, or 151; 150A, Afro-American Literature
   1746-1920; 150B, Afro-American Literature from
   1920-present, 11, Survey of Afro-American Plays;
   (3) One of the genre courses: AAS 143A, Afro-
   American Dramatic Literature, short stories or novels: AAS
   152A, 152B, 152C, 152D or 152E; (4) Any 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), AAS 143A (Per-
   formance of Afro-American Literature), AAS 143B
   (Performance of Afro-American Drama), AAS 143C
   (Black Theater Workshop).

Afro-American Studies Social Science 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, Colo-
   nialism, Slavery and Afro-American Life Before 1865; or
   AAS 117: Afro-American Communities and Cultures
   1865-1970; AAS 121, Black Political Life in the U.S.; AAS
   122, Black Families in American Society; AAS 123,
   Afro-American Religion: Historical Perspectives; AAS
   126, Education and Inequality in American Society;
   AAS 132, Psychology and Black People; AAS 112A or
   112B, Political and Economic Development in the
   Third World; AAS 130, Afro-American Communities
   and Cultures; AAS 144, Religion and Culture in
   Black America.

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

1B. Freshman Composition. (4) Three hours of lecture, plus one hour of discussion per week. Prereq-
   usites: Subject A and 1A. Continued training in expository
   and argumentative writing, with more emphasis on literary
   interpretation. (F,SP)
   Staff
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4A. Africa: History and Culture. (4) 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. (F)

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

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

5B. 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: 5B or introductory course in sociology. The sociology of the black community will be studied through an analysis of the educational, religious, political, economic, and familial dimensions of Afro-American life. (F) Hintzen

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 discussion per week. Prerequisites: Consent of instructor. Seminars in various topics in Afro-American Studies designed to introduce beginning undergraduates to the methods and materials of the discipline. Work in the seminar will typically include class reports and a research paper. (F,SP) Staff

98. Directed Group Studies for Freshmen and Sophomores. (1-4) New course. Must be taken on a pass/fail basis. Supervised research on specific topics related to Afro-American studies. (F,SP)

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) Hintzen

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

107. Race and Public Policy. (3) New course. Two 1½-hour lectures per week. This course examines the formation and implementation of public policies directly related to the black community. While the policies and programs analyzed differ from year to year, basic public policy methodology will be introduced each year. (SP) Henry

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 in the development of a black economic base in the United States from 1918 to present. (SP)

111. Race, Class, and Gender in the United States. (3) Three hours of lecture per week. Prerequisites: Reading 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. (SP) 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 intranational perspective. (F) Hintzen

112B. Political and Economic Development in the Third World. (3) Three hours of lecture per week. An analysis of the political bases of underdevelopment in the Third World, with particular emphasis upon the roles of modernization, urbanization, and the emergence of contemporary African states. (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 twentieth century with the colonial and slave economies in Africa and the New World; including quantitative analysis. (F,SP) 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 American slave trade, the development of the plantation system, urban dynamics, religious life, the development of the Black World, the roles and functions of families in the development of the Black World, and the development of the Black World. (SP) Lewis

117. Afro-Americans in the Industrial Age, 1865-1970. (4) Three hours of lecture and one hour of discussion per week. With emphasis given to the organization of labor, the role of unions, and the history of the labor movement. Special attention will be given to the development of the Black World, the roles and functions of families in the development of the Black World, and the development of the Black World. (SP) 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 roles of Afro-American urban life, the changes which occurred after the Civil War, the reasons for the changes, and the consequences of the changes. (SP) Lewis

119. Selected Topics in the Social-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: 5B or 20 or History 125B and 117 or 1117 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 development of black political ideologies, organizations, and movements. (F) Henry

122. Black Families in American Society. (3) Three hours of lecture per week. Prerequisites: 5B or 20 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)

123. Afro-American Religion: Historical Perspectives. (3) Three hours of lecture per week. Survey of the religious life of Afro-Americans from the transmission of African religious beliefs during slavery to the present day. Black churches, the role of the church in the black community, the rise of independent Black denominations, the role of organized religion, and the church in political and social struggles. (F) Henry

124. Political Philosophy of Martin Luther King, Jr. (3) New course. Two 1½-hour lectures per week. Using the thought and actions of Martin Luther King, this course examines the major events of the civil rights movement. Reading includes original works by King as well as secondary sources with a special emphasis on black religion, nonviolence, and integration. (SP) Henry

125. Law and the Black Community in the United States. (3) Three hours of lecture per week. Prerequisites: 5B or 20 or History 125A-125B (AAS 116 and 117). Examination of the legal decisions and processes that have affected the development of Blacks in America. Attention given to the criminal process, including the police, district attorney, trial courts, and Grand Jury.

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 on the relationship between education and inequality. (SP)

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. Emphasis on folk institutions, religious behaviors, and socio-economic adaptation. (F,SP) Walker

131. Caribbean Societies and Cultures. (3) Three hours of lecture per week. Comparative study of Spanish, Dutch, English, and French-speaking Caribbean societies. Analysis of Caribbean social structure including the development of the plantation 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: 5B 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 as regarding Afro-Americans, offered by American psychology from its origins to the present. (SP)

133. Black Children and Youth: Psychological Development. (3) Three hours of lecture per week. Prerequisites: 132 or upper division course in psychology. Examination of the growth and development of the child through adolescence. (F) Jones

135. Caribbean Cultural History. (3) Three hours of lecture per week. Examination of the history and cultural evolution of the French, Dutch, Spanish, and English-speaking Caribbean societies from the ivory coast to the second world war. Particular attention will be paid to Afro-Caribbean cultural institutions and practices, immigration of Chinese, East Indians, Lebanese, Canary Islanders, and Jews during the post-emancipation period, 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 medical systems in Afro-American societies and the role of the religious institution. Emphasis on ethno-medicine, ethnopsychiatry, ethno-pharmacology, ethnicity, and medical care.

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

138. Black Nationalism. (3) Three hours of lecture per week. Prerequisites: 5B. Examines the concept of Black Nationalism and its historical and intellectual development. Special attention will be given to the role of Black religion and the attempt to develop Black socialism.

139. Selected Topics of Afro-American Social Organization 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 Afro-American contributions to the world of fine art, in the new world with special attention given to African influences.

142A. Third World Cinema. (3) Two 1½-hour lectures, plus two hours of viewing/discussion per week. Prerequisites: Reading and composition requirement. Examines through lectures and a selection of films, the development and achievements of 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) Johnson

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 American 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 and the substance of the course. The use and misuse of ethnic characters are explored. Film makers and artists are sometimes present for discussion. (SP) Johnson

142C. Scenario and Film Criticism. (3) Three hours of lecture and discussion per week. Prerequisites: Completion of reading 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. A workshop approach is emphasized, with limited enrollment, and seminar discussions of the projects involved. (SP) Johnson

143A. Performance of Afro-American Literature. (3) Three hours of lecture per week. Prerequisites: 143A, its equivalent, or consent of instructor. Performance of a play by an African-American writer. The play will be studied within its social and historical context. Selections and assignments include poetry, essays, and excerpts from plays. (F) Wilkerson

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 performance skills as a way of knowing and understanding the oral dimensions of Afro-American literature. Selections and assignments include poetry, essays, and excerpts from plays. (F) Wilkerson

143C. Black Theatre Workshop. (3) New course. Three hours of lecture and one hour of discussion per week. Prerequisites: 143A, its equivalent, 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. (F) Wilkerson

151B. Contemporary Black American Plays 1959 to the Present. (3) Three hours of lecture per week. Prerequisites: Reading and composition requirement. A workshop approach to the image of the Black American woman in contemporary American literature, beginning with the slave narrative through the roman a clef. The use and misuse of the image of the Black woman in contemporary Western literature and Black American writing. (F) Christian

152A. Black American Essays: The Nature and Tradition. (3) Three hours of lecture per week. Prerequisites: Reading and composition requirement. Discussion and analysis of the historical development, use, achievement, and experimentation in the essay form of Black American writing. (F) Peters

152B. Black American Poetry: The Nature and Tradition. (3) Three hours of lecture per week. Prerequisites: Reading and composition requirement. Analysis and discussion of styles and forms in poetry by Black Americans. (F) Peters

152C. Black American Dramatic Literature: Forms and Styles. (3) Three hours of lecture/laboratory sessions per week. Prerequisites: Reading and composition requirement. A study of the primary theatrical form of styles chosen by Black playwrights and the thematic consequences of those choices. Plays will be analyzed both as literature and as theatrical production; e.g., laboratory will include attendance at a local production of a play. (F) Peters
Agricultural and Resource Economics (College of Natural Resources)

Department Office: 207 Giannini Hall, 642-3345
Chair: Alain de Janvry, Ph.D.

Professors:
- Irma Adelman, Ph.D. University of California at Berkeley.
- Robert Gordon Sproul Chair in Agricultural and Resource Economics
- Sherman Robinson, Ph.D. Harvard University. International agricultural development

Assistant Professors:
- James Chalfant, Ph.D. North Carolina State University.
- Larry S. Karp, Ph.D. University of California at Davis.

Undergraduate Advisers: Peter Berck, James Chalfant, Anthony Fisher, Larry Karp.
Graduate Advisers: Michael Hanemann, Jeffrey Perloff, Brian Wright.

Undergraduate Program

Political Economy of Natural Resources

The object of the PENR major is to offer an opportunity to explore those aspects of economic and political institutions which affect the development and management of natural resources and the environment. The focus of concern includes both renewable resources (food, forests and water) and non-renewable 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 courses are designed to enable them to pass qualifying examinations in agricultural and environmental chemistry.

Graduate Course

208. 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

The major is structured to ensure that students obtain a sufficient background in the natural and physical sciences and application of micro-economic theory, and the ability to manage knowledge and skills. The major consists of at least 10 semester units in science, such as economics, law, public policy, or resources administration.

Lower division breadth requirements stipulate at least 20 semester units in social sciences and humanities (including one course in principles of economics, one course in political science or history, and one course in the humanities); two semester courses in reading and composition; two semester courses in calculus; and at least 10 semester units in science (including one lab science course and one course in physical science).

Upper division work must include PENR 100 and PENR 101; one semester course emphasizing writing and composition skills; two semester courses in quantitative methods (a combination of one course in statistics and PENR 115 or 118; or two courses in statistics); and at least 24 semester units, selected in consultation with the advisor, that 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 PENR numbered less than 195. Such courses may be in other major or minor fields defined in consultation with the advisor. In addition, each course used to fulfill an upper division requirement must be passed with a grade of C- or better.

Minor Program

Students may declare a minor in political economy of natural resources. A minimum of six courses from the PENR curriculum is required. Students should declare their minor by the time they have completed the requirements for a PENR major or the requirement for the minor. Students must take at least one course in political economy and one course in the humanities.

Graduate Programs

The Department of Agricultural and Resource Economics, 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.

Upper Division Courses

101. Microeconomic Theory with Application to Natural Resources. (4) Students who have taken Econ 100A, Econ 101A, or Bus Ad. 110 will receive only 2 units of credit. Two 1-hour courses and one hour of discussion per week. Prerequisites: 1 or Econ 100A or 101A.

102. Government and Resources. (4) Two 1-hour lectures and one hour of discussion per week. Prerequisites: 100 or Eco 100A or 101A.

105. Modeling and Management of Biological Resources. (4) Two 1-hour lectures and one hour of discussion per week. Prerequisites: Mathematics 16A-16B or equivalent. Population growth, life tables, harvesting and exploitation theories, optimal management and resource allocation. Applications to managing renewable and non-renewable resources. (SP) Getz

115. Introduction to Agricultural Economics. (4) Two 1-hour lectures and one hour of discussion per week. Prerequisites: Mathematics 16A-16B and Statistics 121 or equivalent. Single equation regression models; hypothesis testing; econometric applications to agricultural and resource issues. (F) Karp

141. Economics of the Food Systems. (4) Two 1-hour lectures and one hour of discussion per week. Prerequisites: 100 or Econ 100A or 101A. The basic principles of agricultural and resource economics. (SP) Schmitz

142. Advanced Topics in Agricultural Economics. (2) One two-hour lecture per week. Prerequisites: 141 or consent of instructor. Qualitative and quantitative analysis of food, agricultural and resource economics. The role of the agricultural sector in the economy and its impact on national economies, commodity markets, and international trade. (F) Karp

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. The role of agriculture in development and the impact of development on agriculture; food, population and resources; the transformation of traditional agriculture; policy issues in rural development. (F) de Janvry

152. Advanced Topics in Development and International Trade. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 100 or Economics 100A. Economic analysis of demand, supply, institutions, national and international policies in world agricultural systems. Institutional effects of policy. Design and analysis of sector-specific economic policy in open economies. Relations between trade and domestic policies. International effects of agricultural policies in developed nations. (SP) Adelman

161. Natural Resource Economics. (4) Two 1½-hour lectures on one topic and one hour of discussion per week. Prerequisites: 100 or Economics 100A or 101A, 101 recommended. Institutional land economics. Theories of land rent. Models of optimal use of minerals, timber, water, and related environmental resources. Resource constraints on economic growth. (F) Fisher

162. Advanced Topics in Environmental and Resource Economics. (3) One 2-hour lecture and one hour of discussion per week. Prerequisites: 100 or Economics 100A or 101A and consent of instructor. Special topics in the area of environmental economics, natural resource economics, and the economics of institutional resource allocations. (SP) Hanemann

185. Senior Thesis. (4) Course may be repeated for credit. Individual meetings with faculty sponsor. Prerequisites: Senior standing in PENR and consent of instructor. Writing of a thesis under the direction of the member(s) of the faculty. Subject must be approved by faculty sponsor. (F,SP)

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. Supervised experience off-campus organizations relevant to specific aspects of political economy of natural resources. 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. Meetings to be arranged. Prerequisites: Consent of instructor. Group study of selected topic or topics in political economy of natural resources. (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. Independent studies. Prerequisites: Consent of instructor. Enrollment is restricted by regulations listed on pages 87 and 88 of this catalog. Open to qualified upper division students wishing to pursue special study and directed research under the direction of a member of the staff. (F,SP)

Agricultural and Resource Economics

Graduate Courses

201. Issues and Concepts in Agricultural Economics. (4) Two 1½-hour lectures and one hour of discussion per week. Prerequisites: Economics 201A-201B or consent of instructor. History, institutions, and policies affecting agriculture markets and environmental quality. Producer behavior over time and under uncertainty. Assignment, property and agricultural supply models. (F) Purdy

202. Production, Industrial Organization, and Regulation in Agriculture. (4) Two 1½-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, oligopolistic 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: Consent of instructor. Characteristic functions, transformation of random variables, sample moments and asymptotic properties of estimators. Regression: hypothesis testing in the general linear model; multicollinearity; heteroscedasticity; autocorrelation and non- spherical disturbances; nonparametric; errors in variables; random censures; other models; vector autoregressive models; nonlinear regression; and qualitative models. (F) Chaffant

212. Econometrics: Multiple Equation Estimation. (4) Two 2-hour lectures and one hour of discussion per week. Prerequisites: 211 and Economics 201B. Theory and practice of simultaneous equations systems and impact of various policies on large and small farmers, consumers, the rural community, and the environment. California agricultural problems and policy. (F) Karp

238. Markets and Trade Workshop. (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. Presentation and discussion of current research in the area of economics. (SP) Staff

241. Agricultural Policy. (3) Two 1½-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, commodity surpluses, and structural changes in the food system. Analysis of public policies in 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


249. Agricultural, Food, and Resource Policy Workshop. (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. Presentation and discussion of ongoing research by faculty, staff and students. (F,SP) Staff

251. Agriculture in Economic Development. (3) Two 1½-hour lectures per week. Prerequisites: Consent of instructor. Origins and nature of underdevelopment in agriculture, food and nutrition in underdeveloped countries. Place and role of agriculture in economic development. (F) Sacedou, de Janvry

252. Sectoral and Regional Planning in Economic Development. (3) Two 1½-hour lectures per week. Prerequisites: Consent of instructor. Analysis of policy issues in agricultural development using sectoral and regional models of growth and development. (SP) Adelman, Robinson

259. Rural Economic Development Workshop. (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. Presentation and critical discussion of ongoing research by faculty, staff and students. (F,SP) Staff

261. Economics of Renewable Natural Resources. (3) Two 1½-hour lectures per week. Prerequisites: Consent of instructor. The theory of optimal management of renewable resources. Open access resources. Extinction. Applications to fisheries and forests. Theory of pollution control policy. The role of price and quantity regulation. Environmental cost-benefit analysis. (F) Berck, Fisher

262. Economics of Exhaustible Natural Resources. (3) Two 1½-hour lectures per week. Prerequisites: Consent of instructor. Theory of optimal exploitation of exhaustible natural resources, with application to fossil fuels. Welfare analysis of alternative management approaches. Econometric models of supply and demand for energy sources. Taxation policy. Bidding theory and leasing policy. (SP) Hanemann

269. Natural Resource Economics Workshop. (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. Presentation and discussion of ongoing research by faculty, staff and students. (F,SP) Berck

271. Nutritional Economics and Policy. (1-3) Two 1½-hour lectures per week. Prerequisites: Consent of instructor. Writing of a thesis under the direction of the faculty. Prerequisites: Consent of instructor. Staff

272. Economics of Consumption and Demand Analysis. (3) Course may be repeated for credit. Individual study. Prerequisites: Consent of instructor. Staff

281. Special Study for Graduate Students. (1-6) 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 and consent of instructor. (F,SP)

282. Special Study for Masters Students. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual study in consultation with the major field adviser for qualified students to prepare for the various examinations required for the M.S. degree. May not be used for unit or residence requirements for the M.S. degree. (F,SP)

282. Special Study for Doctoral Students. (1-12) 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 a comprehensive understanding of the subject matter in the areas of consumption and demand analysis, utility theory, and consumer behavior in order to acquaint students with problems addressed, methodology employed, and frontiers to be breached. Emphasis will be on various models used, especially those related to food and nutrition policy, functional forms, and assessment of empirical results. (SP) Lane, Robinson

299. Individual Research. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Approximately four hours of research per week per unit. Prerequisites: Consent of instructor or permission of the member here of the staff with whom the research is being conducted. Prerequisites: Consent of instructor. Staff

300. Professional Preparation: Teaching of Political Economy of Natural Resources. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One to two hours of lecture and one to two hours of discussion per week. Prerequisites: Graduate standing, appointment as a graduate student instructor, and consent of instructor. Problem review and development, guidance of discussion classes, course development, supervised practice teaching. (F,SP)

300. Professional Training in Research Methodology. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual research.

301. Professional Preparation: Teaching of Political Economy of Natural Resources. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One to two hours of lecture and one to two hours of discussion per week. Prerequisites: Consent of instructor or permission of the member here of the staff with whom the research is being conducted. Prerequisites: Consent of instructor. Staff

302. Production, Industrial Organization, and Regulation in Agriculture. (4) Two 1½-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, oligopolistic competition, vertical integration, price discrimination, and economics of information with applications to food retailing, cooperatives, fishing, and energy. (SP) Zilberman

303. Professional Preparation: Teaching of Political Economy of Natural Resources. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Approximately four hours of research per week per unit. Prerequisites: Consent of instructor or permission of the member here of the staff with whom the research is being conducted. Prerequisites: Consent of instructor. Staff

305. Professional Preparation: Teaching of Political Economy of Natural Resources. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Approximately four hours of research per week per unit. Prerequisites: Consent of instructor or permission of the member here of the staff with whom the research is being conducted. Prerequisites: Consent of instructor. Staff

306. Professional Preparation: Teaching of Political Economy of Natural Resources. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Approximately four hours of research per week per unit. Prerequisites: Consent of instructor or permission of the member here of the staff with whom the research is being conducted. Prerequisites: Consent of instructor. Staff

307. Professional Preparation: Teaching of Political Economy of Natural Resources. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Approximately four hours of research per week per unit. Prerequisites: Consent of instructor or permission of the member here of the staff with whom the research is being conducted. Prerequisites: Consent of instructor. Staff
Ancient History and Mediterranean Archaeology
(College of Letters and Science)

Group Major Office: 3422A Dwinelle Hall, 643-8741

Professors:
John K. Anderson, M.A. F.S.A. (Greek and Roman archaeology)
Guilay Azarbayjani, Ph.D. (Near Eastern art history)
Stanley Brancazio, Ph.D. (Mediterranean ethnology and folklore)
George F. Dales, Jr., Ph.D. (Near Eastern and South Asian archaeology)
Crawford H. Greenewalt, Jr., Ph.D. (Classical Archaeology)
Eric S. Gruen, Ph.D. (Roman history, Euro history)
Wolfgang J. Heimpel, Ph.D. (Sumerian studies, Mesopotamian history)
Robert C. Knapp, Ph.D. (Roman history, Latin historical sources and epigraphy)
Sino K. Kostol, Ph.D. (Architectural history)
Jacobo Milgrom, D.H.L. (Biblical religion, history of ancient Israel)
Stephen G. Miller, Ph.D. (Classical archaeology)
Raphael Sasson, M.A. (Near Eastern history, Graeco law)
John M. Smith, Jr., Ph.D. (Inner Asian history, numismatics, military history)
Andrew J. Stewart, Ph.D. (Greek and Roman art history and archaeology)
David B. Bronson, M.A. (Near Eastern Archaeology)
Ronald S. Stroud, Ph.D. (Greek history and epigraphy)
Leslie L. Trelease, Ph.D. (Greek and Latin linguistics, Greek epigraphy)
Ruth E. Tringham, Ph.D. (Old World anthropology, prehistoric archaeology)
Daniel A. Arnold, Ph.D. (Classical archaeology and art (Emeritus))
W. Kendrick Pritchett, Ph.D. (Greek epigraphy, topography and history (Emeritus))

Associate Professors:
David J. Cohen, J.D. (Ancient rhetoric, Greek and Roman law, political and legal theory)
Laurent J. Sclater, Ph.D. (Classical and Greek, Roman law)
Martin Schwartz, Ph.D. (Iranian studies)

Assistant Professors:
Susanna Elm, D.Phil. (History of late antiquity, early Christianity)
Cathleen Keller, Ph.D. (Egyptian language, history and art history)

Visiting Professors:
Victor R. Gold, Ph.D. (Semitic languages, Syro-Palestinian history and archaeology)
J.E. Hussein, Ph.D. (Syro-Palestinian archaeology)

Senior Staff:
Frank Asaro, Ph.D. (Provenience determination of archaeological artifacts)

Graduate Courses and Seminars
210. Interdisciplinary Seminar in Ancient History and Mediterranean Archaeology. (2 or 4) New course. Course may be repeated for credit. One 3-hour class per week. Prerequisites: Graduate standing. Team-taught by faculty from two different departments. The purpose is not only to expose students to a discipline other than their own, but to engage them directly in the application of that discipline to their own research interests. The topics and instructors will vary from year to year. Among the subjects planned are "Ancient Anatolia" for spring 1990 (Greenewalt, (Classics) and Stefanini, (Near Eastern Studies)."

The Major
There is no undergraduate major.

The Graduate Program
The program is interdisciplinary in nature, administered by a faculty group drawn from several departments. Both M.A. and Ph.D. degrees are offered. Fields of emphasis include Near Eastern history, art and archaeology, Greek history, Roman history, classical art and psephography, epigraphy, ancient law, and religion. Candidates for degrees will offer 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 relevant area who have completed at least one year of undergraduate study in ancient history, art, or archaeology. Applicants should have had sufficient training the guidance advanced work in at least one ancient language.

M.A. Requirements. The M.A. in the area of archeological and art specialization requires 20 semester units and a thesis. The M.A. in the historical area requires 24 semester units, to be followed by a written examination, in the major subject. All M.A. candidates are required to pass at least one language examination before the degree is awarded.

Ph.D. Requirements. There are no specific course requirements. It is expected that all students will take at least one A&HMA interdisciplinary seminar during their graduate years. Students should also take considerable seminar work in at least two of the departments represented in the program and obtain some practical experience in archaeology. Candidates must pass examinations in two modern languages and two ancient languages appropriate to the study of fields. They are then eligible for the Ph.D. qualifying examinations, both written and oral, and the dissertation examination in the major and minor subjects. Upon successful completion of these requirements and when advanced to candidacy, the student proceeds to research and writing of a dissertation under the guidance of a three-person committee. The dissertation must be approved by the committee and be in a form final before the student is recommended for the Ph.D. degree.

For further information, inquiries should be addressed to the Graduate Group in Ancient History and Mediterranean Archaeology.

Anthropology
(College of Letters and Science)

Department Office: 232 Kroebel Hall, 642-3391
Chair: William S. Simmons, Ph.D.

University Professor:
Peter M. Oppolzer, Ph.D. (Emeritus) Harvard University. Human evolution, experimental anthropology

Professors:
Burt Benedict, Ph.D. University of London. Social structure, ethology
Brent Berlin, Ph.D. Stanford University. Ethnobiology, cognitive anthropology, Amazonia, Mesoamerica
Gerald S. Berreman, Ph.D. Harvard University. Inequality, Interaction, India, Himalayas
Stanley H. Davis, Ph.D. University of California at Berkeley. Cultural anthropology, Spain, Mexico

Alan Dumond, Ph.D. Indiana University. Folklore, papyrochronology, symbolism
Nelson H. G. Graburn, Ph.D. University of Chicago. Kinship, art, tourism, circumpolar
John J. Gumperz, Ph.D. University of Michigan. Ethnobiology, human ecology
Phyllis Olin, Ph.D. University of Chicago. Physical anthropology, primatology, development
Ronald S. Stroud, Ph.D. University of New York. Primates, behavior, human ecology
Laura Nader, Ph.D. Radcliffe/Harvard University, Mexico, Middle East, law, controlling processes, comparison, theory
John U. Ogbu, Ph.D. University of California, Africa, educational anthropology, urbanization, ethnography
Herbert P. Phillips, Ph.D. Cornell University. Psychological anthropology, primatology, literature, art, East Africa
Jack M. Potter, Ph.D. University of California at Berkeley Paul M. Rabinow, Ph.D. University of Chicago. France, Italy,pps.

John V. Santar, Ph.D. Ph.D. University of California at Berkeley. Evolution, bio-archeology, behavior, variation
Nancy Nee-Kopilovic, Ph.D. University of California at Berkeley. Medical, psychological, behavior, variation
William A. Shakes, Ph.D. London School of Economics. Social anthropology, political theory
William S. Simmons, Ph.D. Harvard University. Social anthropology, North America

Eugene T. Thompson, Ph.D. University of Edinburgh. European anthropology, early agriculturalists, prehistoric archaeology
Timothy D. White, Ph.D. University of Michigan, Ann Arbor. Physical anthropology, human origins and evolution

John J. Gumperz, Ph.D. Cambridge University. Early man, African prehistory

Elizabeth Colson, Ph.D. (Emerita) Radcliffe College, Social anthropology, social metabolism, ethnography
Mary K. Lord, Ph.D. University of California at Berkeley. Social anthropology, social evolution, ethnography
George M. Foster, Ph.D. (Emeritus) University of California at Berkeley. Change, medieval, Africa

Associate Professors:
James N. Anderson, Ph.D. University of California at Los Angeles. Ecology, development, medical, S.E. Asia
Marcos C. Conley, Ph.D. (Emeritus) Universidad de San Cristobal. Social anthropology, prehistoric art, hunter-gatherers, gender

Assistant Professors:
N. D. Lightfoot, Ph.D. Arizona State University. American archaeology, coastal hunter-gatherers
Alwin Kuhn, Ph.D. Columbia University. Development, gender, South Asia

Medical Anthropology Ph.D. Program Office: 215 Kroebel Hall, 642-3408

Professor: Nancy Nee-Kopilovic, Ph.D. (Emerita)

The Department of Anthropology offers students the opportunity to study humankind from the broadest historical and geographical perspectives. Courses in the department offer knowledge of the physical nature of humans as well as the social and cultural aspects of behavior. Lower division courses are intended to give a general understanding of human evolution, prehistory, and the nature of human cultures, while upper division courses elaborate particular themes.

The anthropology major is designed to serve two purposes: to provide a general education in anthropology for students who are pursuing a liberal education, and to provide preparation for graduate work for students who wish to become professional anthropologists. Students who do not intend to do graduate work in anthropology may plan their pro-
program with considerable freedom, so long as they fulfill the requirements of the major listed below. Students who plan to go on to graduate study at Berkeley or at another institution, should plan their undergraduate program to meet graduate admission requirements. Students should select a combination of courses to form a unified plan of study that meets special intellectual interests.

Undergraduate students, both majors and non-majors, seeking information or advice about their programs or about courses should inquire at 213 Kroeber Hall. The collections and research facilities of the Robert H. Lowie Museum of Anthropology are available for study in archaeology, ethnography, physical anthropology, and related subjects by graduate and undergraduate students and by visiting scholars; the museum's exhibition hall is used for instructional and educational purposes, particularly in connection with class work. Those interested may address the Director, 103 Kroeber Hall. For further information on the Lowie Museum, see Index.

The Anthropology Library, 230 Kroeber 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 a large reading room and a microform center.

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.

Course packages 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, 3, with a minimum grade of C-. These are prerequisites for admission to the major; however, students may apply for admission while completing the third prerequisite.

Courses applied to the major must be taken on a letter-graded basis. The only courses graded P/NP that may be accepted as elective units in the major are Anthropology 193 and a maximum of 4 units of Anthropology 199. To be accepted, these courses must be evaluated by a member of the department. No single course can be used in satisfaction of two requirements in the major.

In addition to the lower division requirements described above, the major requires that the student complete the following nine upper division anthropology courses, for a minimum of 30 units: Anthropology 114A and 114B (fall and spring only), one area course (courses numbered 121A, 122, 123, 124 or 170-188), one methodology course (courses numbered 102L, 103, 104L, 107L, 131, 132, 133, 134, 169A, 169B, 190A, 190B, 190D), and five elective courses in anthropology, totaling a minimum of 15 elective units. The methodology course must be taken for at least 4 units unless Anthropology 114A is taken, in which case it must be taken for 3 units. Substitution of no more than 8 units in relevant allied subjects will be permitted only with the approval of the faculty undergraduate adviser. The total units required of majors are the lower division and a minimum of 30 upper division units in anthropology.

In planning their workload students should be aware that the Department adheres to Academic Senate Regulation 760: "The value of a course in units shall be reckoned at the rate of one unit for three hours' work per week per term on the part of a student, or the equivalent."

Honors Program. The Department of Anthropology provides several specialized programs leading to the A.B. degree with honors. Students with an overall UC grade-point average of 3.30 or higher and a grade-point average of 3.50 or higher in courses in the major, may apply at any time to the major adviser, for enrollment in one of these honors programs. The program will include the writing of a thesis supervised under the guidance of the H195A-195B series of courses.

Preparation for Graduate Study

Admission to graduate studies at Berkeley does not presuppose an A.B. in anthropology. The graduate program is directed toward the Ph.D. candidate, and only a small percentage of applicants for the M.A. degree are awarded it. 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 a year for the following fall semester. The deadline for application is January 5.

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 two years, students attend seminars, prepare three field statements in their specializations, satisfy their language requirement, and prepare for the Ph.D. oral exam. If the student successfully passes 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 usually 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 Adviser, 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 Group in Anthropology at the University of California at San Francisco, currently offer a joint Ph.D. in medical anthropology. Students may apply to the program through either the Berkeley or the San Francisco campus but not 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 campus 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 on all qualifying examinations and on the doctoral 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 biological, bio-cultural, 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 as well as to medicine and the biological sciences. Courses in bioevolutionary dimensions of disease are accompanied by seminars that explore population, migration, and other human afflictions as a social language speaking to the critically sensitive or contradictory aspects of culture and social relations. Anthropological epidemiology asks the questions, "Who gets sick with what ailments?" (different risks, forms of medical knowledge, and medical systems) and "Why?" (what social arrangements, cultural features, and bio-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 adviser.

For students entering the Berkeley campus with the B.A., the doctoral training program is estimated to require five and one half 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 Program Office, the General Catalogue of each campus or the American Anthropological Association's Guide to Departments of Anthropology. Medical anthropologists also benefit from the faculty, courses, and resources of many departments and the School of Public Health at Berkeley, and the Schools of Medicine and Nursing at UCSF.

Application. Applications are considered once each year for the fall semester only. The application period opens in early September and the deadline for receipt of both departmental and Graduate Division applications is January 5. The application period opens on January 5. The minimum requirement for admission to the medical anthropology program at Berkeley is a baccalaureate degree, and on the San Francisco campus, a master's degree in anthropology or a related discipline, or a postbaccalaureate professional degree.

Applications are screened by the anthropology faculty and selections are made on the basis of academic excellence, letters of recommendation, GRE scores, relevant experience, and a strong statement of intellectual and professional purpose.

Medical anthropology courses are listed below: 115-118 and 215A-219.

Courses and Seminars

Courses and seminars are listed below. Instructor listings, semester offerings, course descriptions, and schedule changes are available in 232 Kroeber Hall.

Lower Division Courses

1. Introduction to Physical Anthropology. (4) Three hours of lecture and one hour of section per week. Introduction to human evolution. Physical and behavioral adaptations of humans and their prehistoric and living relatives. Issues in evolutionary theory, molecular evolution, primate behavior, interpretation of fossils. Prehistoric activities, race, differences, genetic components of behavior are defined and evaluated. (F: Milton; SP: White)

2. Introduction to Archaeology. (4) Three hours of lecture and one hour of section per week. Prehistory and cultural growth. (SP) Lightfoot
98. Directed Group Study. (1-4) New course. Course may be repeated for credit. Must be taken on a pass/ not pass basis. Three to 12 hours of group study (or tutorial, lab work) per week. Prerequisites: Consent of instructor; lower division status. Organized group study on topics selected by lower division students under the sponsorship and direction of a member of the Anthropology Department's faculty.

99. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a pass/not pass basis only. Three to 12 hours of tutorial (or field work) 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 Paleontology. (5) Three hours of lecture and three hours of laboratory per week. Prerequisites: 1. Origin and relationships of the extinct forms of mankind. (SP) Conkey

101. Human Variation in an Evolutionary Perspective. (4) Three hours of lecture and one hour of discussion section per week. Prerequisites: 1. Human variation in both a racial and non-racial context; basic genetics (both molecular and populational); theories of racial origins, selective bases of human variation. Phillips

102. Physical Anthropology Laboratory. (1-3) Three to six hours of laboratory per week. Prerequisites: 100 or 101 or 105. Detailed and integrated techniques and methods applicable to the study of intra- and inter-group resemblances and differences. (F) White

103. Introduction to Human Osteology. (6) Six hours of lecture plus 14 hours of lab work and study time per week. Prerequisites: 1 or consent of instructor. An intensive study of the human skeleton, reconstruction of individual and population characteristics, emphasizing methodology and analysis of human populations from archaeology, anatomy, and anthropological principles. (F) White

104. Advanced Human Osteology Laboratory. (1-4) Three to six hours of laboratory per week. Prerequisites: 103 and consent of instructor. Laboratory analysis of human skeletal remains including original research on paleoendocrinology, paleopathology, metric and non-metric analyses, dental anthropology, curation, and computerization of Lowe Museum skeletal collections. (F) White

105. Primates Evolution. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: 1. A consideration of the major groups of primates with an emphasis on the evolution of behavior. (F) Howell

106. Primate Social Behavior. (4) Three 1-hour lectures plus one hour of discussion per week. Recommended prerequisites: 1 or integrative Biology 32: Humans, apes, and selected mobile bioethics 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 examination of the roots of modern human behavior. (F) Dohlman

107L. Primate Social Behavior Laboratory. (1-4) Course may be repeated for credit. One hour of lecture and three or more hours (depending upon units) of laboratory per week. Prerequisites: 106. 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 behavioral data, additional units for credit may be arranged for computer analysis of data. (SP) Dohlman

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, socialization and the biological bases of behavior. (SP) Dohlman

109. Human Evolution. (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 breadth, food avoidance and unusual behaviors with respect to food. Gut anatomy, nutritional requirements and energetics are also considered. (SP) Milton

110. Theory and Method in Physical Anthropology. (4) Three hours of lecture and one hour of required section per week. Prerequisites: 1. 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.

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 biological considerations. It will begin with a delineation of those gene structure and function, mutation, adaptation through natural selection, then consider how these apply to two-sex, social organisms 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. (F) Sarich

Required of All Anthropology Majors

114A. History of Anthropological Thought. (4) New course. Three lectures of three hours and one hour of discussion per week. This team-taught course will present a history of anthropological thought from the mid-19th century to the present, and will focus both upon the integration of the anthropological subdisciplines and upon the relationships between these and other disciplines outside anthropology. (F) Simmons, Deetz

114B. Current Issues in Anthropological Thought. (4) New course. Three hours of lecture and one hour of discussion per week. This course will be team-taught and will cut across the subdisciplinary perspectives within anthropology. It will include in-depth consideration of a series of important topics in contemporary social/cultural/linguistic/medical anthropology, archaeology, and physical anthropology. (SP) Berlin, Conkey

Medical Anthropology

115. 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.

116. Environmental Effects on Human Health and Disease. (4) Three hours of lecture and one hour of discussion or laboratory per week. Prerequisites: 1 or 3, plus a course in general biology or consent of instructor. Examination of major disease related ecological constraints of diverse eco-systems and the biological responses of human populations to these stresses: arctic, high-altitude, arid zones, grasslands, humid tropics, urban.

117. Nutrition and Genetics in Medical Anthropology. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Consent of instructor. Comparative study of nutritional and genetic constraints on human behavior. (F) Simmons, Deetz

118. Socio-Psychological Aspects of Medical Anthropology. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Consent of instructor. Comparative study of mental illness and socially constructed madness in different societies. (SP) Dohlman

Archaeology

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

121. Historical Archaeology. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 2. Archaeology of the period from the...
first European settlement in America, Australasia, South Africa, etc.

121A. American Material Culture. Formerly 121. Three hours of lecture per week. Prerequisites: 2; Patterns in material culture as it reflects behavioral and psychological aspects of American culture since the 17th century. Topics include architecture, domestic artifacts, mortuary art, foodways, and trash disposal. Euro-American, Afro-American, and Native-American examples are considered. (F)

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 and societies 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.

122A. Archaeology of North America. Formerly 122. Prehistory of North American Indians; prehistoric culture areas; relations with historic Indians. (F)

122C. Ancient Civilization of Mexico and Central America. Formerly 123. A study of the development, form, and history of pre-Columbian Indian civilization, surveying the achievements of the Maya, the Aztec, and their neighbors. (SP)

122D. The World of the Ancient Maya. Formerly 124. A comprehensive study of the development and culture history of the longest sustained tradition of aboriginal New World civilization. (SP) Kirch

122E. People of the Andes. Formerly 125. Inca culture and its antecedents; a survey from the earliest times to the present. (SP) Deetz

122F. California Archaeology. Prehistory of California Indians; selected archaeological sites and current issues in interpretations. (SP)

123. Old 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 and societies of the Old World, through the study of archaeology, ethnography, and other relevant fields. No specific sequence to courses; students may take any or all of the following in any sequence.

123A. Stone Age Archaeology. Overview of Stone Age cultures and development. Selected topics or geographic areas of paleolithic research. (SP) Conkey

123B. Archaeology of Africa. Formerly 126. Prehistory and early civilizations of Africa; selected archaeological sites and current issues in interpretations. (SP)

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

123D. Archaeology of Eurasia. Formerly 127. Prehistory and early civilizations of Europe, Asia, and the Near East. (SP)

123E. Mediterranean Archaeology. (4) New course. Three hours of lecture per week. Prerequisites: 2 or consent of instructor. Prehistory and early civilizations of the Mediterranean basin and its hinterland. (F) Tringham

124. Pacific Cultures. (4) New course. Course may be repeated for credit. Three hours of lecture per week. Prerequisite: 2. A variety of courses that consider the peoples and past cultures and societies of Oceania and the Pacific, through the study of archaeology, ethnography, ethnology and other relevant fields. No specific sequence to courses; students may take any or all of the following in any sequence.

124A. New course. Archaeology of the South Pacific. Selected topics and research problems in the archaeology of this region from prehistoric to modern times; an emphasis on their development to the establishment of complex chiefdoms in many localities. Stress on current issues and interpretations. (F) Kirch

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

125. Prehistoric Art. (4) Three hours of lecture per week. Prerequisites: 2 or 3. Draws on study of art in nonliterate societies and an understanding of prehistoric techniques or on archaeological research, with a range of prehistoric arts in cultural contexts; e.g., rock art, Ice Age arts, prehistoric ceramics. Uses illustrative material from Lowie Museum.

126. Invention and Technology. (4) Three hours of lecture per week. Prerequisites: Consent of instructor. Formerly 126. Development and spread of fundamental inventions and illustrative material from the Lowie Museum of Anthropology.

127. Science in Archaeology. (4) Three hours of lecture and one 3-hour lab per week. Prerequisites: 2; A survey of the application of biological and physical sciences to archaeological materials.

128. 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). (SP) Lightfoot

129. 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 preparation of excavated materials for publication, including sampling and analysis strategy, drawing, photography, and writing-up. (F) Liddle

130. History and Theory of Archaeology. (4) Three hours of lecture per week. Prerequisites: 2; A critical historical review of the development of prehistoric and philosophical premises of past and present anthropological theory with respect to its concepts of time and change. (SP) Deetz

131. Social and Cultural Anthropology. (4) Three hours of lecture per week. Prerequisites: 3 or consent of instructor. Formerly 168. Three hours of lecture per week. Prerequisites: 3 or consent of instructor. Western theories of evolutionary and revolutionary change inform our general understanding of societies past and present. This course will evaluate these models by reading about the particular and multifarious experiences of social change in different times and places, and will consider new forms of consciousness and culture created by the colonizing encounter, agrarian transition, industrialization, emigration, and the impact of cosmopolitan culture on non-Western societies. (SP) Ong

132. Urban Anthropology. (4) Three hours of lecture per week. Prerequisites: 3 or consent of instructor. A consideration of anthropological concepts and methods for the urbanization process in towns and cities. (SP) Ogbu

133. Comparative Peasant Society. (4) Three hours of lecture per week. Prerequisites: 3 or consent of instructor. A comparative study of peasant societies as a social type contrasted with primitive and industrial society.

134. Kinship and Social Structure. (4) Three hours of lecture per week. Prerequisites: 3 or consent of instructor. Explores the meanings of gender in both evolutionary and comparative biological 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 theories of gender; the question of universal maleness; cultural constructions of gender and sexuality; health, mental health as affected by gender and sexuality; gender play (gender reversals, gender crossing, and symbolic resistance); the political economy of sex roles, production and reproduction. (F) Ong

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

136. Culture and Personality. (4) Three hours of lecture per week. Prerequisites: 3 or consent of instructor. Relationships of cultural, social, and personality factors in human behavior; personality in representative societies; techniques for studying culture-personality relations. (SP) Scheper-Hughes

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

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

139. 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.

140. 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

141. Social Inequality. (4) Three hours of lecture per week. Prerequisites: 3 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, and from traditional to stratified political societies. Particular attention will be given to the interrelations of cultural and political factors. (F) Shack
195B. 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 cultural forms. Topics include: philosophy and history of social science, power/knowledge, the social difference and power, social science and ethics. (F) Rabkin

157. Law and Anthropology. (4) Three hours of lecture per week. Prerequisites: 3 or consent of instructor. Comparative survey of the ethnography of law; methods and concepts relevant to the comparative analysis of the forms and functions of law. (F) Nader

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

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 accommodations. Readings required cover both literature and social science.

Folklore

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

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

162. Topics in Folklore. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 3 or consent of instructor. Special topics in folklore or ethnomusicology.

Linguistic Anthropology

164. Introduction to Ethnobiology. (4) Three hours of lecture per week. Prerequisites: Consent of instructor. Introduction to the study of human societies' uses and knowledge of the plant and animal world. Comparative study of human conceptual organization of the natural universe, especially views of the biological environment. Implications of folk classification in preliterate societies for general principles of language, thought, and culture. (F) Berlin

165. Language in Society. (4) Three 1-hour lectures per week. Prerequisites: One course in linguistics or anthropological linguistics. Social and linguistic aspects of verbalities, speech communities, language power and social inequality, language and ethnicity, language nation and state. (SP) Gumperz

Methods

169. Ethnographic Research Methods. (5) Course may be repeated for credit. Three hours of seminar and one hour of discussion section per week. Prerequisites: Anthropology 3 and consent of instructor. These courses deal with the problems, design, methods, and applications of ethnographic field research. There is no specific reference to the course; students may take any or all of the following courses in any sequence.

169A. Elicitation and Computer-Assisted Archiving and Analysis of Ethnographic Texts. (5) Formerly 163. Three hours of lecture, three hours of lab plus nine hours of reading/writing/research per week. Prerequisites: 3. Lectures will cover theory and practices in eliciting of ethnographic data, including ethnographic interviewing, questionnaires, event analysis, life history taking, and small group observation. Students will read selected ethnographic studies to become acquainted with different theoretical perspectives, and they will be given an introduction to the use of SUN workstations for data entry, archiving of field notes, and basic text analysis. (F) Gumperz

169B. Research Theory and Methods in Socio-Cultural Anthropology. (5) Formerly 169. Three 1-hour lectures and one hour required section per week. Prerequisite: 3. Introduction to research problems and research design techniques. Will involve local field research on the collection, analysis, and presentation of data. This course requires 15 hours of work per week including class time, outside work and preparation. One section meeting per week will be required. (SP) Phillips

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.

175. Native Peoples of South America. (4) Three hours of lecture per week. Archaeology, ethnohistory, 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 influences, development of folk-peasant societies, and the concept of national cultures. Discussion of contemporary issues will also be covered.

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.


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.

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) Gumperz

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

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. (F) Phillip

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

188. 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.

General Topics

189. General Topics. (4) Course may be repeated for credit. Three hours of lecture per week. Various topics that span more than one subdiscipline of anthropology. Students may take any or all of the courses numbered 189 in any sequence.

190A. Quantitative Methods in Anthropology I. (5) Three hours of lecture and three hours of laboratory per week. Prerequisites: 193 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. (3) Must be taken on a passed/not passed 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

193B. Advanced Computer Techniques. (1-6) New course. May be repeated with consent of instructor. Must be taken on a passed/not passed or satisfactory/unsatisfactory basis. One 1-hour lecture and one 3-hour lab per week. Prerequisites: 193 or equivalent and consent of instructor. Advanced computer methods of practical interest to anthropologists and other social scientists. Topics include: file management utilities (searching, sorting, editing), text editing and formatting, shell script programming, database design and use, and electronic communications. (F,SP) Staff

Seminars and Independent Study

H195A-H195B. Senior Honors. (4,4) 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

195. Undergraduate Seminar. (4) Course may be repeated for credit. Two hours of seminar and two hours of discussion section 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. (SP) DeVos

197. Field Work. (3-12) Course may be repeated for credit. Must be taken on a passed/not passed basis. Three to nine hours of tutorial per week. Prerequisite: Consent of instructor. Individual field experience sponsored by a faculty member; written reports required. (F,SP) Staff

*Not offered 1989-90
*On leave, spring, fall
*On leave, fall
Recalled to active service
Recipient of Distinguished Teaching Award

Anthropology / 101

Humphrey / 101

Application of Quantitative and Computer Methods to Anthropology

Note: See also 196A, above.

190A. Quantitative Methods in Anthropology I. (5) Three hours of lecture and three hours of laboratory per week. Prerequisites: 193 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. (3) Must be taken on a passed/not passed 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

193B. Advanced Computer Techniques. (1-6) New course. May be repeated with consent of instructor. Must be taken on a passed/not passed or satisfactory/unsatisfactory basis. One 1-hour lecture and one 3-hour lab per week. Prerequisites: 193 or equivalent and consent of instructor: Advanced computer methods of practical interest to anthropologists and other social scientists. Topics include: file management utilities (searching, sorting, editing), text editing and formatting, shell script programming, database design and use, and electronic communications. (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 group tutorial per week. Prerequisites: Consent of instructor. Undergraduate research by small groups. Enrollment is restricted by regulations governing 198 courses.

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

Graduate Courses and Seminars

Physical Anthropology

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

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.

206. Fossil Hominids. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. (F) White

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

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.

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

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) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Consent of instructor. Anthropology of health 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. (215B) SP Scheperson. (215A) Hughes

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 disease: psychiatric treatment, practitioners, and institutions.

Archaeology

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

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

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 Protohistorical 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.

226. Archaeology of the Pacific. (4) New course. Course may be repeated for credit. Two hours of seminar per week. Subject matter will vary; current issues and debates in the archaeology of the Pacific, e.g., trade, exchange, colonization, maritime adaptations, etc. (F) Kirch

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

228. Method. (4) Formerly 228. Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. Various topics and issues in the methods of archaeological analysis and interpretation: style, ceramics, architectural analysis, lithic analysis, archaeozoology, etc. (SP) Kirch

229. Archaeological Research Strategies. (4) New course. Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. Various topics and approaches to the practice of archaeological research. Required course for first and second year archaeology graduate students. (F) Lightfoot, Tringham

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

Social and Cultural Anthropology

240A-240B. Fundamentals of Anthropological Theory. (5-5) 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) Potter, Nader, Staff

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

250. Seminars in Social and Cultural Anthropology. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor.

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

250B. Devancy. (4)

250C. Applied Anthropology. (4)

250D. Economic Anthropology. (4)

250E. Political Anthropology. (4)

250F. Religion. (4)

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

250H. Art and Culture. (4)

250I. Anthropology of Law. (4)

250J. Ethnological Field Methods. (4)

250K. Social Inequality. (4)

250L. Urban Anthropology. (4)

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

250N. Education and Culture. (4)

250Q. Social Interaction. (4) (SP) Berreman

250P. Social Change and Development. (4) (SP) Anderson

250S. Material Culture. (4) New course. Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. An examination of the ways in which material culture can tell us about societies. Reading on the analysis and exhibition of material culture. Each student will design an exhibition around an idea or ideas using material to be found in the Lowie Museum of Anthropology. Successful design may result in an exhibition. The seminar is interdisciplinary. (SP) Benedict

250T. Tribal Societies. (4) New course. One 2-hour graduate seminar per week. Prerequisites: Consent of instructor. The comparative study of small-scale, kin based, nonstratified foraging and horticultural societies, with attention to anthropological theories about them, images of them past and present, and policies toward them that have been implemented or advocated. (F) Berreman

250X. Special Topics. (4) (F,SP) Shack, Org. Hammei; Simmons, Staff

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

Folklore

250. 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.

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) (F) Gumperz

270C. Language Variation. (4)

270E. Formal Ethnography. (4) (F) Berlin

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

270G. Color Categories. (4)

270H. Ethnolinguistics. (4)

270J. Decision Making. (4)

270K. Special Topics in Linguistic Anthropology. (4) (SP) Berlin; 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)
280D. China. (4)
280E. Japan. (4)
280F. Southeast Asia. (4) (SP: Phillips)
280G. Oceania. (4)
280H. European Society. (4)
280I. United States Culture and Society. (4) (SP: Potter)

280J. South American Ethnology. (4)
280X. Special Topics in Area Studies. (4) (F: Brandes; SP: Nader)

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 graduates prior to their advancement to Ph.D. candidacy. (F) (SP: Philips)

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 practicum and seminar in quantitative and qualitative data analysis and computing.

293A. 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 credit for every four hours of work in the field. (F, SP)

293B. 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

293C. Directed Reading. (1-8) Course may be repeated for credit. One to eight hours of conference per week. Prerequisites: Consent of instructor. Variable field research per week. Prerequisites: Consent of Instructor. Practice in original field research under staff supervision. One unit credit for every four hours of work in the field. (F, SP) Staff

293D. Directed Research. (1-12) Course may be repeated for credit. Two to eight hours of conference per week. Prerequisites: Consent of instructor. Individual conferences to provide supervision in the preparation of an original research paper or dissertation. (F, SP)

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. Individual study in consultation with 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 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 12 hours of seminar per week. Group consultation with instructor. Supervised training with instructor on teaching under-graduates. (F, SP) Staff

Interdepartmental Studies Courses

Graduate Courses

IDS 215. Faunal Analysis in Archaeology. (4) One 4-hour lecture, 1 hour of discussion, and two 5-hour laboratories per week. Prerequisites: Integrative Biology, 184, 184L or a course in comparative anatomy. Introduction of systemsatics of animals commonly found 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 Integrative Biology. (SP)

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 current research in paleoanthropology and related subjects. Integrative Biology.

IDS 235. Modernity: Nietzsche, Weber, Heidegger and Foucault. (3) Formerly IDS 183. Two hours of seminar per week. Prerequisites: Consent of instructor. A seminar course devoted to consideration of current research in paleoanthropology and related subjects. Integrative Biology.

Architecture (College of Environmental Design)

Department Office: 232 Wurster Hall, 642-4842 Chair: (To be announced)

Professors:

Christopher Alexander, Ph.D. Harvard University.
Architectural design, urbanism

Edward A. Arens, Ph.D. University of Edinburgh. Building technology, energy.

Richard Bender, M.Arch. Harvard University. Architectural design, building technology.

Sam Davis, M.E.D., F.A.I.A. Yale University. Architectural design

Margaret F. Dhaemers (d’Hamer), M.A., M.F.A. California College of Arts and Crafts, Mills College. Photography, W. Russell Elle, Jr., Ph.D. University of California at Los Angeles. Social factors in design

Norma D. Evenson, Ph.D. Yale University. Architectural art history

Sanford Hirshen, A.B., F.A.I.A. California Architectural Foundation.

Gary R. Brown, M.Arch. Harvard University. Architectural design

Melisa C. Caggiano, M.A. University of California at Berkeley. Architectural design, art history

Raymond Litchén, M.S., M.A. Columbia University. Architectural design, environmental science

Lars G. Lenn, M.Arch. Harvard University. Architectural design, semiotics

Jean-Pierre Pratz, Dipl. Arch, E.P.U.L. Universite de Lausanne, Switzerland. Design theory and methods

Horst W.J. Rittel, University of California at Berkeley. Architectural design, urbanism

Daniel Solomon, M.Arch. University of California at Berkeley. Architectural design, urbanism

McLaren Trew, M.Arch. University of California at Berkeley. Architectural design, urbanism

Sim H. Van der Ryn, B.Arch. University of Michigan. Architectural design, urbanism

E. Richard L. Meier, Ph.D. University of California at Berkeley. Architectural design, urbanism

Tertius G. Van der Ryn, B.Arch. University of Michigan. Architectural design, urbanism

Tertius G. Van der Ryn, B.Arch. University of Michigan. Architectural design, urbanism

Tertius G. Van der Ryn, B.Arch. University of Michigan. Architectural design, urbanism

Tertius G. Van der Ryn, B.Arch. University of Michigan. Architectural design, urbanism

Tertius G. Van der Ryn, B.Arch. University of Michigan. Architectural design, urbanism

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Graduate 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 two years of course work in study areas ranging over a diversity of subjects. These may include mathematics, physics, engineering, courses in design, graphics and architectural history, in courses 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.

On leave

On leave, spring

On leave, fall

Recipient of Distinguished Teaching Award

Michael A. Goodman, M.A., F.A.I.A. (Emeritus) University of California at Berkeley

Sam V. Hassid, Ph.D., F.A.I.A. (Emeritus) Harvard University

James L. Prestini, B.S. (Emeritus) Yale University


Ivan Nacher, (Emeritus) Chicago Institute of Design, Architecture


Cranbrook Academy of Art

Herwin Schafer, Ph.D. (Emeritus) Harvard University

Karl V. Lange, B.S. (Emeritus) Oregon State University

Harold A. Stump, A.B. (Emeritus)

Associate Professors:

Charles Benton, M.Arch. Massachusetts Institute of Technology. Building technology

Jean-Paul Blaud, D.P.L. G., M.Arch. École des Beaux Arts, Versailles; University of Illinois. Architectural design, history

Gary R. Brown, M.Arch. Harvard University. Architectural art history

Mary C. Comerio, M.Arch., M.S.W. Washington University. Community design, building economics

Gary Schaller, Ph.D. University of California at Berkeley. Building technology

Muriel Smith, M.Arch. University of California at Berkeley. Computers and design

Jill Stoner, M.Arch. University of Pennsylvania. Architectural design

Adjunct Assistant Professor:

Nezar AlSayyad, Ph.D. University of California at Berkeley. Architectural design

Creating livable environments means balancing community, social, political, economic, and technical requirements with human needs. Understanding these components and the methods of interpreting and ultimately resolving conflicting forces is the major objective of our educational endeavor. To respond to this challenge, faculty members within Architecture represent a variety of scholarly and professional backgrounds and interests.

Although ability in building design is often considered to be the goal of our educational system, our graduate program deals with how people can affect environments and manage human, financial, and natural resources in the creation of that environment is our major emphasis. Many students follow programs in environmental history, behavioral science, resource management, and design theory. Problem identification and formulation and the reconciliation of technical, aesthetic, and cultural concerns are pursued 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 two years of course work in study areas ranging over a diversity of subjects. These may include mathematics, physics, engineering, courses in design, graphics and architectural history, in courses of architecture as a profession and finally, in the social sciences and humanities.
Master of Architecture. The professional degree, Master of Architecture, will be awarded to students who successfully complete a program of study of from one to three years’ duration depending upon previous education and experience. The department makes no restriction as to undergraduate preparation. However, the length of the required residence period, the number of required semester units, and the specific list of required courses may vary depending upon undergraduate major, professional, and personal work experience, and previous graduate study, if any.

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 M. Arch. degree takes three academic years and requires the completion of at least 72 units during that period of residence. Students who hold a B.A. or B.S. degree with a major in architecture may receive up to one year of advanced standing. The Graduate Studies Committee of the department will determine the specific amount of advanced standing individually for each student at the time she or he first registers for graduate study in the department. Students entering the first year M. Arch. programs are available to persons holding the five-year, professional undergraduate degree, Bachelor of Architecture, from an accredited school, or comparable five-year degrees from foreign universities and technical institutes.

Doctor of Philosophy Degree In Architecture. The Doctor of Philosophy in Architecture program is open to exceptionally qualified persons 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 A 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 secretary.

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 involved with visual inquiry in the area of graphics may apply.

The present degree is offered under Plan 1 of the Graduate Division, which requires 20 semester units plus a thesis. The length of time required for completion of the degree varies with individual, depending upon previous preparation. An undergraduate degree from the College of Environmental Design or in an art-related field is helpful but not necessary. The principal emphasis in the admission process is on the portfolio which all applicants for admission to the graduate program must submit.

For additional information please consult the Announcement of the College of Environmental Design or the graduate secretary.

Joint Program with the Department of City and Regional Planning. Two departments offer a joint program for exceptionally qualified students who hold the five-year Bachelor of Architecture degree, or its equivalent. After a minimum of two semesters of individual, dependent, part-time study, and three semesters and 36 units in the Department of City and Regional Planning, the candidate may receive both the M. Arch. and the M.C.P. degrees. Students should seek admission to the Department of Architecture and indicate on their application that they wish to be considered for the joint program.

Joint Program with the Division of Structural Engineering. Students with an interest in structural mechanics and the Department of Architecture. These 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 allowed to cross-credit some units of electives from each degree. Credit earned from the other department will only be applied to a saving in time enrolled, varying from one semester to one year (depending on undergraduate preparation.) Some engineering courses are prerequisite to entering the program or may be taken during the first year of enrollment without credit toward the minimum course requirements. Applicants should seek admission to the Department of Architecture (M. Arch. Program) and indicate on their application interest in the joint program.

Architecture

Architectural Design

100A-100B. Fundamentals of Architectural Design. (5.5) Forty-five hours of lecture/seminar and 75 hours of studio/tutorial per semester. Prerequisites: ED 11A-11B. Must be taken in sequence. Introductory courses in the design of buildings. Problems emphasize the major social, technological and environmental determinants.

100A focuses on the design process, social factors and site planning. (FSP) Staff

100B stresses structures, materials, and energy considerations. Studio work is supplemented by lectures, discussions, and project trips. (FSP) Staff

101. Case Studies in Architecture. (5) Course may be repeated for credit as topic varies. Forty-five hours 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 project trips. (FSP) 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, and project trips. (FSP) Staff

105. Community Design Studio. (5) Forty-five hours of 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.

200A-200B. Fundamentals of Architectural Design. (7.7) 200A must be taken on a satisfactory/unsatisfactory basis. Sixty hours of lecture/seminar and 120 hours of studio/tutorial are required. The basic introductory course in architectural design and theories 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. (FSP) 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, and project trips. (FSP) Staff

202. Final Project in Architectural Design. (5) Forty-five hours of lecture/seminar and 75 hours of studio/tutorial per semester. Prerequisites: Three sections of 201; 209 Thesis section. Course must be taken in last semester of residence for M. Arch degree. Each section deals with specific topics such as urban design, design development, enerary issues, or with individual student-initiated problems. Projects in 202 frequently are presented in the form of a professional report or a thesis. (SP) Staff

208. Seminar in Structural, Mechanical, and Electrical Systems Design in Buildings. Students who have taken a corresponding section of 209 may not receive credit for 208. Fifteen hours of lecture/seminar per week per unit per semester. Prerequisites: Second or third year graduate standing. Seminar on structural, electrical, and mechanical systems pertaining to the student's current graduate design studio project.

209A. Structural Systems Design. (2) Thirty hours lecture per week. (SP)

209B. Mechanical System Design. (1) (SP)

209C. Electrical System Design. (1) (SP)

209. Seminar in Architectural Design. (1-4) May be repeated for credit as topics change. Fifteen hours of lecture/seminar per unit per semester. Prerequisites: Second or third year graduate standing. Topics deal with major problems and current issues in architectural design. (FSP)

209A. Seminar in Architectural Theory.

209B. Seminar in Architectural Criticism.

209C. Current Issues in Architecture.

209X. Special Topics: Architectural Design.

Social and Cultural Factors in Design

110. Social and Cultural Factors in Design. (3) Forty hours lecture and 20 hours of discussion per semester. A survey of the relations between social functions and architectural design, with respect to individuals, groups, families, neighborhoods, and organizations. (F) Cranz

210. Advanced Study in Social and Cultural Factors in Design. (3) Forty-five hours of lecture/seminar per semester. Prerequisites: 110 or consent of instructor. Study of relationships between social and institutional functions and environments. (F)

211. Social and Cultural Factors in Design: Research Methods. (2) Course may be repeated for credit. Thirty hours of lecture/seminar per semester. Required for doctoral students and recommended for Master’s students not in the area of Social and Cultural Factors in Design. (FSP)

219. Seminar on Social and Cultural Bases of Design. (1-4) Course may be repeated for credit as topics change. Fifteen hours of lecture/seminar per unit per semester. Prerequisites: 210 or consent of instructor. Selected topics such as social policy and building form, environments for special populations, for birth and death, social form and housing form, personal and societal values in design, participatory design and urban parks. For current section offerings see departmental announcement. (FSP) 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 of lecture and 20 hours of discussion per semester. Architec, owner, developer, contractor relations, contract documents, and the ethics of the profession. (F)
122. 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
129. Seminar in the Practice of Design. (1-4) Course may be repeated for credit when topics differ. Fifteen hours of lecture/seminar per unit per semester.
129A. Housing Design Seminar.
129B. Written and Graphic Skills for Designers. \[36x731\]
129X. Special Topics in the Practice of Design.
220. Advanced Study in the Practice of Design. (3) Course may be repeated for credit. Forty-five hours of lecture/seminar per semester. Prerequisites: 120 or 122 or consent of instructor. Professional practice, its organization, methods, and problems.
222. Advanced Study in Community Development. (2) 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. (6) Thirty hours of lecture/seminar and 135 hours of internship per semester. Prerequisites: 120; undergraduates seniors need consent of instructor. An intensive and structured exposure to the professional practice of architecture utilizing the resources of a practicing architect's offices as the laboratory.
229. Seminar on the Practice of Design. (1-4) Course may be repeated for credit as topic changes. Students who have taken corresponding section of 229 may not receive credit for 229. Fifteen hours of lecture/seminar per unit per semester. Prerequisites: Designated sections of 129, 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
229A. Advanced Project Development Analysis.
229B. Architectural Practice: Construction Document Phase.
229C. Architectural Practice: Construction Phase.
229D. Construction Management.
229E. Cost Estimation.
229F. Introduction to Construction Law.
229G. On the Profession of Architecture.
229H. Problems and Opportunities in Architecture.
229L. Professional Writing.
229N. Case Studies in Design.
229X. Special Topics in the Practice of Design.

Design Theories and Methods

130. Introduction to Design Theories and Methods. (3) Sixty hours of lecture and 20 hours of discussion per semester. Comparison and discussion of the theories of environmental design and development and testing of various methods, tools, and techniques available for environmental designers. Particular emphasis lies on the difficulties of environmental design and related fields. (F,SP) Rittel, Protzen
130A. Introduction to Design Theories and Methods. (1) Fifteen hours of lecture per semester. Prerequisites: 130A. An introduction to the use of microcomputers in design, this course surveys existing software packages which lend themselves to design application or have been specifically developed for such applications. The use of 8080 (8085) microcomputer and the software will be discussed. (F,SP) Rittel, Smith
132. Computer Applications in Architecture. (3) Two 11-hour lectures and one hour of laboratory per week. Prerequisites: IDS 110 or equivalent. Survey of application of computers in the architectural profession. Topics include 2D/3D computer-aided design, architectural databases, computer analysis and models, and impact on the profession. Final grade is based on homework and programming assignments, midterm project, and final exam. (F,SP) Smith
135. Project Development: Analysis, Strategy, Financing. (2) Two 1-hour lectures per week. Prerequisites: 100A-100B and senior standing. Introduction to the property development process with a focus on techniques for determining the economic viability of a project; the influence of financing on design and development decisions. (F,SP) Staff
139. Seminar in Design Theories and Methods. (1-4) Course may be repeated for credit when topics change. Fifteen hours of lecture/seminar per unit per semester. Prerequisites: 130.
139X. Special Topics: Design Theories and Methods.
230. Advanced Design Theories and Methods. (3) Forty-five hours of lecture/seminar per semester. Prerequisites: 130A or consent of instructor. Design and planning methods, their theoretical foundations and practical applications. (SP) Rittel
231. Research Methods for Design. (2) Thirty hours of lecture/seminar per semester. Methods of scientific research and the use of research in design. Required for doctoral students in the area of Design Theories and Methods. (F) Prozen
239. Seminar: Design Theories and Methods. (1-4) Course may be repeated for credit as topic changes. Fifteen hours of lecture/seminar per unit per semester. Prerequisites: 130 or consent of instructor. (F,SP) Prozen, Rittel
239A. Design and Computers.
239B. Environmental Models and Model Environments.
239C. Ethics of Design.
239D. Logics of Design.
239E. Mathematical Models of Design.
239F. Planning and Design of Infrastructure.
239G. Spatial Configurations.
239H. The Knowledge of the Designer.
239X. Special Topics: Design Theories and Methods.

Building Environments

140. Introduction to Energy and Environmental Management. (4) Fifty hours of lecture and 30 hours of discussion per semester. Prerequisites: Physics or equivalent, or consent of instructor: Study of the thermal and lighting environments in buildings, with emphasis on quantitative design techniques. (F,SP) Benton, Arens
140A. Appropriate Technology.
140B. Artificial Lighting.
140C. Daylighting.
140D. Heating, Ventilating, and Air Conditioning Systems.
140E. Solar Heating.
140X. Special Topics: The Physical Environment in Buildings.
240A-240B. Advanced Study of Energy and Environmental Issues in Design. (3) Forty-five hours of lecture/seminar per semester. Prerequisites: 140 or consent of instructor. The first part of this course covers thermal and solar design, the second lighting design. (F,SP) Staff
241. Research Methods in Building Sciences. (2) Course may be repeated for credit. Thirty hours of lecture/ seminar per week. Prerequisites: PH.D. student in area of environmental physics. Required for doctoral students in the area of environmental physics. (F,SP) Arens

149. Seminar on the Physical Environment in Buildings. (1-4) Course may be repeated for credit as topic changes. Fifteen hours of lecture/seminar per unit per semester. Prerequisites: 140. Selected topics such as climatic design, mechanical systems, natural lighting, artificial lighting, acoustics. For current section offerings see departmental announcement. (F,SP) Arens, Staff
149A. Appropriate Technology.
149B. Artificial Lighting.
149C. Daylighting.
149D. Natural Lighting.
149E. Occupant Response.
149F. Solar Technology.
149X. 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. (F,SP) Staff
150A. Introduction to Structures. (3) Thirty hours of lecture and 30 hours of discussion per semester. Study of typical building subsystems, types of construction, choice of materials and details of design. (F) Langenbach
150B. Artificial Lighting.
150C. Daylighting.
150D. Heating, Ventilating, and Air Conditioning Systems.
150E. Solar Heating.
150X. Special Topics: The Physical Environment in Buildings.
240A-240B. Advanced Study of Energy and Environmental Issues in Design. (3) Forty-five hours of lecture/seminar per semester. Prerequisites: 140 or consent of instructor: The first part of this course covers thermal and solar design, the second lighting design. (F,SP) Staff
241. Research Methods in Building Sciences. (2) Course may be repeated for credit. Thirty hours of lecture/ seminar per week. Prerequisites: PH.D. student in area of environmental physics. Required for doctoral students in the area of environmental physics. (F,SP) Arens

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.
159X. Special Topics: Structures and Construction.
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; emphasis on experience gained from recorded earthquakes. Seismic risk concepts and design considerations based on studies of laterally stable building forms. Urban technology of earthquake hazards mitigation. (SP) Lagorio

259A. Construction and Geologic Hazards. (SP) Staff

259B. Experimental Structures. (SP) Staff

259C. Materials and Specifications. (SP) Staff

259D. Preservation and Conservation: Theory. (SP) Staff

259E. Preservation and Conservation: Implementation. (SP) Staff

259X. Special Topics: Structures and Construction.

History of Architecture

170A-170B. An Historical Survey of Architecture and Urbanism. (4-4) Forty-five hours of lecture and 15 hours of seminar/discussion per semester. The first part of this sequence studies the ancient and medieval periods; the second part studies the period since 1400; the aim is to look at architecture and urbanism in their social and historical context. (F,SP) Tobriner, Upton

171. 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) 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 and consent of instructor. (SP) Kostof

173A. Modern Architecture. (3) Formerly 178, sec. 3; 174; and 179C. Forty-five hours of lecture per semester. Prerequisites: 170A-170B and consent of instructor. (SP) Evenson

173B. Baroque Architecture. (3) Formerly 178, sec. 4; and 178C. 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. (F) Upton

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

174C. San Francisco Architecture. (3) Formerly 179, sec. 4. Forty-five hours of lecture/seminar per semester. Prerequisites: 170A-170B and consent of instructor. (SP) Tobriner

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) Tobriner

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 178. Course may be repeated for credit. Prerequisites: 170A-170B and consent of instructor. (F) Staff

179. Pre-Modern 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 announcements. (F,SP) Staff

271. Methods of Historical Research and Criticism in Architecture. (4) Sixty hours of lecture/seminar per semester. Prerequisites: Doctoral candidate or consent of instructor. (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: 170A-170B or consent of instructor. Selected topics in architectural theory, urban design, Renaissance-Baroque architecture, American architecture, modern architecture. For current section offerings see departmental announcements. (F,SP) Tobriner

279A. African Architecture. (SP) Staff

279B. Asian Architecture. (SP) Staff

279C. California Architecture. (SP) Staff

279D. History of Housing. (SP) Staff

279E. Mesoamerican Architecture. (SP) Staff

279F. Modern Architecture. (SP) Staff

279G. San Francisco Architecture. (SP) Staff

279H. Urban Design. (SP) Staff

279J. Victorian Architecture. (SP) Staff

279L. Renaissance-Baroque Architecture. (SP) Staff

279X. Special Topics: Architectural History.

Special Studies Courses

198. Special Group Study. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Studies developed to meet needs. (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. Enrollment is restricted by regulations listed on pages 87 and 88 of this catalog. Studies developed to meet individual needs. (F,SP) Staff

298. Special Group Study. (1-4) Course may be repeated for credit. May be taken for credit or for credit for more than 4 units are allowed in any one semester. Sections 1-3 will be offered on a satisfactory/unsatisfactory basis only; sections 4-10 must be taken for a letter grade. Special group studies on topics to be introduced by instructor or students. (F,SP) Staff

299. Individual Study and Research for Master's and Doctoral Students. (1-9) Course may be repeated for credit. Individual studies including reading and individual research under the supervision of a faculty advisor and designed to reinforce the student's background in areas related to the proposed dissertation topic. (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 for the Ph.D. This course may not be used for units or residence requirements for the doctoral degree. (F,SP) Staff

Professional Courses

381. Seminar for Graduate Student Instructors in Social and Cultural Factors in Design. (1-2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Fifteen hours of seminar/discussion per unit per semester. Required course for all graduate student instructors in this area. (F,SP)

382. Seminar for Graduate Student Instructors in Practice of Design. (1-2) Course may be repeated twice for credit. Must be taken on a satisfactory/unsatisfactory basis. Fifteen hours of seminar/discussion per unit per semester. Required course for all graduate student instructors in this area. (F,SP)

383. Seminar for Graduate Student Instructors in Design Theories and Methods. (1-2) Course may be repeated twice for credit. Must be taken on a satisfactory/unsatisfactory basis. Fifteen hours of seminar/discussion per unit per semester. Required course for all graduate student instructors in this area. (F,SP)

384. Seminar for Graduate Student Instructors in Building Environments. (1-2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Fifteen hours of seminar/discussion per unit per semester. Required course for all graduate student instructors in this area. (F,SP)

385. Seminar for Graduate Student Instructors in Structures and Construction. (1-2) Course may be repeated twice for credit. Must be taken on a satisfactory/unsatisfactory basis. Fifteen hours of seminar/discussion per unit per semester. Required course for all graduate student instructors in this area. (F,SP)

Interdepartmental Studies Courses

IDS 235. Community Scale Energy Systems. (3) Two 1 1/2-hour lectures/discussions 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 construction 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.

Visual Studies

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

181. Introduction to Photography. (4) Thirty hours lecture and 75 hours studio per semester. Assignments testing standard materials, equipment, and processes for optimum performance resulting in a completed portfolio. Preference will be given to students in the College of Environmental Design. (F,SP) Dhaebers, Staff

185. Selected Topics: Word and Image. (1-4) Course may be repeated for credit as topic changes. Fifteen hours of lecture/seminar per unit per semester. Prerequisite: ED 11A-11B. (F,SP) Staff

185A. Typography.

185X. Special Topics: Word and Image.

186. Selected Topics in Photography. (1-4) Course may be repeated for credit as topic changes. Fifteen hours of lecture/seminar or 90 hours of studio/lab per unit per semester. Prerequisites: VS 181. For current section offerings see departmental announcements. (F,SP) Dhaebers, Staff

186A. Documentary Photography.

186B. Light and Motion Studies.

186C. Photography as an Art Form.

186X. Special Topics: Photography.
Art and History of Art
(College of Letters and Science)

Practice of Art
Department Office: 236 Kroeger Hall, 642-2582
Chair: Christopher G. Brown, M.F.A.

Professors:
Boyd G. Allen, M.A.
Joan V. Brown, M.F.A.
Robert L. Hartman, M.A.
Sylvia Lark, M.F.A.
James F. Melchert, M.F.A.
George J. Miyasaki, M.F.A.
David W. Simpson, M.A.
Brian A. Wall
Elmer N. Bischoff, M.A. (Emeritus)
Sidney Gordin (Visiting)
John C. Haley (Emeritus)
Karl A. Kaesten, M.A. (Emeritus)
Erie Loran, M.F.A. (hon.) (Emeritus)
James A. McCoy, M.A. (Emeritus)
Felix Ruvelo (Emeritus)
Peter H. Voukous, M.F.A. (Emeritus)

Associate Professors:
Jerold G. Balaine, M.F.A.
Christopher G. Brown, M.F.A.
Anne L. Healey, M.A.
Mary L'O Neal, M.F.A.

Assistant Professor:
Richard B. Shaw, M.F.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 think to think visually.
3. To help students understand the strategies that artists have devised to deal with esthetic problems in both traditional and nontraditional methods of artmaking.
4. To help students develop a creative intelligence through practicing a visual arts discipline.

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 artworks (Art 150). An art student should be familiar with ways in which visual ideas have been manifested 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 Environmental Design), 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 four 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 final M.F.A. exhibition and summarized in a written thesis.

Further information about this program may be obtained from the Art Office, 236 Kroeger Hall.

Lower Division Courses

10. Color and Composition. (3) Two 3-hour instructional studio periods and one 3-hour open studio period per week. Introduction to drawing, composition, and color theory. Charcoal, pastel, acrylic and other media on paper. (F,SP)

12. Figure Drawing and Painting. (3) Two 3-hour instructional studio periods and one 3-hour open studio period per week. (F,SP)

14. Introduction to Sculpture. (3) Two 3-hour instructional studio periods and one 3-hour open studio period per week. Projects introduce ways of improvising with raw materials and physical space to create aesthetic 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 1/2-hour instructional periods per week. Weekly discussions will introduce students to visual thinking and to the ideas both in art and other disciplines that artists have investigated and developed in historical and contemporary times. Assigned reading and field trips will provide the basis for discussions. (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. (3) Course may be repeated for credit. Two 3-hour instructional studio periods and one 3-hour open studio period per week. Prerequisites: 10, 12, and 14 or equivalents. Inquiry into concepts of order, process, and content as related to human experience. While faculty contact with students is highly individualized, the course involves group critiques and lectures as well as assigned field trips.

A. Mr. Hartman
B. Mr. Allen
C. Mr. Miyasaki
D. Mr. Simpson
E. Mr. Ballaine
F. Ms. Brown
G. Ms. O'Neal
H. Ms. Lark
I. Mr. Brown
V. Visitor(s) (F,SP)

116. Materials and Processes of Painting. (3) Course may be repeated for credit. Two 3-hour instructional studio periods and one 3-hour open studio period per week. Prerequisites: 10, 12, 14 or equivalents. Inquiry into concepts of order, process, and content as related to human experience. While faculty contact with students is highly individualized, the course involves group critiques and lectures as well as assigned field trips.

A. Mr. Hartman
B. Mr. Allen
C. Mr. Miyasaki
D. Mr. Simpson
E. Mr. Ballaine
F. Ms. Brown
G. Ms. O'Neal
H. Ms. Lark
I. Mr. Brown
V. Visitor(s) (F,SP)

117. Drawing and Composition. (3) Course may be repeated for credit. Two 3-hour instructional studio periods and one 3-hour open studio period per week. Prerequisites: 10, 12, 14 or equivalents. Traditional and contemporary methods and materials used in painting. This course extends the student's knowledge of the elements of art, i.e., their composition, potentialities, and limitations, and the techniques employed in the use of these materials. (F)

126. Special Group Study. (1-4) No more than 4 units to regulations listed on pages 87 and 88 of this catalog. (F,SP)
118. Figure Drawing. (3) Course may be repeated for credit. Two 3-hour instructional studio periods and one 3-hour open studio period per week. Prerequisites: 10, 12, and 14 or equivalents. Emphasis on the human figure and space, light, and color. Various mediums. Art 117 or 118 is required of all art majors. (F,SP)

120. Intaglio. (3) Course may be repeated for credit. Two 3-hour instructional studio periods and one 3-hour open studio period per week. Prerequisites: 10, 12 and 14 or equivalents. Etching, drypoint, aquatint, color printing, and the monotype as well as photoetching will be explored. The development of ideas and concepts conditioned and enhanced by this medium will be emphasized and discussed in group and individual critiques. (F,SP)

122. Lithography. (3) Course may be repeated for credit. Two 3-hour instructional studio periods and one 3-hour open studio period per week. Prerequisites: 10, 12 and 14 or equivalents. Theoretical and practical discussion of related outside materials. (F,SP)

124. Advanced Projects in Printmaking. (3) Course may be repeated for credit. Two 3-hour instructional studio periods and one 3-hour open studio period per week. Prerequisites: 10, 12, 14, plus 6 units of either 108 or 122. Nontraditional projects in printmaking. (SP)

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

131. Cast Metal Sculpture. (3) Course may be repeated for credit. Two 3-hour instructional studio periods and one 3-hour open studio period per week. Prerequisites: 10, 12 and 14 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 media for enriching surfaces. (SP)

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

138. Environmental Sculpture and Sitel Work. (3) Course may be repeated for credit. Two 3-hour instructional studio periods and one 3-hour open studio period per week. Prerequisites: 10, 12 and 14 or equivalents. Students will learn how to use 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 media for enriching surfaces. (SP)

216. 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, critics, and other art professionals. The scheduled weekly seminar will provide a forum for addressing issues raised in these presentations. (F,SP)

218. Seminar: Theory and Criticism. (3) Course may be repeated for credit. One 3-hour period per week. Prerequisites: Graduate standing and consent of instructor. Weekly meetings will provide a forum for discussion of issues relevant to assignments in the fields of aesthetics, theory, and art criticism. (F,SP)

219. Independent Study. (3) Course may be repeated for credit. Times to be arranged with instructor. Prerequisites: Graduate standing and consent of instructor. Individual projects by first year students with one instructor of his/her choice. (F,SP)

224. Seminar for M.F.A. Students. (3) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 3-hour meeting per week. 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)

229. 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: 405 Doe Library, 642-5510
Chair: Andrew F. Stewart

Professors:
- Elizabeth A. Bailey, Ph.D. Harvard University. 17th- and 18th-century art and the northern tradition
- William 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 C. Clark, Ph.D. London University. Modern art
- Matthew Eakin, Ph.D. Columbia University. Late Gothic, Northern Renaissance art
- Loren Partridge, Ph.D. Harvard University. Italian Renaissance art
- Andrew F. Stewart, Ph.D. Cambridge University. Greek and Roman art
- Joanna Williams, Ph.D. Harvard University. Indian and South Asian art
- David H. Wright, Ph.D. Harvard University. First Millennium A.D.

Assistant Professors:
- Jean V. Bony, Agrege (Emeritus) University de Paris. Early 20th-century European art
- Carol Armstrong, Ph.D. Princeton University. Late Byzantine art
- Peter H. Selz, Ph.D. Various art
- Liz Sussman, Ph.D. University of Michigan. Medieval and contemporary art

Associate Professors:
- Harvey Stahl, Ph.D. New York University. Institute of Fine Arts, Romanesque, Gothic, Later Byzantine art
- Anne K. Wagner, Ph.D. Harvard University. Modern art

Assistant Professors:
- Carol Armstrong, Ph.D. Princeton University. Late Byzantine art
- L.D. Ettlinger, D.Phil. (Hon.) University of Halle. Medieval and contemporary art
- Margaretta Lovell, Ph.D. Yale University. American and English art
The major provides a thorough education in the history of the visual arts in all major periods of western and Asian culture as well as the opportunity to do specialized study in areas of the student's choice. Fundamentally a humanistic inquiry and often multidisciplinary in approach, the program prepares students with essential training in those perceptual and historical, research and critical skills needed for many professions. Majors frequently go on to careers in business, 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. One course in 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, Asian (130s), Ancient (140s), and Modern (10A; Ancient to Medieval, and 10B: Renaissance to Modern); 5. One upper division course in another area of intellectual inquiry or academic specialization; 6. One upper division course in research or a supervised guided reading in modern art, museum practice, art conservation, art history, or an interdisciplinary field; 7. Three upper division courses, one of which must be in the History of Art Department; the others may be chosen 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, Psychology; 8. 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 into the 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 contrasting academic work under faculty supervision. The first semester is usually a seminar, directed research, or an 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 the degree Bachelor of Arts, 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 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 (152). All courses must be taken for a letter grade. A general 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 one major minor program, the M.A., 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 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 interests and 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; those who wish to address their purpose in doctoral study, but need not specify a particular field. Applicants to the M.A. or M.A./M.L.I.S. 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 specify the fields and subjects they intend to study and the kind of interdisciplinary curriculum they propose for themselves at Berkeley. These applicants may wish to contact the chair or graduate adviser before applying in order to discuss the feasibility of their proposed study.

3. **Languages.** Because all students are expected to enroll in research courses in their first semester, proficiency in two languages will be necessary upon entry into any program of study in the History of Art. The specific languages necessary will vary according to the field of study (see below, Languages).

4. **Length of Program.** Full-time students of western art who enter with the necessary language preparation are expected to complete the M.A. degree requirements in two years. Students in the concurrent M.A./M.L.I.S. program will require three years.

Normative time for students of Classical and Asian art may be longer because of specialized language requirements.

**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 plus a third course in another of these areas.

2. **Course work.** Ten courses selected to fulfill breadth requirements above (if applicable) plus a research seminar at the graduate level. Of the five, three research seminars are required. One course may be taken in connection with teaching (History of Art 300B) and another leading to the M.A. thesis (History of Art 601). The remaining electives are the seminar, upper division courses, or additional graduate seminars in the History of Art or related fields, or special study involving a significant topic involving a substantial portion of the student's major. Special study courses may permit students to address specific career and interdisciplinary interests and may involve study off campus, such as in an internship or special seminar.

3. **Languages.** Two are required. At the time of admission students are expected to have at least a proficient reading knowledge of one language and a good start on the second (the requirement for which is 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 20 pages, that demonstrates the student's knowledge of the field and ability to engage in independent research and bibliography. It should demonstrate scholarly competence in the investigation of a limited problem. The qualifying paper must be read and approved by three regular faculty members. Applicants may write a brief report on its strengths and weaknesses for the student's file. If the qualifying paper is to serve as a thesis for the M.A. degree, it must be Defense and approved in accordance with the regulations of the Graduate Division and be approved by a committee of three readers, including one faculty member from another department. Students enrolled in the M.A./Ph.D. program who have completed the qualifying paper (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 exhibition catalog of comparable intellectual breadth and scope. M.A. students with interdisciplinary interests may elect to do a special paper. The proposal for the special paper should be submitted in accordance with the regulations of the Graduate Division.

5. **M.A./M.L.I.S. Program.** The History of Art component of this concurrent degree program is nearly identical to the regular M.A. program except that one less 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 most of the History of Art requirements. It is recommended, however, that a special bibliography course (L 299) be taken concurrently with the second or third seminar in the History of Art, in the third or fourth seminar. If the remainder of their librarianship requirements for a total of 28 units. These library service courses are chosen in consultation with the faculty of the School of Library and Information Studies, but must include Cataloguing and Classification (L 210) and one 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 264), or College and University Libraries (L 253). Two library service courses may be combined in the History of Art collections: Organization of Non-Book Materials (L 211) in the slide and photographic archive, and Evaluation of Reference Services (L 257) in the Art History/Classics Graduate Services.

**Ph.D. Degree Requirements**

1. **Admission.** (a) Students already in the M.A./Ph.D. program at Berkeley. Students in post-classical

2. **On leave, spring

3. **Recalled to active service

4. **Recipient of Distinguished Teaching Award

*Not offered 1989-90

*On leave, spring

*Recalled to active service

*Recipient of Distinguished Teaching Award
western art can petition, usually at the end of their fourth semester of enrollment, and those in Classical 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 at other institutions may petition for admission from other fields. The M.A. thesis should be submitted with the application for admission. Students who expect to complete their thesis after the application deadline should consult their advisor or the Research Office. The M.A. thesis is submitted to the Graduate Division on the application for admission and then the thesis as soon as it is completed; final action on the application, however, cannot be taken until the thesis is received. For students entering in the fall, the M.A. without a thesis, submission of two substantial research papers is required. After one year of coursework, including two research seminars and other courses with regular faculty, the guidance committee in consultation with the department will recommend 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. Before the end of the first year of coursework in which the student has successfully petitioned to proceed to the Ph.D. program, a guidance committee consisting of at least two members from the History of Art faculty with additional members from inside or outside the department is convened to discuss and map out a plan of study. This committee, nominated by and appointed for each student, determines requirements in the student's areas of interest, such as art history, theory, literature, and further language study. The requirements normally include courses and seminars and extensive independent reading and 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. Language requirements 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 and Colloquium. 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 for approval (to which the student's other examiners for the qualifying exams may be added). This is followed by oral defense and may take place between one and four months prior to the qualifying examination. At this meeting the precise scope of the qualifying examination is also discussed and determined.

5. Qualifying Examination. The examination is conducted by an interdepartmental committee nominated by and appointed by the student's department and approved by the Graduate Division on behalf of the Graduate Council. It is usually taken at the end of the student's third year of enrollment (or the beginning of the fourth year, before the beginning of field work. It consists of two or three written parts followed by an oral examination. The examination tests the student's basic knowledge of a general field, familiarity with graduates of a special area or areas within it, and the ability to integrate studies from an appropriate outside field with work in the History of Art.

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 works.

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 the Persian Invasions to the age of Alexander. In addition to close study of the major work, particular emphasis upon their cultural context and upon 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 works. (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 upon their cultural context and upon 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 works. (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 and the Fall of the Empire.

Wright

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

Wright

150B. Medieval Art. (4) Two 2-hour lectures per week. Medieval art after 1050. (F)

Wright

151. Late Antique Art. (4) Two 2-hour lectures per week. Designed 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 ninth to the fifteenth centuries with emphasis upon the evolution of painting in fresco, mosaic, and manuscript illumination and upon the influence of Byzantine art in Western Europe.

Stahl

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 upon the character and development of the Romanesque style and upon the influence of the monastic, pilgrim, and crusading movements. The elaboration of new iconographic themes and the influence of small scale precious works will receive special attention. (SP)

155B. Early Gothic Art. (4) Three hours of lecture and one hour of discussion per week. Gothic art and architecture from its origins in France about 1130 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.

Stahl

157. The Illuminated Book in Northern Europe: 13th-16th Centuries. (4) Three hours of lecture and one hour of discussion per week. Late Gothic manuscript illumination will discuss the transition from the two major regional schools in France and the Low Countries. Topics include types of illuminated books and their traditions of illustration, relations of book illumination to other media, and changing aesthetics within the medium itself.

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—and is organized topically: urbanism, fortifications, churches, chapels, palaces, villas, altarpieces, portraits, fresco decoration, tombs, public sculpture, festival decoration, etc. The work of artists is interpreted in terms of its context, iconography, function, setting, patronage, and cultural context.

160A. The 14th Century. (4)

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

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

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

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

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

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

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

181. Contemporary Art. (4) Three hours of lecture and one hour of discussion per week. Painting, sculpture and of the Symbolist and Art Nouveau period. Monuments and other works considered with involvement in architecture, draughtsmanship and artistic criticism. (SP) de Caso

182A. The Beginnings of Modernism: French Painting from 1845 to 1900. (4) Two 1½-hour lectures and one hour of section per week. The topic of this course is the history of French painting from 1846 to 1874 and the formation of the avant-garde and the formulation of the modernist aesthetic—within the social context of later nineteenth century France.

Armstrong

182B. Modernism in Europe 1900–1939. (4) Three hours of lecture and one hour of discussion per week. A survey of the international avant-gardes prior to and between the two world wars: representational and anti-representational practices and strategies in painting, sculpture and photography from Cubism to Surrealism.

Armstrong

183A. American and British Art (1550-1800) Survey I. (4) Three hours of lecture and one hour of discussion per week. Survey of the architecture, painting, and decorative arts of Colonial and early Federal periods. Focus on concepts of technology, quality, and style as it is on a chronological overview. (SP) Lovell

183B. American Art (1800-Present) Survey II. (4) Three hours of lecture and one hour of discussion per week. A survey of the major developments in architecture, decorative arts, photography and painting from Romanticism to post-modernism, focusing on the academic and vernacular traditions and introducing issues of patronage and audience. Field trips to local museums. (F) Lovell

184. American Architecture: Domestic Forms. (4) Three hours of lecture and one hour of discussion per week. A survey of domestic architecture in the United States from 1640 to 1940. Special attention will be given to the development in the Netherlandsof such genres as history painting, landscape, low-life, and notions of imitation and illusionism) of seventeenth century art in Italy, France, and Spain.

Alpers

185. 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, focusing on the evolution of the major regional schools in the Netherlands and on the major themes (e.g., religious, moral, and social) to which they are devoted. (SP) Marrow

186. German Painting, 1350-1550. (4) Three hours of lecture and one hour of discussion per week. The development of German painting in the late Middle Ages and the Early Renaissance. Major artists treated monographically (e.g., Lochner, Witz, Schongauer, Dürer, Grünewald, Altdorfer, and Cranach).

Marrow

187. 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 the kinds of meanings with which they were endowed).

Alpers

188. 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.

Alpers

189. Twentieth-Century Sculpture. (4) Three hours of lecture and one hour of discussion per week. Sculpture from Rodin to the present.

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

189B. American and Bay Area Architecture. (4) Three hours of lecture and one hour 2-hour field trip per week. The lectures will trace the major trends in the history of architecture from the colonial period to the present. In the field trips, individual buildings and the urban development of the Bay Area will be studied and related to nationwide developments.

190. Spatial Topics in Various Fields of Art History. (4) Course may be repeated for credit. Three hours of lecture and one hour of discussion per week. Topics of concern to the instructor, usually related to current research, which may fall outside of the normal curriculum or be of more restricted content than regular lecture courses. May be taken for major status or consent of the instructor. Some field trips. (F,SP) Staff

190A. Asian. (4) (SP) Graybill

190B. Ancient. (4)

190C. Medieval. (4)

190D. Renaissance-Baroque. (4) (SP) Marrow

190E. Sec. 1. Modern. (4) (SP) Marrow

190E. Sec. 2. Modern. (4) (SP) Lovell

192. Undergraduate Seminar: Problems in Research Investigation. Course may be repeated for credit. Three hours of seminar per week plus extensive outside work. Prerequisites: Primarily for juniors and seniors with major status or consent of the instructor. Concentration in Art and History of Art / 111

*Not offered 1989-90

On leave, spring, fall

On leave, fall
tration on specific problems or works in a particular area of History of Art. Assigned readings, discussion and a substantial paper. For specific topics and enrollment, see listings under 405 Doe.

192A. Asian. (4) (F,SP) Graybill, Cahill
192B. Ancient. (4) Cahill
192C. Medieval. (4) (SP) Stahl
192D. Renaissance—Baroque. (4) (F) Alpers
192E. Modern. (4) (SP) de Caso
192F. Museum Studies. (4) (F)
192G. American and British. (4) (F) Lovell

193. Directed Research. (4) Three conference hours per week and a substantial paper. Prerequisites: Consent of instructor and departmental adviser. Intended for advanced undergraduates wishing to continue research on topics already begun in a seminar or to pursue at a high level specialized topics not ordinarily covered in the curriculum. Usually results in a substantial paper. For general independent study see 199; for honors research, see H195. (F,SP) Staff

194. Museum Internship. (4) Course may be repeated for credit. Ten hours of field work per week plus conferences. Prerequisites: Approval of undergraduate advisor and department chair. 192F recommended. Study and organizational experience, usually for no less than ten hours per week, involving a specific institutional project of a curatorial nature. Jointly supervised by a member of the professional staff of the participating museum and a faculty member. Internships must ordinarily be arranged well in advance; for further information, inquire at 405 Doe. (F,SP) Staff

195. Special Study for Honors Candidates in the History of Art. (1-4) Individual conferences. Prerequisites: Senior standing and qualifying scholastic record (3.5 or above). Open to graduates who have completed a major. Directed study leading to the preparation of the honors thesis. Consult the description of Honors Program in Art History. (F,SP) Staff

196. Undergraduate Proseminar. (4) Three hours of seminar per week plus extensive outside work. Prerequisites: Junior or senior with major status or consent of instructor. A seminar intended to introduce majors to (1) the tools and methodology required for basic research in History of Art and (2) the history of the discipline and varied approaches to its study. Sign up outside 405 Doe. (F) Partridge
199. Supervised Independent Study. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual conferences. Prerequisites: Consent of instructor, major adviser and department chair. For students who have pursued an independent study program, offered in courses completed in major. Directly study leading to the preparation of the honors thesis. Consult the description of Honors Program in Art History. (F,SP) Staff

Graduate Courses

193. Graduate Courses

General prerequisites: graduate standing and consent of instructor. In the history of art and reading knowledge of languages.

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 traditional and innovative perspectives designed for candidates for higher degrees. Offerings vary from year to year. Students should consult the department's "Announcement of Courses" for offerings before the beginning of the semester. (F)

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 materials for the study of Chinese painting and give them training in carrying out research projects, bibliography in Chinese, Japanese and western lan-
guage. Sources will be treated, but the emphasis will be on materials in Chinese. Cahill

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) Cahill

231. 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. (F) Cahill

234. Seminar in Modern 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) Stahl

235. 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. (F) Wright

275. Seminar in 18th Century 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) Stewart

281. Seminar in French 19th Century 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) Baxandall

285. Seminar in Late 19th-Early 20th-Century 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) Clark

299. Seminar in American 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) Lovell

301. Individual Study for Master's Students in the History of Art. (1-12) 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 in consultation with the graduate adviser. (F,SP) Staff

302. Individual Study for Doctoral Students in the History of Art. (1-12) Units may not be used to meet either 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 doctoral degree. Individual study, in consultation with the graduate 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) Staff

Professional Courses

300. Teaching the History of Art. (1-5) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduation and concurrent appointment as a graduate student instructor. Weekly meetings with the instructor to discuss the methods and aims of the course, to plan the content and presentation of the material for the discussion sections, and to set standards and criteria for grading and commenting upon papers and exams. In addition, after visiting sections early in the semester, the instructor will discuss with each graduate student instructor individually his or her performance and make any necessary recommendations for improvement. (F,SP) Staff

University Art Museum

The University Art Museum plays an active role in teaching and research, giving students an opportunity for experience in curatorialship 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 Dwinelle Hall, 642-6555
Professors: Rutten and Nakaishi, Ph.D.
Associate Professors: Elaine H. Kim, Ph.D. L. Ling-chen Wang, M.A.
Assistant Professors: Amado Y. Cabezas, Ph.D. Sau-Ing C. Wong, Ph.D.

Lecturers: Michael A. Omi, Ph.D. Jerold H. Takahashi, Ph.D.

Undergraduate Major Advisers: Mr. Cabezas, 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 current curricula of Ethnic Studies 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; (4) 20B or 20C; (5) Ethnic Studies 20; (6) four courses related to major, offered outside of the Department of Ethnic Studies, in either the humanities or social sciences (subject to the approval of the major adviser).

Upper Division. (1) Asian American Studies 120, 145, 165, and one of the 192 courses (or Ethnic Studies 195); (2) Ethnic Studies 130; (3) Two courses in Asian American Studies; (4) Two courses in Ethnic 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 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 a grade-point average of at least 3.3 for 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 H196 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 course work 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, 190, or 192C
   d) Electives: Two courses in Asian American Studies

Lower Division Courses
1. Basic Reading and Composition. (2) Three-hour course 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 in Asian American authors; topics include ethnicity, language and communication, roles, family relationships, careers, choices, etc. Two units recorded credit but recognized as four units of workload in computing study units. (F,SP)
2A. Reading and Composition. (4) Three-hour lectures and one 1-hour tutorial per week. Prerequisites: 120, 129, or 151. 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)
2B. Reading and Composition. (4) Three-hour lectures and one 1-hour tutorial per week. Prerequisites: 120, 129, or 151. This course examines the literary works of Asian American, Afro-American, Chicano and Native American writers in their political and social contexts, focusing on similarities and differences between the experiences of ethnic minorities in the U.S. and those in Asia. This course is open to the writing of senior English majors only and is not replaceable. (F,SP)

Upper Division Courses
120. Comparative History of Asian Experience in America. (3) Two 1½-hour lectures or one 3-hour seminar per week. Prerequisites: 20A. Analysis of the similarities and dissimilarities of the experiences of Asians 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)
121. Chinese American History. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A. Historical coverage of Chinese American History from pre-Pan-Asian movement times to contemporary times; includes influence of traditional values, Eastern and Western; patterns of immigration and settlement; labor history; the influence of public policy, foreign and domestic, on the Chinese individual and community. (F,SP)
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, law and literature, and personality and culture. (SP)
123. Korean American History. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A. This course will cover the history of Korean immigration to the United States; topics include Korean immigration and settlement patterns; labor and socioeconomic history; political activities; community organization; and issues related to the contemporary population influx. (F,SP)
124. Pilipino American History. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A. This course will cover the history of Pilipino immigration to the United States; 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. (F)
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 population and resettlement in the U.S. with special focus on the effects of the war and the role of cultural traditions in the adaptation of Southeast Asians to American society. (SP)

*129. 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 cover immigration, labor, legal issues, and political and economic developments in the islands.
130. Asian American Experience and U.S. Foreign Policy. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A or consent of instructor. A historical and comparative examination of the interaction of U.S. foreign policy toward Southeast Asian countries with the development in Chinese, Pilipino, Indo-Chinese, Japanese, and Korean communities with emphasis on such issues as immigration, labor, education, and political, social, and economic developments in the islands.

3On leave, spring
4Recalled to active service
5Recipient of Distinguished Teaching Award
141. Law in the Asian American Community. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A or 20B. 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, change, 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 students with the basic understanding of the concepts relevant to the psychology of Asian American communities. 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 analyze the institutions and processes 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.

144. Language, Ethnicity and Society: Asian American 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 American children, young adults, and their parents. Interdisciplinary factors affecting the 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.

145. American Political Institutions and the Asian American Communities. (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. The course presents a range of contemporary issues to illustrate how government, ethnic background, immigration history, community structure, class, and social status and race affect the sociopolitical dynamics of the Asian American family and personality.

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 community development; U.S. formal and informal structure and underlying assumptions that permeate housing and community development policies and programs; analysis of how HUD housing and urban renewal policies have come to be employed; how community projects will be covered. May be taken with 197.

150. Asian American Family and Culture. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A or 20B. An analysis of events, forces, and movements affecting Asian women in America drawing from material in literature, history, philosophy, political science and other fields. Readings, reports, papers, and discussion.

151. Asian Women in America. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A or 20B. An analysis of events, forces, and movements affecting Asian women in America drawing from material in literature, history, philosophy, political science and other fields. Readings, reports, papers, and discussion.

152. Comparative Analysis of Asian American Communities. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A or 20B. This course will compare and contrast social organizations and institutions within Asian American communities. An analysis of the formation and development of family, ethnic, and economic organizations provides the basis for understanding the responses of Chinese, Japanese, Korean, Pilipino, and new Asian immigrants to American race relations.

172. Asian American Literature. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20B or 20C. Survey of Asian American literature and its background. Special emphasis on poetry, short stories, plays, etc. that focus on socioeconomic struggles of the Asian American community and peoples. (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 issues facing minority American and Third World writers. Interpretation of themes, symbols, language, characterization, and community portrait in literary works. Practice in forms and techniques of verse and prose writing. (F) Staff

180. Survey of Asian Immigrant Literature. (3) Course may be repeated for credit as topic changes. May be taken on a passed/not passed basis. Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: 20A or 20B or consent of instructor. Two years of Asian language or consent of instructor. Introduction to Asian American literature and other literary writings of one of 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.

192A. Seminar on Asian American History. (3) Formerly 191A. Three hours of seminar per week. Prerequisites: 120 or consent of instructor. Seminar seminar in Asian American Studies topics with topics to be announced at the beginning of each semester. (F) Staff

192B. Seminar on Asian American Communities. (3) Formerly 191B. Three hours of seminar per week. Prerequisites: 165 or 166 or consent of instructor. Students will study Asian American community issues in relation to Asian American social institutions. Through weekly seminars, readings, and supervised placements in local community organizations and agencies, students combine learning through field experience and academic work. Topics such as race, class, political mobilization, and social change will be examined in relation to student field placements.

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

195. Senior Honors Seminar for Asian American Studies Majors. (3) Three hours of seminar per week. Prerequisites: 165 and consent of instructor. Research seminar for senior Asian American Studies majors 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 passed/not passed basis. Meetings to be arranged. (F,SP) Staff

198. Supervised Group Study. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Meetings to be arranged. (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 a topic which leads to the writing of a major paper. Regular meetings with faculty sponsor. (F,SP) Staff

Asian Studies
(College of Letters and Science)

Group Major Office: 2223 Fulton Street, Room 524, 842-5033
Chair and Head Adviser: Lowell Dittmer
Advisers: Beth Berry, Japan (Department of History of Art); Chyi Birch, China (Department of Oriental Languages); George De Vos, Japan (Department of Anthropology); Lowell Dittmer, China (Department of Political Science); Padmanabha Jain, South Asia (Department of South and Southeast Asian Studies); Robert Reed, Southeast Asia (Department of Geography).

Group Major in Asian Studies

The undergraduate group major in Asian Studies is a rigorous but flexible interdisciplinary program designed to provide students with a groundwork in an Asian language, a broad range of interdisciplinary area-related course work, and at least a minimal familiarity with the methods of one discipline relevant to their area studies. The major program assists students by organizing the rich course offerings in the Asian field at the University in such a way as to permit them to focus on a single geographical area, making use of a wide range of disciplines.

Prerequisite Courses in the Major

Students petitioning to enter the group major must have completed the following:

1. One year (two semesters) of a language appropriate to the area of regional specialization (Area I-China, Area II-Japan, Area III-South Asia, Area IV-India, Area V-Southeast Asia, Area VI-China, Area VII-Japan, Area VIII-South Asia, Area IX-India, Area X-Southeast Asia).

2. At least two courses drawn from the following list. Since majors are required to select one department for the disciplinary focus, one of these introductory courses must be from the department in which the candidate for the major intends to fulfill this requirement:

- Anthropology 2, Introduction to Archaeology
- Anthropology 3, Introduction to Social and Cultural Anthropology
- Economics 1, Principles of Economics
- Geography 1, Introduction to Physical Geography
- Geography 4, Introduction to Cultural Geography
- Geography 7, The Geography of Human Economic Activity
- History 9A-9B-9C, Asian History
- History 20, The Arts of Asia: India, China, Japan
- Political Science 2, Introduction to Comparative Politics
- Political Science 3, Introduction to Empirical Analysis and Quantitative Methods
- Political Science 4, Introduction to Political Theory
- Sociology 1, Introduction to Sociology

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 course work:
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, Man’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).

**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 Marxism (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. Two courses from among the following: Political Science 129C, Communist International Relations (4); Political Science 140B, Comparative Communism (4); Political Science 140C, Selected Topics in Communist Politics (4); Political Science 143A, 143B, Northeast Asian Politics (4,4); Political Science 128A, 128B, The American Role in Asia (4,4).

**Sociology**

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: Sociology 172, Development and Modernization (4); Sociology 183, Contemporary Chinese Society (4).

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

- Comparative Literature 160, Western Literary Cross-currents in Twentieth-Century China (3);
- Legal Studies 161, Law in Chinese Society (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 (Chinese) 100A-100B, Advanced Chinese (5-5);
- Oriental Languages (Chinese) 101, Readings in Modern Chinese (4); Oriental Languages (Chinese) 102, Survey of Chinese Literature (3);
- Oriental Languages (Chinese) 154, Readings in Chinese Vernacular Literature (3); Oriental Languages 155, Readings in Later Medieval Poetry (3);
- Oriental Languages (Chinese) 140A-140B, Readings in Chinese Buddhist Texts (3,3);
- Oriental Languages (Chinese) 156, Readings in Chinese Vernacular Literature: Drama;
- Oriental Languages (Chinese) 158, Modern Chinese Literature (3);
- Oriental Languages 131A-131B, Chinese Literature in Translation (3,3);
- 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 II: Japan**

A. The student must complete one additional year of Japanese. Further study of the language is 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 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 foci above and from among the following:

- Geography 110, Industrial Geography of the Industrial World (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);

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 (Japanese) 100A-100B, Advanced Japanese (5,5);
- 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, Niki Literature (3); Oriental Languages (Japanese) 128, Japanese Drama (3); Oriental Languages (Japanese) 129, Ezo Literature (3); Oriental Languages (Japanese) 146A, 146B, Advanced Colloquial Japanese (3,3); Oriental Languages (Japanese) 155, Modern Japanese Literature (3); Oriental Languages (Japanese) 159, Contemporary Japanese Literature (3); Oriental Languages 133A-133B, Survey of Japanese Literature in Translation (3,3);
- 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 part of the first two years’ work carries upper division credit. In these two instances the first two years’ work will satisfy the language requirement but will not count toward the major unit requirement.

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 185, Mainland Southeast Asia (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 foci above and from among the following:

- Geography 110, Industrial Geography of the Industrial World (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);

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 (Japanese) 100A-100B, Advanced Japanese (5,5);
- 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, Niki Literature (3); Oriental Languages (Japanese) 128, Japanese Drama (3); Oriental Languages (Japanese) 129, Ezo Literature (3); Oriental Languages (Japanese) 146A, 146B, Advanced Colloquial Japanese (3,3); Oriental Languages (Japanese) 155, Modern Japanese Literature (3); Oriental Languages (Japanese) 159, Contemporary Japanese Literature (3); Oriental Languages 133A-133B, Survey of Japanese Literature in Translation (3,3);
- 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.
History: 116A, Early China; 116B, The Middle Period; 116C, Modern China; 117A, Social History of China; 117B, Modern Chinese Intellectual History

History of Art: 137, Art of Southeast Asia (4);
Music: 133A, Music of the Southeast Asia Tradition (4);
South and Southeast Asian Studies (Malay/Indonesian) 132, Readings in Modern Indonesian and Malay Literature (3);
South and Southeast Asian Studies 122, Authors and Audiences in the Malay World (3); South and Southeast Asian Studies 124, The Shadow Play in Southeast Asia (3); South and Southeast Asian Studies 123, The Poetry of Indonesia and Malaysia (3); South and Southeast Asian Studies 128, Introduction to Modern Indonesian and Malay Literature (3);
A third year of Dutch or French where appropriate.

D. 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: Chinese Studies, Japanese Studies, and Southeast Asian Studies. These programs give students an introduction to the study of one region of Asia through social science and humanities courses. Minimum requirements are five upper division courses with a C or better in each course. At least three of the courses must be completed at Berkeley; not more than three may overlap with those credited to a student's major. There is no Asian language requirement for the minor.

Option I. Minor in Chinese Studies: Five upper division courses from the following:
Anthropology: 170, China
History: 116A, Early China; 116B, The Middle Period; 116C, 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

Astronomy

(College of Letters and Science)
Department Office: 601 Campbell Hall, 642-5275

Professors:
Jonathan Arons, Ph.D.
Christopher Bozeman, Ph.D.
Marc Davis, Ph.D.
Carl E. Heiles, Ph.D.
Ivan H. King, Ph.D.
Leonard V. Kuhl, Ph.D.
Christopher McKee, Ph.D. (Physics)
Jerry Nelson, Ph.D.
Frank H. Shu, Ph.D.
Joseph I. Silk, Ph.D.
Hyron Spinrad, Ph.D.
William Vuchy, Ph.D.
Leland E. Cunningham, Ph.D. (Emeritus)
John G. Phillips, Ph.D. (Emeritus)
Harold F. Weaver, Ph.D. (Emeritus)

Associate Professors:
Giorgi Basir, Ph.D.
Imre Fodor, Ph.D.
Alexei Filippenko, Ph.D.

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

Adjunct Associate Professors:
Charles Alcock, Ph.D.
John Bieging, Ph.D.
Richard Klein, Ph.D.

Lecturers:
David D. Cuttack, Ph.D.

Major Advisers: Mr. Heiles, Mr. Basir.
Graduate Advisers: Mr. Davis, Ms. de Pater, 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 Lick Observatory (near the campus), a 120-inch telescope at Kitt Peak Observatory, an 85-foot radio telescope and three 100-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 in Astrophysics

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 languages courses that will enable them to read a gaining knowledge of any one of the three languages: German, Russian, and French.

The last two years, leading to the A.B. degree in astrophysics, are spent in more intensive work, primarily in physics, astronomy, and mathematics. 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 physics and astronomy.

Prospective astrophysics students are encouraged, but not required, to take Astronomy 7 and 80 while in the lower division. Astrophysics majors are required to take Astronomy 127A-127B-127C. With the approval of the departmental adviser, outstanding 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 courses will generally be chosen from the following list: Analytic Mechanics (Physics 112A-112B), Modern Physics and Advanced Electrical Laboratory (Physics 111), Introduction to Statistical and Thermal Physics (Physics 112), Introductory Nuclear Physics (Physics 124A), 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 (Physics 101A-101B), Mathematical Physics for the Physical Sciences (Math 121A-121B), Numerical Analysis (Math 128A-128B), Physics of the Earth (Geophysics 122A-122B), Introduction to the Theory of Statistics (Statistics 101-102).

Honors Program. For honors in astrophysics 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 As and one B; (3) an individual project of research or study, involving at least three units of research credit, which the student’s project is designed 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 which 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 outside the department and must acquire one year’s teaching 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. Nonmathematical description and research results in modern extragalactic astronomy and cosmology. (F) Spindel

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.

5. Breakthroughs and Discoveries in Modern Astronomy. (2) Two hours of lecture per week. Prerequisites: 10 or 7 or consent of instructor. Considers the major breakthroughs 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.

6. Evolution and Origin of the Universe. (2) Two hours of lecture per week. Prerequisites: 10, 105, 7, or 73, or consent of instructor. Topics vary and may include modern instrumentation, the three degree cosmic radiation, radio galaxies and quasars, pulsars, interstellar atoms and molecules, interstellar masers, and radar studies of the solar system. Emphasis on physical understanding with occasional use of mathematics.

7. Selected Topics in Astronomy. (2,3) Course may be repeated for credit, taking different sections (A, B, C, etc.). Two or three hours per week, depending on course. Prerequisites: 10, 105, 7, or 73, 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)


10. Stellar Structures. (2,3) Course may be repeated for credit, taking different sections (A, B, C, etc.). Star clusters, galaxies, and clusters of galaxies. Formation dynamics and evolution.


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

13. Observational Astronomy. (2,3) Telescopes, instruments, astronomical photography, and observational techniques.


15. High Energy Astrophysics. (2,3) Study of a selection of unusual astronomical objects, such as Gamma ray, x-ray, and ultraviolet sources, from an observational viewpoint.

16. History of Astronomy. (2,3) Astronomical concepts which influenced development of subfield of astronomy; determination of the size of the Universe; instrumentation, planetary astronomy, novae and supernovae, and galaxy evolution. (F) Dey, Najita

17. Introduction to General Astronomy. (4) Students who have completed 7 will receive no credit for 10. Three hours of lecture and 1 hour of discussion per week. Prerequisites: 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 include quasars, pulsars, black holes, and extraterrestrial communication, etc. Individual instructor’s syllabuses available from the department. (F,SP)

18. Optical Astronomy Laboratory. (2) New course. One hour lecture and one 4-hour lab per week. Prerequisites: Math 1A-1B, Physics 7A, Math 50A and Physics 7B to be taken concurrently. Coordinate systems, transformations, and variations. Telescopes and instrumentation.

19. Directed Study in Astronomy. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: 7, 10 or 105 and consent of instructor. Supervised observational studies or directed reading for lower division students. (F,SP)

Upper Division Courses

19A. Astrophysics of Stars and Stellar Systems. (3) Three hours of lecture per week; occasional laboratories or observing time. Prerequisites: Physics 7 series, Math 121A-121B. Interaction between theoretical techniques and observational studies. This course is intended primarily for majors in the physical sciences and engineering. (SP) Welch

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. Instruments in modern astrophysical research. This course is intended primarily for majors in the physical sciences and engineering. (SP) Welch

127B. Stellar Structure and Evolution. (3) Three hours of lecture per week; occasional laboratories or observing time. Prerequisites: 127A. The transfer of radiation, stellar atmosphere analysis, planetary atmospheres; stellar structure and evolution. (SP) Backer

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


190. Graduate Seminar. (2) Course may be repeated for credit. Two 1-hour seminars per week. Prerequisites: Upper division standing. Seminar format discussion of selection of current research in astronomy. This course meets for two hours per week in an informal setting where group discussions or student presentations will take place on astronomical issues of current interest. The focus will be not only on the formal subject matter, but also on the nature of scientific inquiry itself. Students should learn by experience how to recognize scientific problems and resolve them. (F)

H195. Special Study for Honors Candidates. (2-4) Individual project of research or study. (SP)

3On leave, spring
4Recalled to active service
5Recipient of Distinguished Teaching Award

*Not offered 1989-90
1On leave, spring, fall
2On leave, fall
3On leave, spring
4Recalled to active service
201A. Physical Processes in Astronomy. (4) Students who have taken Astronomy 214 or IDS 253 may not receive credit for 201A. Three hours of lecture per week. Prerequisites: Physics 105, 110A, 110B concurrently; consent of instructor. Two 1-hour lectures per week. The formulation and numerical solution on large-scale computers of problems involving coupled non-linear astrophysical flows with radiation transport can be presented. The fundamental concepts underlying finite-difference approaches for Lagrangian and Eulerian dynamics and various implicit and explicit formulations and solutions to the equations of radiation transport will be discussed. Topics and computational applications will include normal and x-ray irradiated stellar atmospheres; pulsating variables and stellar mass loss; supernova explosions (evolution and x-ray bursts); accretion onto neutron stars in the limit of strong radiation-gas dynamic coupling (x-ray pulsars); sequential star formation and the 2-D evolution of H II regions. (SP) Klein

258. Advanced Stellar Dynamics. (3) Three hours of lecture per week. Prerequisites: 218, Stellar orbits, integrals, and celestial mechanics; galactic models; spiral structure, density waves, and resonance. Stellar encounter theory; dynamics of star clusters; simulation techniques. Dynamics of elliptical galaxies, the dynamics of discs, galaxy interactions and collisions. (SP)

267. Plasma Astrophysics. (3) Three hours of lecture per week. Prerequisites: 201 recommended. Application of magnetohydrodynamics and plasma physics to astrophysical problems. Topics will be chosen from magnetohydrodynamic stellar processes, solar and stellar flares and winds, mhd dynamos, pulsars, x-ray sources, supernovae and supernova remnants, and cosmic rays and active galactic nuclei. (SP)

216. Stellar Dynamics and Galactic Structure. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Advanced Instruction in observational and computational methods as applied to astronomy. Open to graduate students. (F,SP)

228. Extragalactic Astronomy and Cosmology. (3) Three hours of lecture per week. A survey of the field of extragalactic astronomy. Classification and morphology of galaxies, the distance scale, galaxy dynamics and masses, the stellar population of galaxies, clusters of galaxies, galaxy evolution and active galactic nuclei (including QSOs). Cosmological models, and the early universe. (SP) Spinrad

236. Radio Astronomy. (3) Three hours of lecture per week. Prerequisites: 218, Consent of instructor. Topics and problems. (F) Backer

249. 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 gas and dust in the atmospheres and surfaces. Meteors, comets, and the interplanetary medium. Observational techniques and problems. (SP) de Pater

250. Special Topics in Astrophysics. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. Topics and problems. May not be used for unit or residence requirement for the doctoral degree. (F,SP)

255. Computational Methods In Theoretical Astrophysics. (3) Two 1½-hour lectures per week. Prerequisites: 201, 217 or consent of instructor. The formulation and computational applications will include normal and x-ray irradiated stellar atmospheres; pulsating variables and stellar mass loss; supernova explosions (evolution and x-ray bursts); accretion onto neutron stars in the limit of strong radiation-gas dynamic coupling (x-ray pulsars); sequential star formation and the 2-D evolution of H II regions. (SP) Klein

292. Seminar. (1-2) Course may be repeated for credit. Two hours of lecture per week. Prerequisites: Consent of instructor. Advanced topics in x-ray astronomy and high energy astrophysics. (SP)

298. Directed Group Study. (1-4) Course may be repeated for credit. Two hours of lecture per week. Prerequisites: Consent of instructor. One hour per week. (SP)

299. Advanced Study and Research. (2-12) 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: Physics and Astronomy. (SP)

Berkeley Programs for Study Abroad (Special Studies)

Berkeley Programs for Study Abroad (BPSA) offers the Education Abroad Program for undergraduates and graduate students. For additional information, see Index. BPSA also sponsors the Berkeley Professional Development Program in India for graduate students in professional fields spend two semesters doing research or field work in India. Participants are placed at Indian universities and research institutes, and are assisted by Indian professors and professionals in developing their projects. Seminars are offered by the program's academic staff on Indian culture and professional issues related to these programs. Since English is the language of the program, good business communication skills are required. There is no language requirement. An orientation program is organized in India prior to departure. The 8-semester credit program is divided into two 4-semester programs. All courses listed below are offered in India only. All courses listed below are offered in India only. Upper Division Courses

100. Cultural Traditions of India. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Three hours lecture
As a result of the reorganization of the biological sciences on the Berkeley campus, the faculty and programs of the Department of Biochemistry will become a part of two divisions (the Division of Biochemistry and Molecular Biology and the Division of Genetics) in the new Department of Molecular and Cell Biology. Students interested in biochemistry who wish to apply for admission after fall 1989 and who require further information should also contact the graduate adviser in the Division of Biochemistry and Molecular Biology in the new department. The names and locations of these advisers can be obtained by writing to Ms. Patricia Power, Staff Assistant to the Dean, College of Letters and Science, 201 Campbell Hall, University of California at Berkeley; Berkeley, CA 94720.

Concordance of Courses: On the following page is a list of courses formerly offered by the Department of Biochemistry, followed by their new names, numbers, and titles, consult lists in this catalog under the headings "Integrative Biology," "Molecular and Cell Biology," or "Plant Biology." At press time for this catalog, some course information was still not available. If you have questions, or if you do not find a course listed with its new name, number, or title, consult staff in one of the new departments for up-to-date information.

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 the full scope of the biological sciences resources available on the San Francisco campus and the strong engineering and basic life sciences resources available on the Berkeley campus.

The program is interdepartmental as well as intercampus. It combines related interests and research activities of faculty from five of the seven engineering departments and from several nonengineering departments at Berkeley with the full 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 carry 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 94720; (415) 642-8790.

Bioengineering Graduate Group, School of Medicine, Medical Sciences Building, Room 553A-4, University of California at San Francisco, CA 94143-0640; (415) 476-5151

Bioengineering Graduate Group, College of Engineering, Meaian Interdisciplinary Studies Center, 2011 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/no pass basis. Supervised independent study (F,SP)

Biology (College of Letters and Science)

As a result of the reorganization of the biological sciences on the Berkeley campus, the teaching functions of the Department of Instruction in Biology will be administered by three new departments, effective fall 1989: the Department of Molecular Cell Biology (responsible for Biology 1A), the Department of Integrative Biology (responsible for Biology 1B), and the Department of Plant Biology (responsible for Biology 11). For an explanation of the full scope of the biological sciences reorganization and its implications, see page 89.

Undergraduate Program: Beginning fall semester 1989, students will no longer be accepted into the former undergraduate field major in biological sciences. Prospective majors interested in the area of functional biology—organismal emphasis (formerly Biology—Plan A1) should consider one of the plans offered by the Department of Molecular and Cell Biology and should contact the major adviser or undergraduate assistant for the Division of Cell and Developmental Biology in the new department for information. Students interested in the area of functional biology—organismal emphasis (formerly Biology—Plan A1) should consider one of the plans offered by the Department of Molecular and Cell Biology and should contact the major adviser or undergraduate assistant for the Division of Cell and Developmental Biology in the new department for information. The names and locations of these advisers can be obtained by writing to Ms. Patricia Power, Staff Assistant to the Dean, College of Letters and Science, 201 Campbell Hall, University of California at Berkeley; Berkeley, CA 94720.

Continuing students who declared one of the biology majors before fall semester 1989 may continue in the program, provided they complete all degree requirements and graduate before fall semester 1993. For each program, please consult the appropriate new department indicated above. Beginning fall semester 1993, all students will be expected to complete an undergraduate major current at the time of their application for the degree.

Lower Division Courses

Because the following three courses provide a broad, basic introduction to the biological sciences, majors and nonmajors, and because they will be taught by faculty from all three of the new biology departments, the name "Biology" has been retained to reflect their interdisciplinary character.

Biology 1A. General Biology. (4) Three 1-hour lectures, one 3-hour laboratory, and one 1-hour discussion per week. Prerequisites: College Chemistry 8A. Chemistry 8A is recommended concurrently. General introduction to cell structure and function, molecular and organism genetics, animal development, form and function. Intended for all majors and nonmajors, and because they will be taught by faculty from all three of the new biology departments, the name "Biology" has been retained to reflect their interdisciplinary character.

Biology 1B. General Biology. (4) Three 1-hour lectures, one 3-hour laboratory, and one 1-hour discussion per week. Prerequisites: College Chemistry 1A-1B. Chemistry 8A is recommended concurrently. General introduction to cell structure and function, molecular and organism genetics, animal development, form and function. Intended for all majors and nonmajors, and because they will be taught by faculty from all three of the new biology departments, the name "Biology" has been retained to reflect their interdisciplinary character.
<table>
<thead>
<tr>
<th>Old No.</th>
<th>Course Title</th>
<th>Equivalent New Course, If Any</th>
</tr>
</thead>
<tbody>
<tr>
<td>010</td>
<td>Of Molecules and Man: A View for the Layman</td>
<td>MCellBi 011 Chemistry of Life</td>
</tr>
<tr>
<td>100A</td>
<td>General Biochemistry</td>
<td>MCellBi 100 General Biochemistry</td>
</tr>
<tr>
<td>100B</td>
<td>General Biochemistry</td>
<td>MCellBi 110 General Biochemistry and Molecular Biology</td>
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<tr>
<td>101</td>
<td>General Biochemistry Laboratory</td>
<td>MCellBi 110L General Biochemistry and Molecular Biology Laboratory</td>
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<tr>
<td>102</td>
<td>Survey of the Principles of Biochemistry</td>
<td>MCellBi 102 Survey of the Principles of Biochemistry and Molecular Biology</td>
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<td>102L</td>
<td>Biochemistry Laboratory</td>
<td>MCellBi 102L Biochemistry Laboratory</td>
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<tr>
<td>190</td>
<td>Proseminar</td>
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<td>201</td>
<td>Advanced Biochemical Laboratory Methods</td>
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<td>201A</td>
<td>Advanced Biochemical Laboratory Methods</td>
<td>MCellBi 201A Advanced Biochemistry and Molecular Biology Laboratory Methods</td>
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<tr>
<td>201B</td>
<td>Advanced Biochemical Laboratory Methods</td>
<td>MCellBi 201A Advanced Biochemistry and Molecular Biology Laboratory Methods</td>
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<td>201C</td>
<td>Advanced Biochemical Laboratory Methods</td>
<td>MCellBi 201A Advanced Biochemistry and Molecular Biology Laboratory Methods</td>
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<tr>
<td>203</td>
<td>Structure and Function of Eukaryotic Cellular Membranes</td>
<td>MCellBi 203 Structure and Function of Eukaryotic Cellular Membranes</td>
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<td>205</td>
<td>Biochemistry of Nucleic Acids</td>
<td>MCellBi 205 Biochemistry of Nucleic Acids</td>
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<td>206</td>
<td>Physical Biochemistry</td>
<td>MCellBi 206 Physical Biochemistry</td>
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<td>207</td>
<td>Comparative Biochemistry</td>
<td>MCellBi 207 Comparative Biochemistry</td>
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<td>208</td>
<td>Eukaryotic Gene Expression and Regulation</td>
<td>MCellBi 208 Regulation of Gene Expression</td>
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<tr>
<td>211</td>
<td>Introduction to Research in Biochemistry</td>
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<tr>
<td>231</td>
<td>Seminar on Carbohydrate Research</td>
<td>MCellBi 219A Carbohydrate Research</td>
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<tr>
<td>233</td>
<td>Seminar on Enzyme Mechanisms</td>
<td>MCellBi 219B Enzyme Mechanisms</td>
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<tr>
<td>234</td>
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Biomedical and Environmental Health Sciences (School of Public Health)

Department Office: 112 Haviland Hall, 642-4416

Chair: George F. Sensabaugh, D.Crm

Professors:
- Nina M. Agabian, Ph.D. Albert Einstein College of Medicine. Pathogenesis and antigenic variation of medically important parasites; DNA technology
- Richard J. Brand, Ph.D. University of California at Berkeley. Biostatistical methods for risk research and clinical trials
- Robert C. Cooper, Ph.D. Michigan State. Water quality and health
- John L. Hardy, Ph.D. University of Minnesota. Genetics to the natural history of arboviruses
- Donald Heyneman, Ph.D. Rice University. Host parasite studies in parasitology; impact of technological development in the Third World
- Nicholas P. Jewell, Ph.D. University of Edinburgh. Biostatistics and applications of statistical methods
- Mary King, Ph.D. University of California at Berkeley. Genetics and epidemiology of breast cancer
- Joseph P. Lash, M.D. Women's Medical College of Pennsylvania. Community-oriented primary care
- William J. Oswald, Ph.D. University of California at Berkeley. Applied epidemiology; sanitary engineering; bioengineering
- Nicholas L. Petrakis, M.D. University of Washington, St. Louis. Cancer epidemiology
- S. J. Pugh, M.D. University of Chicago. Epidemiology of infectious diseases
- Steven D. Asher, M.D. Analytical data analysis to environmental and epidemiological problems

Associate Professors:
- Gerhard F. Sensabaugh, D.Crm. University of California at Davis. Analytical human biochemical genetics
- Allen H. Smith, M.D., Ph.D. Diablo (New Zealand).
- Epidemiology of occupational related diseases
- Michael E. Tarter, Ph.D. University of California at Los Angeles. Computer-intensive model-free statistics

Lecturers:
- Robert C. Speir, Ph.D. Cambridge University. Engineering aspects of environmental and occupational health
- S. Leonard Syme, Ph.D. Yale University. Social and cultural factors in the occurrence of disease
- Anthony J. Thompson, Ph.D. University of Wisconsin. Immunologic tolerance induced with soluble protein
- John L. Thrombosis of California at Berkeley. Forensic science; physical evidence analysis and communication
- Nayan A. Vfedros, Ph.D. University of Colorado. Comparative immunology and microbiology of marine and freshwater bacteria
- Edward T. Wei, Ph.D. University of California at San Francisco. Epidemiology
- Warren Winkelman, Jr., M.D., M.P.H. Columbia University. Epidemiology; cancer; AIDS

Concordance of Courses: On the following page is a list of courses formerly offered by the Department of Instruction in Biology, followed by their new names, numbers, and titles in the new departments. For a list of courses offered by the new departments, followed by their former names, numbers, and titles, consult lists in this catalog under the headings "In- terdisciplinary," "Molecular and Cell Biology," or "Plant Biology." At press time for this catalog, some course information was still not available. If you have questions, or if you do not find a course listed with its new name, number, and title, consult staff in one of the new departments for up-to-date information.

The mission of the Department of Biomedical and Environmental Health Sciences is to educate graduate students for 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 this 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 mission 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 that affect human health; development of analytical methods and investigatory models to measure and assess the impact of these factors on health; and to recommend and evaluate health programs for the areas of special interest to 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. An important role of the department in the environment, the human health aspects of the work place, and forensic science. Since investigation of these problem areas requires the assistance of other professionals, students are encouraged to develop broad programs of study within the department, in the school, and on the campus.

The range of disciplines represented by the faculty in the department includes biostatistics, chemistry, chemical biology, engineering, epidemiology, toxicology, forensics, genetics, immunology, medicine, microbiology, pathology, 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 Ph.D. degree programs in biostatistics, 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, 601, and 602. The courses may be repeated for credit, but some sections may not be given every semester.

K. Environmental Health Sciences

L. Biostatistics

N. Epidemiology

P. Biomedical Sciences

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

S. Forensic Science

Upper Division Courses

102. Microbiology Related to Health and Disease. (4) Two 1/2-hour lectures and one 2/2-hour discussion/demonstration per week. Prerequisites: Elementary biology and a one-semester or consent of instructor. Basic principles of molecular biology, pathogenesis, immunity, epidemiology, and control of medically important viruses. (F) Hardy

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, immunity, epidemiology, and control of medically important viruses. (F) Hardy

105. Laboratory in Medical Virology. (7) Formerly 105L and 105R. Three 1-hour lectures, three 2-hour laboratory, and one 2-hour discussion per week. Prerequisites: Elementary courses in biology, chemistry, or consent of instructor. Basic principles of cellular structure and function of pathogenic bacteria and fungi, pathology, epidemiology, host-immune response and prevention. Laboratory: immuno-diagnostic techniques, isolation, identification, and biochemical activities of selected pathogenic bacteria and fungi. (SP) Vedros, Grant

106. Introduction to Hematology. (3.5) Two hours of lecture and two 2-hour laboratory/discussion per week. Prerequisites: Consent of instructor. Theories, principles, and development of blood coagulation, hematopoietic mechanisms, and immunohematology. Analyses of formed blood elements, including normal and abnormal characteristics. To be offered even-numbered years. (F) Rogers, Grant

121. Introduction to Vital and Demographic Statistics. (4) Three 1-hour lectures and one 1-hour discussion per week. Statistical and methodological approaches to 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. (SP)
# Concordance List for Biology

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<th>Old No.</th>
<th>Course Title</th>
<th>Equivalent New Course, If Any</th>
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<td>General Biology (no change)</td>
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<tr>
<td>001B</td>
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<tr>
<td>002</td>
<td>Topics in Biology</td>
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<td>007</td>
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<tr>
<td>011</td>
<td>Introduction to the Science of Living Organisms</td>
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<td>012</td>
<td>Natural History of Fungi</td>
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<td>100</td>
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<td>Variation, Adaptation and Transformation of Animal Cells</td>
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<td>120</td>
<td>Introduction to Comparative Virology</td>
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<td>130A</td>
<td>Introduction to Probability and Statistics in Biology and Public Health.</td>
<td>(F) Tarter</td>
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<td>Cell Motility</td>
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<td>499</td>
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<td>MCellBi 481B Transmission Electron Microscopy</td>
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Health risk systems, analysis of mass data. Offered odd-numbered years. (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 tools of descriptive and inferential statistics, life tables, rates and rate adjustment. Regression and correlation, statistical aspects of basic experimental and observational health research designs. (F) Tarter

130A. Introduction to Probability and Statistics in Biology and Public Health. (4) Three 1-hour lectures and one 2-hour discussion per week. Prerequisites: High school algebra. Descriptive statistics, probability, probability distributions, point and interval estimation, hypothesis testing, chi-square, correlation and regression with biomedical applications. (F) Langhauser

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

138. Introduction to Health Survey Methods. (4) Three hours of lecture and one 2-hour discussion/laboratory section per week. Prerequisites: 130A or equivalent. Design of surveys in public health. Sampling techniques and theory. Program evaluation. Health services research and analysis. Construction of health status indexes and scales. Offered even-numbered years. (F) Malani

148. Chemical Hazards in the Environment. (3) Two 1½-hour lectures per week. Prerequisites: Bio1A-1B or Chem. 8A-8B 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 community and in the work environment. (SP) Koshland, S

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

153. Introduction to Pharmacology and Toxicology. (3) New course. Two 1½-hour lectures per week. Prerequisites: Organic chemistry; upper division biological science. Principles of drug action and toxicology. Brief survey of major groups of chemicals used in therapy. (SP) Cooper

156. Microbiology of Water and Wastewater. (3) Two 1-hour lectures and one 3-hour laboratory demonstration per week. Prerequisites: Elementary courses in biology and chemistry. Principles of microbiology applicable to the aquatic environment, drinking water, and wastewater. (SP) Reingold

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 bio-statistics 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. Exemption exams offered for both modules. (SP) Staff

181. Trace Microanalysis. (4) Two 1-hour lectures and two 3-hour laboratories 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) Staff

183. Forensic Toxicology. (2) Two hours of lecture per week. Prerequisites: Upper division standing in a physical or natural science. Detection and estimation of toxic substances in the human organism by chemical and physical means. Systematic analysis of normal and abnormal constituents to determine presence or absence in relation to legal standards of proof. (F) Shugin

183L. Forensic Toxicology Laboratory. (2) One 1-hour lecture/discussion and one 3-hour laboratory per week. Prerequisites: Upper division standing in a physical or natural science. Laboratory in the detection and estimation of toxic substances in the human organism by chemical and physical means. (F) Shugin

197. Field Study in Public Health. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Requires three hours of work per unit per week. Individual conferences. Prerequisites: Enrollment is restricted by regulations listed on pages 87 and 88 of this catalog. Supervised experience relevant to specific aspects of public health in off-campus organizations. Regular individual meetings with faculty sponsor 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. Requires three hours of work per unit per week. Requires permission of instructor. May be repeated for credit. (SP) Staff
basis. Requires three hours of work per unit per week. Prerequisites: Enrollment is restricted by regulations listed on pages 87 and 88 of this catalog. (F,SP) Staff

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a pass/not pass basis. Requires three hours of work per unit per week. Prerequisites: Enrollment is restricted by regulations listed on pages 87 and 88 of this catalog. (F,SP) Staff

Graduate Courses

201A. Principles of Infectious Disease. (5) Three 2-hour sessions per week to include lecture, discussion and demonstration labs. Prerequisites: Basic courses in the various. One 2-hour lecture per week. Prerequisites: Consent of instructor. A critical analysis of the various types of interactions that occur at the molecular, organi- zational, and community levels between infectious disease agents, humans and their environment that result in infection and disease in humans and human populations. (SP) Hardy

201B. Infectious Disease: Host-Parasite Interactions. (4) Two 2-hour lectures/discussions per week. Prerequisites: 201A or consent of instructor. A critical analysis of the various types of interactions that occur at the molecular, organizational, and community levels between infectious disease agents, humans and their environment that result in infection and disease in humans and human populations. One hour lecture and one 2-hour laboratory per week. Prerequisites: Consent of instructor. A critical analysis of the various types of interactions that occur at the molecular, organizational, and community levels between infectious disease agents, humans and their environment that result in infection and disease in humans and human populations. (SP) Agabian

202A. Biostatistical Methods. (4) 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 mathematical statistics course taken concurrently. 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 pre- diction and analysis. Material presented will be illustrated in the laboratory. (F) Agabian

202B. Biostatistical Methods. (4) 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 methods on censored data with covariates. Biostatistical concepts and modelling relevant to design, conduct and analysis of clinical trials. Material presented will be illustrated in the laboratory. (SP) Agabian

221. Clinical Trials. (3) Three 1/2-hour lectures per week. Prerequisites: Consent of instructor. A critical analysis of the various types of interactions that occur at the molecular, organizational, and community levels between infectious disease agents, humans and their environment that result in infection and disease in humans and human populations. (SP) Waldorf

222. Biometrical Data Analysis—Pathological and Complete Data Analysis. (3) Three 1/2-hour lectures and one 2-hour discussion session per week. Prerequisites: 130A/ 130B or equivalent, or consent of instructor. Survey of classical methods: mixture, clustered, grouped, incom- plete, Cox-model, and truncated data simulation and analysis. Offered even-numbered years. (F) Tarter

223. Introduction to Risk and Intervention Research Methods. (4) Three hours of lecture and one 2-hour discussion/laboratory session per week. Prerequisites: 130A or consensual. Biostatistical concepts and modelling relevant to the design and analysis of multifactor cohort studies, matched and unmatched case-control studies, and intervention studies. (SP) Selvin, Jewell

224. Risk Research Methods. (3) Two 1-hour lectures per week. Prerequisites: Calculus, matrix algebra, and one year of mathematical statistics. Biostatistical concepts and measuring relevant to the design and analysis of multifactor cohort studies, matched and unmatched case-control studies, and intervention studies. (SP) Selvin, Jewell

225. Biometrical Data Analysis—Model Free Curve Estimation. (4) Three 1-hour lectures and one 2-hour discussion session per week. Prerequisites: 130A-130B or equivalent, or consent of instructor. Generalized his- tograms and Gram-Charlier expansions; series inclusion and stopping rules, multiplier and weighting techniques, nonparametric regression, variance reduction, smoothing, and equiprobability contour estimation methods and other graphical methods. Offered even-numbered years. (SP) Tarter

226A-226B. Special Topics in Biostatistics. (1-3) Course may be repeated for credit. One to three hours of lecture/discussion per week. Prerequisites: 220A- 220B or consent of instructor. Current issues in biosta- tistical research. Topics depend on student demand and faculty availability. Possible topics are bioassay, meta-analysis, compart- mental models, biostatistical consulting, covariance structure models, bootstrap and jackknife methods, arti- ficial intelligence techniques in biostatistics. (F,SP)

230. Stochastic Processes in Biology and Health. (3) Formerly BEHS 230A-230B. Three 1-hour lectures and one 2-hour discussion session per week. Prerequisites: Consent of instructor. An introduction to a wide variety of models and methods, illustrated with biological and biomedical examples. Generating functions, bionomial process, Poisson process, random walks, Brownian motion, reaction processes, Markov chains, branching processes, birth-and-death processes, epidemic models, diffusion processes, dis- crete-time martingales. Mathematical results are precisely stated, interpreted, and explained, but formalities of proof are omitted. (SP)

231. Introduction to Multivariate Public Health Statistics. (4) Three 1-hour lectures and one 2-hour dis- cussion session per week. Prerequisites: 130B or consent of instructor. Statistical inference employing multiple regression, principal components, discriminant analysis, analysis of covariance, and analysis of multivariate dis- crete data. (F) Redmond

232. Theory of the Life Table and Competing Risks and Their Applications. (3) Three 1-hour lectures and one 1-hour discussion session per week. Prerequisites: Statistics 101 and 102, or consent of Instructor. De- scription of the life table and its construction; statistical inference and theory of the life table; medical follow-up of new life table; theory of disease, a fertility table; theory of competing risks; multiple decrement life table; applications. Offered even-num- bered years. (F) Chiang


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 exposure assessment and control applied to chemicals in industry. Particular emphasis is placed upon interpretation of health standards, statistical monitoring strategies, and industrial ventilation design. Offered every 2 years. (SP) Rappaport

241. Industrial Hygiene: Physical Agents. (3) Three hours of lecture per week. Prerequisites: 240. Noise, radiation, and heat as occupational hazards. An introduction to industrial hygiene evaluation and related damage-risk criteria. (SP) Spear, Thomas

242. Characterization of Airborne Chemicals. (3) Two 1-hour lectures per week. Prerequisites: Graduate standing in Environmental Health Sciences or permission of instructor. Principles of exposure assessment and control applied to chemicals in industry. Particular emphasis is placed upon interpretation of health standards, statistical monitoring strategies, and industrial ventilation design. Offered every 2 years. (SP) Rappaport

245. Indoor Air Pollution. (3) Three hours of lecture per week. Prerequisites: Graduate standing and consent of instructor. Introduces the major pollutant classes of concern, describes pollutant behavior, explores health implications of exposures, and investigates policy implications. Includes: combustion by-products, tobacco smoke, radon, organic chemical and microbiologi- cal agents. (F) Nero, Rappaport

*Sophomore standing.

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

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246. Principles of Occupational Diseases. (2) Two hours of lecture per week. An overview of the major occupational diseases, including pulmonary, dermatologic, musculoskeletal, neurological, and psychological disease. Specific disease causing agents (solvents, metals, pesticides, and others) will be discussed. The course will cover disease etiology, manifestations, and prevention. This course does not require previous medical/clinical background. (F)

247. Chemical Risk Assessment. (3) One 2-hour lecture and one hour of discussion per week offered as a 3-hour block. Prerequisites: Previous or concurrent enrollment in BEHS 253, BEHS 160, 260, or 264. BEHS 240. Description of the objectives, principles, and methods of 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. (F) A. Smith, M. Smith, Spear

253. Environmental Toxicology. (3) Three hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. Principles of toxicology applied to the evaluation and control of chemical hazards in air, food, and water. Biological mechanisms of toxicity will also be discussed. (F) Wei

254. Advanced Toxicology. (2) Course may be repeated for credit. Three hours of seminar per week. Prerequisite: Consent of instructor. Examination of current topics in toxicology research. Seminar format. (SP) Wei

255. Chemical Carcinogenesis and Teratogenesis. (3) 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) M. 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. Their description, distribution, and control. (F) Cooper

258. Toxicology Laboratory. (3) One hour of lecture followed by 7 hours of laboratory per week. Prerequisites: Graduation standing or consent of instruction. Experimental methods and techniques for evaluating the toxic properties of chemicals. Emphasis on chemicals of industrial importance. Offered odd-numbered years. (F) T. Lee

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) Oswald

260. Epidemiologic Methods. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 160 or equivalent one-semester course in epidemiology; 130A or concurrent enrollment or consent of instructor. Principles and methods of epidemiology: study design, selection, and definition of cases and controls. Data collection, analysis, and inference. Laboratory provides an opportunity to apply methods to data sets generated by the faculty. (F) Winkelstein

261. Current Problems in Epidemiology. (3) Course must be taken under satisfactory/unsatisfactory basis. One 3-hour lecture per week. Prerequisites: Introductory course in epidemiology and biostatistics. Guest lecturers and staff present their current work on topics of interest and relevance, emphasizing the bases for development of research programs, methods employed, and difficulties encountered. (SP) Reingold

262. Advanced Epidemiology. (3) Course may be repeated for credit. Two 1 1/2-hour lectures per week. Pre- requisites: Consent of instructor. Development of research questions and application of epidemiology to common diseases of complex etiology. Students elect two areas of concentration from several subject modules which are selected annually from current priority issues. Pre-enrollment required. (SP) Staff

263. Epidemiology and Control of Infectious Diseases. (4) Three 2-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, investigation, prevention, and treatment. Emphasis is on current problems in health agencies at a state, national and international level. (SP) Reingold, Roberto, Werner

264. Occupational Epidemiology. (2) Two 1-hour lectures per week. Prerequisites: Consent of instructor. Prerequisites: Methods of epidemiologic study design, execution and analysis of occupational health studies, and for occupational health monitoring and surveillance programs. (F) A. Smith

266. 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. Emphasis is on epidemiologic and social research design issues, problems in definition and assessment, and problems of confounding. Detailed attention will be paid also to the biological pathways that link psychosocial factors and physiologic function. (SP) Syme

267. Topics in Disease Surveillance. (2) One 2-hour seminar 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 the basis for 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

268. Genetic Epidemiology. (2) One 2-hour lecture per week. Prerequisites: Upper division or graduate courses in epidemiology, genetics or human genetics, and statistics or biostatistics; or consent of instructor. Epidemiologic, genetic and statistical approaches for the analysis of genetic influences on diseases in human populations and families. Interaction of genetic, environmental, and cultural risk factors for disease. (SP) King

269. Advanced Occupational and Environmental Epidemiology. (3) Three hours of lecture per week. Prerequisites: Completion of the epidemiologic 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) A. Smith

270. Epidemiological Analysis. (3) Three hours of lecture per week. Prerequisites: 260, 223, and 231 or consent of instructor. Advanced treatment of epidemiologic methods and data analysis, including cohort studies and case-control studies. The interpretation of cohort data, spatial cluster data and contingency tables; logistic regression; analysis of time-dependent data including life tables, Kaplan-Meier estimators, and survival analysis (SP) Reingold

271. outbreak Investigation. (2) One 1-hour session per week plus field work. Prerequisites: Consent of instructor. The course will teach students why and how 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 outside regular class hours, will involve the investigation of actual outbreaks and clusters in conjunction with local county health departments and under the supervision of the instructor. (F,SP) Reingold

272. Epidemiology of Neoplastic Diseases. (3) Must be taken on a satisfactory/unsatisfactory basis. Two 1 1/2-hour lectures per week. Prerequisites: 260 or 160. This course is intended for students who have already acquired a basic understanding of epidemiology, biostatistics and environmental health sciences. The objectives of the course are to introduce the student to the epidemiology of some major site-specific cancers, to consider epidemiologic approaches to the study of their causation, and to examine some current problems in the field. Several issues of study design and implementation will be discussed. (SP) Katarianoff

281. Advanced Forensic Science: Physical Aspects. (4) One 2-hour lecture/discussion and three 3-hour laboratory sessions per week. Prerequisites: Consent of instructor. Detailed analysis of advanced procedural and interpretational problems in forensic science. Focus on problems of a physical nature. (F) Thomson

282. Advanced Forensic Science: Biological Aspects. (4) One 2-hour lecture/discussion and three 3-hour laboratory sessions per week. Prerequisites: Consent of instructor. A detailed analysis of advanced forensic procedural and interpretational 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: Sensabaugh, Smith. Emphasis is on current problems in this area. (SP) Sensabaugh

285. Forensic Science Trial Practice. (1) Formerly 297S. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour discussion per week. Prerequisite: 281 (may be taken concurrently). Preparation of evidence in court, mock trial. (SP) Staff

289. Epidemiology/Biostatistics Seminar. (1-4) Course may be repeated for credit. Topics to be announced. (F,SP) Staff

290. Epidemiology/Biostatistics Laboratory. Course may be repeated for credit. One 2-hour session per week. Prerequisites: Sensabaugh, Smith. Open to all students in 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

295. Current Topics in Forensic Science. (1) Course may be repeated for credit. One 2-hour session per week. Prerequisites: Graduate standing in department or consent of instructor. Discussion of current topics in forensic science. (F,SP) Staff

296. Special Study. (1-8) Course may be repeated for credit. Individual conferences. Prerequisites: Qualified graduate students in biomedical and environmental health sciences. Designed to permit any qualified graduate 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 topics and recent literature. (SP) Reingold

299. Individual Research. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour session per week. Prerequisites: Open to all students in the area of biomedical and environmental health science. Designed to permit qualified graduate students to pursue study under direction of a faculty member. (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. Individual conferences. Individual study for the 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) Staff
602. Individual Study for Doctoral Students. (1-12)
Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Individuals consultation with the major field advisor. Intended to provide an opportunity for qualified students to prepare themselves for the various examinations required 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. Two hours of lecture per week. Discussion and practice of teaching techniques as applied to biostatistics. (F,SP) Staff

Interdepartmental Studies Courses
Graduate Courses
221. Ecology and Epidemiology of Arthropod-Borne Zoonoses. (2)* Two hours of lecture per week. Prerequisites: Consent of instructor. This interdisciplinary graduate course will focus on the ecology and epidemiology of zoonotic diseases transmitted by arthropods. Students will conduct field and laboratory investigations, and recent advances in diagnostic and control methodologies will be discussed. Presentation of findings stemming from research projects will enhance understanding of disease transmission in natural resources. Students will learn to develop an area of interest within animal sciences. Students interested in pursuing studies in many allied biological sciences. (Ten) 201 Campbell Hall; Robert J. Tarter

Biophysics and Medical Physics
(College of Letters and Science)

As a result of the reorganization of the biological sciences on the Berkeley campus, the faculty and programs of the Department of Biophysics and Medical Physics will become part of the Division of Biophysics and Medical Sciences in the new Department of Molecular and Cell Biology, effective fall 1989. For an explanation of the full scope of the biological sciences reorganization and its implications, see page 88.

Undergraduate Programs: Beginning fall semester 1989, students will no longer be accepted into the former undergraduate majors in biophysics or biophysics: medical physics option. Prospective majors interested in biophysics or medical physics should consult Plan III (emphasis in biophysics) of the major offered by the new department. Continuing students who declared the major in biophysics or biophysics: medical physics option before fall semester 1989 may continue in the program, provided they meet all degree requirements and graduate before fall semester 1993. Both continuing and prospective majors should contact the major advisor or undergraduate assistant in the Division of Biophysics and Cell Physiology of the new Department of Molecular and Cell Biology. The names and locations of these advisors can be obtained by writing to Ms. Patricia Power, Staff Assistant to the Dean, College of Letters and Science, 201 Campbell Hall, University of California at Berkeley, Berkeley, CA 94720. Beginning fall semester 1993, all students will be expected to complete an undergraduate major current at the time of their application for the degree.

Graduate Program: The graduate program in biophysics will continue to be administered by the Graduate Group in Biophysics. This campus-wide interdepartmental group was organized to permit interested students to receive training leading to the M.A. or Ph.D. in biophysics. Students interested in study and 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 understanding of basic biology and biophysics and in other sciences, but individual deficiencies may be removed during the early stages of graduate study. Graduate courses in biophysics are listed in this catalog among the offerings of the Division of Biophysics and Cell Physiology of the Department of Molecular and Cell Biology. Further information is available from the Group Office, 101 Donner Laboratory, 642-0379.

Concordance of Courses: On the following page is a list of courses formerly offered by the Department of Biophysics and Medical Physics, followed by their new names, numbers, and titles in the new departments. For a list of the courses offered by the departments, followed by their former names, numbers, and titles, consult this catalog in the heading "Integrative Biology." "Molecular and Cell Biology," or "Plant Biology." At press time for this catalog, some course information was still not up-to-date.

Bioresource Sciences
(College of Natural Resources)

Department Office: 218 Wellman Hall, 642-6660

Major Advisers: Natural Resource emphasis, John Doyen, 217 Wellman; Genevi Huisman, 150 Hilgard; Robert Raabe, 147 Hilgard; Loy Volkman, 330 Hilgard. Animal Science emphasis, Clarence Weismann, 414 Wellman; Harvey Turner, 125A Hilgard; Robert Lane, 411 Wellman; Steven Lindow, 227 Hilgard; Rudolph Pipe, 319 Wellman; Norman Terry, 8 Giannini.

Group Major in Agricultural Sciences
This major program provides an interdisciplinary study of the science of renewable natural resources and involves faculty and courses from numerous departments within the college. At the lower division level, the major includes the introductory concepts of agriculture 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 choices of electives in 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 foundation for pre-med or 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 an excellent preparation for graduate work in zoology or other animal sciences. Students are expected to develop an area of interest within animal resources and sciences. The major advisor or the dean's office in Student Affairs should be consulted about specific courses on the Berkeley campus that fulfill pre-veterinary requirements.

Biostatistics
(College of Letters and Science)

Group Major Office: 101 Haviland Hall, 642-5241
Address: 140 Welman Hall
Co-chairs: Nicholas J. Jewell, Ph.D.; Dennis M. средин, 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 C. Dion, Ph.D., University of California at Berkeley. Nonparametric, survival analysis
Joseph L. Hodges, Jr., Ph.D., University of Edinburgh. Sampling and survival analysis
Mary Alice King, Ph.D., University of California at Berkeley. Human genetic analysis, epidemiology
Michael J. Klasa, Ph.D., University of California at Berkeley. Applications of statistics in the sciences
Lucien Le Cam, Ph.D., University of California at Berkeley. Asymptotic methods, stochastic modeling
Steve Levin, Ph.D., University of California at Berkeley. Data analysis of epidemiologic problems
Charles J. Stein, Ph.D., Stanford University. Nonparametric statistical modeling, Statistical software
Michael E. Tarter, Ph.D., University of California at Los Angeles. Computer and graphical methodology
Carolyn Thomas, Ph.D., University of California at Berkeley. Models related to radiation biology
Warren Winkelstein, Jr., M.D., M.P.H., Syracuse University. Ecology, cancer, AIDS
Calvin Zipin, Ph.D., Sc.D., Johns Hopkins University. Population models
Chin Long Chiang, Ph.D., (Emeritus) University of California at Berkeley. Bioclimatic processes, life tables
P. N. David, Ph.D., (Emeritus) University of London. Combinatorial, spatial patterns
Everett R. Dempster, Ph.D., (Emeritus) University of California at Berkeley. Population and quantitative genetics
William C. Reeves, Ph.D., M.P.H., (Emeritus) University of California at Berkeley. Mosquito-borne viruses and control
Elizabeth L. Scott, Ph.D., University of California at Berkeley. Applications of statistics in the sciences

Assistant Professors
Hina M. Malani, Ph.D. Columbia University. Survival analysis, biostatistics
William J. Redfern, Ph.D. University College London. Factor-analysis models and the method of moments

Group Major in Biostatistics

The phenomena studied in the health, medical, and biological sciences, as in all sciences, involve chance mechanisms. To understand such mechanisms and their relationship with the phenomena requires competence in probability and statistics, and to apply these concepts to any field of science requires a basic knowledge of the subject matter of the field. Biostatistics is concerned with development of statistical principles and methods and their application to problems in the health, medical, and biological sciences. As a discipline, biostatistics is essential to research and contributes to the understanding in these scientific areas.

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 with 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 graduate advisor.

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 the Bioresource Sciences.
Concordance List for Biophysics and Medical Physics

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<th>Course Title</th>
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<td>MCellBi 022 Origin and Early Evolution of Life</td>
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<td>012</td>
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<td>300</td>
<td>Professional Preparation: Supervised Teaching of Biophysics</td>
<td>MCellBi 380 Teaching of Biophysics</td>
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Preparation for Graduate Study

Minimum entrance requirements consist of two full-year courses in calculus and one-year courses in mathematical statistics or biostatistics. 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.

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 of 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 with 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)

As a result of the reorganization of the biological sciences on the Berkeley campus, the faculty and programs of the Department of Botany will become parts of two new departments, effective fall 1989: faculty and programs concerned with the systematics, ecology, and evolution of plants will join the Department of Integrative Biology, and those concerned with physiology and molecular biology of plants will join the Department of Plant Biology in the College of Natural Resources. For an explanation of the full scope of the biological sciences reorganization and its implications, see page 38.

Undergraduate Program: Beginning fall semester 1989, students will no longer be accepted into the undergraduate major in botany. Prospective majors interested in botany should consider one of the majors offered by the new departments described above and should contact the major advisers in the appropriate new departments. The names and locations of these advisers can be obtained by writing to Ms. Patricia Power, Staff Assistant to the Dean, College of Letters and Science, 201 Campbell Hall, University of California at Berkeley; Berkeley, CA 94720. Continuing students who declared the botany major before fall 1989 may continue in the program, provided they complete all degree requirements and graduate before fall semester 1993. Such students should contact the major adviser or undergraduate assistant in the Department of Integrative Biology. Beginning fall semester 1993, all students will be expected to complete an undergraduate major current at the time of their application for the degree.

Graduate Program: For fall semester 1989, new students have been admitted to the existing graduate program in botany. Graduate programs for the new biological sciences departments are currently under review, and it is anticipated that the new graduate programs will receive final approval during fall semester 1989. All new and continuing graduate students will be notified when these programs are approved. At that time, students will have the option of continuing in the program to which they were admitted or requesting transfer to a related new program. For details of the existing graduate programs in botany, students should contact the graduate adviser in the Department of Plant Biology. Students wishing to apply for admission after fall 1989 and requiring further information should contact the new department, either Integrative Biology or Plant Biology, to which they wish to apply.

Concordance of Courses: On the following page is a list of courses formerly offered by the Department of Botany, followed by their new names, numbers, and titles in the new departments. For a list of the courses offered by the new departments, followed by their former names, numbers, and titles, consult lists in this catalog under the headings "Integrative Biology," "Molecular and Cell Biology," or "Plant Biology." At press time for this catalog, some course information was still not available. If you have questions, or if you do not find a course listed with its new name, number, and title, consult staff in one of the new departments for up-to-date information.
## Concordance List for Botany

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<td>280</td>
<td>Botany Colloquium</td>
<td>IntegBi 292 Integrative Biology Colloquium</td>
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<td>290</td>
<td>Seminar</td>
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<td>PlantBi 290 Seminar</td>
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Buddhist Studies

(College of Letters and Science)

Group Members: Office 1203 Dwinelle Hall, 642-4684
Chair: P.J. Dahlin, Ph.D.

Professors:
- Robert N. Bellah, Ph.D. Harvard University. (Sociology and Religion)
- James Cahill, Ph.D. University of Michigan. (History of Art)
- Alan G. Astley, Ph.D. University of Pennsylvania. (South and Southeast Asian Studies)
- Padmanabha S. Jayi, Ph.D. University of London. (South and Southeast Asian Studies)
- Lewis R. Lancaster, Ph.D. Wisconsin. (Oriental Languages)
- J. Friggs Staal, Ph.D. University of Madras. (Philosophy and Oriental Languages)
- Joanna Williams, Ph.D. Harvard University. (History of Art)

Associate Professors:
- James E. Bosson, Ph.D. University of Washington. (Oriental Languages)
- Michel Strickmann, Ph.D. Ecole Pratique des Hautes Etudes. (Oriental Languages)
- Bared A. Van Nooten, Ph.D. University of California. (South and Southeast Asian Studies)

Graduate Adviser: Lewis R. Lancaster.

Group in Buddhist Studies

The Group in Buddhist Studies offers an interdisciplinary program of study and research leading to the Ph.D. degree in Buddhist Studies. The group, which cooperates closely with the Department of South and Southeast Asian Studies and the Department of Oriental Languages, emphasizes the close ties of religion with the linguistic background and the surrounding civilizations. Students who wish to join the program may choose either an emphasis in Sanskrit or in an East Asian language, i.e., Chinese or Japanese. For those who choose the Sanskrit emphasis, the required secondary language will be Chinese or Tibetan; for the Japanese emphasis, the required secondary language will be Sanskrit.

Preparation. For admission to the graduate program the student must have completed an M.A. in one of the appropriate Asian languages or have equivalent language preparation. Early in the student’s doctoral career, written examinations in two modern languages must be passed. These languages must be relevant to the student’s program and have the approval of the graduate adviser.

Further information about the program, including a full statement of the requirements for advancement to candidacy, is available upon request from the group office.

Business Administration

(School of Business Administration)

Office: 350 Barrows Hall, 642-7989
Dean: Raymond E. Miles, Ph.D.

Professors:
- David A. Ask, Ph.D. Stanford University. (Marketing)
- Gary Smith, Ph.D. University of California. (Marketing)
- R. Roland K. Hult, Ph.D. Stockholm School of Economics. (Economics of population aging, macroeconomics)
- Frederick E. Baiden, Ph.D. Princeton University. (Strategic Finances, Marketing Systems)
- Wayne S. Bottom, Ph.D. P.C.A. University of California. (Accounting, Auditing, Computers)
- Louis P. Buzan, Ph.D. Northwestern University. (Marketing, Strategic Management)
- Harold W. Bodie, Ph.D. University of Michigan. (Marketing Strategies, Distribution Systems)
- James W. Baylis, Ph.D. University of Michigan. (Marketing Strategies, Distribution Systems)
- Alan R. Cary, Ph.D. P.C.A. Stanford University. (Taxation, Business Ethics)
- Earl F. Shel, Ph.D., J.D., D.H.L. (hon.) Edgar F. Kaiser Professor (Business Administration) University of California. (Business Ethics, Corporate Social Responsibility)
- Robert H. Edlestein, Ph.D. Harvard University. (Real Estate, Auditing)
- Edwin M. Epstein, LL.B., M.A. Yale University. (Business Ethics and Corporate Policy Behavior)

Associate Professors:
- Glenn R. Carroll, Ph.D. Stanford University. (Organization Theory, Corporate Finance)

Susan B. Foote, J.D. University of California at Berkeley. (Medical Technology, Product Liability)

Robert G. Harris, Ph.D. University of California at Berkeley. (Industry Economics, Regulation, Telecommunications, Antitrust)

Dorit S. Hochbaum, Ph.D. University of Pennsylvania. (Optimization Research and Applications)

Michael L. Katz, Ph.D. Oxford University. (Competitive Strategy, Microeconomics, Managerial Compensation)

Jonathan S. Leonard, Ph.D. Harvard University. (Employment, Productivity, Collective Bargaining)

Trevor A. Mathes, Ph.D. Northwestern University. (Corporate Finance, Economics, Accounting)

International Finance, Applied Economics

David C. Mowry, Ph.D. Stanford University. (Economics of Foreign Trade, Business History)

Brett M. Trueman, Ph.D. Columbia University. (Implications of asymptotic properties, Janitorial, and organizational networks)

Andrew W. Shogen, Ph.D. Stanford University. (Network Analysis, Marketing)

Francis Van Luo, Ph.D. University of California at Berkeley. (Management of Public and Nonprofit Institutions)

Milo W. Smith, Ph.D. (Emeritus) Iowa State University. (Accounting)

Acting Associate Professor:
- Peter Cappelli, Ph.D. University of Pennsylvania. (Accounting)

Assistant Professors:
- Sara L. Beckman, Ph.D. Stanford University. (Marketing Strategy, Corporate Organization, Design, Cost Management)
- Gregory Comor, Ph.D. Yale University. (Economics of Production)

Gerard Gennotti, Ph.D. Massachusetts Institute of Technology. (Theory of Investments, Asset Pricing)

Michael L. Gerlaich, Ph.D. Yale University. (International Business and Management)

Benjamin E. Hermlin, Ph.D. Massachusetts Institute of Technology. (Theory of Contracts and Mechanism Design)

Alison J. McCauley, Ph.D. (Accounting, Information Sharing and Communication)

Albert T. (Pete) Kyle, Ph.D. University of Chicago. (Finance, Market Microstructure)

David J. Levine, Ph.D. Harvard University. (Macroeconomics, Labor Issues, Corporate Investment)

David M. Mock, Ph.D. Massachusetts Institute of Technology. (Finance, Futures Markets, Asset Pricing)

Zoe-Vonna Palmrose, Ph.D. P.C.A. University of Washington. (Auditing, Litigation, Accounting, Regulation)

Richard T. Townsend, Ph.D. University of Wisconsin. (Career Systems, Systems Management, Organizational Behavior)

Andrew L. Rose, Ph.D. University of California at Berkeley. (Economics of Financial Intermediation, International Finance, Macroeconomic Policy)

Christine M. Rosen, Ph.D. Harvard University. (Environmental Regulations, Public Policy)

Aris Seghe, Ph.D. University of Rochester. (Database Design, Decision Making)

Ilamar Simonsen, Ph.D. Duke University. (Accounting, Market Efficiency)

Pradyot K. San, Ph.D. Columbia University. (Information, Incentives and Disclosures, Management Accounting)

Nancy F. McDowell, Ph.D. University of Michigan. (Urban Economics and Real Estate)

Acting Assistant Professor:
- Toshiyuki Shibano, Stanford University. (Accounting, Auditing, Statistical Analysis)

Professor:
- Richard M. Schiller, Ph.D. New York University. (Health Economics, Law, Public Policy, Nonprofit Organizations)

Affiliated Professors:
- Philip E. Tetlock, Ph.D. (Psychology)

Lecturers:
- Cristina G. Banks, Ph.D. University of Minnesota. (Personnel Management and Assessment)

David Dittmar, Ph.D. Cornell University. (Business Education, Finance, Public Utilities)

Thomas W. McCullough, Ph.D., J.D. University of California at Berkeley. (Management of Information Systems, Computer, Economic Analysis and Policy)

Adjunct Professors:
- Grill Silver, J.D. University of California at Berkeley. (Executive Compensation, Organizational Economics)


Clarence H. Wughton, M.B.A., C.P.A. Harvard University. (Auditing, Accounting)

Peter T. Jones, J.D. Harvard University. (International Business, Competitiveness, Country Analysis)
Undergraduate and Graduate Programs

For a description of the undergraduate and graduate programs in business administration, see page 69.

Lower Division Courses

1. Introduction to Accounting. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Sophomore standing. The identification, measurement, and reporting of the financial effects of economic events on enterprises; the contemporary model and its origins. (F,SP)

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, Mathematics 16A-16B and Statistics 21 or equivalents. Economic analysis applicable to the problems of business enterprises with emphasis on the determination of the level of prices, outputs, and inputs; effects of the state of the competitive environment on business and government policies. (F)

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. Analysis of the operation of the market system with emphasis on the factors responsible for economic instability; analysis of public and business policies which are necessary as a result of business fluctuations. (F,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 long-run and short-run forecasts of economic activity. (SP)

115. Management in the Public and Not-for-Profit Sectors. (3) Three hours of lecture per week. Prerequisites: 110. Economic basis of the public and not-for-profit sectors. Institutional arrangements as they impinge on operations in the public sectors. Emphasis on managerial approaches and tools to use in a nonprofit environment. (SP)

120. Managerial Accounting. (3) Two hours of lecture and 2 hours of discussion per week. Prerequisites: 1. Three hours of lecture and two hours of discussion per week in the process of management of an enterprise. Classifications of costs and revenue on several bases for various applications. Markets for financial assets and the structure of yields, influence of Federal Reserve System and monetary policy on financial assets and institutions. (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 effects of events involving working capital and long-term plant assets, investment in securities, intangible assets. (Required for those specializing in accounting.) (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 analysis, accounting for partnerships, consolidated financial statements, adjustments of consolidated financial statements, accounting for the financial effects of pension plans; other advanced accounting problems. (Required for those specializing in accounting.) (F,SP)

124. Cost Accounting. (3) Two hours of lecture and one 1/2-hour discussion per week. Prerequisites: 1 and 120. Intensive study of basic cost accumulation systems and refinements thereof used to determine costs of products or activities in various types of enterprises. (SP)

125. Administrative Accounting. (3) Students will receive no credit for 125 after taking 1 or 120. Three hours of lecture per week. Introduction to accounting and its uses in analyzing, planning, and controlling the operations of organizations of all types. (For students interested in administration or management who are not majors in business administration.) (F,SP)

126. Auditing. (4) Three hours of lecture and one 1/2-hour discussion per week. Prerequisites: 121; 122 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. (F,SP)

127. Accounting Systems for Management. (4) Three hours of lecture and one 1/2-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. (F)

128A. Federal Income Taxation I. (F) Formerly 128A. Three hours of lecture and one 1/2-hour discussion per week. Prerequisites: 1 and 120; 121 recommended. Determination of individual and corporation tax liability; influence of federal taxation on economic activity; tax considerations in business and investment decisions. (F,SP)

128B. Federal Income Taxation II. (F) Three hours of lecture and one 1/2-hour discussion per week. Prerequisites: 128A. A study of federal taxation of corporations, shareholders, partners; 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 problems in order to broaden students' perspectives 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 study required. (F)

130. Financial Management. (4) Three hours of lecture and one 1/2-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 budgeting, 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. Organization of the financial system and the operation of the market for financial assets and the structure of yields, influence of Federal Reserve System and monetary policy on financial assets and institutions. (F,SP)

133. Investments. (3) Three hours of lecture per week. Prerequisites: 110 and 120. The measurement and demand for investment capital, operations of security markets, determination of investment policy, and procedures for analysis of securities. (F,SP)

139. Seminar in Finance. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 110 and 120. Minimum GPA required. Seminar for honors students in finance. A variety of topics in finance with emphasis on current financial problems and research. (F,SP)

140. Introduction to Management Science. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Comp Sci 8, Econ 1, Math 1A-B and Statistics 21 or equivalents. Survey of management science and its applications to business problems. Topics covered include linear and integer linear programming, project management, dynamic programming, interactive control, queuing theory, and simulation. (F,SP)

141. Strategic Planning of Production and Operations. (3) Three hours of lecture per week. Prerequisites: 3 or consent of instructor. A survey of the strategic issues in production and operations management and the techniques managers can use to address these issues. Topics include plant design, plant and warehouse location, capacity expansion, R and D, new products, and acquisition of new technologies. (F,SP)

142. Production and Operations Management. (3) Three hours of lecture per week. Prerequisites: 140 or consent of instructor. A survey of the concepts and methodologies for management control of production and operations systems. Topics include cost, inventory, control, material requirements planning for multistage production systems, aggregate planning, scheduling, and production distribution. (F)

145. Applications of Linear Models to Decision Making. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 140 or consent of instructor. Stochastic and deterministic models of decision analysis. The course includes treatment of queueing systems, inventory management and control systems, and quality control systems. The techniques presented include linear programming, decision analysis, objective function programming, and statistical analysis. Particular emphasis is placed on application of models to actual situations in business, industry, and government. (SP)

147. Computers and Modern Organizations. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Computer Science 8 or consent of instructor. A survey course concerned with the importance of computers in organizations, including small groups, univariate, firms, government agencies, and computer networks. Topics include history of development of computers, characterization of scientific versus business problems, information storage and retrieval, compilers, problem-oriented languages, simulation, and current developments in computer systems. (F,SP)

150. 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 addressed. The interaction among technology, environment, and human behavior are considered. Alternate theoretical models are discussed. (SP)

151. Management of Human Resources. (3) Three hours of lecture per week. Prerequisites: 150 or consent of instructor. The designs of systems of rewards, assessment, and manpower development. The interaction of selection, placement, training, personnel evaluation, and career ladders within an ongoing organization. Role of the staff manager. Introduction of charge. Implications of behavioral research for management problems and policies. (F,SP)

154. Industrial Relations. (3) Students will not receive credit for both Economics 151 and Business Administration 151. Three hours of lecture per week. Prerequisites: 110 or consent of instructor. A survey course concerned with the importance of behavioral science to business. Topics include analysis of manual, white collar, and professional employee relations. Background and functioning of employer and employee organizations. Functioning of labor markets and wage and income security issues. Questions of
public policy in labor economics and industrial relations. (F,SP)

155. Labor and the Law. (3) Three hours of lecture per week. Analysis of the issues arising out of legislative, administrative, and judicial efforts to define the rights, responsibilities of employers and labor relations. Includes programs to deal with racial, ethnic, sex, and age discrimination as well as the law of unemployment compensation. (F)

156. Collective Bargaining Systems. (3) Three hours of lecture per week. The nature, institutions, and processes of collective bargaining. Analyses of labor-management issues and their economic and political significance. Comparative analyses of industrial relations systems in major industries, in public employment, and in other countries. (F)

159. Special Topics In Organizational Behavior. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 150 or consent of instructor. Analysis of recent literature and development related to such topics as organization development, environmental determinants of organization structure and decision making behavior; management of professionals in management in temporary structures; cross-cultural studies of management and organization. (F,SP)

160. Marketing. (3) Two 1 1/2-hour lectures per week. Prerequisites: 110 or equivalent. The evolution of markets and marketing; market structure; market cost and effectiveness of various marketing efforts; the development of marketing programs including decisions involving products, price, promotional distribution. (F,SP)

161. Introduction to Marketing Research. (2) Two 1 1/2-hour lectures per week. Prerequisites: 160. Marketing research objectives; qualitative research, surveys, expenditure sampling, data analysis. (SP)

162. Sales Management. (3) Two 1 1/2-hour lectures per week. Prerequisites: 160. Analysis of selling function, sales management, and channel management within the firm. (F)

163. Organizational Buying Behavior. (2) Two hours of lectures per week. Prerequisites: 160. The interaction of buyer and seller in a non-consumer environment. Development of buying policies in quality and quantity determination; vendor selection; make-buy decisions; pricing and terms of sale; energy and resource conservation; negotiation. (F)

165. Advertising. (2) Two hours of lectures per week. Prerequisites: 160. Basic concepts and functions of advertising in the economy; consumer motivation; problems in utilizing advertising and its effectiveness. (F,SP)

166. Retailing. (2) Two hours of lecture per week. Prerequisites: 160. History and development of retail management types; geographical structure of retail trade; assortments of goods and services; store management; government regulations. (SP)

169. Marketing Policies and Problems. (2) Course may be repeated for credit. Two 2-hour seminar per week. Prerequisites: 160 or consent of instructor. Special topics in marketing including geographic market structures, consumer behavior, product policy, consumerism, and other topics. (F,SP)

170. Social and Political Environment of Business. (3) Three 1 1/2-hour lectures per week or one 2-hour lecture and one hour of discussion per week. Prerequisites: Senior standing. Study and analysis of American 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 national priorities. The expanding role 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 1 1/2-hour seminar meetings per week. Prerequisites: 175 and/or 170 recommended. 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 1 1/2-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 1 1/2-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 political and social topics, business associations, and the impact of law on economic enterprise. (F,SP)

177. Legal Aspects of Business Transactions. (3) Two 1 1/2-hour lectures per week. Prerequisites: 175. A review of the legal implications of certain common business transactions and situations, including problems arising in sales, installment buying, inventory financing, obtaining and extending credit, negotiable instruments, and insolvent in the Uniform Commercial Code. (SP)

178. Legal Aspects of Real Estate. (3) Two 1 1/2-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) Two 1 1/2-hour lectures per week. The nature of real property; market analysis; construction cycles; mortgage lending; equity investment; metropolitan growth; urban land utilization; real property valuation; public policies. (F,SP)

181. Valuation of Real Property. (3) Three hours of lecture per week. Prerequisites: 180 or equivalent. Critical examination of appraisal concepts and methods; the role of value estimates in private land-use and real estate investment; an overview 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 demand; equity investment criteria; public policies in real estate finance and urban development. (F,SP)

188. Introduction to International Business. (3) Two hour of seminars and one hour of discussion per week. Prerequisites: Senior standing. Introduction to Accounting, Macro and Macroeconomic Theory. A survey involving the objectives, the role of foreign market analysis and operational strategy 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 planning are developed. Several major types of planning models and techniques are evaluated for strategic policy choices, organizational design, and the allocation of resources. (F,SP)

196. Special Topics In Business Administration. (1-3) Course may be repeated for credit. One to 3 hours of lecture per week. Prerequisites: Upper division standing. 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)

198. Regional Economic Development. (1-4) Course may be repeated for credit. Must be taken on a pass/failed basis. Prerequisites: Consent of instructor. Enrollment is restricted by regulations listed on pages 87 and 88 of this catalog. (F,SP)

Graduate Courses

200. Financial Analysis for Business Decisions. (3) Two hours of lecture and two hours of discussion per week. This course provides an introduction to probability theory and statistical applications to the problems of business. Topics include: probability distributions, sampling and estimation, hypothesis testing, regression analysis, nonparametric statistics and time series analysis. (F)

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; the determination of prices, inputs, and outputs; (1) Understanding 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 situation today to broader problems associated with economic growth and decay in the world. (F,SP)

202A. Financial Reporting. (3) Two hours of lecture per week plus one optional hour of tutorial session. Prerequisites: 202B 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 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 7 1/2 weeks. Prerequisites: 201A, 202A, and 204. Business finance, with emphasis upon financial problems and policies of corporations, the role of commercial banks, institutional and other investors in supplying funds for corporations, and the development and marketing of securities. (F,SP)

204. Introduction and Management Sciences. (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 applications 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 to store and retrieve information. Topics include database management, systems analysis and design, and telecommunications and distributed processing. (F)

205. Organizational Behavior. (3) Three hours of lecture per week. 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,SP)

206. Marketing Organization and Management. (3) Two 1 1/2-hour lectures per week. Prerequisites: 201A or equivalent. Topics include an overview of the marketing system and the marketing concept, buyer behavior, market segmentation and market targeting, new product decision making, marketing structures, and evaluation of marketing performance in the economy and society. (F,SP)
207. Business and Public Policy. (3) Two 1½-hour lectures per week. Provides the entering MBA student (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 environment within which the business enterprise functions. The instructor will approach these issues from the viewpoint of a variety of academic disciplines, including law, economics, history, sociology, and political science, as well as varied practical experiences. (F,SP)

210. Market Structure and Economic Performance. (3) Three hours of lecture per week. Prerequisites: 201A-201B, 204B-204C, [204B-204C renumbered 202], or equivalents. Examines optimal production and pricing policies for firms in competitive environments; optimal strategic choice in duopolies; and price of imperfect information. Discussing how 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, 204B-204C, [204B-204C renumbered 202], or equivalents. Emphasis is on data analysis; the student will learn techniques in these industries. Potential regulatory reforms with existing competition in these industries. (F,SP)

212. Managerial Decisions in Regulated Industries. (3) Three hours of lecture per week. Prerequisites: 201A-201B, 204B-204C, [204B-204C renumbered 202], or equivalents. The theory and use of statistical and econometric methods with special emphasis on applications. Topics include regression analysis; special problems in applied regression analysis; simultaneous equations estimation; elements of multivariate analysis. (F)

213. Statistical and Econometric Methods for Business. (3) Three hours of lecture per week. Prerequisites: 201A-201B, 204B-204C, [204B-204C renumbered 202], or equivalents. The course will focus on a variety of currently used forecasting techniques. These include econometric techniques and purely extrapolative (time series) methods. The course will be more than a course in forecasting. 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 required. (SP)

215. Management in the Public and Not-for-Profit Sectors. (3) Three hours of lecture per week. Prerequisites: 201A-201B, 204B-204C, [204B-204C renumbered 202], or equivalents. The course will focus on a variety of currently used forecasting techniques. These include econometric techniques and purely extrapolative (time series) methods. The course will be more than a course in forecasting. 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 required. (SP)

220A. Financial Accounting I. (4) Three hours of lecture and one 1½-hour discussion per week. Prerequisites: 202A or consent of instructor. This course and the following three courses are intended to provide students with an in-depth understanding of the concepts and methods of financial accounting. (F,SP)

222. Financial Information Analysis. (2) Two hours of lecture per week. Prerequisites: 202A and 203 recommended. Issues of accounting information evaluation with special emphasis on the use of financial statements by decision makers outside the firm. The implications of recent research in financial accounting for external reporting issues will be explored. Emphasis will be placed on models that describe the user's decision context. (F,SP)

223A. Doctoral Seminar in Accounting I. (3) Students may not receive credit for both 223A and 233A. Three hours of seminar per week. Prerequisites: 220A or equivalent, 292A and Economics 201A-201B. A critical evaluation of recent accounting literature involving empirical research. (F,SP)

223C. Doctoral Seminar in Accounting III. (3) Three hours of seminar per week. Prerequisites: 220A or equivalent, 292A and Economics 201A-201B. A critical evaluation of recent accounting literature with emphasis on managerial accounting. (F,SP)

224. Managerial Accounting. (3) Three hours of lecture per week. Prerequisites: 202A and 202B or equivalent. This course includes the theory of management accounting, its application in modern organizations, and related problem areas included in recent CPA and CMA examinations. (F)

225. Advanced Topics in Accounting. (2) Two hours of lecture per week. Prerequisites: 202A, 202B or equivalent. Seminar in advanced topics in accounting selected from subjects from auditing theory, control aspects, management information systems, and managerial accounting. (F)

228A. Income Taxation I. (4) Three hours of lecture and one 1½-hour discussion per week. Prerequisites: 202A and 202B or equivalent. The study of the fundamentals of income taxation relating to individuals and business entities. Students are also introduced to tax research, tax planning, and tax policy. (F,SP)

228B. Income Taxation II. (2) Two hours of lecture per week. Prerequisites: 228A or equivalent. The study of corporation tax problems, partnership tax problems, subchapter S corporations, estate and gift taxation, income taxation of estates and trusts. (F)

228C. Seminar in Income Taxation. (2) Two hours of lecture per week. Prerequisites: 228A or equivalent; 228B recommended. Tax research, tax planning, and tax policy. (F,SP)

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. Strategic planning and management 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 one 1½-hour discussion per week for 15 weeks or two hours of lecture and two hours of discussion per week for 7½ weeks. Prerequisites: 203. Financial decision problems, their structure, solution, and implications, including decision diagrams and dynamic decision models, the representation of preferences, asset composition models, and the structure of asset prices. (F,SP)

231. Project and Security Valuation. (2) Two hours of lecture per week. Prerequisites: 203 or equivalent. Estimation of financial flows; valuation of risky projects, securities, and firms; effects on valuation of financing mechanisms, inflation, and taxes. Traditional security analysis and capital budgeting models and techniques. (F)

232. Money Markets and Financial Institutions. (2) Two hours of lecture per week. Prerequisites: 201B and 202A and 229A and 228A and 229A and 228A. Money market and capital market institutions, commercial bank, and nonbank financial institutions. Portfolio composition and market behavior of financial intermediaries. Organization 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 for 7½ weeks. Prerequisites: 233. Structure and comparison of the securities market; issues between security prices, business cycles, and money market developments. Consideration of individual and institutional investment policies and principles of security analysis. (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 mergers. Development of theory and application to financial management decisions. (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: 232. Normative issues in financial institutions, regulation of financial institutions, the organization of money markets, and empirical studies on financial institutions and financial markets. Topics to be covered will vary. (SP)

236. Advanced Topics in Securities Markets and Investments. (2) Course may be repeated for credit. Two hours of lecture for 15 weeks or four hours of lecture for 7½ weeks. Prerequisites: 233. Normative models for investment management, valuation of securities, behavior of security prices, the function and regulation of security markets, and empirical studies on securities prices and portfolio behavior. Topics covered will vary. (F,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. Doctoral Seminar in Finance. (3) Students may not receive credit for both 223A and 238A. Three hours of seminar per week. Prerequisites: 233 and 234 or other introduction to decision theory; Economics 201A-201B. Research seminar in economics, including the theory of intertemporal choice under certainty or uncertainty, portfolio optimization, asset market equilibrium, valuation of uncertainty, problems in corporate finance, and the business firm and public policy. Development of theory and empirical verification of financial models. (F,SP)

240. Introduction to Management Science. (3) Three hours of lecture and one 1½-hour discussion per week. Prerequisites: 204. 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 and the production of goods and services; models of those functions that are useful for the firm's strategic planning. Topics include models of a firm's capacity expansion, facility location, and technology selection decisions, learning curve strategies; and industry cost data for a variety of industries. (SP)

242A. Introduction to Operations Management. (3) Two 1½-hour lectures per week. Prerequisites: 204 or consent of instructor. This course is an introduction to production and operations management open to all Business School students. The course includes two or three visits to manufacturing plants and discussion of manufacturing systems (continous production, batch production, multiple products, assembly line and various hybrids of pure systems). Special attention will be paid to the implementation of technology.
to the analysis of the technologies and systems used in the manufacturing plants visited. (SP)

242B. Operations Management. (3) Two 11/2-hour lec-
tures per week. Prerequisites: 204. This course is in-
lated to the interests of students in the field of manu-
facturing and of service facilities. The problems and
features of planning, construction, scheduling, quality
and operations of manufacturing (and some serv-
ices) is covered. Cases are used to examine decision
making in the manufacturing en-
vironment. (SP)

243. Decision Analysis. (2) Two hours of lecture per
week. Prerequisites: 204B-204C [200] or equivalent. Pro-
cesses of uncertainty and the
application of the expected-utility rule with personal probabilities.
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 in-
fomration. Examples in oil leasing, contract bidding, and
labor negotiations. (SP)

246. Advanced Topics in Management Science. (2-
3) Course may be repeated for credit. Two or three
hours of lecture per week. Prerequisites: Consent of
instructor. This course will focus on a particular topic in
management science and its application to decision
making. Course topics will vary, with likely topics
involving being integer programming models, network models, stochastic modeling, Markov decision models, con-
tinuous-time probability models, and management in-
formation systems.

247. Simulation for Business Decisions. (2) Two hours
of lecture per week. Prerequisites: 204-204B-204C
[200 and 204], or equivalents. Uses of computer modeling
in business decision-making contexts. Structure of sim-
ulation models; simulation languages, data structures,
techniques, 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 11/2-hours of discussion per week. Prereq-
quisites: 204A. 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
management models and their strategic importance are stud-
ied. Other topics include future developments in computer
technology and acquiring and managing computer re-
sources. A team project consists of the design and
implementation of a data base using a relational database
management system package. (F)

248B. MIS: Systems Analysis and Design. (3) Two
11/2-hour lectures per week. Prerequisite: 204A [204].
The goal of this course is to provide future general managers and information systems specialists with ex-
pertise in aspects of utilizing information in decision
making. Topics covered include the role of information
systems in organizations, systems analysis, trade-offs
economic consideration in systems development,
software selection and review of technological ad-
vancements. Other topics include future developments in
the use of efficient information systems in manufacturing.

249. Models of Manufacturing Systems. (3) Three hours
of lecture per week. Prerequisites: IEOR 262A and
IEOR 262A, or equivalent; BA 249A or consent of
instructor. This course is designed for doctoral 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) tech-
niques. Topics include but are not limited to: 1) automatic
transfer linkages; 2) flow lines and assembly systems; 3)
dynamic economic production systems; 4) inventory sys-
tems. Design system models, material handling systems and some manufacturing control issues will receive
special attention. (F)

249C. Models of Management Information Systems.
(3) Three hours of lecture per week. Prerequisites:
IEOR 262A and IEOR 262A, or equivalent; or consent of
instructor. The purpose of this course is to explore analytical meth-
ods used for the analysis and enhancement of in-
formation systems and provide students with 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 the
necessary background and tools for such an analysis.

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 process
as the beginnings of what appear to be new 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. An introduction to the field of managing
human resources associated with managing the personnel
function. Topics include the processes of recruitment, selection, place-
ment, training, and evaluation of people within or-
ganizations. 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 of research
for management problems and policies. (F)

252. Negotiations and Conflict Resolution. (3) Three
hours of lecture per week. Prerequisites: 205 or consent of
instructor. An introduction to the various ways environment and technological fac-
tors impinge upon the structure and management of
organizations. Subjects include organization growth,
control systems, professionalism, and reactions to
change and uncertainty. (F)

253. Public Policy and the Management of Human
Resources. (3) Three hours of lecture per week. Prereq-
quisites: 205 and 207, or consent of instructor. This
course will analyze government regulation of personnel,
including such issues as age, race and gender discrim-
ination, affirmative action, equal pay and comparable
worth and telecommunication technology. Discussion of case
studies will focus on corporate and bureaucratic
strategy and implementation in light of the rights and
responsibilities of employers and employees. (F)

254A. Research in Micro-Organizational Behavior. (3)
Formerly part of 208. Three hours of seminar per week.
Prerequisites: Ph.D. student or consent of in-
structor. Review of the research literature of micro-or-
ganizational behavior, including its social psychological
and psychological foundations. Topics include: job design,
training, evaluation of people within orga-
nization psychology. (SP)

254B. Research in Macro-Organizational Behavior. (3)
Formerly part of 208. Three hours of seminar per week.
Prerequisites: Ph.D. student or consent of in-
structor. Review of the research literature of macro-or-
ganizational behavior, including its sociological, political
and economic foundations. Topics include: bureaucratic,
product, power and policy implications, organiza-
tional psychology, institutional theory, organizational ecology, resource de-
pendency and transaction costs. (F)

254C. Research in Industrial Relations and Labor. (3)
Formerly part of 208. Three hours of seminar per week.
Prerequisites: Ph.D. student or consent of instructor. Review of the research literature of industrial relations and labor,
including its economic and institutional foundations.
Topics include: unionism, wages, productivity, turnover,
collective bargaining, strikes and arbitration, government
regulation, internal labor markets, and implicit contracts. (F)

254D. Special Research Topics in Organizational Behavior and Industrial Relations. (3) Formerly part of 208. Three hours of seminar per week. Prerequisites: graduate standing. In-depth study of selected research topics in organizational behavior and industrial relations not ordinarily covered in 254A, B and C. Possible topics include: history of organizational research; human resource management; research; comparative manage-
ment; and business policy and strategy. Content varies from year to year. (SP)

255. Employment and Pay Policy. (3) Three hours of
lecture per week. Employment discrimination and un-
employment. Analyses of wage and salary administration
and labor market behavior in the U.S. and abroad; produc-
tion and clerical workers, managerial and professional
workers. Problems of wage and income policies of the
firm, union, and the national economy. (SP)

256. Collective Bargaining. (3) One 3-hour evening
lecture per week. Prerequisites: 205. Studies of the
bargaining process; the legal basis of collective bar-
gaining; administration of collective agreements, including
contract negotiation and arbitration of grievances; proc-
eses of dispute settlement; comparative international
systems. (SP)

257. Human Behavior in Organizations. (3) Three
hours of lecture per week. Prerequisites: 205 or equiv-
alent, or consent of instructor. A study of the social and
psychological factors affecting human behavior and perform-
ce in work places. Topics include motivation, job
design, leadership, conflict, human information
processing, social influence, and intra- and inter-group
dynamics. (SP)

258. Technology, Organization, and Environment. (3)
Three hours of lecture per week. Prerequisites: 205
or consent of instructor. An introduction to the various ways environment and technological fac-
tors impinge upon the structure and management of
organizations. Subjects include organization growth,
control systems, professionalism, and reactions to
change and uncertainty. (F)

259A. Special Topics in Organizational Behavior and
Industrial Relations. (2-3) Course may be repeated
for credit. Two or three hours of lecture for 15 weeks
or four to six hours of lecture for 7½ weeks. Prerequisites:
205 or consent of instructor. Analysis of recent literature and developments related to such topics as organization development; environmental determin-
ants of organization structure and decision-making behavior; management of professionals; and manage-
ment in temporary structures; cross-cultural studies of
management organizations, and industrial relation sys-
tems and practices are examined. (F, SP)

259B. Special Topics in Organizational Behavior and
Industrial Relations. (2-3) Course may be repeated
261A. Marketing Research: Techniques and Data Analysis. (3) One 2-hour lecture and one 1/2-hour laboratory per week. Prerequisites: 206 or equivalent. This course develops the skills necessary to plan and implement a variety of marketing research studies. Topics include research design, data measurement, survey methods, experimentation, statistical analysis of marketing data, and effective reporting of technical material to management. Students select a client and prepare a marketing research report intended for students with substantive interests in marketing. (F,SP)

261B. Introduction to Marketing Research. (2) One 2-hour lecture per week. Prerequisites: 204C [200], 206 or equivalent. The focus of this course is on developing marketing research designs and completing marketing research studies. Course is intended for students with non-marketing concentrations. (SP)

262A. Marketing Management: Physical Products. (3) Two 1 1/2-hours lecture per week. Prerequisites: 202B and 206, or equivalent. The objective of this course is to develop a framework for analyzing management problems and complete marketing programs including product, price, distribution, and promotion. Topics include case analysis of a heavy use of case analysis. Course is primarily designed for those who will take a limited number of advanced marketing courses and wish an integrated approach. (F)

262B. Marketing Management: Services. (3) Two 1 1/2-hours lecture per week. Prerequisites: 202B and 206, or equivalent. The focus of this course is on developing student skills to formulate and critique complete marketing programs. The course examines the advantages and limitations of marketing management and its impact on managerial decision making. It includes selected topics from 261A emphasizing research design and the critical analysis of marketing research studies. Course is intended for students who have a strong interest in professional marketing programs and wish an integrated approach. (F)

263. Product and Price Management. (3) Two 2-hour lecture per week. Prerequisites: 202B, 206 or equivalent. Analysis of methods of new product development and introduction, product portfolio management, and pricing tactics. Emphasis on a variety of settings for both new and mature products. (SP)

264. Industrial Marketing Management. (2) Two hours of lecture per week. Prerequisites: 206 or equivalent. Analysis of the special problems of marketing industrial products: demand estimation, channel management, sales forecasting, management, leasing and sales, negotiation. (SP)

265. Advertising Management. (2) One 2-hour lecture per week. Prerequisites: 206 or equivalent. 260 is recommended. A specialized course in advertising, focusing on management and decision making. Topics include objective setting, copy decisions, media decisions, budgeting, and examination of theories, models, and other research methods appropriate to these decision areas. Other topics include social/economic issues of advertising by nonprofit organizations. (F)

266. Channels of Distribution. (2) Two hours of lecture per week. Prerequisites: 202B, 206 or equivalent. The success of marketing programs often weighs heavily upon its co-execution by members of the firm's distribution channel. This course seeks to provide an understanding of how the strategic and tactical roles of the channel can be identified and managed. This is accomplished by examining the economics, political, and social forces which govern the channel evolution. It is completed through the examination of tools to select, manage, and motivate channel partners. (F,SP)

267. Strategic Marketing Planning. (2) One 2-hour seminar per week. Prerequisites: 202B, 203, 206. Strategic planning theory and methodology. Emphasis on an understanding of how customer, competition, industry and environment analysis and its application to strategy development and choice. (F)

268. Seminar in Marketing Management. (2) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: 206 or equivalent. Advanced selected topics in marketing. Intended principally for MBA students. Topics will vary from year to year. (F)

269A. Seminar in Marketing: Buyer Behavior. (2) One 2-hour seminar per week. Prerequisites: Consent of instructor. Advanced topics in marketing that are relevant to advanced MBA students. This course will consider in depth one or two major issues related to marketing. (F)

269B. Seminar in Marketing: Decision Models. (2) One 2-hour seminar per week. Prerequisites: Consent of instructor. Advanced topics in marketing that are relevant to advanced MBA students. This course will consider in depth one or two major issues related to marketing. (F)

269C. Seminar in Marketing: Social Environment and Public Policy. (2) One 2-hour seminar per week. Prerequisites: Consent of instructor. Advanced topics in marketing that are relevant to advanced MBA students. This course will consider in depth one or two major issues related to marketing. (F)

270. Seminar on the Modern Corporation. (3) Three hours of discussion per week. Prerequisites: 202 or equivalent. The course will consider in depth one or two of the major topics rising out of the role of the large corporation in modern society. Topics include social policy and responsibility, implications of social change for the corporation, proposals for reform of corporate governance, and interactions between private economic institutions and the social, and political systems. (F)

271. Seminar on the Interaction of Business and Government. (3) Two 1/2-hour seminar sessions per week. Prerequisites: Consent of instructor. There exists considerable diversity of opinion among observers of American society concerning the role of business and government in the United States economy. This course will examine the diverse and complex relationships between the public and private sectors by focusing on a variety of interactions between the government and business in this country, including economic planning, resource allocation, stabilization of the economy, purchasing of goods and services, regulation, sponsorship and promotion of economic activity, collaboration and joint venture in research and development, and taxation. (F)

272. Seminar in Business and Public Policy: (3) Two 1/2-hour seminar sessions per week. Prerequisites: Consent of instructor. Students in this seminar undertake a comparative analysis of a selected number of advanced capitalism economic systems. The primary objective is to develop an understanding of the diverse historical, political, and cultural factors that underlie the contemporary political, social, and legal environment of the corporate enterprise. (SP)

273. Topics in the Management of Nonprofit Organizations. (3) Three hours of lecture per week. Prerequisites: MBA core courses or consent of instructor. This course is designed as a "capstone" course for second-year MBA students who have an interest in nonprofit organizations, either as employees of nonprofit organizations or as members of boards of trustees. It will be interdisciplinary in nature and build upon course work in all areas of business administration. Topics include, but are not limited to: (1) legal issues, (2) funding-raising, (3) volunteers, (4) financial management issues, and (5) economic relationships with government. (SP) Van Loo

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 the important legal aspects of management and the study of the public policy process and the way it is manifested in law. The focus is on those aspects of law which affect managers directly and which are of current topical importance, including contracts and corporate law. (F,SP)

276. History of the Corporation and the American Business System. (1) One 2-hour seminar per week for 7V4 weeks. Prerequisites: 292A; Ph.D. student or consent of instructor. This seminar is intended principally for Ph.D. students but open to advanced MBA students. The purpose of this course module is to introduce students to the classics of political economy, this course covers recent research on public policies toward business. (F)

278. The Corporation and the American Political System. (1) One 2-hour seminar per week for 7V4 weeks. Prerequisites: 292A; Ph.D. student or consent of instructor. Examination of the political behavior of large corporations in the United States will be the focus of the seminar. Students will also be exposed to recent research on the political activities of other business elites including "peak organizations" such as the Business Roundtable, trade associations, and individual business political operatives. (SP)

279A. Foundations of Capitalism and Political Economy. (1) One 2-hour seminar per week for 7V4 weeks. Prerequisites: 292A; Ph.D. student or consent of instructor. Examination of the political behavior of large corporations in the United States will be the focus of the seminar. Students will also be exposed to recent research on the political activities of other business elites including "peak organizations" such as the Business Roundtable, trade associations, and individual business political operatives. (SP)

279B. Economic Analysis of Nonprofit Organizations. (1) One 2-hour seminar per week for 7V4 weeks. Prerequisites: 292A; Ph.D. student or consent of instructor. Examination of the political behavior of large corporations in the United States will be the focus of the seminar. Students will also be exposed to recent research on the political activities of other business elites including "peak organizations" such as the Business Roundtable, trade associations, and individual business political operatives. (SP)

279C. Corporate Governance and Stakeholder Management. (1) One 2-hour seminar per week for 7V4 weeks. Prerequisites: 292A; Ph.D. student or consent of instructor. Examination of the political behavior of large corporations in the United States will be the focus of the seminar. Students will also be exposed to recent research on the political activities of other business elites including "peak organizations" such as the Business Roundtable, trade associations, and individual business political operatives. (SP)

279D. U.S. Public Policies Toward Business. (1) One 2-hour seminar per week for 7V4 weeks. Prerequisites: 292A; Ph.D. student or consent of instructor. Examination of the political behavior of large corporations in the United States will be the focus of the seminar. Students will also be exposed to recent research on the political activities of other business elites including "peak organizations" such as the Business Roundtable, trade associations, and individual business political operatives. (SP)

279E. Business Ethics and the Corporate Social Policy Process. (1) One 2-hour seminar per week for 7V4 weeks. Prerequisites: 292A; Ph.D. student or consent of instructor. Examination of the political behavior of large corporations in the United States will be the focus of the seminar. Students will also be exposed to recent research on the political activities of other business elites including "peak organizations" such as the Business Roundtable, trade associations, and individual business political operatives. (SP)

*Not offered 1988-89

*On leave, spring

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contemporary scholarly literature arising from efforts to develop analytically useful conceptual categories both to reflect the social function of business organizations and those who run them and to assist corporate leadership in what has been termed the "management of values." Students will be exposed to three streams of critical thinking approaches: (a) business ethics, (b) "corporate social responsiveness," and (c) corporate social responsiveness" as well as current scholarship relating to synthetic concepts such as "corporate social process." (F,SP)

279C. Competitive Business and Public Policy. (1) 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 place the relationship between business and government in the United States in perspective. Topics include two sets of issues: business-government relations in Western Europe and East Asia, and America's role in the world economy. (F,SP)

279R. International Business and Public Policy. (1) 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 which involve international firms. Host-country/home-country policy issues relating to foreign investment and technology transfer. Students will learn international business strategies by case study. The course will be divided into two parts: the first part will cover the theoretical base of international business and the implications for policy makers; the second part will investigate specific regions. (F,SP)

280. Real Estate and Urban Land Economics. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. This course introduces students to the practice of real estate field. It covers: Consent of instructor. The interaction of the private and public sectors in urban development; modeling the urban economy. Growth and decline of urban areas; selected policy issues: housing, transportation, financing, local government, urban redevelopment and neighborhood change are examined. (F,SP)

283. Real Estate Financing. (3) Three hours of lecture per week. Prerequisites: 280; and background in the basics of finance, micro-economics, macro-economics, statistics, and quantitative analysis. Students will be introduced to the practice of real estate field. It covers: Consent of instructor. The interaction of the private and public sectors in urban development; modeling the urban economy. Growth and decline of urban areas; selected policy issues: housing, transportation, financing, local government, urban redevelopment and neighborhood change are examined. (F,SP)

284. Seminar in Real Estate Investment Analysis. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Analysis of selected problems and special studies; cases in residential and nonresidential development and financing, urban redevelopment, real estate taxation, mortgage market developments, equity investment, valuation, and zoning. (SP)

285. International Finance. (3) Two 1 1/2-hour lectures per week. Prerequisites: Prereq. Praxis: 210. This course introduces students to the institutions and operation of the international financial system; arbitrage and hedging; international aspects of financial decisions. (F,SP)

286. International Operations Management. (2) Prerequisites: Ph.D. student or consent of instructor. A summary of management problems unique to international operations, including strategic planning, organization, management, and especially marketing, supplemented with cases. (F,SP)

287. Theory and Institutions of International Trade. (2) Four hours of lecture for 7 1/2 weeks. Prerequisites: 281A. The purpose of this course is to introduce students to the major theoretical approaches to the shaping patterns of international trade. Topics include: theories of international trade; analysis of tariffs, protection, and commercial property; international cartels; economic integration; international movements of capital and labor; trade and development. (F,SP)

288. Survey of International Business. (3) Students may not receive credit for 285 or 286. Two 1 1/2-hour lectures per week. Prerequisites: All core courses or equivalent. A one semester combination of B.A. 285 and B.A. 286, designed for those students who wish to take but one course in international business. Both micro and macro aspects of international business are covered. (F)

289. Seminar in International Business. (2) Prerequisites: Consent of instructor. Two 1 1/2-hour lectures per week. Prerequisites: 207. Seminar techniques will be applied to highly topical subjects in the international business field. The subject of the seminar generally varies from semester to semester. (F)

290. Strategic Planning: Models and Decisions. (3) Three hours of lecture per week. Concepts of strategy and planning are developed. Several major types of planning models and techniques are evaluated for strategic policy choices, organizational design, and the allocation of resources. (F)

292A. Research and Theory in Business Administration: Economics and Management Science. (3) Two 1 1/2-hour lectures per week. Prerequisites: Ph.D. student or consent of instructor. The focus of this course is on models of individual and group decision making under uncertainty. Topics covered include: utility theory and decision theory; cooperative and noncooperative game theory; and social choice and utilitarian ethics. (F)

292B. Research and Theory in Business Administration: Behavioral Science. (3) Two 1 1/2-hour lectures per week. Prerequisites: Ph.D. student or consent of instructor; previous work in statistics and probability theory. The focus of this course is on defining a research problem, designing and employing specialized techniques to solve the problem, and interpreting results. Topics will include concepts of causality, analysis of variance, experimental design, survey research, observation, and multivariate analytical techniques. (F)

292C. Research and Theory in Business Administration: Applied Econometric Methods. (2) Course may be repeated for credit. One 2-hour lecture per week. Prerequisites: Ph.D. student; Econ 201A, 201B; Stat 200A, 200B; and one of the following: Econ 241A; Econ 241B; ABE 211 and 212, BA 213 and 214 with consent of instructor. This course will review basic econometric theory and apply the more specialized statistical and theoretical techniques found in current journal articles in the fields of Accounting, Economic Analysis and Policy, Finance, and Business and Public Policy. It will be a workshop in which emphasis on the empirical results is embodied. Term paper will be a first pass at stochastic models to be used as part of student's dissertation research. (F)

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 or equivalent; STA 204 or equivalent; IER 236A or equivalent. Students will abstract and develop stochastic models of specified problem descriptions. Each such assignment will be linked to the review of modern applications of the article(s) addressing these problems. Any additional theory needed will be covered. Topics for this course include but are not limited to: (1) random variables: notions of stochastic convergence and classical limiting theorems, (2) discrete state Markov processes, (3) continuous state Markov processes, (4) martingales, (5) compensators, and (6) Markov decision processes with applications in accounting, public policy, economics, finance, management science, marketing, and sociology. Students will be selected by research interests of enrolled students. Term paper will be a first pass at stochastic models to be used as part of student's dissertation research. (F,SP)

293. Individually Supervised Study for Graduate Students. (1-5) 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 advisor as appropriate for the student's program. (F,SP)

294B. Philosophy of Systems Management. (3) Two hours of lecture and 1 1/2 hours of discussion per week. The concept of social systems improvement by means of inquiry (management science, operations research, planning, etc.). Emphasis is placed on the basic philosophical issues involved in the evaluation of system performance. (F)

295A. Entrepreneurship and Business Development. (4) Formerly 235B. Four hours of lecture per week. Prerequisites: All core courses or equivalents. Lectures 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 planning, marketing, accounting, and organizational problems in a well-written proposal for financing is emphasized. (F)

295B. Entrepreneurship and Business Development. (2) Formerly 235B. Two hours of lecture per week. Prerequisites: All core courses or equivalents. Lectures discuss various aspects of starting, operating, and expanding the owner-managed business. The integration of financial planning, marketing, accounting, and organizational problems in a well-written proposal for financing is emphasized. (F)

296. Special Topics in Business Administration. (1-3) Course may be repeated for credit. One, two, or three hours of lecture per week. Prerequisites: Graduate standing. 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)

297B. Seminar in Business Administration. (2) 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 and current research on business administration topics is presented. The theme of a BA 298 section can be based on the literature of an existing business administration field on a topic that spans more than one field. Students will attend a one-hour preseminar discussion at which the paper to be presented next will be discussed. (F,SP)

299. Individual Research In Business Problems. (F,S)

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. Prerequisites: Graduate standing. Individual study for the comprehensive requirements in consultation with field advisor. (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. Must be taken on a satisfactory/unsatisfactory basis. 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 field. Students will attend a one-hour preseminar discussion at which the paper to be presented next will be discussed. (F,SP)

Interdepartmental Studies Courses

Upper Division Courses

IDS 170. Economics of Organization. (3) 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, what bosses do and how bosses 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 structure of government and the organization of the 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: Doctoral standing or consent of instructor. This special interdisciplinary seminar will be organized to celebrate the 50th anniversary of the publication of Chester Barnard’s The Functions of the Executive (1938). Classic organizational issues, such as the nature of the employment relationship, the communication processes within and among 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 focussed efforts, with respect to the economics of organizations. The course will also feature guest lecturers from a variety of eminent scholars of economics and organization. (SP) Williamson

IDS 296. Management of Innovation and Policy. (3) 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 manner which will generate key insights into how technology can be developed and managed. Sponsoring Departments: Engineering and Business Administration. (SP) Ticee

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. Strategic Management In the Public Sector. (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 Professionalism in Organizations. (3)

For information about these and other courses related to this program, see the Public and Nonprofit Management section of this catalog.

Celtic Studies

(College of Letters and Science)

Major in Celtic Studies

The major in Celtic studies will accept students beginning fall semester 1989. The program is designed to give students both a broad understanding of the place of Celtic languages and cultures in the world and a firm grounding in one or more of the Celtic languages. In addition to at least four semesters of language study and the other major requirements, students will be required to organize their studies with reference to one other methodological or disciplinary area chosen from anthropology, art history, comparative literature, linguistics, history, rhetoric, Scandinavian or another language and literature. Some students may find it advantageous to declare a minor in one of the language departments that permits it. Students interested in the major should consult staff in the Division of Undergraduate Studies, 301 Campbell Hall, or Professor Eve Bweetser or Gary Holland, Department of Linguistics.

Major Requirements

Lower Division. Celtic Studies 70 plus three semester courses from the following course sequences: 5A-5B, 6A-6B, 15, 16, or the equivalent. Students with prior knowledge of a Celtic language may apply for Credit by Examination.

Upper Division. Eight upper division courses, including at least one advanced language course chosen from 105A or 105B, 105A, 105B, or 105C; 106A, 106B, or 106C; plus 128 or 129, 138 or 139, and 168 or 169. Scandinavian 123, 162, and 165 may also count toward the major. Courses from the following list may be taken with the approval of the major advisor: Anthropology 180; Art History 152; Comparative Literature 152 and 165; History 150A, 151A, 151B, and 165A; Linguistics 130 and 131.

Honors Program

In order for students to graduate with honors in Celtic studies, they must have achieved an overall grade-point average of 3.3 or higher in all work completed in the University. The minimum grade-point average in all courses required for the major, and they must have taken both Celtic Studies 128 and 129 (only one of the two is required for the major). A thesis is also required, which should normally emanate from H195, the Honors Seminar.

Minor in Celtic Studies

Lower Division: Celtic Studies 70 (not yet offered; consult advisor for information).

Upper Division: Five upper division courses chosen from the major list and approved by the major advisor. All upper division courses applied to the minor must be completed on a letter-graded basis; at least three of the five courses must be completed at Berkeley, and a minimum overall grade-point average of 2.0 is required in the upper division courses applied to the minor.

Students interested in the minor should consult staff in the Division of Undergraduate Studies, 301 Campbell Hall, or Professor Eve Bweetser, Department of Linguistics, 2404 Dwinnelle Hall, or Professor Gary Holland, Department of Linguistics.

Graduate Studies

Although no graduate degrees in Celtic are offered at present, it is possible to pursue research in Celtic languages, literature, history, anthropology, etc., in a variety of departments. Dissertations on Celtic subjects have been accepted in the departments of Comparative Literature, History, Rhetoric, English, French, and Anthropology and in the program in Folklore.

5A. Beginning Modern Irish. (4) New course. Three hours of lecture and three hours of laboratory per week. Introduction to spoken and written Irish. Focus will be on pronunciation, simple sentence structure and grammatical exposition. Translation of straightforward English constructions will follow, and as soon as possible, the reading and translating of some contemporary Irish writing. No previous knowledge of the language required.

6A. Beginning Modern Welsh. (4) New course. Three hours of lecture and one 3-hour laboratory per week. Introduction to modern Welsh grammar and conversation. Pronunciation, imperfect and past tenses will be stressed in this beginning course. Also includes brief readings in modern literary Welsh. Vocabulary development and speaking skills will be emphasized. Some consideration will be given to the relationship of the spoken language to literary (written) Welsh.

Krar

Chemical Engineering

(College of Chemistry)

Department Office: 201 Gilman Hall, 642-2291
Chair: Alexis T. Bell, Sc.D.
Undergraduate Majors Office: 420 Leilani Hall, 642-2368

Professors: Alexis T. Bell, Sc.D., Massachusetts Institute of Technology. (on leave, spring) Harvey W. Blanch, Ph.D. University of New South Wales. Biochemical engineering, enzyme technology, kinetics, chemical kinetics.

Elton J. Cairns, Ph.D. University of California at Berkeley. Electrochemistry, energy conversion, thermodynamics, materials for chemical processes, process analysis.


Donald N. Hanson, Ph.D. University of Wisconsin. Process engineering, process development, separation processes.

Scott Lynn, Ph.D. California Institute of Technology. Synthesis of inorganic chemical processes

*On leave, spring

Recalled to active service

Recipient of Distinguished Teaching Award
The College of Chemistry offers a major in chemical engineering leading to the B.S. degree. The program emphasizes fundamental work in development, design, and operation of chemical processes and of process equipment. Students with high scholastic 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, 2A, 2B, 3A, 3B, 8A, 8B, 10, 11A, 11B, 12, 13A, 13B, 15A, 15B, 152, 160, 161, 162, 185, and 210A with grades of C- or higher. Principles of heat and mass transfer, kinetics, and separation processes. Emphasis on investigation of basic relationships important in engineering. Experimental design, analysis of results, and preparation of engineering reports are stressed. (F,SP)

150A. Transport Processes. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 140; 150A with grade of 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)

150B. Transport Processes. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 140 with grade of 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)

152. Separation Processes. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 141; 150A with a grade of C- or higher; Math 50B (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 liquid-liquid and vapor-liquid systems, humidification and drying. (F,SP)

154. Chemical Engineering Laboratory. (3) Two 4-hour laboratory periods per week. Prerequisites: 150B; 152; 142; 185 or demonstration of competence by exam. Special methods and theory for design and operation of processes in the biochemical industries, with special emphasis on fermentation systems. (F,SP)

160. Chemical Process Design. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 142; 150B; 152. Design principles of chemical process equipment. Design of integrated chemical processes with emphasis upon economic considerations. (F,SP)

162. Dynamics and Control of Chemical Processes. (3) Formerly 172. Two hours of lecture, one hour of discussion, and three hours of laboratory per week. Prerequisites: 150B; Math 50B. Analysis of the dynamic and control properties of chemical processes. Emphasis on the control of their behavior; implementation of computer control systems on laboratory processes and process simulations. (F,SP)

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 systems. (F,SP)

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 processes. (F,SP)

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)

173. Particulate Systems. (3) Three hours of class meetings per week. Prerequisites: 150B. Production and separation of particulate systems in gases and liquid flows. Dust and mist collection, sedimentation, and agglomeration processes. (F,SP)

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 reaction engineering processes, analysis of reaction systems, reactor design. Laboratory experiments in catalyst characterization, combustion, homogeneous kinetics, and reactor performance. (F,SP)

176. Principles of Electrochemical Processes. (3) Three hours of lecture per week. Prerequisites: 141; 150B. Principles and application of electrochemical phenomena in chemical and environmental engineering, including electrolysis and electrochemical energy conversion. (F) Cairns, Tobias

178. Polymer Science and Technology. (3) Three hours of lecture per week; in five of the weeks one hour of laboratory. Prerequisites: 20B. Properties of organic polymers. Properties of solutions, melts, glasses, elastomers, and crystals. Engineering applications, emphasizing processing technology. Experiments in polymerization and characterization. (F) Soane

179. Process Technology of Solid-State Materials Development. (3) Three hours of lecture per week. Prerequisites: Engineering 45; one course in electronic circuits recommended; senior standing. Chemical processing and properties of solid-state materials. Crystal growth and device technology. Analysis of chemical processing to the manufacture of semiconductors and solid-state devices. (SP) Hess

185. Technical Communication for Chemical Engineers. (2) Course may be repeated for credit with consent of instructor. Must be taken on a pass/no pass basis. Three hours of lecture per week. Prerequisites: 140; satisfactory completion at UC of Subject A examination or course; satisfaction of Chem. Eng. English composition requirement and satisfactory language skills and writing. Emphasis on technical report writing, lecture, oral and report presentation skills in formats commonly used by chemical engineers. (F,SP) Sullivan

194. Research for Advanced Undergraduates. (2-3) Course may be repeated for credit. Individual conferences. Prerequisites: Honors and senior standing. Original research under direction of one of the members of the staff. (F,SP) Staff

195. Special Topics. (2-3) Course may be repeated for credit. Individual conferences. Prerequisites: Consent of instructor. Lectures and/or tutorial instruction on special topics. (F,SP) Staff

199. Special Laboratory Study. (2-3) Course may be repeated for credit. Individual conferences. Prerequisites: Senior standing. Consent of instructor. Special laboratory or computational work under direction of one of the members of the staff. (F,SP) Staff

Graduate Courses

230. Theoretical Methods in Chemical Engineering. (3) Three hours of lecture per week. Prerequisites: Math 50A and 50B or equivalent; open to senior honor students with consent of instructor. Mathematical formulation and solution of problems drawn from the fields of heat and mass transfer, fluid mechanics, and reaction kinetics employing vector calculus, ordinary differential equations, Laplace transforms, and partial differential equations. (F,SP) Graves

232. Computational Methods in Chemical Engineering. (3) Three hours of lecture per week. Prerequisites: 230. Open to senior honor students. Introduction to modern computational methods for treatment of problems by computer. Emphasis on development of numerical techniques to chemical engineering calculations with emphasis on computer methods. (SP) Staff

240. Phase Equilibria with Applications of Statistical Mechanics. (3) Three hours of lecture per week. Prerequisites: Graduate standing. Molecular thermodynamics of multicomponent systems with applications to separation operations. Equilibrium properties of pure and mixed fluids. Principles of statistical mechanics with emphasis on configurational properties of fluids. Introduction to theories for gases, liquids, polymers and their mixtures, and adsorbed fluids, with applications to separation operations. (F) Prasanth, Theodorou

244. Applied Chemical Kinetics and Reaction Analysis. (3) Three hours of lecture per week. Prerequisites: 142 and 230, or equivalent, or consent of instructor. Collision theory and transition state calculations, chain reactions and free-radical mechanisms, adsorption phenomena. Langmuir-Hinshelwood kinetics, description of selected systems of industrial importance. Interaction of chemical and physical rate processes in governing the apparent behavior of chemically reactive systems. (F) Peterson

245. Catalysis. (3) Three hours of lecture per week. Prerequisites: 244 or Chemistry 219, or consent of instructor. Adsorption, 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. (SP) Bell

246. Principles of Electrochemical Engineering. (3) Three hours of lecture per week. Prerequisites: Graduate standing, or consent of instructor. Electrode processes in electrodynamics and in galvanic cells. Charge and mass transfer in ionic media. Criteria of scale-up. (SP) Newman

248. Applied Surface and Colloid Chemistry. (3) Three hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. Principles of surface and colloid chemistry with current applications; surfactant thermodynamics, wetting, adsorption, colloid systems, association colloids, interacting electrical double layers and colloid stability, kinetics of coagulation, and electrokinetics. (SP) Clark

249. Biochemical Engineering. (3) Three hours of lecture per week. Prerequisites: 150; Bacteriology 102; Chemistry 120B, 112E or consent of instructor. Application of chemical engineering principles to the processing of biological and biochemical materials. Design of systems for cultivation of microorganisms and for the separation and purification of biological products. (SP) Clark

250. Process Fluid Mechanics. (3) Three hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. An advanced-level first course in fluid mechanics, with emphasis on topics relevant to problems of the processing industries. Development of basic conservation equations; constitutive equations for Newtonian and non-Newtonian fluids; exact solutions and approximations at low and high Reynolds numbers, including convective mass and heat transfer. (SP) Depri

251. Separation Processes and Mass Transfer. (3) Three hours of lecture per week. Prerequisites: Graduate standing, or consent of instructor. Methods for separating homogeneous or heterogeneous solutions by liquid-liquid, liquid-vapor, and multicomponent separations, carried out in simple continuous and batch contactors, and in staged and counter-current equipment. Diffusion and interphase mass transfer. Effects of high flux and simultaneous reaction. Patterns of change and energy consumption in separation processes. Selection of separation techniques. (SP) Chakraborty

256. Advanced Transport Phenomena. (3) Three hours of lecture per week. Prerequisites: 150A or equivalent; 178 or equivalent recommended. Rheology and fluid flow analyses for polymer processes including extrusion, calendaring, fiber spinning, injection molding, and mixing. Materials and transport properties for polymer data in microelectronics and optoelectronics. (F) Chakraborty

257. Processing of Advanced Polymeric Materials. (3) Three hours of lecture per week. Prerequisites: 150A or equivalent; 178 or equivalent recommended. Rheology and fluid flow analyses for polymer processes including extrusion, calendaring, fiber spinning, injection molding, and mixing. Materials and transport properties for polymer data in microelectronics and optoelectronics. (SP) Chakraborty

262. Computer Control of Chemical Processes. (3) Two hours of lecture and one 3-hour laboratory per week. Prerequisites: Math 189 (linear algebra) or equivalent, or consent of instructor. Synthesis and implementation of digital control systems for complex systems. Control configurations, process modeling and identification, multivariable and adaptive controls. Applications to distillation, combustion, heat exchange, and separation processes. (F)

263. Chemical Process Economics and Project Evaluation. (3) Three hours of lecture per week. Prerequisites: 160 or consent of instructor. Methods used by the chemical and petroleum industry to evaluate the economic worth of processes using acceptable economic, marketing, and managerial factors. Practice is offered through the medium of unstructured and open-ended projects involving group participation and individual efforts.

265. 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.

269B. Electrochemical, Hydrodynamic, and Interfacial Phenomena. (2) Course may be repeated for credit. Two hours of lecture per week. Prerequisites: Open to properly qualified graduate students. (SP) Newman

269D. Engineering Principles of Emerging Biotechnologies. (2) New course. Two hours of lecture per week. Prerequisites: Graduate or consent of instructor. This course will emphasize the fundamental principles that underlie several new technologies within biochemical engineering. Topics to be covered include protein engineering, enzyme and microbial immobilization, drug delivery, membrane transport, and material models. State-of-the-art developments in these areas will be examined through review of current literature.

275J. The Solid State. (2) Course may be repeated for credit. Two hours of lecture per week. Prerequisites: Physics 71J. Introduction to concepts of solid-state physics. The course will be a survey of the electronic structure and properties of solids. Considerable time will be spent on the prediction of electronic structure and properties from empirical parameters.

275M. Optical Methods in Chemical Engineering. (2) Two hours of lecture per week. Prerequisites: Open to properly qualified graduate students. (F) Muller

275O. Chemical Engineering Management. (2) One 2-hour lecture per week. Prerequisites: Graduate or consent of instructor. Students will participate in solving open-ended technical and business problems facing management in an industrial organization. Emphasis will be on problem synthesis, creative and strategic thinking, and communication skills. The course will provide an understanding (1) of what is expected of a new engineer in industry, (2) of the viewpoint of management, and (3) of the skills needed for success. (SP) Grosberg

279B. Spectroscopy for Chemical Engineers. (3) New course. Three hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. This course will review the quantum mechanical principles of spectroscopy, the interaction of radiation with matter, and then apply these principles to solve spectroscopy problems in chemical engineering research.

279V. The Finite Element Method in Fluid Mechanics. (2) Students who have taken a first course in fluid mechanics and numerical methods may not receive credit for 279V. One 2-hour lecture per week. Prerequisites: Graduate standing or consent of instructor. This course is an introduction to the numerical solution of fluid mechanics problems by means of the finite element method. Topics include: matrix methods, numerical solution of the incompressible Navier-Stokes equations, free and moving boundary flows, computer-aided design and simulation, and advanced topics in the finite element modeling of viscoelastic (memory) fluids.

279Y. Mass Transfer. (2) Two hours of lecture per week. Prerequisites: Graduate standing or consent of instructor.
Choice of College

A student can complete a major in chemistry either in the College of Chemistry (B.S. degree) or in 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 chemical industry, for 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, and a choice of one of 105, 108, 125. (For students who wish to be certified to the American Chemical Society, this must be 125.)

Honors Program. In addition to completing the requirements for the major in chemistry, students in the honors program must (a) earn a grade-point average of at least 3.5 in upper division courses in the major and overall in the University; and (b) be recommended by the major adviser—this would normally be based upon passing 113 or 122 with an A or higher or 112 with a B+ or higher, or 113 with a B or higher in at least 3 units of H194. Students interested in the honors program should consult with their major adviser during the junior year.

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 and/or 4B may not receive credit for the corresponding semesters of 1A-1B. Two 1-hour lectures, one hour of discussion, and one 4-hour laboratory per week. Prerequisites: 1A or a score of 3, 4, or 5 on the chemistry AP exam. Corequisites: Math 4A-4B. General chemistry within past two years (high school physics also recommended), introductory calculus (may be taken concurrently), and a score of 70 or higher on the College Entrance Examination Board Achievement Test in Mathematics (Math Act, level 1 or 2). Highly motivated students with Math

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, 125. (For students who wish to be certified to the American Chemical Society, this must be 125.)

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Chemistry Major in the College of Letters and Science

Major Requirements

Mathematics: 1A, 1B.

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Chemistry Major in the College of Letters and Science

Major Requirements

Mathematics: 1A, 1B.

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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 and/or 4B may not receive credit for the corresponding semesters of 1A-1B. Two 1-hour lectures, one hour of discussion, and one 4-hour laboratory per week. Prerequisites: 1A or a score of 3, 4, or 5 on the chemistry AP exam. Corequisites: Math 4A-4B. General chemistry within past two years (high school physics also recommended), introductory calculus (may be taken concurrently), and a score of 70 or higher on the College Entrance Examination Board Achievement Test in Mathematics (Math Act, level 1 or 2). Highly motivated students with Math
Ach 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 qualitative work and includes an independent research project in 4B. Equivalent to 1A-1B plus the prerequisites for further courses in chemistry (F, SP) Porta, Moretti

8A. Organic Chemistry with Biological Emphasis. (Students with credit in 112A 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) Vollhardt, P. Bartlett

8B. Organic Chemistry with Biological Emphasis. (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. This course explores more complex compounds with particular reference to natural products and substances of biological importance. (F, SP) P. Bartlett, Vollhardt

104A-104B. Advanced Inorganic Chemistry. (3;3) Formerly 104 Courses 14, 130A and 130AL will restrict credit in 130A. Students with credit in 104A-104B may not receive credit for 130AL. Two 1-hour lectures and one 2-hour laboratory per week. Prerequisites: 4 or 5 or 4B. The chemistry of metals and nonmetals including the application of physical chemical principles. (F, SP) P. Bartlett, Vollhardt

105. Advanced Quantitative Analysis. (4) Two 1-hour lectures and two 4-hour laboratories per week. Pre-requisites: 120A with grade of C- or higher and 120B. Three hours of lecture and one 5-hour laboratory per week. Prerequisites: 1B or 4B, Math 1B, Physics 7C (which may be taken concurrently). Quantum mechanics and spectroscopy of atoms and molecules with application to large molecular systems and solids. Deficiency in 130B may be removed by successfully completing 120A and 120B. (F, SP) R. Harris, Lestor; R. Harris

120A. Physical Chemistry. (3) Students with credit in 130A may receive 1 unit of credit for 120A. Three hours of lecture per week. Prerequisites: 1B or 4B, Math 1B, Physics 7C (which may be taken concurrently). Quantum mechanics and spectroscopy of atoms and molecules with application to large molecular systems and solids. Deficiency in 130B may be removed by successfully completing 120A and 120B. (F, SP) R. Harris, Lestor; R. Harris

120B. Physical Chemistry. (3) Students with credit in 130B may receive 2 units of credit for 120B. Three hours of lecture per week. Prerequisites: 120A. Thermodynamics, statistical mechanics and kinetics with application to complex chemical systems. Deficiency in 130B may be removed by successfully completing 120A and 120B. (F, SP) Johnston; Johnston, Whaley

122. Quantum Mechanics and Spectroscopy. (3) Three hours of lecture per week. Prerequisites: 120B. Postulates and methods of quantum mechanics and group theory applied to molecular structure and spectra. (SP) Saykally

210A. Advanced Chemical Thermodynamics. (3) Formerly IIS-139. Three hours of lecture and discussion per week. Prerequisites: 120B or 130A or Chemical Engineering 141 or equivalent. Properties of real fluids and their mixtures. Phase equilibria and chemical equilibria for a variety of systems including electrolytes and polymers. Additional topics (to be chosen by the instructor) may include, for example, solid solutions, adsorption, chromatography, ion exchange, and properties of mixtures containing surfactants. (F, SP) Johnston; Johnston, Whaley

25. Physical Chemistry Laboratory. (3) One hour of lecture and one 5-hour laboratory per week. Prerequisites: 120A or 130A or Chemical Engineering 141 or equivalent. Properties of real fluids and their mixtures. Phase equilibria and chemical equilibria for a variety of systems including electrolytes and polymers. Additional topics (to be chosen by the instructor) may include, for example, solid solutions, adsorption, chromatography, ion exchange, and properties of mixtures containing surfactants. (F, SP) Johnston; Johnston, Whaley

25A. Advanced Physical Chemistry Laboratory. (3) Three hours of lecture per week. Prerequisites: 120A-120B, 125, 203; or equivalent. Current techniques and theory in inorganic chemistry including discussion of the structure, bonding, and reactions of inorganic compounds. (F, SP) Armstrong; Anderson

258. Structure Analysis by X-Ray Diffraction. (3) Must be offered on a satisfaction/credit basis. Two 1-hour lectures and two 4-hour laboratories per week. Prerequisites: Consent of instructor. The theory and practice of modern, single-crystal X-ray diffraction. Groups of 2-10 students. Weekly laboratory practice and instruction in the preparation and interpretation of high quality X-ray diffraction data for inorganic and organic compounds (F, SP) Armstrong; Anderson

Not offered 1989-90

14A.130A-130BL. Physical Chemistry. (3;3) Students with credit in 14 may not receive credit for 130A. Students with credit in 130A and/or 130B may not receive credit for 14. Three hours of lecture and one hour and one half hour of laboratory 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 section will not involve the calculation of complex chemical equations. Students with secure background in mathematics and the quantitative aspects of chemistry may enroll in 130AL-130BLB, which is lecture only.

130A. Elementary chemical thermodynamics and its biological application, solutions, electrochemistry, active transport processes. Deficiency in 120A and/or 120B cannot be removed by successfully completing 130A. (F, SP) Mathies, Sauer; Hearst

130B. Chemical kinetics, including enzyme reactions; molecular structure and interactions involved in biological structure; molecular spectroscopy; biological surfaces. Deficiency in 120A and/or 120B cannot be removed by successfully completing 130B. (SP) Tinoco; Mathies, Sauer

130AL-130BL. Biophysical Chemistry. Lecture Only. (2,2) Students with credit in 14 may not receive credit for 130A-130B. Students with credit in 130A and/or 130B may not receive credit for 130BL. Two hours of lecture per week. (F, SP) Prerequisites: 14B or 14Y, and at least one semester course in calculus. Intended for students majoring in the biological sciences. Equivalent to lecture portions of 130A-130B. Students with insecure background in mathematics and the quantitative aspects of chemistry should enroll in 130A-130B. Deficiency in 14 cannot be removed by successfully completing 130AL. Difficulty in 130A and/or 130B cannot be removed by successfully completing 130BL. (F, SP) Staff

143. Nuclear Chemistry. (2) Two 1-hour lectures per week. Prerequisites: Physics 7C or equivalent. Radioactivity, fission, nuclear models and reactions, nuclear activities, the nature. Computer methods will be introduced. (F) Hoffman

192. Individual Study for Advanced Undergraduates. (1-3) Course may be repeated for credit. Individual conferences. Prerequisites: Consent of instructor and advisor. All properly qualified students who wish to pursue a problem of their own choice, through the permission of a non-laboratory study, may do so if their proposed project is acceptable to the member of the staff with whom they wish to work. (F, SP)

H194. Research for Advanced Undergraduates. (1-3) Course may be repeated for credit. Laboratory. Prerequisites: Honors standing, 120B, and consent of instructor and advisor. Students who have completed a satisfactory number of advanced courses may pursue original research under the direction of one of the members of the staff. (F, SP)

161. Special Laboratory Study. (2,4) Course may be repeated for credit. Laboratory. Prerequisites: 125 and at least one of 105, 108, or 115; consent of instructor and advisor. Special laboratory work for advanced undergraduates. Proctor (F, SP)

189. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. Non-laboratory study only. Enrollment is restricted by regulations listed on pages 87 and 88 of this catalog. (F,SP)

Graduate Courses

203. Chemical Applications of Group Theory. (3) Three hours of lecture per week. Prerequisites: Background in the use of matrices and linear algebra. The behavior 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) Johnston; Johnston

204A-204B. Advanced Topics in Inorganic Chemistry. (3) Three hours of lecture per week. Prerequisites: 104, 120A-120B, 125, 203; or equivalent. Current techniques and theory in inorganic chemistry including discussion of the structure, bonding, and reactions of inorganic compounds. (SP,F) Armstrong; Anderson

206. Structure Analysis by X-Ray Diffraction. (3) Must be offered on a satisfaction/credit basis. Two 1-hour lectures and two 4-hour laboratories per week. Prerequisites: Consent of instructor. The theory and practice of modern, single-crystal X-ray diffraction. Groups of 2-10 students. Weekly laboratory practice and instruction in the preparation and interpretation of high quality X-ray diffraction data for inorganic and organic compounds (F, SP) Armstrong; Anderson

"On leave, fall"
diffraction film techniques, the collection of intensity data by automated diffractometer procedures, and structure analysis and refinement. (SP) Raymond

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 stereochemistry and conformational analysis to organic chemical synthesis; synthesis of carbonyl-containing compounds and related reactions. (F) Hawkins

211B. Synthetic Organic Chemistry. (2) Two 1-hour lectures per week. Prerequisites: 211A or consent of the instructor. Application of carbonyl condensation reactions and organometallic reagents to 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 discussion and laboratory per week. Prerequisites: 210A; may be taken concurrently, or consent of instructor. Introduction to organic research. (SP) Lee

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) Dawson

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: 120B and 122 or equivalent. Introduction, one dimensional problems, matrix mechanics, approximation methods. (SP) Miller

221B. Advanced Quantum Mechanics. (3) Three hours of lecture per week. Prerequisites: 221A. Time dependence, interaction of matter with radiation, scattering theory, Molecular and many-body quantum mechanics. (SP) Wilczek

223A. Chemical Kinetics. (3) Formerly 223B. Three hours of lecture per week. Prerequisites: 220A (may be taken concurrently). Deduction of mechanisms of complex reactions. Collision and transition state theory. Photochemical and molecular reaction rates. Molecular beam scattering studies. (SP) Lee


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 proteins, and with bioenergetics, membrane organization, and membrane protein structure. Physical-chemical approaches to these topics will be emphasized. (F) Wilkens

243. Advanced Nuclear Structure and Reactions. (3) Three hours of lecture per week. Prerequisites: 143 or equivalent and introductory quantum mechanics. Selection of topics on nuclear structure and nuclear reactions. (SP)

255. Special Topics. (1-3) Course may be repeated for credit. Lecture series on topics of current interest. Recently offered topics: inorganic compounds, metalloorganic chemistry, biomolecular spectroscopy, magnetic resonance, the chemistry of air pollution, and natural products. (F.S.P) Chandler, Lee, Strauss; Kim

298. Seminars for Graduate Students. (1-3) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Seminars. Prerequisites: Graduate standing. In addition to the weekly graduate research 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.S.P)

299. Research for Graduate Students. (1-9) 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.S.P)

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 adviser, intended to provide an opportunity 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.S.P)

Professional Courses

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.S.P)

301. Undergraduate Chemistry Instruction. (2) Course may be repeated once for credit. Must be taken on a passed/not passed basis. One hour of lecture and 5 hours of laboratory per week. Prerequisites: 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.S.P)

Interdepartmental Studies Courses

Upper Division Courses

IDS 145. Chemical Methods in Nuclear Technology. (3) One 1½-hour lecture and one ½-hour laboratory per week. Prerequisites: Nuclear Engineering 101 or Chemistry 143. Experimental illustrations of the interaction between chemical and nuclear science and technology; fission process, chemistry of fission fragments, chemical effects of nuclear transformations; application of radiocactivity to study of chemical problems; neutron activation analysis. Sponsoring departments: Chemistry and Nuclear Engineering. (SP) Hoffman

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 effectors to enzymes, and analyses of the thermodynamic and kinetics of these reactions. Catalytic mechanisms utilized by enzymes and correlation of mechanism with three-dimensional structure. The design of mechanism-based enzyme inhibitors. Sponsoring departments: Molecular and Cell Biology/Chemistry. (SP) Klinman

Chicano Studies

(Special Studies or College of Letters and Science)

Program Office: 3040 Dwinelle Hall, (415) 642-0240

Professor: Mario Barrera, Ph.D.

Associate Professors: Margarita Melville, Ph.D. Carlos Munoz, Jr., Ph.D. Patricia Panza, Ph.D. Gary Soto, M.F.A.

Assistant Professor: Norma Alarcon, Ph.D.

Adjunct Lecturers: Yvette Flores-Ortiz, Ph.D. Francisco Hernandez, Ph.D. Larry Tijuana, D.Cmth.

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 interrelationship of 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 involvement into the world of work and for a wide range of advanced graduate 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 requirements:

1. Completion of the general University requirements in senior residence, Subject A, American History and Institutions.

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 average in all courses in the major program.

Breadth Requirements—Special Studies

(For College of Letters and Science, Chicano Studies requirements, see the college announcement)

1. Demonstrate proficiency in Reading and Composition: 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 consultation with the Chicano Studies advisor).

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 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 advisor, 3410 Dwinelle.

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) One Chicano studies upper division elective.

Lower Division Courses

1A. English Reading and Composition for Native Speakers of Spanish. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Subject A. To acquaint 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 organization of a full composition. (F) Sato

1B. English Reading and Composition for Native Speakers of Spanish. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 1A and Subject A. Designed to acquaint bilingual students with the methods of expository discourse. An introduction to writing, beginning with sentence and paragraph structure, with an emphasis on unity, coherence, and overall organization of a full composition. (SP) Barrera

6A. Chicano Spanish. (4) Four hours of lecture per week. Designed and systematically structured to develop confidence in the Chicano student's ability to communicate in Chicano 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 the Spanish language will be continually reinforced through class presentation, written and oral reports and researched topics. (F) Soto

68B. Chicano Spanish. (4) Four hours of lecture per week. Prerequisites: 6A. To expand upon the material and concepts presented in 6A. This course is intended to acquaint Chicano students with the language of Chicano and Chicano-Spanish authors and to critical analyses of a variety of their writings. (SP) Soto

20. Introduction to Chicano Culture. (3) Three hours of lecture per week. An introduction to the cultural life of Chicano people. The period from 1910 to the present. A key theme will be the interaction between Chicano and American society as expressed in Chicano literature, music, art, and folklore. Attention will also 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. A survey of how Chicano art is being studied and presented through the Mexican period, the mural movement, and contemporary Chicano art. (SP) Melville

40. Introduction to Chicano Literature in English. (4) Four hours of lecture per week. The course will acquaint students with Chicano literature written in English, and will provide necessary background for understanding more specialized courses in the area. (SP) García

50. Introduction to Chicano History. (3) Three hours of lecture and one hour of discussion per week. A critical introduction to Chicano historical institutions and their effect on Chicanos-Latinos. (F) Abarán

60. 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 identity, effects of social class, language patterns, the family, barrio, youth, and sexual identity. (SP) Barrera

Upper Division Courses

101. Introduction to Chicano Studies Research. (4) Formerly 101A-101B. Three hours of lecture per week. Prerequisites: Upper division standing. The seminar 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. Secondarily, the seminar will undertake a comprehensive and critical assessment 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 of a 6-unit research project. The faculty will establish criteria and grade the project. For more information, see the Chicano Studies advisor, 3410 Dwinelle.

102A. Chicano Studies Seminar. (3) Three hours of lecture per week. Prerequisites: Upper division standing. An advanced seminar designed to acquaint professional and graduate students with the current literature in Chicano Studies. This seminar is designed to acquaint 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 organization of a full composition. (F) Sato

102B. Chicano Studies Seminar. (3) Three hours of lecture per week. Prerequisites: Upper division standing. An advanced seminar designed to acquaint professional and graduate students with the current literature in Chicano Studies. This seminar is designed to acquaint 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 organization of a full composition. (SP) Barrera

108. Mexican History and Social Context. (3) Three hours of lecture per week. Prerequisites: 40 and consent of instructor. An examination of the Mexican social context 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) Saragosa

145. La Chicana. (3) Three hours of lecture per week. Prerequisites: 50 and/or 145 recommended. A critical introduction to Chicana identity and assimilation from the perspectives of social science and the humanities. Topics include cultural identity, effects of social class, language patterns, the family, barrio, youth, and sexual identity. (SP) Barrera

150A. History of the Southwest: Mexican and Hispanic Period. (3) Three hours of lecture per week. Prerequisites: 50 and/or 150A recommended. A history of Chicanos from the late nineteenth century to the present. Emphasis will be given to American political, social, and economic forces and their impact on Chicano communities. Particular attention will be given to the internal dynamics of Chicano communities over time through the discussion of topics such as immigration, labor patterns, urbanization and cultural change. (SP) Saragosa

150B. History of the Southwest: Mexican-United States Period. (3) Three hours of lecture per week. Prerequisites: 50 and/or 145 recommended. An examination of the diversity among contemporary Chicano families through a historical analysis, including Spanish, Indian and 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 sibling-child relationships. (SP) Melville

161. 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 comparative perspective. (SP) 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 course will cover U.S. policies, 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) Melville

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) Melville

172. Chicanos and the 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 Chicana/o community in the United States; the history 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 experiences of Chicano students in public and private schools, bilingual education, school segregation, and higher education. (SP) Melville

174. Chicanos, Law, and Criminal Justice. (3) Three hours of lecture per week. Prerequisites: 70 recommended. An examination of the development and functioning of the legal and judicial system in Chicano communities, and their effects in the Chicano community; response to these institutions by Chicanos. (SP) Melville

176. Chicanos and Health Care. (3) Three hours of lecture per week. Prerequisites: 70 recommended. Re-
relationship of the health care delivery system in the U.S. to the Chicano community. To include an examination and analysis of the concept of mental health as defined by Chicanos. Analysis of program alternatives and the Chicano response to health care problems and issues.

Flores-Ortiz

T. Juanico, Jr., M.C.P. (Emeritus) Massachusetts Institute of Technology.

Donald L. Foley, Ph.D. (Emeritus) Washington University.

Irene Tinker, Ph.D. London School of Economics.

Richard L. Meier, Ph.D. University of California at Los Angeles.

Ira Michael Heyman, LLB. (Chancellor). Yale Law School.

When S. Cohen, Ph.D. London School of Economics.

Edward Blakely, Ed.D. University of California at Los Angeles.

Stewart Cohen, Ph.D. (Emeritus) University of California at Berkeley. Planning theory, social programs and policy.

Judith E. Innes, Ph.D. Massachusetts Institute of Technology. Urban economics and housing.

Robert B. Cervero, M.C.P., Ph.D. University of California at Berkeley. Transportation planning, transportation methods.

Conway R. Mocera, B.S. (Emeritus) University of California at Berkeley. Land use planning.

Robert B. Cervero, M.C.P., Ph.D., University of California at Los Angeles. Transportation planning, planning methods.

Frederick C. Collignon, Ph.D. A.I.C.P. Harvard University. Social policy, services planning.

Judith E. Innes, Ph.D. Massachusetts Institute of Technology. Social policy analysis.


Michael Southworth, Ph.D. Massachusetts Institute of Technology. Regional development, planning methodology.

Assistant Professors:

Peter Bosselman, M.Arch. University of California at Los Angeles. Urban design, public communication.

Elizabeth Daniel, Ph.D. (Emeritus) University of California at Berkeley. Planning, urban policy, transportation planning.

John Landis, Ph.D. University of California at Berkeley. Housing, urban economics, public finance. Associate Director, Center for Urban and Environmental Studies, University of California at Berkeley.

Barry Rosen, M.C.P. University of California at Berkeley. Urban services planning, communication.

The planning of cities is as old as urban civilization. Still today the concept of planning is undergoing a rapid development.

The planning process is to be considered.

The present planning process is not based on a passed/not passed basis.

Individual arrangements. Prerequisites: Upper division standing; consent of instructor. Supervised individual field experience in the community relevant to specific aspects of Chicano Studies. Regular meetings with faculty sponsor and written reports required.

FSP

Field Work in Chicano Studies. (1-3) 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)

Senior Thesis. (4) Must be taken on a passed/not passed basis. By arrangement. Prerequisites: Consent of instructor. Writing of a thesis under the direction of the member(s) of the faculty. (F,SP)

H195A-H195B. Honors Thesis. (3-3) Credit and grade to be arranged upon completion of the sequence. To be arranged. Prerequisites: Consent of instructor; upper division standing; a 3.5 GPA and a 3.3 GPA in the major. Independent study and preparation of an honor thesis under the supervision of a faculty member. (F,SP)

Field Work in Studies. (1-3) Course may be repeated for credit. One 3-hour seminar per week. 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)

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. Independent work for advanced students in Chicano Studies. Regular meetings with faculty sponsor and written reports required. (F,SP)

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. Independent work for advanced students in Chicano Studies. Regular individual meetings with faculty sponsor and written reports required. (F,SP)

City and Regional Planning

(Planning of Environmental Design)

Department Office: 228 Wurster Hall, 642-3256

Chair: Edward Blakely, Ed.D

Professors:

Edward Blakely, Ed.D. University of California at Los Angeles. Local economic development theory.

Margaret S. Cohen, Ph.D. (Emeritus) University of Colorado. Urban sociology.

Stewart Cohen, Ph.D. London School of Economics. Economic development theory.

Leonard L. Duhl, M.D. Albany Medical College. Social programs and policy.

Piers M. D. Ph.D. Cambridge University. Metropolitan planning.

Ine Michael Heyman, LLB. (Chancellor). Yale Law School. Urban design, environmental planning.

Allan B. Jacobs, M.C.P. University of Pennsylvania at Urban Planning.

Richard L. Meier, Ph.D. University of California at Los Angeles. International programs and policy.

Robert B. Cervero, M.C.P. Harvard University. Community development and housing.

Marlene Tisdell, Ph.D. University of Pennsylvania. Urban economies and housing.

Irene Ten-Z, Ph.D. London School of Economics. Development planning in urban planning.

Melvin M. Waterman, M.C.P. University of California at Berkeley. Urban design, environmental planning.


Corwin R. Mocera, B.S. (Emeritus) University of California at Berkeley. Land use planning.

Francis Violich, B.S. (Emeritus) University of California at Berkeley. Land use planning.

Robert B. Cervero, M.C.P., Ph.D., University of California at Los Angeles. Transportation planning, planning methods.

Frederick C. Collignon, Ph.D. A.I.C.P. Harvard University. Social policy, services planning.

Judith E. Innes, Ph.D. Massachusetts Institute of Technology. Social policy analysis.


Michael Southworth, Ph.D. Massachusetts Institute of Technology. Regional development, planning methodology.

Lecturers:


Ted H. Bradshaw, Ph.D. University of California at Berkeley. Public organization.


The planning of cities is as old as urban civilization. Still today the concept of planning is undergoing a rapid development.

The planning process is to be considered.

The present planning process is not based 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)

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. Independent work for advanced students in Chicano Studies. Regular individual meetings with faculty sponsor and written reports required. (F,SP)

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)

City and Regional Planning

(Planning of Environmental Design)

Department Office: 228 Wurster Hall, 642-3256

Chair: Edward Blakely, Ed.D

Professors:

Edward Blakely, Ed.D. University of California at Los Angeles. Local economic development theory.

Margaret S. Cohen, Ph.D. (Emeritus) University of Colorado. Urban sociology.

Stewart Cohen, Ph.D. London School of Economics. Economic development theory.

Leonard L. Duhl, M.D. Albany Medical College. Social programs and policy.

Piers M. D. Ph.D. Cambridge University. Metropolitan planning.

Ine Michael Heyman, LLB. (Chancellor). Yale Law School. Urban design, environmental planning.

Allan B. Jacobs, M.C.P. University of Pennsylvania at Urban Planning.

Richard L. Meier, Ph.D. University of California at Los Angeles. International programs and policy.

Robert B. Cervero, M.C.P. Harvard University. Community development and housing.

Marlene Tisdell, Ph.D. University of Pennsylvania. Urban economies and housing.

Irene Ten-Z, Ph.D. London School of Economics. Development planning in urban planning.

Melvin M. Waterman, M.C.P. University of California at Berkeley. Urban design, environmental planning.


providing policy and planning guidance. Designed for students whose primary interest is urban problems, rather than economics per se. (SP) Gruenstein

191F. Historical Preservation and Urban Planning. (3) Formerly part of 198 series. Three hours of lecture and discussion per week. This course is designed to introduce students to historic preservation in urban design and planning. Themes and topics to be explored include: the historical development of urban land use; methods of evaluating as a planning tool, viewing as a backdrop to planning, the effectiveness of economic incentives, and the legal and constitutional issues. (SP) Tilling

198. Special Group Study. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Flexible, at discretion and discussion per week. This course is designed to statistical techniques to solve planning and policy prob

199. Special Study for Advanced Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Flexible, at discretion and discussion per week. Group studies developed to meet specific needs of students. Enrollment restricted by regulations listed on pages 87 and 88 of this catalog. (F,SP)

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. Principal focus on the evolution of North American planning practice and theory since the late 19th century; some comparative and earlier material. (SP) Bosselmann

201. The Urban Planning Process. (2) Two hours of lecture and discussion per week. Prerequisites: Entry level master's students. Survey of the field of city planning—basic principles of city planning; role of the city planning profession in relation to the evolution of cities, introduction to specialties within the planning practices. Core-required course. (F) Blakely

202. Economics of Public Enterprise. (3) Three hours of lecture and discussion per week. Prerequisites: 113 or Economics 100A or equivalent. Roles of government agencies as producers of urban services in nonmarket setting; local public finance, taxation, and budgeting; measurement of benefits and costs; criteria and procedures for investment decisions concerning types and qualities of services and facilities. (SP) Collignon

204. Analytical and Research Methods for Planners. Course may be repeated for credit as modules vary. A series of course modules on research design strategies and analytic methods for planners. Each module will run from one to two semester and one to two quarter modules. A student may take sequentially two or three modules in one semester. Prerequisites: Consent of instructor. (F) Blakely

204A. Introduction to Urban Planning Methods. (3) Three hours of lecture/discussion per week. Prerequisites: Introductory statistics course or equivalent background. Introduction to the use of quantitative reasoning and statistical techniques to solve planning and policy problems. Course focuses on applying (i) techniques of inferential statistics and sampling to planning problems; (ii) multivariate techniques such as chi-squared and linear regression; (iii) advanced multivariate techniques such as multiple regression, logit analysis, and modeling. (F) Blakely

204E, Forecasting and Time Series Analysis in Planning. (4) Four hours of lecture/discussion per week. Prerequisites: 204A or equivalent. An introduction to simple and multiple regression, time series analysis, and forecasting methods. (SP) Dowell

204D. Multivariate Analysis in Planning. (3) Four hours of lecture/discussion per week for 10 weeks. Prerequisites: 204A or equivalent. Application of advanced multivariate methods in planning. Emphasis on causal modeling of cross-sectional data. Topics include: multiple regression analysis, residual analysis, weighted least squares, non-linear models, path analysis, log-linear models, factor analysis, principal components, and cluster analysis. Completion of two computer assignments, using several microcomputer statistical packages, is required. (SP) Dowell

204C. Modeling and Measurement Methods. (2) Four hours of lecture/discussion per week. Prerequisites: Advanced quantitative methods course. Applications of conceptual and modeling policy problems for research and analysis. Causal modeling, principles and techniques of measurement for hard-to-measure phenomena, and applications of indicators in planning and research. Emphasis on working through examples pertinent to environmental, social and economic issues. (SP) Dowell

205. Planning and the Legal Process. (3) Three hours of lecture/discussions per week. Introduction to the study of public policy and planning problems. 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 housing. (F) Eizel

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 city planning; relationship of long-range physical planning to urban renewal; the process of city planning legislation in reorganization of local government. (F) Christiansen

208. Citizen Involvement in the City Planning Process. (3) Three hours of lecture/seminars per week. An examination of present-day citizen organizations in the city planning process. Models for citizen involvement ranging from advising to community control. Examination of the effectiveness of different organizational models in different situations. (SP) Blakely

210. Introduction to Studio Laboratory: Plan Preparation. (4) Two hours of seminar and eight hours of studio per week. Prerequisites: City Planning students or consent of instructor. An introductory laboratory experience in planning. Students will work in teams to develop a land use plan for a specific city area. (F) Oeakin, Osband

211. Urban Land Economics. (3) Three hours of lecture and discussion per week. Prerequisites: 113 or Economics 100A or equivalent. A survey of the economic principles of urban land economics. Topics include: financial, pricing, and subsidy issues; transportation impacts on energy and environmental quality; transportation needs of the elderly and disabled; transit performance; land use compatibility and land use impacts; land use impacts on urban area. (SP) Landis

212. Land Use Controls. (3) Three hours of lecture/discussion per week. Focus on the theory, practice, and impact of land use controls. Topics include: development regulations, zoning, and land use controls. Applications to industrial land, urban and other techniques of land use control; objective of the course is to acquaint the student with regulatory techniques, efficiency, and equity aspects of various control mechanisms. (SP) Deakin

213. Transportation and Land Use Planning. (3) Three hours of lecture and discussion per week. Prerequisites: 212 or equivalent. An examination of the interactions between transportation and land use systems; historical perspectives on transportation; characteristics of travel and demand estimation; evaluation of various transportation planning systems; decision making in the design of transportation and urban structure; empirical evidence of transportation-land use impacts; case study examinations. (F) Cervo

214. Urban and Regional Physical Infrastructure. (3) Three hours of lecture and discussion per week. Prerequisites: 113 or Economics 100A or equivalent. Examination of the interaction of basic knowledge and technology of physical infrastructure systems: transportation, water supply, wastewater, storm water, solid waste management, community energy facilities, and urban public facilities. The problems of physical infrastructure development; centralized vs. decentralized systems; case studies. (SP) Staff

215. Planning and Analysis for Urban Development Projects. (3) Three hours of lecture and discussion per week. Prerequisites: 211 or equivalent. Using case studies, this course acquaints students with the techniques of project feasibility; analysis of project proposals and overall project compatibility assessment. Case studies will be based on a variety of urban and rural sector developments in local city and suburban locations. (SP) Lands

216. Urban Transportation Policy and Planning. (3) Three hours of lecture and discussion per week. Prerequisites: 213 or consent of instructor. Policy issues and dilemmas in urban transportation planning; examination of current transportation topics such as multiple regression, logit analysis, log-linear models, logit and probit analysis, principal components, and factor cluster analysis. Application of indicators in planning and research. Emphasis on working through examples pertinent to environmental, social and economic issues. (SP) Dowell

218A-218B. Studio: Community General Plan and Development Studies. (4/4) Two hours of lecture/ seminar and four hours of studio per week. Prerequisites: 210 or 215 or 212. Section A will focus on General Plan development and review. Section B will focus on site development and land use planning. Studio experience in analysis, policy advising, and project design or general plan preparation for urban communities undergoing development. (F and SP) Sholinsky, Dowell

219. Advanced Seminar on Land Use and General Plan Topics. (3) Course may be repeated for credit. Three hours of seminar meetings per week. Prerequisites: 206, 212, and at least one studio. Seminar exploring current land use issues facing California communities, with topics varying 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. Economic base and other macro models; impact analysis and projection of changing labor force and industrial structure; economic-demographic interaction in growth and urban structure; role of government in growth and population distribution. (F) Saxonian

221. Rural Area and Small Town Planning and Policy. (3) One 3-hour seminar per week; one field session. Prerequisites: Graduate standing. This seminar focuses on rural places and the larger regional and national 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 projects 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. Gaming simulations synthesis; simple computer models

*Not offered 1988-90
1On leave, spring
*Recalled to active service
1Recipient of Distinguished Teaching Award

2On leave, spring
2On leave, fall
3On leave, spring
223. Economic Development Planning. (3) Three hours of seminar discussion per week. prerequisites: Economics 110a or 203a, 204a-204b or Statistics 131 or equivalent. Strategy and tools for developing employment in regional and local areas. Organization of economic development activities. Program and project analysis. (SP) Blakely

224. Location Theory and Spatial Interaction Models. (2) Two hours of lecture per week. Prerequisites: Economics 100a or equivalent; Calculus. Density an integration of behavioral and spatially parti- cular emphasis on analytical models of location and spatial activity. Introduction to static and growth models of residential and industrial locations, and urban influences on spatial distribution of urban activities. (F) Cervero

225. Advanced Methods of Urban and Regional Analysis. (1-3) Three hours of lectures per week. Prerequisites: 204a-204b; 220 or 231 or 215. Covers regional accounting, economic base analysis, shift share techniques, input-output analysis, linear programming, regional economic models, and qualitative sectoral studies. In some semesters, optional five-week, one-unit modules may be offered. Check department for start of semester. (F) (SP) Blakely

227. Studies in Regional Growth and Development. (3) Three hours of seminar sessions per week. Prerequisites: 220. Intensive 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. (SP) Saxenian

228. Workshop Studio in Metropolitan and Regional Planning. (4) Two hours of seminar and four hours of studio per week. Prerequisites: Relevant past coursework and consent of instructor. Field problem in major phases of metropolitan or regional planning work. A collaborative student-group effort in formulating policy or plan recommendations within specific governmental framework. (F) (SP) Staff

229. Research Seminar in Urban and Regional Development. (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 as determined by research class discussion. Designed primarily for Ph.D. students and Master's students writing professional reports and theses. (F) Teitz

230. Housing Markets and Planning. (3) Three hours of lecture and discussion per week. Prerequisites: 113 or an introductory course in microeconomics, 204a or an introduction to regional economics, or consent of instructor. An analysis of housing markets and empirical methods for measuring market conditions and performance: housing consumption, housing supply and production, and market performance. Empirical analysis and applications to policy issues. (F) Teitz, Landis

231. Housing Finance and Policy. (3) Three hours of lecture and discussion per week. Prerequisites: 230. Survey of housing policy and programs at the local, state, and federal level; focusing on program design as well as methods and institutions of housing finance. Topics covered include mortgage structuring, operations of financial intermediaries, forms of ownership, federal subsidy programs, tax subsidies, and the use of tax-exempt mortgage revenue bonds. (SP) (SP) Landis

238. Workshop in Housing and Community Development. (4) Two hours of seminar and four hours of studio per week. Prerequisites: 231. Directed field project or group research on selected issues, drawn from following: housing development programs, redevelopment, neighborhood-level planning, preservation or construction of housing. Focus on neighborhoods in older central cities. (SP) Montgomery

239. Housing Policy Seminar. (3) Three hours of seminar and discussion per week. Prerequisites: 230, or consent of instructor. Discussion, readings, field work, and directed research on housing policies, their history, formulation, implementation, and evaluation. (SP) Staff

240. Theories of Urban Form and Design. (3) Three hours of lecture and discussion per week. Prerequisites: Consent of instructor. Theories of land use, culture of urban design, physical planning, and conservation; the implicit theories, ideologies, language, and methods of the major movements in the field. A conceptual model for evaluating these theories and relating them to case studies of urban design and other environmental plans. (SP) (Southworth

246. Field Observation and Diagnosis of Urban Environment. (2) Four hours of seminar, discussion, and field work. Prerequisites: Graduate students in environmental design. The seminar will review the limitations and possibilities of observations for city planning. The fieldtrips, on foot, will look at, record, and learn from a variety of urban environments, including physical, social, and economic conditions and trends. Five two-hour seminars and five five-hour fieldtrips. This is a 10-week module. (F) Jacob

247. The Educatve City. (1,0-3) Three hours of lecture and discussion per week (for 3 units). Prerequisites: Consent of instructor. Explores the potential role of the urban physical environment in learning and development. Topics include the process of environmental learning, characteristics of educative environments, techniques for predicting, and measuring the effects of environmental learning. (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. (F) Bosselman

250. Planning and Governing. (3) Three hours of lecture and discussion per week. Prerequisites: Consent of instructor. Origins and evolution of the idea of planning. Values, choice, and purposive 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) (Southworth

252. Theory and Practice of Implementation for Planners. (3) Three hours of lecture and discussion per week. Planning and implementation within the context of governmental institutions; systems for choice, change and control. Focus on organizational behavior and capacity for change, and processes of intergovernmental relations. (F) (Southworth

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 will be used as a base for examining the literature from the various social sciences for their relevance to development planning. (F) (Southworth

259. Advanced Topics in Planning Theory. (3) Course may be repeated for credit. One 3-hour seminar meeting per week. Prerequisites: 250, 253, 252 or equivalent. Selected advanced topics in planning theory. (F,SP) Cohen

260. Introduction to Social Theory and Planning. (3) Three hours of lecture and discussion per week. An interdisciplinary course in social and political theories of location and spatial structure. Introduction to and development of an understanding of social theory. An examination of specific advanced topics in social theory. (F,SP) Innes

262. Comparative Analysis of Urban Policies. (3) Three hours of lecture and discussion per week. Prerequisites: Consent of instructor. Analysis of selected topics in urban and metropolitan planning with emphasis on implications for planning practice and urban policy formulation. In some semesters, optional five-week, one-unit modules may be offered, for those wishing to gain intensive review of the research. (SP) Tinker

267. Seminar in 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 alter- natives, municipal budgeting and finance of service, health and safety, parks, transportation, educational facility and manpower requirements, linkages of service planning to land use and social planning. Course comple- 214 on physical infrastructure. (F) Staff

268. Professional Planning and Presentation Evaluation. (4) Four hours of lecture and discussion per week. Prerequisites: 252, 254, 255, or 252, 214, 252, 220 or equivalent. Techniques and process of designing, simulating, and evaluating alternative sequences of actions 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) Christensen

272. Seminar in Social Policy and Urban Services. (3) Course may be repeated for credit. One 3-hour seminar meeting per week. Prerequisites: 250, 252 or equivalent; 204a-204b or consent of instructor. A seminar on advanced topics in social policy or urban services planning, including an opportunity for students to gain intensive review of their individual research. (SP) Tinker

276. Regional and Urban Development Strategies in Third World Countries. (3) Three hours of lecture and discussion per week. Competing theories of regional and urban distribution of nonextractive industries and populations. Effects of natural resource distribution, of governmental services and infrastructure, and of private investment. Alternative strategies for influencing settle- ment patterns. Review of experience to date in various nations. (SP) Tinker

277. Techniques in Mediation, Group Process, and Conflict Resolution. (1,5) Two hours of lecture/ discussion per week. Instruction in basic techniques increasingly being used in planning practice. Half-course. (SP) Rosen

279. Introductory Graphics. (1,5) Three hours of studio/design discussion meetings per week. Prerequisites: City Planning students or consent of instructor. Basic instruction in graphics for planners having no design background, or expecting to become urban designers. Half-course. (SP) Staff

280. Topics in City and Metropolitan Planning. (1-2) Course may be repeated for credit. Three hours of lecture and discussion per week per module. Prerequisites: Consent of instructor. Analysis of selected topics in city and metropolitan planning with emphasis on implications for planning practice and urban policy formulation. In some semesters, optional five-week, one-unit modules may be offered, including guest speakers. Each week, one unit will be offered, for those wishing to gain intensive review of the research. (SP) (SP) Staff

292. Doctoral Seminar. (3) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Three hours of seminar meetings per week. Prerequisites: Consent of instructor. Advanced study in city and regional planning. Specific topics to be announced at the beginning of each semester. (F) (SP) Hall, Webber

295. Supervised Research in City and Regional Planning. (1-2) Course may be repeated for credit.
Civil Engineering (College of Engineering)

Department Office: 760 Davis Hall, 642-2321
Chair: Kenneth A. Crandall, Ph.D.

Professors:
- James M. Anderson, Ph.D., Cornell University. Analytic photogrammetry, surveying
- Robert G. Bax, Ph.D., University of Florida. Offshore and coastal structures, ocean and coastal engineering
- Vittorio Bertotti, Ph.D., Institute for Transportation Research Center, Berkeley. Massachusetts Institute of Technology. Inelastic behavior of structures
- Tor L. Brekke, Dr. Ing., Technical University, Norway. Geotechnical engineering, underground opening
- A. K. Chopra, Ph.D., University of California at Berkeley. Dynamics of structures, earthquake engineering
- Keith C. Cronenberg, Ph.D., University of Illinois at Urbana-Champaign. Risk analysis, management systems
- Carlos DeGuzman, Ph.D., University of Michigan. Transportation theory, mathematical analysis
- Aamir Der Kiureghian, Ph.D., University of California at Berkeley. Structural reliability, risk analysis
- William G. Goddard, Ph.D., Queen's University, Ireland. Experimental mechanics
- Richard E. Goodman, Ph.D., University of California at Berkeley. Geological engineering, soil mechanics
- James A. Harden, Ph.D., University of California at Berkeley. Flood and tidal hydraulics, stochastic hydrology
- Alexander James, Ph.D., University of Dundee, Scotland. Aquatic systems
- N. J. J. H. James, Ph.D., University of Durham. Water, wastewater chemistry, biological waste treatment
- Adio Kanaan, Ph.D., Institute of Transportation Studies, University of California at Berkeley. Transportation, air transport engineering
- James M. Kelly, Ph.D., Stanford University. Structural mechanics
- Jacob Linden, Ph.D., Columbia University, Mechanical engineering. Mechanics of solids
- John Lysmer, Ph.D., University of Michigan. Theoretical soil mechanics
- Stephen A. Mahin, Ph.D., University of California at Berkeley. Structural behavior, earthquake engineering
- Adolf D. May, Jr., Ph.D., (Vice Chair) Purdue University. Traffic operations and traffic systems
- Hugh D. McNiven, Ph.D., Columbia University. Mechanics of solids, earthquake structures
- Andrew R. Ng, Ph.D., University of California at Berkeley. Advanced accident analysis, safety
- K. N. Mahta, Ph.D., University of California at Berkeley. Ceramics materials and concrete
- James K. Mitchell, Sc.D., Massachusetts Institute of Technology. Soil behavior, engineering, improvement
- Carl L. Monismith, M.S. (Robert Horon Noyce Professor of Civil Engineering), University of California at Berkeley. Transportation engineering, pavement design
- Gordon F. Newmark, Ph.D. (Director, Institute of Transportation Studies) University of California at Berkeley. Transportation engineering, transportation science
- William J. O'Keeffe, Ph.D., University of California at Berkeley. Applied geology, waste management
- Karl S. Polzer, Ph.D. (Roy W. Carlson Distinguished Professor of Civil Engineering) University of California at Berkeley. Construction quality assurance, concrete structures
- William Nazaroff, Ph.D., Columbia University. Environmental engineering, air pollution
- Edward S. Seed, Ph.D., University of California at Berkeley. Geotechnical engineering, earthquake engineering, soil mechanics

Professor:
- Bruce A. Bolt, Ph.D.

Lecturers:
- Clarene K. Chao, M.S.
- Elizabeth A. Deskin, M.S., J.D.
- David W. Halligan, M.S.
- Eugene M. Herson, M.S.
- Wolfgang S. Homburger, M.S.
- Thomas A. Lang, M.S.
- Richard E. Parsons, M.S.
- Raymond B. Seed, Ph.D.
- Edward Sullivan, Ph.D.
- Jerome Weesner, M.D.

Adjunct Professors:
- Victor E. Cole, B.S.
- Robert B. Reimer, Ph.D.

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 techniques involving mathematics, physics, chemistry, computer and experimental methods, and human factors are used to consider projects such as buildings, bridges, dams, transportation systems, and water supply systems. Students learn about the latest technology in engineering practice. A strong emphasis is placed on developing excellent technical and communication skills to prepare graduates for direct entry to professional practice or admission to graduate study.

- R. Brady Williamson, Ph.D., Harvard University. Fire protection, fire flow systems, materials engineering.
- Edward L. Wilson, D.Eng., (Vice Chair) University of California at Berkeley. Analysis of large finite element systems.
- Frank Beno, D.Sc. (Emeritus)
- Jack C. Bowkamp, C.I. (Emeritus)
- Boris Breiter, M.S. (Emeritus)
- W. K. Cough Jr., Sc.D., L. and Elvira E. Nathanson Professor of Structural Engineering (Emeritus)
- Harmer E. Davis, M.S. (Emeritus)
- Howard D. Everett, M.S. (Emeritus)
- Ben C. Garvin, Jr. Ph.D. (Emeritus)
- Joe R. Goss, M.S. (Emeritus)
- Walter L. Lawrence, M.S. (Emeritus)
- Tung-Yin Lin, M.S. (Emeritus)
- Francis C. Mott, M.C.E. (Emeritus)
- Joseph Penzien, Sc.D. (Emeritus)
- David Fintz, M.S. (Emeritus)
- Edgar Popov, Ph.D. (Emeritus)
- Raphael S.M. (Emeritus)
- Jerome F. Thomas, Ph.D. (Emeritus)
- Robert L. Wiegell, M.S. (Emeritus)

Associate Professors:
- C. William Ibsen, Ph.D., University of California at Berkeley. Structural systems, construction management.
- Nicholas Sitar, Ph.D. Stanford University. Geotechnical engineering, groundwater.

Assistant Professors:
- Abhohassan Aftab, Ph.D. University of Michigan. Experimental research, design of steel structures.
- Richard A. Denker, Ph.D., University of Canterbury, NZ. Hydraulic and hydrologic engineering.
- Gregory L. Fennes, Ph.D., University of California at Berkeley. Structural dynamics.
- Filippos Filippou, Ph.D., University of California at Berkeley. Analysis, design of concrete structures.
- Mark Hansen, Ph.D., University of California at Berkeley. Air transportation.
- Paolo C. Moro, Ph.D. (Roy W. Carlson Distinguished Professor of Civil Engineering) University of California at Berkeley. Transportation, concrete structures.
- William Nazaroff, Ph.D., California Institute of Technology. Air pollution.
- Raymond B. Seed, Ph.D., University of California at Berkeley. Geotechnical engineering, earthquake engineering, soil mechanics.

On leave, spring:
- Rodney J. Sobey, Ph.D. Imperial College, London. Coastal, environmental quality.

*Not offered 1989-90
*On leave, spring, fall
*On leave, fall

Related Courses in the Program in Public and Nonprofit Management:
- BDS 208. Techniques of Management Control. (3)
- BDS 209. Applied Microeconomics. (3)
- BDS 210. Organizational Understanding for Managers. (3)
- BDS 211. Public Sector Accounting. (3)
- BDS 212. Financial Management. (3)
- BDS 214. Strategic Management in the Public Sector. (3)
- BDS 217. Technology, Tasks, and Politics. (3)
- BDS 218. Information Resource Management. (3)
- BDS 219. Financing Tools for Public Managers. (3)
- BDS 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.

**On leave, spring.
*Occasional service
†1984 Distinguished Teaching Award
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 (available without charge from the College of Engineering, University of California at Berkeley, Berkeley, CA 94720). All students must complete a total of 18 units of humanities and social studies of which six units 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 50A-50B, Chemistry 1A, Physics 7A-7B, Engineering 7, 28, 36, and 45, Civil Engineering 85 and 92, and Statistics 25. Electives: 14 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; Hydraulic and Coastal Engineering; Sanitary and Environmental Engineering; Structural Engineering; Mechanics and Materials (SEMM); 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 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 and 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 concurrent programs with 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, calculation of measurements, distance, elevation, angles; systematic and random error analysis; adjustment of measurements; weighting; principles of least squares; directions; traversing; horizontal and vertical curves. (F,SP) Anderson

86. Plane Surveying. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisite: Trigonometry. Principles and practice of surveying, including use of tapes, theodolite, level, alidade; calculations of traverse, areas, volumes, curves; stadia and plane table mapping. (F) Anderson

89. Introduction to Civil Engineering. (1) Must be taken on a pass/no pass basis. One hour of lecture per week. Introduction to familiarize the entering student with the nature and scope of civil engineering and its component specialties; to include study of actual projects and a field trip as appropriate. (F) Chandland

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, objects, Moments. Individual laboratory experiment. Staff

101. Hydraulics Laboratory. (2) One hour of lecture plus one 3-hour laboratory per week. Prerequisites: 100. Experiments in measuring, open channel flow, hydraulic machinery, hydraulic models; special experiments designed by the student. (F) Hadley

102. Advanced Hydraulics. (4) Three hours of lectures per week, plus one hour of laboratory. Prerequisites: 100, Energy and Moments. Principles of mechanics applied to open channel, surge, nonuniform flow, sediment transport, hydraulic models, flood propagation, flow through porous media, computer applications. (SP) Jenkins

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, interrelation between precipitation and runoff, groundwater flow, flood frequency and unit hydrographs, numerical methods for streamflow, data generation, applications of hydrology in engineering design. (F) Denton

111. Introduction to Sanitary/Environmental Engineering. (4) Three 1-hour lectures and one hour of discussion per week. Prerequisites: Consent of instructor. 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 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 fresh-water and saline lakes, reservoirs, streams, and estuaries; physical and chemical structure of aquatic ecosystems; plankton ecology; eutrophication and pollution. This course forms 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; waste recclamation; advanced and appropriate technology. (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 their quality. Emphasis is placed on the application of chemical principles employed to modify the concentration of the 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 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. Laboratory and written reports. (SP) 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. No-
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 beams, columns, and slabs; concrete mix design; Design for service and ultimate loads. Detailed for ducile behavior. (SP) Moehle

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 beams, columns, and slabs. Actions to which structural systems are subjected. Characteristics of various systems and their approximate analysis. Shear stress in wood and concrete. Detailing for strength and economy. (SP) Powell

148A. Structural Systems I. (3) Three 1-hour lectures per week. Prerequisites: Architecture 150. Analysis of determinant structural systems and prestressed concrete. 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. (F) Mehta

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 loadings. Design of rigid 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: 85 or 85S+25. General characteristics and design of transportation systems: streets and highways, rail, transit, air, water. Capacity considerations: time-space diagrams, queueing. Transport system design: horizontal and vertical alignment, cross-sections, earthwork, drainage, pavements. Economic analyses. Operations, maintenance, rehabilitation, energy; environmental considerations. (F,SP) Daganza, May, Monismith

151. Introduction to Transportation Planning and Implementation. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 150 or 151. Geometric, drainage, and environmental design for, and construction and rehabilitation of, transportation facilities, particularly streets and highways, railroads, and airfields. (F) Monismith

153. Design and Construction of Transportation Facilities. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 150. (may be taken concurrently). E45. Introduction to properties of civil engineering materials, such as cements, aggregates, concrete, asphalt, wood, plastics, and structural steel. Experiments for evaluating behavior of these materials under simple conditions. (F,SP) Monismith

161. Concrete Materials. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 160 (may be taken concurrently). Composition and properties of materials required to make concrete. Portland cements, supplementary cementing materials such as fly ash, ground-granulated blast-furnace slag, condensed silica fume, and fly ash. Aggregated types including lightweight expanded shale. Water reducing, set controlling and air entraining admixtures. Laboratory experiments on concrete materials embedment and their later influence on strength and durability characteristics of concrete. (SP) Monterro

165. Concrete Construction. (2) 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 concrete used for construction of highways, airfields, bridges, dams, and hydraulic structures. (F) Mehta

166. Engineering Construction. (3) Two 1½-hour lectures per week; field trips. Prerequisites: Upper division standing. The construction industry; its development, components, organization, and importance; construction methods and practices, applications and limitations; factors involved in the selection of plant equipment and material, principles of planning and organization and operating construction forces, and estimating costs. (F) Crandall

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: Upper division standing. Principles and management techniques applied to the planning, design, construction, and operation of civil engineering systems; professional relations; contracts and specifications. (F,SP) Crandall

168. Fire Protection Engineering. (2) Two 1-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 included with emphasis on fire safety provisions. Relationship between these codes and fire protection engineering is presented. (SP) Williamson

169. Polymers in Construction. (2) Two 1-hour lectures per week. Prerequisites: Engineering 45. Consideration of broad aspects of polymers in construction, particularly their use in the development of new materials and performance specifications; selection of materials; relationship of mechanical properties to microstructure; fire safety; weatherability; manufacturing techniques; use of sealants and coatings on structures. (F) Brekke

170. Engineering Geology. (2) Two 1½-hour lectures/laboratory demonstrations 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) Brekke, Star

171. Introduction to Geological Engineering. (3) Two 1½-hour lectures per week. Prerequisites: 170 or an introductory course in Physical Geology. Geological and geophysical exploration for structures in rock; natural aggregates for construction; geological engineering of underground openings; evaluation of dam sites. (SP) Brekke

173. Groundwater and Seepage. (3) Two 1½-hour lectures per week. Prerequisites: Senior standing in engineering or science, CE 100 recommended. Introduction to the determination of hydrologic and transient flow through porous media, numerical analysis, pumping tests, groundwater geology, contaminant transport, and design of waste containment systems. (F) Star

175. Soil and Foundation Engineering. (3) Two 1-hour lectures and one 3-hour discussion/labatory demonstration period per week. Prerequisites: 100, 130, 170 (one of which may be taken concurrently). Soil formation and identification. Physical and mechanical properties of soils. Bearing capacities and lateral earth pressures on structures. Site investigations, design of substructures, construction problems in foundation engineering. (F,SP) Garrison

176. Soil Mechanics and Foundation Design. (2) Two 1-hour lectures and one 3-hour laboratory 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 pressure; minimizing settlements; radial drainage; lateral pressure on walls. (SP) Lyser.

177. Soil Properties and Their Engineering Application. (2) One hour of lecture and one 3-hour laboratory period per week. Prerequisites: 175. Laboratory testing of soils and their use in solving practical problems. Students assume role of consultant and instructor assumes role of client. Soil test results are used to develop recommendations that are conveyed in four short engineering reports. (F,SP) Chan, R. Seed

179. Asphalt and Asphalt Mixtures. (3) 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 asphalt-aggregates, and mixture design. (F) Chan, Monismith

185. Control Surveys. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 85 or 86 with consent of instructor. Vertical control, precise leveling; horizontal control, triangulation, trilateration, traverse surveys; electronic distance measuring. (SP) Chan

186. Elementary Photogrammetry. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 185 or consent of instructor. Applications of photogrammetry; precision cameras; geometry of photographs; ground control; flight planning; stereoscopy and parallax; radial line triangulation; map revision; mosaic; 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 equivalent. Simple, compound, reverse, and transition surveying; parallax; curvilinear parabolas; reconnais- sance and CS 7. Planning and investment decisions. Development of urban facilities; modern urban transportation systems; planning and structures; selection of materials for engineering construction. (SP) Anderson

188. Airphoto Analysis and Interpretation. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: Senior standing or consent of instructor. A series of lectures by distinguished civil engineers designed to provide an appreciation of the role of science, technology, and engineering in society in considering the needs of society in conceiving projects, balancing the interplay of conflicting demands, and utilizing a variety of disciplines to produce unified and efficient systems. (SP) Monismith


199. Supervised Independent Study. (1-4) Course to be repeated for a maximum of four units per semester. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor and major advisor. Supervised independent study projects and reports may be found on pages 87 and 88 of this catalog. (F,SP) Staff

Graduate Courses

201. Physical Oceanography. (2) Two hours of lecture and one 3-hour laboratory 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 flows, frontal and eddy dynamics, geostrophic effects, Ekman transport,3 and porous infiltration into the ocean. (SP) Staff

202. 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 3On leave, spring 1989-90
4One on leave, spring, fall
5Recipient of Distinguished Teaching Award
6On leave, spring
209B. Hydrologic Mixing Processes. (3) Three hours of lecture per week. Prerequisites: 100. Applied fluid mechanics of short, surface gravity waves. Topics include linear wave theory, wave properties, shallow water transformation, 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 wave motion, wave transformation, and currents, and the application of this information to some coastal and offshore engineering problems. (F)

205B. Coastal Engineering. (3) Three 1-hour lectures and demonstration periods per week. Prerequisites: 205A. 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) Roda

208. Computational Methods in Open Channel Flow. (3) Three 1-hour lectures per week. Prerequisites: 100A or equivalent. Numerical methods applied to nonsteady flows in rivers and estuaries, flood wave propagation, automatic control of water supply systems, computer applications. (F)

207. Sediment Transport Mechanics. (3) Three hours of lecture per week. Prerequisites: 102 or consent of instructor. Sediment transport in rivers, estuaries, and closed conduits. Measurement techniques, modeling of river systems, river mechanics. (F) Shen

209A. Hydrologic Mixing Processes. (3) Three hours of lecture per week. Prerequisites: 205B. Concepts of hydrodynamic diffusion and transport; turbulent mixing; mixing in rivers, reservoirs, and estuaries. (SP) Denton

209B. Hydrologic Mixing Processes. (2) Two hours of lecture per week. Prerequisites: 205A and 209A. Numerical and physical modeling of dispersion in estuaries and reservoirs; mixing in stratified flows. (SP)

210A. Advanced Applied Limnology: Plankton Ecology. (3) Two hours of lecture and 3 hours of laboratory 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 trophic levels. This course is part of a sequence composed of CE 113, Foresty 178, 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 trophic levels. This course is part of a sequence composed of CE 113, Foresty 178, CE 210A-210B, and Forestry 278. (F) Home

211. Water Treatment Engineering. (3) Course may be repeated for credit. Three 1-hour lectures per week. Prerequisites: 111 and 115 (both may be taken concurrently). Water quality methods for beneficial use, standards, and regulations. Concepts of mass balance and chemical reactor theory applied to water quality improvement. Specific topics include gas transfer, particulate removal processes, chemical precipitation, ion exchange, adsorption, and disinfection methods. (F, SP) Hermanowicz

212. Wastewater Treatment Engineering II. (3) Three 1-hour lectures per week. Prerequisites: 111 and 115. Wastewater discharge and receiving water standards. Primary, secondary and tertiary wastewater treatment and sludge treatment and disposal fundamentals and design. Salinity treatment, mobilization, biological treatment, activated sludge, fixed film reactors, anaerobic digestion, and nutrient removal. (SP) Hermanowicz

213. Applied Ecology Laboratory. (1) One 3-hour laboratory/demonstration per week. Prerequisites: 113 or consent of instructor and field experience with the major tests which form the basis of modern sanitary and environmental regulations. Consider spherical, and acute fish toxicity, algae bloom, and taxonomic and control 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 kinetic models and physical, chemical, and bio-chemical principles applied to the description of the composition and behavior of natural waters, water and wastewater treatment processes, and water pollution control laws, and design of the circulation of important elements in natural water systems and their significance in water quality. (F) Jenkins

215. Advanced Sanitary Engineering Laboratory. (3) One hour of lecture and six hours of laboratory per week. Prerequisites: 116, 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 processes. (SP) Sellick

216. Industrial Water and Wastewater Treatment. (3) Three 1-hour lectures per week. Prerequisites: 116, 211, and 212 (concurrently). Theory and design of water and wastewater treatment process for industrial applications. Emphasis will be placed on process technology that tranfers to industrial wastewater treatment and wastewater treatment, and is required 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, 212 (may be taken concurrently) or consent of instructor. Chemical reactor theory, mass transfer, heterogeneous and homogeneous reactions, as applied to sanitary/ environmental engineering processes. (SP) Ruddy

218A. Air Quality Engineering. (3) New course. Three 1-hour lectures per week. Prerequisites: Engineering 150 or graduate standing. Fundamental quantitative description of atmospheric physics and chemistry of air pollutants. Pollutant generation in combustion systems, atmospheric photochemistry, transport and dispersion of pollutants, pollutant deposition, pollutant effects, acid deposition. (SP) Nazaroff

218B. Air Quality Engineering. (3) New course. Students who have received credit for 218C taken prior to spring 1990 may not receive credit for 218B. Three 1-hour lectures per week. Prerequisites: Engineering 150 or graduate standing. Fundamental quantitative description of atmospheric chemistry and physics of air pollutants. Properties and dynamics of atmospheric aerosols, gas-to-particle conversion processes, formation and control of particles, visibility degradation. Approaches to air pollution monitoring and control. Indoor air quality. (SP) Nazaroff

218C. Toxic Air Management. (1) Formerly 218B. Students who have received credit for 218C taken prior to spring 1989 may not receive credit for 218B. Three 1-hour lectures per week. Prerequisites: E150 or consent of instructor. Overview of indoor and outdoor air quality, health effects, air quality management programs, and physical science principles of various methods for measuring pollutant concentrations. (SP) Nazaroff

219. Toxic Air Management. (3) Three hours of lecture per week. Prerequisites: 218A and 218B. Introduction to probability theory and random processes. Correlation and power spectral density functions. Dynamic analysis of structures subjected to stationary and non-stationary random excitations. First excursion and fatigue failures. Applications in earthquake engineering, wind engineering, and ocean engineering. (F) Staff

227. Earthquake-Resistant Design. (3) Three hours of lecture per week. Prerequisites: 225 (may be taken concurrently) and 245. Design of structures to resist earthquake loading, including analysis of linear and nonlinear response; response spectrum estimates; estimates of maximum response; effects of inelastic behavior. Laboratory demonstrations. (F,SP) Chopra, Fvenes

228. Random Vibration of Structures. (3) Three hours of lecture per week. Prerequisites: 220. Introduction to basic concepts and developments in structural dynamics. First excursion and fatigue failures. Applications in earthquake engineering, wind engineering, and ocean engineering. (F) Staff

229. Experimental Dynamics and Model Analysis. (3) Two 1-hour lectures and one 3-hour laboratory. Prerequisites: Graduate standing in engineering. Experimental behavior of structures, Dynamic loading; steady- state loading, impact, seismic, impact. Static loading, buckling, interaction effects, instrumentation, data acquisition and reduction, data analysis and theory of models for predicting structural response. Structural models in research and design. (SP) Godden

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-


234A. Thermomechanics of Deformable Solids I. (3) Three hours of lecture per week. Prerequisites: 231A. Mathematical preliminaries (normed vector spaces, differential vector fields, and manifold theory). Theoretical foundations of physical deformable bodies (balance principles, energy, elasticity). Offered according to student demand and faculty availability.

234B. Thermomechanics of Deformable Solids II. (3) Three hours of lecture per week. Prerequisites: 234A or consent of instructor. Unified treatment of problems, involving mechanical and thermal phenomena interacting with solids and structures; consistent linearization of nonlinear theory; variational techniques; implications for applications to computational methods, including finite element methods applied to finite deformation problems. (SP) Sullivan

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 our present interest are solid and structural mechanics. Sections will 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. (F)

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) Three hours of lecture per week.

235G. Shell Theory. (3) Three hours of lecture per week.

235H. Three-Dimensional Elasticity. (3) Three hours of lecture per week.

235I. Wave Propagation. (3) Three hours of lecture per week.

240. Advanced Civil Engineering Materials. (3) Two 2-hour lectures per week. Prerequisites: 160 or equivalent. Constitutions of concrete, wood, and construction steels is discussed; differences and similarities in regard to environmental effects, elastic modulus, strength, and ductility. Experimental methods demonstrated for investigation of structure and properties of those materials. (SP) Kanafani

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, water, cements, and admixtures; properties of hardened concrete; mass concrete, lightweight concrete and heavy-weight concretes, concretes containing cementitious and fiber-reinforced concretes. (SP) Astaneh

242. Composite Behavior. (3) Two 1-hour lectures and one 2-hour laboratory per week. Prerequisites: 160 or equivalent. Relationship between concrete microstructure and mechanical properties. Composite materials theory for concrete. Fiber-reinforced materials, materials, and microstructures, theoretical models. Use of instrumentation, data acquisition, and modern experimental techniques employed in concrete research. (F) Monteiro


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 loadings. Failure criteria. Influence of load and environment history. (F) Astaneh

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 and frameworks; and first and second order theories. Behavior of beam-column joints. Design of slabs; recent advances in application of yieldline theory and strip methods. (SP) Moehle

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) Filippou

246. Design of Concrete Shells. (3) Three hours of lecture per week. Prerequisites: 220 and 140. Application of shell theory; approximate methods and computers to the design of shells and folded plate structures. Determination of reinforcement or prestressing requirements. Study of existing experimental results including ultimate strength tests. Design problems involving shell structures. (SP) Kanafani

247. Advanced Steel Design. (3) Three hours of lecture per week. Prerequisites: 141. Advanced topics in steel design. Design of plate girders, composite constructions and hybrid beams considering strength, stiffness, stability and fatigue. 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: 242 or consent of instructor. Operational planning and management of the highway transportation system. The highway system is presented as a set of operational units with inputs and outputs, each having a 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) May
255L. Highway Traffic Operations Laboratory. (1) One 3-hour laboratory per week. Prerequisites: 255 (may be taken concurrently) or consent of instructor. Operational planning and management of the highway transportation system. Designed to be taken concurrently with 255L. Laboratory exercises will be given to field studies, mathematical analyses, and model applications. (SP)

256. Transportation Planning. (3) One 3-hour lecture per week. Critiques of urban, regional, and national planning techniques and methodologies. Strategic versus tactical planning. Current research and research needs. (F)

257. Applications of Queueing Theory to Transportation. (2) Two 1-hour lectures per week. Prerequisites: Graduate standing or consent of instructor. Deterministic queueing models with application to urban traffic, highway traffic signals, bus dispatcher, etc. Stochastic models, Poison arrivals, light traffic and diffusion approximations. (SP)

258. Freight Transportation. (3) Two 1 1/2-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 guide-way interaction is considered and compared with other modes. Systems are examined by extending the analysis to regional and national. Performance characteristics are defined by modal systems interrelationships and measured by comparison across modes. Current research, technology, and policy. (SP) Garrison

258L. Freight Transportation Laboratory. (1) One 3-hour laboratory per week. Prerequisites: 258L (may be taken concurrently) or consent of instructor. Classification of terminal design and operations; optimization of sorting subject to train or truck/mass and blocking constraints; route design and analysis operations using train, truck, and locomotion simulators; and parametric analyses of new technology systems. (SP) Garrison

259. Public Transportation Systems. (2) One 2-hour lecture per week. Prerequisites: 250, 251, 252, or consent of instructor. Analysis and evaluation of mass transit systems, their operation and management. Technology of transit vehicles and structures. Impact on urban land use. Public policy and financing. (SP) Homburger

259L. Public Transportation Systems Laboratory. (1) One 3-hour meeting per week. Prerequisites: 259 (may be taken concurrently). Design and evaluation project of a public transportation facility. (SP) Homburger

260. Air Transportation. (3) Three 1-hour lectures per week. Prerequisites: Graduate standing or consent of instructor. Nature of commercial aviation; structure of the airline industry; aircraft characteristics and performance; airport network and air traffic control; airports, scheduling and planning; design and operations; flight operations. (SP) Hansen, Karanfili

260L. Air Transportation Planning. (1) One 3-hour studio per week. Prerequisites: 260 (may be taken concurrently). Studio course in air transportation planning. Problems in airport planning and design; airline planning; aviation systems planning. (SP) Hansen, Karanfili

261. Feasibility Analysis of Transportation Systems. (2) One 2-hour lecture per week. Objectives and criteria for choice of transportation investments; economic analysis, estimation of costs and benefits, discounting treatment of intangibles and uncertainty; site selection and environmental constraints; impact analysis. (SP) Staff

262. Analysis of Transportation Data. (2) Two 1-hour sessions per week. Prerequisites: Statistics 134 or equivalent. Use of the computer. The use of the computer in transportation. Data gathering techniques, sources of errors, considerations of sample size. Experiment design for demand forecasting and transportation operations analyses. Analysis techniques. (SP) Daganzo

263. Operations of Transportation Terminals. (3) Two 1 1/2-hour lectures per week. Prerequisites: Graduate standing or consent of instructor. Characteristics of terminals on a mode by mode basis (sea ports, railyards, airports, parking lots, etc.). Methodologies used to study terminal operations and the management of congestion. (Chronographs, input-output diagrams, pricing, simulation) Stages in the use of the methodologies. (SP) Daganzo

264. Transportation Networks. The course consists of two parts CE 264 for one half semester followed by 264C and/or 264C. Part A treats mathematical modeling of the geometric aspects of networks common to private, public, and railroad transportation. Part B then deals with the analysis of flows (mostly private automobile traffic) whereas Part C deals with the movement of goods. Students may enroll for part A followed by either part B or C or both. (SP) Daganzo, Newell

264A. Graphs, Metrics, and Routing. (2) Two 1-hour lectures, one 2-hour lecture per week for one half semester. Mathematical characterization of networks, graph theory, shortest paths, continuum approximations, vehicle routing. (F) Daganzo, Newell

264B. Network Flows and Traffic Assignment. (1) Two 1-hour lectures per week for one half semester. Prerequisites: 264A. Stationary vehicle flows on networks, conservation equations, traffic assignment, hierarchy structure of highway networks, time-dependent flows through bottlenecks. (F) Daganzo, Newell

264C. Logistics. (1) One 2-hour lecture per week for one half semester. Prerequisites: 264A. Transportation/inventory production cost interrelationships, physical distribution networks, many-to-many networks, the role of transhipment and terminals in logistic operations, system design. (SP) Garrison

265. Pavement Design and Rehabilitation. (3) Three 1-hour lectures per week. Prerequisites: Graduate standing in engineering. Theories, principles, and techniques in the structural design, construction, and rehabilitation of pavements for streets, highways, airports, and container transfer facilities; stabilization; pavement management; pavement evaluation; overlay design. (F) Monismith

266A. Construction Organization and Management. (3) Two 1 1/2-hour lectures per week. Prerequisites: 166 or equivalent. Typically 266A and 266C. Two 1 1/2-hour lectures per week plus individual meetings one 1-hour lecture per week. Management of construction organizations and control concepts during entry into business and for continued operation; computer system definitions and computer utilization. Topics include legal, financial, labor, accounting, and others that impact decision-making in the construction industry. (F) Newell

266B. Marketing and Management of International Construction and Engineering. (3) Formerly 266B and 266C. Two 1 1/2-hour lectures per week plus individual meetings one 1-hour lecture per week. Formerly 266J. Management of international projects, including investigation, planning, procurement, logistics, personnel and financial. Special problems of adverse environment. (SP) Hester

266C. Transportation Networks. The course consists of two parts CE 264 for one half semester followed by 264C and/or 264C. Part A treats mathematical modeling of the geometric aspects of networks common to private, public, and railroad transportation. Part B then deals with the analysis of flows (mostly private automobile traffic) whereas Part C deals with the movement of goods. Students may enroll for part A followed by either part B or C or both. (SP) Daganzo

266D. Essentials of Construction Project Control. (3) New course. Two 1 1/2-hour lectures per week. Prerequisites: 266A and 266C (concurrently) or consent of instructor. Principles of engineering and construction project control. Accounting and job cost, scheduling, and quality control issues addressed separately and as integrated systems. Scientific risk analysis considerations are introduced throughout the course. (SP)

266E. Computer Applications in Construction. (3) Formerly 268J. Two 1-hour lectures per week. Specific computer applications, computer hardware and software programs are presented, and the use of commercial microcomputer packages in their solution is discussed in detail. Special attention is given to the selection and use of heavy construction equipment, cost, and schedule control problems, and quality assurance techniques. (SP) lbb

266F. Project Management. (3) Three 1-hour lectures per week. Prerequisites: Graduate standing or consent of instructor. Advanced course concerned with construction activities. Emphasis is placed on scheduling and control of projects. Topics covered include technical management, emphasis on physical properties of asphalts, aggregates, their combinations, and the relationship of these properties to design, construction, and rehabilitation of pavements; classification of construction technologies; recycling; and energy considerations. (SP) Monismith

270A. Advanced Soil Mechanics. (3) Two 1 1/2-hour lectures per week. Prerequisites: 175 and 177 or equivalents, or permission of the instructor. Advanced topics of soil mechanics, including consolidation, settlement, lateral earth pressures, bearing capacity, and founded buildings, and excavation bracing, and applications to civil engineering projects. (F) H. Seed

270B. Advanced Soil Mechanics. (3) Two 1-hour lectures per week. Prerequisites: 270A or equivalent. Formerly 270J. Emphasis is placed on design including shear strength, scope stability, and deep foundations, and applications to civil engineering projects. (SP) R. Seed

270L. Advanced Soil Mechanics Laboratory. (3) One 1-hour lecture, one 3-hour laboratory per week, and project. Prerequisites: 270A, 270B (concurrently), or consent of instructor. Lectures and experimental studies of advanced aspects of soil property measurement with application to analysis and design. Cementitious behavior to load control and Janbu's method, static and cyclic tests, and sampling and sample handling, field testing related topics including advanced instrumentation, data acquisition, and measurement techniques. (SP) R. Seed, Chan

272. Soils 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, and earth retaining. Practical applications. (F) Hester

274. Sand and Gravel. (3) Two 1-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 processing of concrete. Analysis of bridges, bridges, pressure vessels, and tunnel control structures. (SP) Hester

275C. Construction of Harbor, Coastal, and Ocean Structures. (3) Two 1-hour lectures per week. Prerequisites: 140 and 141. Construction methods and equipment for structures such as breakwaters, wharves, terminals, outfall sewers, power plant intakes and discharges, submarine oil and gas pipelines, dredging, offshore platforms, Arctic Ocean structures, subsea and deep ocean facilities. (SP) Bea
geological factors on properties; colloidal phenomena in soils; soil structure; analysis of conduction phenomena; compressibility, strength, and deformation properties; stress-strain relations; and liquefaction problems.

274. Introduction to Soil Dynamics. (3) Two 1½-hour lectures per week. Prerequisites: Knowledge of FORTRAN programming. Dynamic analysis of single and multi-degree-of-freedom systems. Wave propagation in viscoelastic layered media; two-dimensional problems; methods of solution. Stress analysis; response analysis. Introduction to seismic structure-interaction analysis. Dynamic soil properties and their determination. (F) Lysmer

275. Soil Dynamics-Earthquake Engineering. (2) Two 1-hour lectures per week. Causes of earthquakes; instability and 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. Principles of earth dam design; compaction of earth dams; cracking in dams; causes of failure; slope stability; control measures; methods of evaluating stability of earth dams; earthquake-resistant design of dams; rockfill dams. (SP) H. Seed

277. Theoretical Soil Mechanics. (2) Two 1-hour lectures per week. Prerequisites: Knowledge of FORTRAN programming. Consolidation analysis by finite difference methods; consolidation analysis by finite element method; limit analysis of bearing capacity and stability problems. (F) Lysmer

278. Seafloor Sediments: Origin, Properties, and Offshore Engineering Applications. (2) Two hours of lecture per week. Prerequisites: Introductory courses in geology and soil mechanics. Geological oceanology, including evolution of the ocean basins, plate tectonics, geology of the seafloor; hardware and techniques for sampling, laboratory and in situ testing, summary of geophysical and geological studies with emphasis on cyclic loading behavior, case histories.

280. Rock Mechanics. (3) Two 1½-hour lectures per week, one field trip, and several laboratories. Prerequisites: 172. Engineering in discontinuous rocks; geological description and exploration; joint statistics; deformability; shear strength; block theory; stability analysis; numerical analysis. (SP) Goodman

281. Engineering Geology. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: A course in Physical Geology; knowledge of geologic origin and history of the earth, geologic structure, and rocks. Application of geology in exploration, design, and construction of engineering works. (F) Sitar

283. Geological Engineering of Underground Openings. (3) Two 1½-hour lectures per week. Prerequisites: Course in engineering geology or physical geology. Geological exploration for underground openings; methods of excavation, rock reinforcement, support, and lining; stability problems in hardrock, soft-rock, and soil tunneling; monitoring instrumentation; large openings for special purposes; case studies. (F) Goodman

285. Adjustment Computations. (4) Two 2-hour lectures per week. Prerequisites: 185 (may be taken concurrently); Statistics 25 or equivalent. Review of matrix algebra and computer programming; introduction to probability and variance and covariance propagation; derivation of method of least squares adjustment with applications to problems in surveying; coordinate transformations with applications to coordinate refinement in analytical photogrammetry. (F) Anderson

288. Analytical Photogrammetry. (4) Two 2-hour lectures per week. Prerequisites: 185 or equivalent; 287 or equivalent. Computer programming; collinearity and coplanarity; systems of survey equations; least squares adjustment. (F) Anderson

289. Sterereosimulation and Adjustment. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 185. Design of stereosimulation instruments; interior, relative, and absolute orientation; map compilation; control extension by independent models; adjustment to ground control; analysis of systematic and random errors. (SP) Anderson

290A. Probabilistic Methods in Geotechnical Engineering. (1-2) Students enrolled in 249 will receive 1 unit of credit for 290A. Two 1-hour lectures per week. Prerequisites: Graduate standing in civil engineering or graduate student status. The course will include supervised teaching of laboratory sections of civil engineering courses, group analysis of videotapes, reciprocal classroom visitations, and an individual project. (F,SP) Staff

290B. Analysis and Design for Fatigue. (2) Two 1-hour lectures per week. Prerequisites: 225, 221. Analysis and design procedures for civil engineering structures subjected to cyclic loadings; treatment of statistical and deterministic forces; failure analysis techniques; mechanisms of fracture and crack propagation; design procedures for extended fatigue life; methods of inspection and repair; case studies. (F) Lysmer

290C. Computer-Aided Structural Engineering. (3) Three 1-hour lectures per week. Prerequisites: Background in structural analysis and design required, consent of instructor, and second-year standing. Advanced techniques for computer-aided structural design using modern computers and analysis techniques and representation systems. Database models systems and fundamentals of geometric modeling and computer graphics. Engineer-computer interface. Techniques for developing computer-aided engineering systems. (F) Fan

290P. Strategic Issues of the Engineering Construction Industry. (3) Two 1½-hour lectures per week. Prerequisites: Graduate standing or consent of instructor. Strategic issues of engineering and construction in the present competitive market. Advanced methods of managing complex projects in all phases of activities starting with concept development, through engineering design, procurement, construction, and operational startup. Project economics and finance are given special attention. (F) Cole

290Q. Heavy Construction Methods and Estimating. (2) One 2-hour lecture 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) Barrie

290R. Advanced Topics in Geotechnical 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) Goodman

290T. Advanced Topics in Transportation Theory. (3) Two 1½-hour lectures per week. Prerequisites: Consent of instructor. Problems in theoretical analysis of transportation systems. (F,SP) Daganzo, 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. Propagation of economic development, and the role played by transportation. Case studies of transportation planning in selected regions. (F,SP) Kanafani

291A. Numerical Methods in Hydraulic and Coastal Engineering. (3) Three 1-hour lecture and demonstration periods per week. Prerequisites: 100; Mathematics 504 and 506. Introduction to numerical methods in hydraulics and hydrology and in coastal and ocean engineering. Time series analysis, multidimensional implicit equations, ordinary differential equations, boundary value problems (elliptic partial differential equations) and initial value problems (parabolic and hyperbolic partial differential equations), applications in hydraulic and coastal engineering. (F,SP) (F) (F)

291C. Advanced Hydromechanics. (3) Three 1-hour lectures per week. Prerequisites: 100. Flow kinematics, strain and vorticity, stress tensor, Navier-Stokes Equations, exact solutions to Navier-Stokes Equations, High Reynolds Number flow-boundary layer, oscillatory boundary layer, turbulence energy, wakes and plumes, open channel flows.

291D. Environmental River Mechanics and River Engineering. (3) Three hours of lecture per week (some field trips). Prerequisites: 207. Major topics are: mechanics per week. Prerequisites: Graduate student status. Analysis of special channel designs with and without hydraulic structures, reservoir sedimentation, sedimentation problems at river mouths, and the mathematical modeling of alluvial rivers (including degradation and aggradation). Alternative engineering solutions according to river behavior analysis and certain biological concerns will be discussed. (SP) Shen

291E. Contaminant Transport Processes. (5) May be taken on a satisfactory/unsatisfactory basis. Three hours of lecture per week; prerequisites: 110 and 117 (recommended). The fate of contaminants in the environment is controlled by transport processes within a single media and between media. The similarities in contaminant dispersion between air, water, and groundwater will be emphasized. Interphase transport processes such as volatilization and adsorption will then be considered from an equilibrium perspective followed by the kinetics of mass transfer across environmental interfaces. (SP)

298. Group Studies, Seminars, or Group Research. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing. Advanced studies in various subjects involving special problems, informal group studies of special problems, group participation in comprehensive design problems, or group research on complex problems for analysis and engineering solutions. (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, Research or investigation in selected advanced subjects. (F,SP) Staff

301. 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, and one hour of discussion per week. Prerequisites: Consent of instructor. The course will include supervised teaching of laboratory sections of civil engineering courses, group analysis of videotapes, reciprocal room visits, and an individual project. (F,SP) Staff

601. Individual Study for Master's Students. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual study for the comprehensive or language requirement. Students may use the course to meet either unit or residence requirements. (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. Individual study with the major field adviser. Units may not be used for unit or residence requirements. (F,SP) Staff
The Department of Classics offers four undergraduate majors: Greek, Latin, Classical Languages, and Classical Civilization.

**Majors 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); Latin 100, 101; either Latin 102 or 103; four courses chosen from Latin 115-123; one course chosen from Greek 115-123; one course chosen at any level (except 10A-10B); one course from the list of recommended courses (see below), excluding Greek language courses; Classics 190.

**Majors in Latin**
- Elementary Latin (either Latin 1-2 or Latin 14-2 or Latin 10 or the Latin Workshop, offered during Summer Session); Latin 40A-40B (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 Latin 115-123; one course of any level (except 10A-10B); one course from the list of recommended courses (see below), excluding Latin language courses; Classics 190.

**Majors in Classical Languages**
- 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, either Latin 102 or 103; either Greek 102 or 103; four courses chosen from Greek 115-123; one course of any level (except 10A-10B); one course from the list of recommended courses (see below), excluding Greek language courses; Classics 190.

**Majors in Classical Civilization**
- 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, either Latin 102 or 103; Latin 10, 11, 12, 13, 14, 15, Latin 40A-40B for Ph.D. students; one course chosen from the list of recommended upper division courses.

**Majors in Classical Civilization**
- 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, either Latin 102 or 103; Latin 100, 101, either Latin 102 or 103; two courses chosen from Greek 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.

The Graduate Program
The Master of Arts degree may be taken in Greek, Latin, Classics (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. They are also recommended to enter courses in epigraphy, comparative grammar, and Greek dialects which they are offered, since the interval between offerings of each is at least three years. The graduate program is varied from year to year so that in a normal period of graduate study students may take courses in several fields and periods. Service for two semesters as a graduate student instructor is normally required as part of the Ph.D. program in Classics. Most seminars may be taken only after four units of coursework, and Ph.D. students are also encouraged to take Advanced Prose Composition in Greek and Latin (Classics 250, 260) 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.

**Preparation for Graduate Study**
To enter graduate study in Classics, students should complete the major in Classical Languages (or a satisfactory equivalent). For those desiring only a master's degree in Greek or Latin at Berkeley, the 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 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, 260) 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.
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 courses 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. Prerequisites: 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,SP)

A. The Bronze Age to ca. 350 B.C. (F) Greenwell

B. Ca. 350 B.C. to the Antonine Age. (SP) Miller

28. The Classic Myths. (4) Three 1-hour courses 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 ancient and present cultures. (F) Nagler

34. Epic Poetry: Homer and Virgil. (4) Three 1-hour classes and one 1-hour discussion per week. Greek and Roman epics with reading of the Iliad, Odyssey, Aeneid (SP) Rosemeyer

35. Greek Tragedy. (4) Three 1-hour classes or two 1 1/2-hour lectures per week. Greek tragedy with readings of Aeschylus, Sophocles, and Euripides. (F) Mastoraide

36. Greek Philosophy. (4) May be taken on a passed/not passed basis. Three 1-hour classes or two 1 1/2-hour lectures per week. Introduction to the philosophies of Socrates, Plato, and Aristotle. (SP) Ferrari

39. Freshman Seminar. (3) Formerly 96. Two 1-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 influence and interpretation of the classics in later traditions. (SP) Griffith

Upper Division Courses

100A. Greek Literature. (4) Three 1-hour or two 1 1/2-hour lectures per week. Readings in Greek writers at the upper division level; enrollment limited. (F) J.K. Anderson

100B. Latin Literature. (4) Three 1-hour or two 1 1/2-hour lectures per week. Readings in Latin writers at the upper division level; enrollment limited. (SP)

110. Ancient Metrics. (2) Two 1-hour lectures per week. Prerequisites: Greek 2 or 10. The principles of ancient metre of all types.

119. Latin Epic. (4) New course. Course may be repeated for credit. Three 1-hour or two 1 1/2-hour classes per week. Prerequisites: Latin 101. Readings in Latin epic poetry.

120. Greek and Roman Historians. (4) Three 1-hour or two 1 1/2-hour lectures per week. Readings in the major Greek and Roman historians. (SP)

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) Bulloch

122. Roman Religion. (4) Three hours of class per week. History of development of Roman religion.

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) Stroud

2. Elementary Greek. (4) Three hours of lectures per week. Beginners' course. Extensive reading. (SP) Stroud

10. Intensive Elementary Greek. (8) Five 1-hour classes and one hour discussion per week. Beginners' course (intensive); equivalent to Greek 1-2. (SP)

40A-40B. Intermediate Greek Prose Composition. (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) Ferrari

Upper Division Courses

100. Xenophon and Attic Prose. (4) Three 1-hour or two 1 1/2-hour lectures per week. Prerequisites: 2 or 10.

102. Plato. (4) Must be taken on a passed/not passed basis. Three 1-hour or two 1 1/2-hour lectures per week. Prerequisites: 100. The Apology and other readings in Plato.

103. Greek Drama. (4) Must be taken on a passed/not passed basis. Three 1-hour or two 1 1/2-hour classes per week. Prerequisites: 100. Readings in Euripides and/or other dramatists. (F) Mastoraide

117. Hellenistic Poets. (4) Formerly Greek 115C. Course may be repeated for credit with consent of instructor. Two 1-hour or three 1-hour classes per week. Prerequisites: Two courses from Greek 100-103. Readings in various Hellenistic poets. (F) Thrassis

120. Herodotus. (4) Formerly Greek 120C. Course may be repeated for credit with consent of instructor. Two 1-hour or three 1-hour classes per week. Prerequisites: Two courses from Greek 100-103. Readings in Herodotus. (F) Stroud

121. Thucydides. (4) Formerly Greek 120A. Course may be repeated for credit with consent of instructor. Two 1-hour or three 1-hour classes per week. Prerequisites: Two courses from Greek 100-103. Readings in Thucydides.

122. Attic Oratory. (4) Formerly Greek 120B. Course may be repeated for credit with consent of instructor. Two 1-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 1-hour or three 1-hour classes per week. Prerequisites: Two courses from Greek 100-103. Readings in Plato and Aristotle. (SP) Ferrari

125. The Greek New Testament. (4) Three hours of lecture per week. Prerequisites: 100. Readings in the Gospels and Epistles in Greek.
Latin

Courses in this group are designated Latin 1, 2, 40, etc.

Lower Division Courses

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)

Murgia

10. Intensive Elementary Latin, (6) 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 writing Latin prose and sight reading; review of grammar. (SP)

Upper Division Courses

100. Caesar and Sallust. (4) Three 1-hour or two 1 1/2-hour lectures per week. Prerequisites: 101. Readings in Caesar and Sallust. (F: Habinek; SP: Knapp)

101. Vergil. (4) Three 1-hour or two 1 1/2-hour lectures per week. Prerequisites: 100. Selected readings from Vergil. (F,SP)

102. Cicero. (4) Three 1-hour or two 1 1/2-hour lectures per week. Prerequisites: 100. Selected readings from Cicero.

103. Horace and the Lyric, (4) Three 1-hour or two 1 1/2-hour lectures per week. Prerequisites: 100. Readings in Horace and other Latin lyric poets. (F) Thratt

115. Roman Comedy, (4) Formerly Latin 115A. Course may be repeated for credit with consent of instructor. Two 1-hour or three 1-hour classes per week. Prerequisites: Latin 101. Readings in Plautus and Terence.

116. Lucretius, Vergil's Georgics, (4) Formerly Latin 115C. Course may repeated for credit with consent of instructor. Two 1-hour or three 1-hour classes per week. Prerequisites: Latin 101. Readings in the De Rerum Natura and the Georgics.

117. Latin Lyric, (4) Formerly Latin 115B. Course may be repeated for credit with consent of instructor. Two 1 1/2-hour or three 1-hour classes per week. Prerequisites: Latin 101. Readings in Roman lyric poets. (F)

118. Satire. (4) New course. Three 1-hour or two 1 1/2-hour classes per week. Prerequisites: Latin 101. Readings from Roman satirists.

120. Livy. (4) Formerly Latin 120C. Course may be repeated for credit with consent of instructor. Two 1-hour or three 1-hour classes per week. Prerequisites: Latin 101 or 102. Readings in Livy. (SP)

121. Tacitus. (4) Formerly Latin 120A. Course may be repeated for credit with consent of instructor. Two 1-hour or three 1-hour classes per week. Prerequisites: Latin 101 or 102. Readings in Tacitus. (F)

122. Post-Augustan prose. (4) Formerly 120B. Course may be repeated for credit with consent of instructor. Two 1 1/2-hour or three 1-hour classes per week. Prerequisites: Latin 101 or 102. Readings in Seneca, Pliny the Younger, and other prose writers. (SP) Murgia

123. Petronius, Apuleius. (4) Formerly Latin 120D. Course may be repeated for credit with consent of instructor. Two 1-hour or three 1-hour classes per week. Prerequisites: Latin 101 or 102. Readings in Petronius and Apuleius. (F) Murgia

140. Medieval Latin. (4) Three 1-hour or two 1 1/2-hour lectures per week. Prerequisites: 100. Introduction to medieval Latin: readings in prose and poetry from Cassiodorus to the Italian renaissance, with emphasis on certain periods. (SP)

155A-155B. Latin of the Fourth and Fifth Centuries. (4-4) Three 1-hour or two 1 1/2-hour lectures per week. Prerequisites: 101 or 102.

A. Readings in fourth and fifth century prose.
B. Readings in fourth and fifth century poetry.

H19SA-H19SB. Honors Course in Latin. (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. Independently studied 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 13th week of the second semester. (F,SP)

197. Field Studies. (2-4) New course. Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: 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) Habinek

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 honor 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 honor students. (F,SP)

Graduate Courses

Classics

The proseminar (Classics 200) is prerequisite to all graduate seminars; this requirement does not apply to graduate courses that are not seminars proper (namely Classics 201A-201B, 202A-202B, 222, 223, 250, 260), and it may be waived only with special permission of the graduate advisor.

Courses vary from year to year and are not necessarily given in alternate years.

Graduate Courses

200. Proseminar. (4) Two 1 1/2-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 1 1/2-hour classes per week. A sequence of readings and lectures on Greek literature.

202A-202B. Survey of Latin Literature. (4-4) Two 1 1/2-hour classes per week. A sequence of readings and lectures on Latin literature.

210. Greek Poetry. (2 or 4) Two 1-hour or one 3-hour class per week. Prerequisites: Graduate status.

210A. Homer

210B. Hesiod

210C. Earlier Lyric Poetry

210D. Later Lyric Poetry

210E. Hellenistic Poetry

215. Greek Dramatists. (2 or 4) Two 1-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 1-hour or one 3-hour class per week. Prerequisites: 200.
Comparative Literature

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.
236A. Sallust
236B. Caesar
236C. Livy
236D. Tacitus
236E. Suetonius

237. Roman Prose Writings. (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-AD. (F) Nicolet

240. Topics in Late Antique 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. (SP) Bullock

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.
A. Latin literature 500-900 A.D. (SP)
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 40B or equivalent. Advanced instruction in the writing of Greek prose. (SP) Bullock

260. Advanced Latin Composition. (4) Course may be repeated for credit. Two 1½-hour or one 3-hour class per week. Prerequisites: Latin 40B or equivalent. Advanced instruction in the writing of Latin prose. (SP) Szanzer

270. 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. (F: Greenwall; SP: J.K. Anderson)

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. (F) Knapp

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)

298. Special Study. (2-8) Course may be repeated for credit. Prerequisites: Completion of qualifying examination for the Ph.D. degree. Normalized 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 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)

602. Individual Study for Doctoral Candidates. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual study in consultation with the graduate adviser or personal 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)

Professional Courses

300. Teaching of Classics: Methods and Problems. (3) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual study in consultation with the graduate adviser or personal 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)

302. Teaching Practicum. (3-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Seminar in problems of teaching. Required for all new graduate student instructors. (F,SP)

Related Courses in Other Departments
For courses in Sanskrit, see Department of South and Southeast Asian Studies; for courses in modern Greek, see Department of Comparative Literature.

Comparative Biochemistry
(College of Natural Sciences, Interdepartmental Graduate Groups)

Office: 2553 Life Sciences Building, 642-3313
Chair: Lester Packard, Ph.D.

Professors:
Bruce Ames, Ph.D. (Biochemistry)
Bruce Ames, Ph.D. (Biochemistry)
Frida Ferro-Luzi, Ph.D. (Biochemistry)
Clement E. Ballou, Ph.D. (Biochemistry)
George A. Brook, Ph.D. (Physical Education)
Bob B. Buchanan, Ph.D. (Molecular Plant Biology)
John E. Casida, Ph.D. (Entomology and Parasitology)
J.M. Chamberlain, Ph.D. (Biochemistry)
Alvin J. Clark, Ph.D. (Molecular Biology)
R. David Cole, Ph.D. (Molecular Biology)
Alexander A. Glazer, Ph.D. (Microbiology and Immunology)
John E. Hearst, Ph.D. (Chemistry)
Sung-Ho Kim, Ph.D. (Chemistry)
Jack F. Kinch, Ph.D. (Biochemistry)
Daniel E. Koshland, Ph.D. (Biochemistry)
Marian E. Koshland, Ph.D. (Microbiology and Immunology)
Stuart M. Linn, Ph.D. (Biochemistry)
Richard Malbin, Ph.D. (Molecular Plant Biology)
Sheldon Margen, M.D. (Social and Administrative Health Sciences)
John B. Neillands, Ph.D. (Biochemistry)
Hiroshi Niinido, Ph.D. (Microbiology and Immunology)
Lester Packard, Ph.D. (Pharmacology and Anatomy)
Jess C. Rapob, Ph.D. (Biochemistry)
Henry Rapoport, Ph.D. (Physiology)
Harry Rubin, D.V.M. (Molecular Biology)
Kenneth Sauer, Ph.D. (Chemistry)
Howard Schachman, Ph.D. (Biochemistry)
George Sensabaugh, D.Crm. (Biomedical and Environmental Sciences)
Barry Shane, Ph.D. (Nutritional Sciences)
Thomas P. Singer, Ph.D. (Adjunct Professor)
Mary Ann Williams, Ph.D. (Nutritional Sciences)
Daniel I. Amon, Ph.D. (Docteur (Hon.) (Molecular Plant Biology) (Emeritus)
George M. Briggs, Ph.D. (Nutritional Sciences) (Emeritus)
Mevin Calvin, Ph.D. (Medical Education) (Emeritus)
Heinz Fraenkel-Conrat, Ph.D. (Medical Education) (Emeritus)
Thomas H. Jukes, Ph.D., D.Sc. (In-Residence) (Emeritus) (Medical Physics)
E.L. Robert Sambach, Ph.D. (Nutritional Sciences) (Emeritus)
Leon Wolfsky, Ph.D. (Microbiology and Immunology) (Emeritus)

Associates Professors:
George Chang, Ph.D. (Nutritional Sciences)
Benito O. de Lumen, Ph.D. (Nutritional Sciences)
Edward E. Peres, Ph.D. (Adjunct) (Biochemistry)
Alexandra Quintanilla, Ph.D. (Adjunct (Pharmacology and Anatomy)

*Not offered 1989-90
*On leave, spring
*Recalled to active service
*Recipient of Distinguished Teaching Award

Assistant Professors:
Nancy K. Amy, Ph.D. (Nutritional Sciences)
Anastasia Milt, Ph.D. (Molecular Plant Biology)
Lecturer:
Jones A. Richmond, Ph.D. (Nutritional Sciences)

Graduate Advisers: John B. Neillands, George S. Sabaugh.

This program is administered by an interdepartmental group which was organized to permit students interested in a biochemical approach to research problems to obtain graduate training and advanced degrees. This interdisciplinary program allows the student to do research on a biochemical problem and to fulfill M.A. or Ph.D. thesis requirements under the supervision of a faculty member in one of several departments, such as Biochemistry, Molecular Plant Biology, Entomological Sciences, Nutritional Sciences, Physiology-Anatomy, and organized research units such as Chemical Biodynamics. Students are expected to obtain a background in physiology and biology and to specialize in some area of biochemistry.

Comparative Literature
(College of Letters and Science)

Department Office: 440B Dwainelle Hall, 642-1202
Chair: Kenneth Weisinger, Ph.D.

Professors:
Paul J. Alpers, Ph.D. (English)
Robert Allen, Ph.D. (Hebrew)
William S. Anderson, Ph.D. (Latin)
Michael Andre, Ph.D. (Polish) (English)
Cyril Birch, Ph.D. (Chinese)
Carol J. Glover, Ph.D. (Scandinavian)
Louise George Clabon, Ph.D. (Italian)
Phillip W. Damon, Ph.D. (English)
Joseph J. Dogan, Ph.D. (French)
Robert P. Hughes, Ph.D. (Slavic)
Eric O. Johnsonness, Ph.D. (Linguistics)
James T. Monroe, Ph.D. (Arabic)
L. Jannette Richardson, Ph.D. (Greek)
Thomas G. Rosenmeier, Ph.D. (Greek)
Baka L. Spahr, Ph.D. (German)

Associate Professors:
Paul M. Bertrand Auge, Ph.D. (French)
Anthony J. Casciardi, Ph.D. (Spanish)
Francoise R. Maspes, Ph.D. (Spanish)
Michael N. Nagler, Ph.D. (Classics)
William Nestrick, Ph.D. (English)
Avital Ronnell, Ph.D.
Florence Verdun, Ph.D. (Latin)
Kenneth Weisinger, Ph.D. (German)

Assistant Professor:
Michael Lucey, Ph.D. (French)

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 traditions than the study of a single literature could furnish; to explore the contacts between writing and other pursuits; to acquaint themselves with some of the significant writings in the theory of literature; and to prepare themselves for methodical investigation of issues involving more than one literature.

Students must have fulfilled the requirement in Subject A before taking the examinations offered by the Department of Comparative Literature. For further information, see Subject A listing in the Index.

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 required courses. 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 junior course (CL100) is designed to introduce 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 traditions than the study of a single literature could furnish; to explore the contacts between writing and other pursuits; to acquaint themselves with some of the significant writings in the theory of literature; and to prepare themselves for methodical investigation of issues involving more than one literature.

Students must have fulfilled the requirement in Subject A before taking the examinations offered by the Department of Comparative Literature. For further information, see Subject A listing in the Index.
In addition to the requirements for the regular program, candidates for the A.B. with a major in Comparative Literature must (1) accumulate at least 12 units in one literature read in the original language and with emphasis on the classic works of that literature, (2) at least two courses totaling not fewer than 12 units in another literature read in the original language, and (3) at least one course in upper division Comparative Literature in translation to be selected from the offerings of the Department of Classics, or one upper division course in Greek (courses numbered 101 or higher), Latin, classical Arabic, Biblical Hebrew, classical Persian, Ottoman Turkish, Sanskrit, classical Chinese, classical Japanese, or Old Church Slavonic.

Note that, although only two literatures (for example, English-French-Latin) are required for the A.B. degree, an adequately prepared student may find it advantageous to work in three literatures (for example, English-French-Latin).

Requirements: Honors. Students who have attained junior standing may be admitted to the honors program if (1) they have accumulated at least an overall 3.3 grade-point average and at least a 3.3 grade-point average in courses in the major, (2) they have completed at least 12 upper division units in literature, including Comparative Literature 100 or the equivalent, and (3) are prepared to do upper division work in two vernacular foreign languages and at least one classical language. (4) at least one course in upper division Comparative Literature in Greek and Latin in translation to be selected from the offerings of the Department of Classics, or one upper division course in Greek (courses numbered 101 or higher), Latin, classical Arabic, Biblical Hebrew, classical Persian, Ottoman Turkish, Sanskrit, classical Chinese, classical Japanese, or Old Church Slavonic.

In addition to the requirements for the regular program outlined above, candidates for the A.B. with honors must: (1) meet the requirements of a study plan involving several literary traditions. The requirements for the A.B. with a major in Comparative Literature are listed below.

Requirements: Lower Division. There are no lower division requirements beyond the completion of the Letters and Science reading and composition requirement and of adequate work in at least one foreign language sufficient to qualify for admission to upper division literature courses in that language.

The Graduate Program

Students are ordinarily admitted for postbaccalaureate work leading to the Ph.D. degree. This degree prepares students for teaching and research in ancient and modern languages and literatures and is especially designed to encourage interdisciplinary research involving the study of literary and theoretical documents in several languages. The program is composed of a sequence designed to provide students with the maximum of flexibility compatible with a rigorous course of study. During the first two years of study, emphasis falls on the comprehensive historical coverage required for passing the examinations on the study of at least two ancient or modern literatures in one area. In subsequent years, students design an individual program of study involving three literatures. Additional information concerning the program should be sought from the vice chair in charge of graduate studies in the Department of Comparative Literature.

Undergraduate Preparation. Students interested in the graduate program in comparative literature at Berkeley are advised that strong undergraduate preparation in foreign languages will speed up their work at the graduate level. A reading knowledge of one classical language is required for the Ph.D.

Requirements for the M.A. Degree. A minimum of 24 approved graduate and upper division units is required to be eligible for the M.A. degree. (1) One course in upper division Comparative Literature, and (2) work in at least two separate ancient or modern literatures (for example, English and Italian). The department does not specify courses required for the M.A. degree but advises students to follow the program of study that will best assist them in preparation for the M.A. written and oral examinations, to be taken not later than the fourth semester of study. This should include a series of primary and secondary texts selected by the student in consultation with an adviser.

Requirements for the Ph.D. Degree. A total of 11 graduate courses is required for the Ph.D. degree, counted cumulatively from the beginning of graduate study at Berkeley. (Students entering with M.A.'s from other institutions will be required to demonstrate preparation equivalent to that of the Berkeley M.A. in comparative literature.) Courses include Introduction to Comparative Literature, as well as graduate-level courses in the major and each of two minor literatures. These courses are intended to help prepare students for the Ph.D. written and oral qualifying examinations, which examine the three literatures in a comprehensive context according to diachronic and synchronic criteria. The student must pass one oral examination on reading lists and a statement of interest drawn up by the student in consultation with an adviser. Students are expected to complete these examinations not later than during the fourth year of study in order to devote the following two years to the development of a prospectus and the completion of a dissertation. Dissertation 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

1A-1B. English Composition in Connection with the Reading of World Literature. (4,4) Three 1-hour lectures per week plus individual conferences. Prerequisites: Subject A examination or course. 1A or equivalent is prerequisite to 1B. Expository writing based on analysis of selected masterpieces of ancient and modern literature. (F,SP)

H1A-H1B. English Composition in Connection with the Reading of World Literature. (4,4) Three 1-hour discussions per week plus individual conferences. Prerequisites: (a) Subject A examination, or (b) a 3.5 grade-point average in high school English, (c) a reading knowledge of an ancient or modern foreign language, and (d) permission of the instructor. Expository writing based on analysis of selected masterpieces of ancient and modern literature. Limited to 10 qualified freshmen, who must attend weekly tutorial sessions. Individual assignments provide each student with the opportunity to exploit his or her linguistic and literary training. (F,SP)

Upper Division Courses

100. Introduction to Comparative Literature. (3) Three 1-hour lectures per week. Prerequisites: One upper division literature course in a foreign language or consent of the instructor. Selected literature of the ancient and modern eras in connection with problems of comparative methods and analysis. (SP) 

112A-112B. 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) 

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 aspects of the Biblical tradition and their relevance to the study of later literature. (SP)

125. The Mystical Tradition in Literature. (3) Two 1-hour lectures per week. A survey of the major concepts of 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)

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...
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. Literature of the European Middle Ages. (SP) Damon

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) Clabes

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 18th century and of the Romantic period.

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 19th and 20th centuries. (SP) Massiello

160. Western Literary Cross-Currents in 20th-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 creation. When not given see Oriental Languages 206.

165. Myth and Literature. (3) Two 1-1/2 hour lectures and discussion periods per week. Prerequisites: Preparation in two foreign languages. Comparative investigation of the interrelations between myth, folklore, and fiction. The relationship of oral tradition to written literature. Prerequisites: Preparation in two foreign languages. Comparative investigation of oral tradition to written literature.

166. Literature of War and Peace. (3) Two 1-1/2 hour lectures and discussion periods per week. Exploration of important literary works which neither glorify war nor sentimentalize peace but illuminate the problem. Works of ancient, medieval, and modern times. Comparison of the various national cultures. Topics will vary from year to year.

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. Course consists of special topics not otherwise listed in the regular curriculum. Prerequisites: Preparation in two foreign languages. Comparative investigation of a topic in the 19th and 20th centuries. (SP) Spanier

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) Hughes

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. (F) Clover

230. Studies in Oriental-Western Literary Relations. (4) 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 literatures. Prerequisites: Preparation in two foreign languages. Comparative investigation of a topic in Western literature involving the study of classical and post-classical documents.

240. Studies in the Relations Between Classical and Later Literature. (4) One 3-hour lecture and discussion period per week. Prerequisites: Preparation in one foreign language, at least one of which must be Greek or Latin. Comparative investigation of a topic in Western literature of the 19th century and of the Romantic period. (F) Cianelli

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 topic in the history of criticism.

262. Studies in the Theory of Literary History. (4) One 3-hour lecture and discussion period per week. Prerequisites: Preparation in two foreign languages. Comparative investigation of a topic in Western literary history. (F) Cianelli

263. 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 critical theory.

265. Studies in Poetics. (4) One 3-hour lecture and discussion period per week. Prerequisites: Preparation in two foreign languages. Comparative investigation of a topic in descriptive poetics.

266. The Craft of Critical Writing. (4) Course may be repeated for credit. One 3-hour seminar and discussion period per week. Prerequisites: Preparation in one foreign language. Preparation in English. Preparation in a foreign language other than English.

278. Studies in Philosophy and Literature. (4) One 3-hour lecture and discussion period per week. Prerequisites: Preparation in two foreign languages. Comparative investigation of
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 students for employment or for further study in computer science.

Unfortunately, because of large enrollments and the limited resources available, the number of computer science majors must be restricted. Students should apply at the Computer Science Advising Office, 522 Evans Hall. (Further information, including deadlines for applications, is available from that office or by phoning 642-7214.) Applications will be considered only from students who have completed the lower division requirements, including the college's reading and composition requirement, and who have accumulated no more than 92 semester units of credit. A grade-point average of at least 3.0 on the lower division technical requirements is normally necessary, but not sufficient, for admission to the major. An admission quota has been established.

Because of the division's over-enrollment, admission of transfer students into the major has also been curtailed. Transfer to Berkeley, even with the expressed intention of majoring in computer science, does not guarantee admission to the major. Freshman and sophomore transfer students are subject to the same admission procedures as regular Berkeley students. Junior transfers must receive approval of their provisional acceptance to the major before arriving at Berkeley and must then satisfactorily complete lower division requirements. Applications from students who transferred to Berkeley as juniors without provisional acceptance will not be accepted into the major.

Requirements for the Major

Lower Division Requirements: The following lower division courses are required for entry into the Letters and Science major in computer science. All these courses must be graded; none may be taken passed/ not passed.

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 electronics (EECS 42). It is strongly recommended that EEECS 43, a 1-unit lab course, be taken with EECS 42. Alternatively, EECS 40 can be used to replace EECS 42.
4. 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. All courses applied toward the major must be graded; none may be taken passed/not passed.

1. Three core courses:
   a. Hardware (CS 150).
   b. Software (either CS 162 or CS 164).
   c. Theory (CS 170).
2. Breadth courses from two different areas, one of which must be software:
   a. Hardware (either CS 152 or EE 145M and EE 140).
   b. Software (either CS 162 or CS 164). (May not overlap with the software requirement in (1)).
   c. Theory (either CS 172 or 174).
3. One upper division mathematics or statistics course (Engineering 118 may be used to satisfy this requirement).

The remaining upper division courses applied toward the 27-unit requirement are subject to the approval of a faculty adviser. A list of technical electives for which approval will be routinely granted is available at the advisers' office (522 Evans Hall). This list includes all upper division CS and EECS courses except CS 190. It also includes courses from the fields of engineering, mathematics, statistics, linguistics, bibliography, economics, philosophy, and geophysics.

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. Attain a 3.5 GPA in all courses that will be counted toward the major.
2. Attain a 3.5 GPA overall.

Once admitted to the honors program, a student must:
1. Maintain an overall 3.5 GPA in all courses to be counted 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.
3. Take one course from each of the three areas:
   a. Hardware (either CS 152 or EE 145M and EE 140);
   b. Software (either CS 162 or 164);
   c. Theory (either CS 172 or 174);
4. Complete one term of CS H196 in the senior year. This requirement includes completion of a one-semester project chosen by the student with the approval of a faculty member who will supervise the work in coordination with the instructor of H196. Alternatively, students may complete an honors project under the direction of a regular Computer Science faculty member. CS 199 credit can be received for this project.

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 or 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 Electrical Engineering and Computer Science section of this catalog.

Conservation and Resource Studies

(College of Natural Resources)

Department Office: 112 Gillman Hall, 482-6730
Chair: Carolyn Merchant, Ph.D.

Professors:
W. C. Cobb, Ph.D., Pennsylvania State University. Forest pathology.
D. L. Dahlsten, Ph.D., University of California at Berkeley. Forest entomology, biological control.
J. W. Cobb, Ph.D., University of Wisconsin. Forest entomology, pest management.
S. M. Schultz, Ph.D., University of Nebraska. Systems ecology.
A. E. Reams, Ph.D., University of Maryland. Environmental history, philosophy, ethics.
B. D. Fleishman, Ph.D., University of Michigan. Resource policy and law.

F. C. Marsden, Ph.D., Cornell University. Biocultural anthropology.
S. M. Shipley, Ph.D., University of Wisconsin. Forest entomology, pest management.
D. L. Dahlsten, Ph.D., University of California at Berkeley. Forest entomology, biological control.
J. W. Cobb, Ph.D., University of Wisconsin. Botany.
J. W. Cobb, Ph.D., University of Wisconsin. Environmental history, philosophy, ethics.
Undergraduate Program

The Conservation and Resource Studies major is an interdisciplinary program designed for those who are interested in environmental issues and areas of interaction among human, natural resources, population, energy, technology, societal institutions, and cultural values. Students draw on the course offerings of the entire campus and appropriate community resources to complete the individual requirements of study. The major's orientation is toward flexibility and an individualized education approach to understanding the structure and dynamic functions of complex and dynamic systems within our society and biosphere. It encourages interaction among students, faculty, and community.

Department offerings are designed to help each student formulate an area of interest, but are not in any way meant to limit the range of options available. The sequences of courses offered through the department augment the courses of the college and those of the campus and define the academic subjects germane to the field of conservation and resource studies.

Course requirements for the major include 10, 90, 100, and 194. In the freshman and sophomore years, students will be expected to take two courses in reading and composition, one course in mathematics or statistics, a minimum of two courses in the biological sciences and two in the social sciences. In addition, students must take two courses in each of two of the following areas: physical sciences, humanities, and social and cultural sciences. Two courses preparatory to the individual areas of interest. In the junior and senior years, students will concentrate on their areas of interest. A more detailed statement of major requirements is available from the departmental office.

Admission to the CRS major is limited. Applications for on-campus transfers from other majors are reviewed once each semester. Deadlines are September 26 for spring admission and March 20 for fall semester.

Minor Program

A minor in CRS is available to any Berkeley student in good academic standing. Requirements are completion of CRS 10 and any four additional CRS courses, three of which must be upper division. All courses must be taken for a letter grade and average a minimum of 2.0 grade points overall. Additional information is available in the CRS office.

Graduate Studies

CRS has no graduate major under its own administration. However, beginning with the 1989-90 academic year, the department will offer a limited number of graduate courses and, on an ad hoc basis, may facilitate admission of students to appropriate graduate programs. Additional information and requirements for pursuing graduate study in a particular aspect of conservation and resource studies under the direction of CRS faculty. In most cases, students admitted under this arrangement will plan a program of study that will fulfill all normal degree requirements for the graduate major in which they are enrolled. More information may be obtained from Carolyn Merchant, chair, Conservation and Resource Studies.

Lower Division Courses

10. Environmental issues. (4) Two 1½-hour lectures and one 1½-hour discussion per week. Relationship between human society and the natural environment; case studies of ecosystem maintenance and disruption. Issues of economics and social valuation of environmental 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 1½-hour discussion per week. Prerequisites: 10 (to be taken concurrently) or consent of instructor. One group project related to the CRS 10 lecture series. (F,SP) Miller

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-hour discussion for those students enrolling for 3 units. Physical and chemical properties of the environment; how they relate to pollution and environmental degradation. Students with weak backgrounds in chemistry should enroll for three units instead of two. (SP) Hulsman

60. 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 non-science majors. Basic biological approaches to problems in relation to environmental disruptions. 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) Dahlgren

90. Introduction to Conservation and Resource Studies. (1) Must be taken on a passed/not passed 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 contrasting approaches to solutions through institutional and community-based efforts. One field trip is normally required. Required of CRS majors entering with fewer than 60 units. (F) Miller

98. Directed Group Study in CRS. (1-3) Course may be repeated for credit. One 2-hour seminar per week for one semester. Prerequisites: Passed with distinction in upper division standing. Consent of instructor, adviser, and department chair. One hour of lecture/discussion per week per unit. Study of current issues in depth in regular courses in the department. (F,SP) Staff

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: Lower division standing; 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 required for the major. Students in consultation with a faculty sponsor present a proposal with clearly formulated objectives and means of implementation. (F,SP) Staff

Upper Division Courses

100. Environmental Problems: Principles and Methods of Analysis. (4) Two 1½-hour lectures and one 1½-hour discussion per week. Prerequisites: One course in biology; one course in mathematics or statistics; one course in introductory college biology or non-energy analysis and comparison of frameworks that integrate natural and social science explanations of environmental problems. Case studies, emphasizing physical, biological, social, economic, and value dimensions in the identification of causes and approaches to solutions. Required of CRS majors. (SP) Schultz

101. Urban Garden Ecosystems. (4) Three hours of lecture and three hours of discussion/demonstration per week. Study of urban garden and recreation eco-

*Not offered 1989-90
On leave, spring, fall
On leave, spring
Recalled to active service

On leave, spring

Conservation and Resource Studies / 159
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. Impact of environmental alterations 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 minor 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 interrelated systems from the colonial period 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 per unit. Comparative analysis of policy systems governing natural resource development in rural Third World. Emphasis on organization and function of agricultural and mineral enterprises, with particular consideration of rural hunger, resource availability, technology, and patterns of international aid. (SP) Carr
166. Political Ecology. (4) Three hours of lecture and one hour of discussion per week per unit. Analysis of ecological problems in the U.S. from the standpoint of their roots in contemporary political and economic processes and their potential solutions in the present political system. Special emphasis on U.S. policy regarding energy and agricultural development, considered within the global context. (F) Staff
168. Natural Resource Policy and Indigenous Peoples. (4) Three hours of lecture and one hour of discussion per week per unit. Critical analysis of the historical transformation of Indigenous peoples and their environments from 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) Carr
190. Seminar in Environmental Issues. (3) Course may be repeated for credit. Three hours of lecture 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 project. One hour oral presentation of major area of interest and a senior thesis synthesizing the area of interest. Required final semester for all CRS majors. (F,SP)
195. Senior Thesis. (3-4) Students who have successfully completed CRS 194 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) Staff
196A. Internship in CRS—Field Module. (3-4) Must be taken on a passed/not passed basis. Fifteen to 40 hours per week at placement location for 10 weeks. Prerequisites: Upper division standing; consent of advisor, 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/Summer Module. (2-4) Two hours of seminar per week; variable hours research/analysis for five weeks. Prerequisites: Upper division standing, faculty sponsor, and CRS department; completion of CRS 196A. A five-week period for the student's analysis of his/her internship experience, presentation of internship report (under the supervision of chair of internship committee), and participation in a weekly seminar required of all returning interns. (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, advisor, 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, advisor, and department chair. Study of special topics that are not covered in depth in regular courses in the department. (F,SP)
199. Supervised Independent Study and Research. (1-9) Course may be repeated for credit. Must be taken on a passed/not passed basis. Approximately three hours of laboratory work per week per unit. Prerequisites: Consent of instructor, advisor, and department chair. Enrollment is restricted by regulations listed on pages 87 and 88 of this catalog. Supervised independent study and research specific to aspects of conservation and resource studies. (F,SP)

Graduate Course
250. Environmental History, Philosophy and Ethics. (3) New course. Three lecture/discussion per week. Prerequisites: Upper division course in history of science or a social science. A critical survey of classical and recent literature in the field of environmental history, philosophy, and ethics with special emphasis on the American environment. Topics will include environmental historiography, theories of environmental history, and the relationships between environmental history, philosophy, ethics, ecology, and policy. (F) Merchant

Interdepartmental Studies 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, ecology. Specific examples of the role of physics in contemporary social issues. Sponsoring departments: Conservation and Resource Studies and Physics. (F) Staff

Upper Division Courses
IDS 121A-121B. Environmental Education. (3-3) 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: IDS 121A; consent of instructor. Theory and practice of translating ecological knowledge, environmental issues and values into educational forms for all age levels and all facets of society, including schools. Concentrates on experience in participatory education. Sponsoring departments: Education and Conservation and Resource Studies. (F,SP) Hurst

Dance (College of Letters and Science)
Office: Dramatic Art Department, 101 Dewitt Annexe, 642-1677
See information about dance courses and curricula, see information listed under the Department of Dramatic Art.

Demography (College of Letters and Science)
Graduate Group Office: 2232 Piedmont Avenue, 642-9800
Chair: Eugene Hammel, Ph.D.

Associate Professors: James Anderson, Ph.D. (Anthropology) Frances Van Loo, Ph.D. (Business Administration)

Lecturer: Sheila Johanson, Ph.D. (Demography)

The regional Graduate Group in Demography includes faculty at Berkeley, Davis, and Stanford, and appropriate course work may be taken at any of these locations by students registered at any of these three institutions. Graduate degree programs in demography, as such, are located only at Berkeley, where the group offers general course work at both the undergraduate and graduate levels, as well as professional training leading to the Master of Arts and Ph.D. degrees in demography. Particular emphasis is placed on the interrelationships between population structure and change and on the social and economic characteristics of populations.

The master's degree is designed as a final degree for those who wish to pursue a professional career at that level of training, and as a second degree for students earning the doctoral degree in a related discipline. Doctoral students in demography are required to have or take a master's degree in an allied discipline; the basic course work for the master's program is required for the doctoral degree as well. Students already enrolled at UC campuses or Stanford are admissible to demography courses if they have completed the prerequisites. Those not at Berkeley must make the necessary intercampus exchange arrangements. Seniors are admissible to the graduate courses by consent of the instructor. Although there is no undergraduate major, the Group in Demography offers an undergraduate minor in demography. The minor is open to all interested undergraduates at Berkeley campus.

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 major. Students not already enrolled in the University who wish to enter the degree programs or who wish to pursue course work only, for professional upgrading, should apply to the chair. General deadlines for application speci-
The program in Development Studies offers an opportunity for qualified graduate students. 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**

Economics 75. World Population and Economics. (4)

**Economics 175. Economic Demography. (F)**

**Economics 275A. Economic Demography. (3)**

**Economics 275B. Selected Topics in Economic Demography. (3)**

Public Health 121. Introduction to Vital and Demographic Statistics. (4)

Public Health 122. Introduction to Health Statistics. (4)

Public Health 233. Theory of the Life Table and Competing Risks and Their Applications. (4)

Sociology 128. Population. (4)

Population Studies 5. Seminar in Population. (2)

Population Studies 100. Introduction to Population Theory. (3)

Population Studies 110. Introduction to Population Analysis. (3)

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**Development Studies (College of Letters and Science)**

**Group Major Office:** Institute of International Studies, 201 Moses Hall, 642-4466

Major Advisers: Carl G. Rosberg (Director, IIS); Michael J. Watts (Geography, Head Adviser); Irma Adelman (Agricultural Economics); Miguel A. Altiir (Entomological Sciences); James N. Anderson (Anthropology); Pranab K. Bardhan (Economics); David Collier (Political Science); Ruth B. Collier (IIS); Jyotindra Das Gupta (Political Science); Alain de Janvry (Agricultural Economics); Lowell Dittmer (Political Science); Louise P. Fortmann (Forestry and Resource Management); Thomas B. Gold (Sociology); John J. Gumpertz (Anthropology); Ira M. Lapides (History); David L. Lewis (Political Science); Thomas R. Metcalfe (History); Robert R. Reed (Geography); Jeff Romm (Forestry and Resource Management); Z. I. Sabry (Public Health Nutrition); Elisabeth Sackell (Agricultural Economics).

**Group Major in Development Studies**

The program in Development Studies offers an opportunity for qualified graduate students. 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)

**Staff**

602. Individual Study for Doctoral Students. (1-8)

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 an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. (F,SP)

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**Development Studies / 161**
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, consisting of representatives from several academic departments, and, on a more regular basis, by the major adviser, also a member of the faculty committee. This 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 specific area. In the procedural aspects of all undergraduate plans of study, students in the program are assisted by the staff in the Group Major Office, participating faculty members, the student's faculty advisor, and teaching associates working in the program.

Note: At the time this catalog was published, program revisions were under consideration. Please check with the major office regarding current requirements.

Lower Division Courses. Anthropology 3; Political Science 2; Economics 1; Statistics 2 or 21. Recommended Courses. Sociology 1; Geography 4, 16; Environmental Design 4.

Upper Division Courses. A total of nine (30-36 units) should include core courses, (2) research methods, and (3) area courses. Core credits 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, 154; City and Regional Planning 110, 116; Conservation and Resource Studies 168; Development Studies 100; Economics 171, 172; Geography 130, 131; Political Science 139A, 139B, 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 advisor. Anthropology 169 or 190A or 195B or Economics 141 or History 101 or Political Science 131 or 132A, 132B, 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 before entering Economics 141. 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 obtain a 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 a major adviser. Any 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, city 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). 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) 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 10 know little about life in the Third World countries and are unfamiliar with the relevant theory in political economy of 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 the macro character 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 theories of development and underdevelopment. The second part deals with a variety of micro and macro phenomena organized around land, labor, and work. This would embrace peasants, rural labor migration, the informal sector, multinational, new industrialization, the role of women, the role of the state, and the ideological institutions. (SP)

Upper Division Courses

100. History of Development and Underdevelopment. (4) Two 1.5-hour lectures and one 1.5-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 to understand and assess theoretical interpretations of development and underdevelopment. (F,SP)

150. Advanced Studies in Development. (3) Course may be repeated for credit with permission of instructor. One 3-hour session per week. Prerequisites: Consent of instructor, background in developments of related social sciences. Advanced multidisciplinary research in current issues and topics of development. Seminars will focus on specific geographical areas with appropriate comparative material 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 with development of 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) Staff.

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 Group Major office for current requirements. To 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 reviewed by a member of the faculty committee and approved by a selected group of the same committee. (F,SP)

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 sponsor and written reports required. (F,SP)

198. Directed Group Study. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Group study. Prerequisites: Upper division standing and consent of instructor. Directed group study (upper division). (F,SP)

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 a faculty adviser. Enrollment is restricted by regulations listed on pages 87 and 88 of this catalog. (F,SP)

Staff

Dramatic Art

(Committee of Letters and Science)

Department Office: 101 Dwinnelle Annex, 642-1877

Professors:

William H. Oliver, Ph.D. Cornell University. Directing, acting, Spanish theater

John Warren Travis, M.F.A. Stanford University. Directing, acting


Robert W. Goldstey, M.F.A. (Emeritus) University of Toronto. Directing, acting, French theater

Lorne M. Buchman, Ph.D. Stanford University. Directing, acting, contemporary theatre

Assistant Professors:

Dunbar H. Ogden, III, Ph.D. Yale University. Theater history, classics

Associate Professor:

Carol J. Broad, B.A. San Francisco State University. Theater production/design

Lecturer:

Barbara Cott, B.A. San Francisco State University.

The Majors

Dramatic Art

Lower Division. Dramatic Art 10, 20A-20B, 45A or 45B.

Upper Division. Thirty units of upper division courses in the Department of Dramatic Art including 120, 123; six units chosen from courses 122, 123, 124, 125, 126, 127, 151A-151B; six units chosen from courses 110A-110B, 111, 139A-139B, 162, 163, 172A-172B, 173A-173B, 174A-174B, 175A-175B; four units chosen from courses 170, 171, two units of which must be in 170.

Dramatic Art—Dance

(Students are required to take a dance technique course each semester.)

Lower Division. Dramatic Art 10, 40A-40B, 41A or 45B.

Upper Division. Thirty units of upper division courses in the Department of Dramatic Art including 144, 145, 146A, 150A-150B; six units chosen from courses 122, 123, 124, 125, 126, 127, 129, 151A-151B, 189; four units chosen from courses 170, 171, and a dance technique course from the following sequence: 141A-141B, 142A-142B, 143A-143B; must be taken each semester that the student is enrolled in the major.

No course in Dramatic Art offered in satisfaction of undergraduate major requirements may be taken on a passed/not passed basis except Drama 40A-40B, 141A-141B, 142A-142B, 143A-143B, 170, and 171.

Honors Program. Majors in the Department of Dramatic Art with an overall grade-point average of 3.3 in the University and in the major may, with the approval of the department, apply for admission to the honors program. Application should be made through a departmental major adviser not later than the end of the student's junior year. Students accepted in the honors program will include in their programs courses H195A, intensive critical study of problems of dramatic literature, acting, playwriting, directing, dance or design; and H195B, development
of studies begun in H195A, either under circumstances of actual theatrical production or as a senior thesis.

**Graduate Programs**

**Preparation for Graduate Study.** The background of a student undertaking work toward an advanced degree should approximate that of an undergraduate major in Dramatic Art. The qualifying examination for admission to the College of Letters and Science (admission to the limited status program, however, is not automatic). Two faculty advisers will assist each graduate student seeking admission to the limited status program or to the advanced program. The student must take the necessary courses while enrolling in limited status in the year in which other specialties than those offered here are taken. Audition and consent of instructor. Study under the supervision of a graduate student in the Drama program. (F,SP) Murota

The University Dance Theater 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 off-campus dance group, performs throughout the year in schools and community centers on the West Coast and travels upon invitation to Europe for summer appearances. All credit may be earned for work in drama and dance production. For further information inquire at 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. If cast, all students must perform. Tryouts are announced on the department's bulletin boards.

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**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 in elementary body alignment and basic locomotor patterns, utilizing the body and extremities as a totality. (F,SP) Murota

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. Study of the musical structure with emphasis placed on note values, rhythmic patterns and dictation, score reading and phrasing. All work will be achieved through structural improvisation. (SP) Egan

**Upper Division Courses**

141A-141B. 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. Refinement of movement techniques and qualitative analysis of movement with regard to rhythm, dynamics, and style. (F,SP) Murota

142A-142B. 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: 141A-141B, audition, or consent of instructor. Advance movement techniques and qualitative analysis of movement in relation to content. (F,SP) Rogers

143A-143B. 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: 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. Prerequisites: 141A-141B. (SP) Egan

144. Sources of Movement. (3) Four and one-half hours of lecture and studio per week. Prerequisites: 40A-40B, or consent of instructor. Beginning application of dance technique as a means of communication in the theater. Use of basic technical fundamentals as a means of extending natural movement in energy, space and with emphasis on style and qualitative analysis. (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;3) Four 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. (F,SP) Rogers

147. Dance Analyses. (3;3) Formerly 147A-147B. Four and one-half hours of lecture and studio per week. Prerequisites: 142A-142B and 144, or consent of instructor. Instruction in the methods and principles of dance analysis with emphasis placed on movement development. (F) Murota

148. Introduction to Movement Improvisation. (1) Must be taken on a passed/not passed basis. Three hours of studio per week. Prerequisites: Consent of instructor. Study and analysis of stage movement through nonverbal approaches. (SP) Rogers

149. Repertory and Production. (3) Course may be repeated for credit. Seven and one-half hours of studio per week. Prerequisites: Consent of instructor. Advanced students of dance are to be organized as a company for the development of a dance repertory for public performance, the creation of new choreographic works, and the study of those already created. (SP) Rogers

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**Graduate Courses**

*246A-246B. Advanced Choreography. (4;4) Seven and one-half hours of lecture and studio sessions per week. Prerequisites: 141A-141B, 146A-146B, and one year of graduate work. In-depth study and presentation of choreography and styles of theater. (Opera, drama, musical, environmental, avant garde, post-modern.)

*249. Dance Repertory and Production. (4) Course may be repeated for credit. Seven and one-half hours of lecture and studio per week. Prerequisites: Consent of instructor. Advanced students will be organized as a company for the development of a dance repertory for public performance, the creation of new dance works, and the study of those already created.

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**Dramatic Art**

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**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: Audition and consent of instructor. Instruction of elementary acting. (F,SP)

11. Scene Study and Voice Work. (3) Six hours of studio sessions per week plus preparation and rehearsals to be arranged. Prerequisites: Audition and consent of instructor. Instruction in study of scenes, and training in voice. (SP)

12. Beginning Study of Voice and Speech. (3) Two 2-hour studio sessions per week. Prerequisites: Consent of instructor. Beginning study of voice and speech in the interpretation of dramatic literature. (SP) Sussel

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*Not offered 1989-90

*On leave, spring, fall

*On leave, fall

*Recipient of Distinguished Teaching Award
Upper Division Courses

110A-110B. Intermediate Acting. (3;3) Course may be repeated for credit. Six hours of studio sessions per week plus preparation and rehearsals to be arranged. Prerequisites: Audition; one year of undergraduate work in acting, or consent of instructor. (F,SP) Berman, Sussel

111. Advanced Acting. (3) Course may be repeated for credit. Two 3-hour sessions per week plus preparation and rehearsal time. Prerequisites: Two years of undergraduate work in acting, or consent of instructor. (F,SP) Oliver (F); McCandless (SP)

Graduate Courses

210. Advanced Acting: Company Class. (3) Course may be repeated for credit. Two 3-hour studio sections 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, 204A-204B; 120; junior standing and consent of instructor. Beginning study of principles of stage composition, blocking, and analysis of dramatic texts for the director. (SP) Buchman

163. Company Class for Directors. (3) Three hours of lecture and discussion per week. Prerequisites: Junior standing, 162, 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. Prerequisite: Consent of instructor. A. Aeschylus to Shakespeare (F) Ogden B. Shakespeare to Beckett (SP)

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 204A-204B, or consent of instructor. Study of major documents in dramatic theory and criticism, to focus on: Aristotle, Corneille, Lessing, Artaud, Brecht, and modern performance analysis and theory. (F)

122. Drama and Theater in Ancient Greece and Rome. (3) Three hours of lecture per week. Prerequisites: 1A-1B and Dramatic Art 204A-204B, or consent of instructor. Drama and the theater of ancient Greece and Rome. (F)

123. Drama and Theater in Europe: Middle Ages to 1600; British to 1642. (3) Three hours of lecture per week. Prerequisites: 1A-1B and Dramatic Art 204A-204B, or consent of instructor. Dramatic literature of England and Europe from church drama to the High Renaissance. (SP) McCandless

124. Drama and Theater in 17th Century Europe: Including Spanish Golden Age. (3) Three hours of lecture per week. Prerequisites: 1A-1B, Dramatic Art 204A-204B, or consent of instructor. Eighteenth-century comedy and tragedy; Romantic drama; drama of the Victorian age; the early modern period. (F)

126. Drama and Theater in Europe and United States: 1850-1918. (3) Three hours of lecture per week. Prerequisites: 1A-1B, Dramatic Art 204A-204B, or consent of instructor. Contemporary drama. (F)

127. Drama and Theater: 1918 to Present. (3) Three hours of lecture per week. Prerequisites: 1A-1B, Dramatic Art 204A-204B, or consent of instructor. Masterworks of the late 19th and early 20th century drama. (F)

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 for a major period of artistic activity in the theater. (F,SP) Egan

Playwriting

Upper Division Course

139. Playwriting. (3;3) Formerly 139A-139B. 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. (F,SP)

173A-173B. Scenography: Scene Design for the Theater. (3;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 theater. (SP) Travis

175A-175B. Scenography: Lighting Design for the Theater. (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) Brentano

177. Visual Arts in Theater. (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 theater. (SP) Travis

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 passed/not passed basis. Enrollment is restricted by regulations listed on pages 87 and 88 of this catalog. Supervised group special studies of topic, 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 passed/not passed basis. Individual study. Prerequisites: Eight or more units in the Department of Dramatic Art, with an average grade of B. Restricted to honor students. Enrollment is restricted by regulations listed on pages 87 and 88 of this catalog. Reading and conference with an instructor in an area not corresponding with any regular course. (F,SP)

Theater History

Lower Division Courses

*49. Twentieth-Century World Theater. (3) Two 1 1/2-hour lectures per week. Prerequisites: Specially de-
and consent of instructor: Advanced practice in play direction. (F,SP)
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 dissertation. 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 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 teaching. (F,SP)
602. Individual Study for Doctoral Students. (1-12) Course may be repeated for credit. Must be taken on satisfactory/unsatisfactory basis. To be arranged. 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)

Dutch Studies
(College of Letters and Science)

Group Major Office: 5329 Dwinelle Hall, 642-3010

Professors:
Svetlana Alpers, Ph.D. (History of Art)
William J. Bouwens, Ph.D. (Slav Faculty, History)
Alan S. Curtis, Ph.D. (Music)
James Marrow, Ph.D. (History of Art)
Blaise Lee Spall, Ph.D. (German, Comparative Literature)
J. Fritz Staal, Ph.D. (South and Southeast Asian Studies)
Jan de Vries, Ph.D. (History)

Associate Professors:
Dunbar Ogden, Ph.D. (Dramatic Art)
Thomas F. Shannon, Ph.D. (German)
Johan P. Snapper, Ph.D. (German, Queen Beatrix Professor)

Lecturer:
Jeanne van Oosten, Ph.D.

Peter Paul Rubens Professors:
Reginald de Schryver, Ph.D. (Leuven, 1982)
Walter Prevenier, Ph.D. (Ghent, 1983)
Roland Wijmijns, Ph.D. (Brussels, 1984)
Carlos Tindemans, Ph.D. (Ghent, 1985)
Marcel Janssens, Ph.D. (Leuven, 1986)
Ferdinand J. de Hen, Ph.D. (GHENT, 1987)
Hugo Baetsens Beaumont, Ph.D. (Brussels, 1988)
Aldjaan E. Verhulst, Ph.D. (GHENT, 1989)

Adviser: Mr. Snapper.

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:


Additional courses are to be selected from the following list to complete the major: Dutch 6 (see German Department for complete description of these courses) 107, 120, 160, 175, 190, 198, 199; German 278; Comparative Literature 180, 190UL, 170; Linguistics 165, 244; History 165A-165B.

Honors Program. Students accepted in the honors program may enroll in Dutch 110B (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 180 (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, 642-2879

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. Students may include Hungarian, Lithuanian, Armenian, and Georgian as staffing permits. For further information, see East European Studies course listings following Slavic Languages and Literature.

Economics
(College of Letters and Science)

Department Office: 250 Barrows Hall, 642-0822

University Professor:

Professors:
Irma Adelman, Ph.D. University of California. Development Economics.
George A. Anand, Ph.D. M.I.T. Microeconomics.
Robert M. Anderson, Ph.D. Yale University. Mathematical economics.
George F. Breake, Ph.D. University of California. Public finance.
Carlo M. Cipolla, Laureus University of Pavia. Economic theory.
Jan Dek, 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.
Samuel Goldin, Ph.D. Stanford University. Economics.
Gregory Grossman, Ph.D. Harvard University. Economic systems.

*On leave, spring
Recalled to active service
Recipient of Distinguished Teaching Award
Transfer Students

Transfer students interested in the economics major should be aware that the admissions process requires evidence of academic performance at Berkeley beyond that which is required for college credit. Unfortunately, because of large enrollment and limited resources available, it has proved 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 for junior transfer students who did not receive Records of the specially-designated students will be forwarded to the Economics Department.

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.

Undergraduate Major Programs

Students may elect to graduate under one of two plans:

Plan A: recommended for students interested in a broad liberal arts approach to economics.

Plan B: recommended for students interested in a more formal, theoretical approach to economics. Plan B is recommended for students intending to do graduate work in economics.

Requirements for graduation under Plan A are completion of: one course in statistics with calculus as a prerequisite (such as Statistics 20, 21, 21X, 25, 131A or 131F) and one course in economics history of thought from the following: 105, 106, 111A, 111B, 112, 113, 114, 115. Students graduating under Plan A are strongly recommended to take the following:

1. Economics 100A-100B in the sophomore year.
2. Upper division electives in other social sciences.
3. Courses in economic statistics.
4. An undergraduate seminar course in the senior year.

Plan B. Students are required to meet all department and college prerequisites and fulfill the usual requirements for a major in the College of Letters and Science. In addition, students must complete the following:

1. Introduction to Economics. (4) Two hours of lecture per week. Prerequisites: Consent of instructor. Topics, experimental in nature, will vary from year to year.

Departmental Honors

Students interested in graduating with honors in economics should consult with a faculty advisor no later than the first semester of the senior year. The department recommends a student for graduation with honors based on the student's academic performance provided by a thesis written in the senior year, and (b) the student's course grade record overall and in the major. The senior thesis may be an extension of a seminar paper prepared under the continued guidance of a faculty member through enrollment in H195. Students should refer to the Economics Major's Handbook for possible changes in these requirements.

Advising. Students planning to do graduate work in economics should consult with faculty advisers regarding appropriate programs. These students' typical electives would be Plan B majors. All majors are encouraged to consult with a faculty adviser frequently in planning their programs.

Graduate Program

The graduate program trains doctoral students interested in pursuing advanced study and conducting original research in economics. Detailed information concerning admission, financial aid, and degree requirements is contained in the brochure Ph.D. Program in Economics which is available from the graduate assistant, Department of Economics.

All new admissions are restricted to students pursuing the Ph.D. degree, students enrolled in the School of Law or in other doctoral programs on the Berkeley campus may enroll for an A.M. degree in economics if approval is given by both departments. The requirements for an M.A. are: (1) course work in economic theory equivalent to Economics 101A-101B, 200A-200B, or 201A, 202A; (2) completion of 24 units of approved course work, of which 12 units must be in graduate economics courses numbered 201 or greater; and (3) satisfactory performance in two written field examinations. Interested students should see the graduate assistant for further details and applications.

Law and Economics

The School of Law and the Department of Economics sponsor a concurrent program which permits students to study for the degree of Juris Doctor while preparing for the Ph.D. degree in economics. For new admissions, students should see the graduate assistant for further details and applications.

Lower Division Courses

1. Introduction to Economics. (4) Two hours of lecture and two hours of discussion per week. A survey of economics, designed to give graduate students a broad overview of the field. (F,SP)

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) 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 "over-population," urbanization, public health, and environmental quality are discussed.

90. Freshman Seminar. (3) Three hours of seminar per week. (4-10) Prerequisites: Consent of field. Topics, experimental in nature, will vary from year to year. (F)

98. Directed Group Study. (1-4) Course may be repeated for credit. Must be taken on a pass/failed basis.
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102. Aggregate Economic Theory and Policy. (3) 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, Casella

101A. Economic Theory—Micro. (4) Three hours of lecture and two hours of discussion per week. Prerequisites: 1 and one semester of calculus. Basic economic theory with emphasis on microeconomic principles. (F,SP) Dekei-Tabak, Staff

101B. Economic Theory—Macro. (4) Three hours of lecture and two hours of discussion per week. Prerequisites: 101A and one semester of calculus. A survey of the theories of the determination of national income, employment, and price levels, with attention to the effects of monetary and fiscal policy. (F,SP) Staff, Casella

104. Economics of Marxism. (3) Three hours of lecture per week. Prerequisites: 100B or 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.

105. History of Economic Thought. (3) Three hours of lecture per week. Prerequisites: 100A-100B or 101A-101B. A survey of the theories of major economists from Adam Smith to Keynes. (SP) Reich

*106. Economics of Man. (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 analysis. (F)

107. Political Economy and History of Economic Thought Seminar. (4) Three hours of seminar per week. 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-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: 101A or 101B. A survey of major issues involving the relationship between power and the economy. (SP) Ward

110. European Economy and Society from the Fall of the Roman Empire to the Industrial Revolution. (3) 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. This course is equivalent to History 158A. Students will not receive credit for both courses.

111B. The Industrial Revolution and the Origin of the Modern Economic System. (3) Three hours of lecture per week. Prerequisites: 1. The rise of the European economy to world dominance in the period from 1750-1814. This course is equivalent to History 158B. Students will not receive credit for both courses.

112. European Economic History Seminar. (4) Three hours of seminar per week. Prerequisites: 111A or 111B or 115 and consent of instructor. Seminar paper is required. (F)

113. American Economic History. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 1. A survey of trends in the American economy; focusing on factors explaining economic growth and on the changing distribution of the gains and losses associated with growth. This course is equivalent to History 135; students will not receive credit for both courses. (SP) C. Romer

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. (F) C. Romer

115. The World Economy in the 20th Century. (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. (SP) Staff

116. Industrial Organization Seminar. (4) Three hours of seminar per week. Prerequisites: 101A or 101B. A seminar on problems in the field of industrial organization. Seminar paper is required. (F) Keeler

117. 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. (F)

118. Special Topics in Industrial Organization. (3) Three hours of lecture per week. Analysis of market structure, conduct and performance in selected industries. See course announcement for current topics and prerequisites.

119. Economics of the Environment. (3) Three hours of lecture per week. Prerequisites: 100A or 101A. Analysis of public policy measures designed to preserve and improve human environments.

120. Public Sector Microeconomics. (3) Three hours of lecture per week. Prerequisites: 101A or 101B. The economic and policy analysis of government expenditures, taxes, and intergovernmental fiscal relations. (F)

121. Seminar in Public Sector Economics. (4) Three hours of seminar per week. Prerequisites: 131 and/or consent of instructor. Enrollment will be limited. A seminar paper is required. (SP) Break

122. Monetary Theory and the Banking System. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 100B or 101B. Survey of money, monetary interest, and income theories. Depository institutions, other financial intermediaries, the Federal Reserve System and the supply of money. (F,SP) Staff

123. Aggregate Economics Seminar. (4) Three hours of seminar per week. Prerequisites: 102 or 103 and consent of instructor. Enrollment will be limited. A seminar paper is required. (SP) Staff

124. Economic Statistics and Econometrics. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 100A-100B or 101A-101B and Statistics 20, 21, or 131A. Introduction to problems of observation, estimation, and hypothesis testing in econometrics through the study of the theoretical and application of linear normal regression model, critical evaluation of selected examples of empirical economic research and exercises in applied econometrics. (SP) Staff

125. Economics of Trade Unionism and Collective Bargaining. (3) Three hours of lecture per week. Prerequisites: 101A or 101B. The economic theory of collective bargaining. (SP) Staff

126. Wage Theory and Policy. (3) Three hours of lecture per week. Prerequisites: 100A-100B or 101A-101B. The determination of wages and employment. Application of the theory to policy analysis. (SP) Staff

127. Labor Economics Seminar. (4) Three hours of seminar per week. Prerequisites: 151 or 152 and consent of instructor. Topics in labor economics. Seminar paper is required. (SP) Staff

128. Urban Economics Seminar. (4) Three hours of seminar per week. Prerequisites: 156. Seminar on problems of the urban economy. Topics covered include location theory, housing, transportation, and the fiscal problems of city governments.

129. Urban Economics Seminar. (4) Three hours of seminar per week. Prerequisites: 156 and consent of instructor. Seminar on problems of the urban economy. A seminar paper is required.

130. Economic Systems Seminar. (3) Three hours of seminar per week. Prerequisites: 163 and consent of instructor. Enrollment will be limited. A seminar paper will be required.

131. 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)

132. Case Studies in Economic Development. (3) Three hours of seminar per week. Prerequisites: 156 or 162 or 163 and consent of instructor. Enrollment will be limited. A seminar paper will be required.

133. Economic Development Seminar. (4) Three hours of seminar per week. Prerequisites: 171 or 172. Economic development, its stages, growth, institutions, problems; other Soviet-type economies. (SP) Staff

134. Special Topics in Economic Systems. (1.5) One and one-half hours of lecture per week. Prerequisites: 1. Recommended: 161 or 162. As announced in the department course descriptions.

135. Economic Systems Seminar. (3) Three hours of seminar per week. Prerequisites: 163 or 164. Economic systems. (SP) Staff

136. Monetary Theory and the Banking System. (3) Three hours of lecture per week. Prerequisites: 101A-101B. Current international monetary institutions, common markets; foreign trade agencies; terms of trade; international food and agricultural policies; commodity agreements and the oil crisis. (SP) Staff

137. International Economic Relations. (3) Three hours of lecture per week. Prerequisites: Econ 1. A general introduction to economic geography, emphasizing the economic determinants of modern, fertility, and labor force par- ticipation. Relationship of population growth to 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 third world countries as aging and the transition of the Baby Boom into the labor market. (SP) Lee

138. International Economic Relations. (3) Three hours of lecture per week. Prerequisite: 104A or 104B. The theory of international trade and its applications to tariff protection. (F) Bardhan

139. International Economic Policies. (3) Three hours of lecture per week. Prerequisites: 161 or consent of instructor. The international mechanism of adjustment; current international monetary institutions, common markets; foreign trade agencies; terms of trade; international food and agriculture; cartels, commodity agreements and the oil crisis. (SP) Staff

140. Seminar on Topics in Economics. (4) Course may be repeated for credit with consent of instructor. Topics may be initiated by instructor. Seminar paper will be required. Enrollment will be limited. A seminar paper is required.

141. Seminar on Topics in Economics. (4) Course may be repeated for credit with consent of instructor. Topics may be initiated by instructor. Seminar paper will be required. Enrollment will be limited. A seminar paper is required.
197. Field Studies. (1-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. Number of hours to be announced. Prerequisites: Upper division standing. Written proposal must be approved by department chair. Supervised field study 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/no pass 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/no pass basis. Number of hours to be announced. Prerequisites: Upper division standing. Written proposal must be approved by department chair. Enrollment is restricted by regulations listed on pages 87 and 88 of this catalog. (F,SP) Staff

200A. Fundamentals of Economic Theory. (2) 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. Macroeconomic analysis, behavior of firms and households and the determination of prices and resource allocation in a market economy. Staff

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 201A-201B and 202A-202B rather than 200A-200B. Microeconomic analysis—determination of national income, employment, price level, growth, and distribution. 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

201C. Linear Economic Models. (3) Two hours of lecture per week. Prerequisites: 201A-201B. Linear economic models, linear programming, activity analysis, intertemporal and non-linear programming. (F,SP) D. Romer

202A-202B. Macroeconomic 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-term models, implications of various expectations hypotheses, wage price determination, the role of money and financial assets, theories of consumption and investment behavior, dynamic systems and international considerations. (F,SP) Akerlof, Casella, Williamson

202C. Capital and Economic Growth. (3) Two hours of lecture per week. Prerequisites: 201A-201B and 202A-202B. An examination of the roles of time and capital in the processes of income and wealth 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. Staff

203. Advanced Topics in Economic Theory. (3) Two hours of lecture per week. Prerequisites: Consent of instructor. See department course description each semester. (SP) Staff

204. Mathematical Tools for Economics. (4) Three hours of lecture and one hour of discussion section 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) Rued, Staff

205. History of Economic Thought. (3) Two hours of lecture per week. Topics in the history of economic analysis. (SP) Reich

206. 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, Dekel-Tabak

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) Dekel-Tabak

209B. Mechanism Design and Agency Theory. (3) Two hours of lecture per week. Prerequisites: Economics 201B and 202A-202B or consent of instructor. This course will study the optimal design of mechanisms 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) Hermlin

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) Eichengreen, C. Romer

210B. Topics in European Economic History. (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in European economic history. (SP) Eichengreen, C. Romer

210C. Topics in American Economic History. (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in American economic history. (SP) Sutch, C. Romer

215A-215B. Political Economy. (3,3) Two hours of lecture per week. Prerequisites: Consent of instructor. (F,SP) Sutch, C. Romer

215C. Selected Topics in Political Economy. (3) Two hours of lecture per week. Special topics, varying from year to year. (SP) Ward

216. Seminar in Political Economy. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. Staff

220A. Industrial Organization. (3) Two 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) Staff

220B. Industrial Organization. (3) Two hours of lecture per week. Prerequisites: 220A. The characteristics of regulated industries and the consequences of regulatory performance. (SP) Gilbert

220C. Special Topics in Industrial Organization. (3) Two hours of lecture per week. See course announcement for current topics and prerequisites. Staff

221. Seminar in Industrial Organization, Regulation and Public Enterprises. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. (F,SP) Staff, Gilbert

224. Economics of Institutions. (3) New course. Two hours of lecture per week. This course develops the proposition that institutions have pervasive implications in the applications of statistics. A comparative institutional approach is employed whereby the transaction is made the basic unit of analysis. Students are organized with respect to their comparative contracting properties. (SP) Williamson

230A. Public Sector Microeconomics. (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 200A. (SP) Break

230B. Public Sector Microeconomics. (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) property tax and other local revenue sources, and (3) analysis of local government expenditures. Students may take any or all of the individual seminars, with one unit of credit for each. (SP) Hermalin

230C. Public Sector Microeconomics. (3) Two hours of lecture per week. The economic and policy analysis of government expenditures, taxes, and intergovernmental fiscal relations. (SP) Hall

231. Seminar in Public Sector Economics. (3) Two hours of seminar per week. Prerequisites: Consent of instructor. (SP) Staff

236A-236B. Aggregate Economics. (3-3) Two hours of lecture per week. Prerequisites: For 236A: 201A-201B and 202A-202B. For 236B: 236A. Macroeconomic models; theory and practice of aggregate economics; rational expectations models; finance theory integrated with macro. (F,SP) Clauser, Peck, Casella, O. G. Hermalin

239C. Aggregate Economics. (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) Craine, D. Romer

240. Introduction to Econometrics. (4) Three hours of lecture and 1½ hours of discussion section per week. Prerequisites: Statistics 131A or equivalent and an introduction to linear algebra. A survey course designed for students in economics and related fields. Probabilistic and statistical methods of economics, illustrated by a representative selection of empirical studies. (SP) Hall

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. Intended for students specializing in econometrics and others with strong mathematical backgrounds. Linear and nonlinear statistical models and their applications in economics. Special problems; analysis of controlled experiments. (F,SP) Rothenberg

241B. 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. Intended for students specializing in econometrics and others with strong mathematical backgrounds. Linear and nonlinear statistical models and their applications in economics. Special problems; analysis of controlled experiments. (SP) Rothenberg

242. Seminar in Econometrics. (3) Two hours of seminar per week. Prerequisites: Consent of instructor. (F,SP) Hall, Rothenberg

243. Special Topics in Econometric Theory. (2) Course may be repeated for credit. Two hours of lecture per week. Prerequisites: 241A-241B. See department course description each semester.

244. Applied Econometrics. (3) Three hours of lecture per week. Prerequisites: Econometrics 240. Methods of applied econometrics, with emphasis on alternative modelling strategies and problems met in practice. In-
250A-250B. Labor Economics. (3,3) Two hours of lecture per week. Prerequisites: Consent of instructor. This course will cover the standard approaches to macroeconomics of open economies, i.e., to the determination of income and the balance of payments. The emphasis will be theoretical and, at times, econometric. 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, the real effects of monetary and portfolio-balanced 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 rigidities, unwanted real appreciation and the international debt problem. (SP, F, Su) Frankel.

250A-250B. Laboratory. (3,3) Two hours of lecture per week. Prerequisites: 250A or consent of instructor. Application of economic theory to the study of activity and residence in cities. (F, Su) Brown, Staff.

251. Seminar in Labor Economics. (3) Two hours of seminar per week. Prerequisites: Consent of instructor. Seminar for students at the doctoral dissertation level. (F, Su) Brown, Staff.

252. Urban Economics. (3) Formerly 255A. Two hours of lecture per week. Prerequisites: 250A or consent of instructor. Application of economic theory to the study of activity and residence in cities. (F) Dickens.

253. Urban Economics. (3) Two hours of lecture per week. Prerequisites: Consent of instructor. Seminar for third-year doctoral students in the early stages of their dissertation research. (F, S) Dickens.

255. Survey of Research in Economics. (1) New course. Must be taken on a pass/fail basis. Two hours of seminar per week. Presentations by departmental faculty of new research areas in different subfields of economics. (F, S) Staff.

256. Seminar in Urban Economics. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. Faculty-student research and dissertation workshop. (F, S) Staff.

260A-260B. Economic Systems. (3,3) Two hours of lecture per week. Prerequisites: 260A is prerequisite to 260B. Methods and problems of comparing economic systems; their institutions, ideologies, performance, and problems. (F, Su) Staff. Ward, Grossman.

260C. Economic Systems. (3) Two hours of lecture per week. Prerequisites: Cases Studies of the Soviet Union and other non-market economies. (F, S) Staff.

261. Seminar in Economic Systems. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. (F, S) Staff.

270A-270B. Analytics of Economic Development and Planning. (3,3) Two hours of lecture per week. Prerequisites: 260A is prerequisite to 260B. Problems of underdevelopment and poverty, policy issues and development strategies. (F, S) Staff. Barthman.

270C. Analytics of Economic Development and Planning. (3) Two hours of lecture per week. Prerequisites: 201A-201B, 201A-201B, 201C, 202C. Basic macro-policy planning with investment project analysis. (F, S) Adelman.

270D. Special Topics in Development. (3) Two hours of lecture per week. See course announcement for current topics and prerequisites. (F, S) Staff.

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, S) Staff.

275A. Economic Demography. (3) Two hours of lecture per week. Prerequisites: 270B. Economics of demographic change in developed and developing countries including capital formation, labor markets, transfers and urbanization. Economic determinants of fertility, mortality and migration. (SP) Lee.

275B. Selected Topics in Economic Demography. (3) Two hours of lecture per week. A review of recent literature in selected areas of economic demography; content will vary from year to year. (F, S) Staff.

280A-280B. International Economics. (3,3) Two hours of lecture per week. Prerequisites: 280B is prerequisite to 280B. The world economy as a general equilibrium system. The theory of international economic policy. (F, S) Staff. Barthman.

280C. International Economics. (3) Two hours of lecture per week. Prerequisites: 280B. The first half of this course will cover the standard approaches to macroeconomics of open economies, i.e., to the determination of income and the balance of payments. The emphasis will be theoretical and, at times, econometric. 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, the real effects of monetary and portfolio-balanced 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 rigidities, 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: 260A or consent of instructor. (F, S) Staff. Frankel.

290. Doctoral Thesis Workshop. (4) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Permission of instructor. Seminar for third-year doctoral students in the early stages of their dissertation research. (F, S) Dickens.

295. Survey of Research in Economics. (1) New course. Must be taken on a pass/fail basis. Two hours of seminar per week. Presentations by departmental faculty of new research areas in different subfields of economics. (F) Staff.

296. Special Economics Topics. (3) Two hours of lecture per week. Prerequisites: Consent of instructor. Topics of different sections to be announced annually. (F, S) Staff.

298. Directed Group Study for Graduates. (1-4) Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. Prerequisites: Consent of instructor. Seminar for graduate 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. (F, S) Staff.

Professional Courses

301. Graduate Student Instructor Practicum. (6) Must be taken on a satisfactory/unsatisfactory basis. One 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 through employment as a graduate student instructor. (F, S) Rothenberg.

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 51A or equivalent. Selected topics illustrating the application of mathematics to economic theory. This course will be repeated for credit. (F, S) Staff. May not be used for unit or residence requirements for the Ph.D. (F, S) Staff.

IDS 170. Economics of Organization. (3) Two 1 1/2 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, what bosses do and how bosses 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 structure of government and the organizational properties of socialism, are also considered. Sponsoring departments: Business Administration and Economics.

IDS 190. 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 government, economics, business and biology. Growth dynamics, phase-plane methods; state variables, statistical signals, sampled data, stability, root locus, gradient methods, and computer simulation of large systems. Sponsoring departments: Economics, EECS.

Graduate Courses

IDS 213A-213B. Mathematical Economics. (3,3) Students who have received credit for Economics 207A-207B may not receive credit for IDS 213A-213B. Two hours of seminar per week. Prerequisites: Math 104 and 110 and Statistics 101. 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, 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, S) Staff.

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: Doctoral standing or consent of instructor. This seminar will be organized to celebrate the 50th anniversary of the publication of Chester Barnard'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 are left open, with respect to the economics of organizations. The course will also feature guest lectures from a variety of eminent scholars of economics and organization. (F, S) Staff.

EDUCATION

(Graduate School of Education)

Office: 1501 Tolman Hall, 642-3726
Academic Dean: William D. Rohwer, Jr., Ph.D.
Professors: Charles S. Benson, Ph.D. Columbia University. Economics.
Guy Benveniste, Ph.D. Stanford University. Management, planning, professionalization, higher education.
Anders Assen, Ph.D. University of London. Developmental psychology; cognition and instruction.
K. Patricia Cross, Ph.D. University of Illinois. Community college policy and administration.
Andrea A. diSessa, Ph.D. Massachusetts Institute of Technology. Physics and computation cognition.
David P. Gardner, Ph.D., D.H. (Hon.). (President of the University of California at Berkeley). Educational technology.
Bernd R. Gifford, Ph.D. University of Rochester. Policy analysis, technological education.
W. Norton Grubb, Ph.D. Harvard University. Education policy, labor markets.
James W. Guthrie, Ph.D. Stanford University. Policy studies.
Guy Benveniste, Ph.D. Stanford University. Economics.
Curtis D. Hardoy, Ph.D. University of California at Berkeley. Brain function, attention, human information processing.
John G. Hurst, Ph.D. Ohio State University. Democratic, educational, educational policy, educational policy and administration.
Arthur R. Jensen, Ph.D. Columbia University. Differential psychology; cognitive ability.
Nadine M. Lambert, Ph.D. University of Southern California. Educational psychology; educational psychology teaching education.
Rogers J. Reis, Ph.D. University of California at Berkeley. School management, leadership; urban education.
Graduate Program

For a description of the graduate program in education, see page 72.

Education

Lower Division Courses

60. Preparation for Leadership. Formerly EDUC 88. Must be taken on a pass/no pass basis. Two hours of lecture per week. The purpose of this course is to provide lower division students an introduction to the theory and practice of leadership and organizational dynamics. It emphasizes leadership opportunities at Berkeley and will assist students to prepare to take on leadership positions. (SP)

98. Directed Group Study. (1-4) New course. Must be taken on a passed/not passed basis. Two 1/2-hour lectures and discussions per week. (F,SP) Staff

197. Field Studies. (1-4) Course may be repeated for credit. One 3/4-hour discussion and one hour of field work per week. Prerequisites: Consent of instructor. (F,SP) Schoenfeld, Fillmore, Rohwer

290. Special Topics Seminars. (1-4) New course. Must be taken on a pass/no pass basis. Group meetings to be arranged. Course may be repeated for credit.

Upper Division Courses

197. Field Studies. (1-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. Field study. Prerequisites: Consent of instructor. University organized and supervised field studies involving experiences in schools and school-related activities. (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. Independent study. Prerequisites: Consent of instructor. (F,SP) Staff

296. Supervised Independent Study and Research for Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. Independent study. Prerequisites: Consent of instructor. (F,SP) Staff

299. Special Study and Research. (1-12) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual conference and independent study. Prerequisites: Consent of instructor. Consultation and analysis for graduate and undergraduate assistants. (F,SP) Staff

Graduate Courses

290. Special Topics Seminars. (1-4) New course. Course may be repeated for credit. One hour of seminar per week per unit. Topics to vary from semester to semester and section to section. A. Higher Education

291A. The Educational System of the United States. (3) Formerly EDUC AE 275. Three 1-hour lectures per week. Analysis for research assistants. Prerequisites: Consent of instructor. Staff

Social and Cultural Studies in Education

Lower Division Courses

39. The College and University Novel. (3) Two 1½-hour lecture/discussions per week. Analysis of novels with college and university settings to gain the perspectives of students and faculty on essential features of higher education, especially in the United States.
180. Logic of Inquiry. (3) Three hours of lecture and discussion per week. An analysis of the logical and epistemological foundations of empirical research with the aim of developing a critical and vigorous approach to empirical inquiry, deductive and inductive logic, the structure of scientific theories, justification, falsification, the role of values, prediction and the nature of causality. (F) packer

181. Work, Leisure, Education, and Career Choice. (2) Formerly EDUC 250A-250B. Former EDUC 280A is not related. May be taken on a satisfactory/unsatisfactory basis. Discussion per week. Upper division standing or consent of instructor. Psychological and philosophical ideas about work, leisure, and education and the relationship between these ideas and the student's career, family, and life plans. Opportunity for personal planning. (F)Downey

183. History of Education in the United States. (3) Three hours of lecture per week. Social and intellectual history of educational institutions since Independence. Adaptations of European theory and practice in education. Effects of political, social, and economic change on families, churches, schools, colleges, and other educational agencies. Reform movements and their effects. (F)Downey

184. Philosophical Foundations of Education. (3) Three hours of lecture per week. Systematic exposition of major educational thought with emphasis upon original research by students in independent study and shared discussions and critiques of the seminar. Coursemate attention given to methods of historical inquiry. (F) packer

284A. Philosophy of Education. (3) Three hours of lecture per week. Philosophical analysis applied to current educational problems and key concepts. (F) Jarrett

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) Downey

284C. Signs, Symbols, and Language. (3) Three hours of lecture per week. A study of the processes of education considered as the development of methods by which to employ and interpret symbols—linguistic and non-linguistic, metaphorical and literal—to serve expressive and communicative needs. (SP) Jarrett

285A. The School as a Workplace. (3) Three hours of lecture/discussion per week. Introduction to theory and research on the school as a professional workplace and its effects on classroom 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. (F) Little

286A. The Logic and Politics of Curriculum. (3) Three hours of lecture and discussion per week. An examination of critical and recurring debates on school curriculum. Analysis of both emerging theories of knowledge and the social and political ideals of democratic societies—critical study of principles, philosophies, theories, and practices designed to develop understanding, commitment, and skills to empower a citizenry dedicated to achieving equality, justice, and peace in the world. (F)Hurt

287A. Theories of the Self: Freud and Jung. (3) One 3-hour lecture/discussion per week. Prerequisites: Graduate standing. Philosophical and psychological theories of the nature of human nature and their implications for education and human development. Extensive investigation of Freud and Jung, preceded by a brief overview of the unconscious and examination of a few of their successors. (F) Jarrett

287B. Theories of the Self: Existentialism and Phenomenology. (3) One 3-hour lecture/discussion per week. Prerequisites: Graduate standing. Philosophical and psychological theories of human nature and their implications for education and human development. Following brief examination of Dostoevsky, Kierkegaard, Nietzsche, and Huisset, attention will center on Heidegger, Ortega y Gasset, and Ricoeur. (SP) Lowery

288A. Research on Teachers and Teaching. (3) Three hours of lecture and discussion per week. Introduction to the research on teachers and teaching, from a variety of social and behavioral science disciplines. Intended to acquaint school professionals and prospective researchers with examples of important research and the methodologies and perspectives being pursued. Considers such issues as teaching effectiveness, classroom interactions, the development of theories of teaching, and students' learning from classroom teachers. (F) packer

288B. Theory and Methods in Field Work I. (3) Formerly EDUC 280A. Course may be repeated for credit. Three hours of lecture and discussion per week. Survey of methodological issues in qualitative research, emphasizing field research methods. Topics to be included are the various research strands of the Chicago school, cultural studies, and participating in research. (F) Hansen

288C. Theory and Methods in Field Work II. (3) Formerly EDUC 280B. Course may be repeated for credit.

Three hours of lecture and discussion per week. Prerequisites: Admission to a credential program. Development of skills, data reduction analysis, and model building in qualitative research. Continuation of 288B. (SP) packer

288D. School Ethnography. (3) One 3-hour lecture/discussion per week. This course acquaints students with the ethnographic traditions in school research and exposes students to a range of ethnographic method- ods. 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 methods to the classroom and school settings. The course includes a practicum component.

289A. Teacher as Researcher. (3) Formerly EDUC 289. One 3-hour lecture/discussion per week. Intended to prepare teachers and teacher education students to develop, implement and interpret symbols—linguistic and non-linguistic, metaphorical and literal—to serve expressive and communicative needs. (SP) Jarrett

289B. Research on Teacher Education. (3) One 3-hour lecture/discussion per week. This course examines the historical and contemporary perspectives of teacher education. Readings and discussions will include an overview of research at the preservice, induction, and inservice levels, as well as in-depth studies of specific research projects in the supervision, program design, and teacher education reform. (F)

294. Thesis Seminar. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Three hours of discussion per week. Recommended for M.A. students working on seminar papers, theses, and doctoral students preparing dissertation proposals. (F,SP) Staff

298. Group Study for Graduate Students. (3) Course may be repeated for credit. Section 1: letter grading option; sections 2-10: satisfactory/unsatisfactory grading. Three hours of seminar per week. Research on special topics and problems not covered by courses or seminars. (F,SP) Staff

Professional Courses

381. Practicum in Teacher Education. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two hours of lecture/discussion and two hours of consultation plus field work per week. Prerequisites: Admission to M.A. or Ed.D. program in Teacher Education and consent of instructor. Supervision and introduction to current issues in teacher education. Participation in planning and implementing selected Berkeley teacher education programs. Supervised experience in classroom teaching of individuals and groups of students, with emphasis on the social foundations component of teacher education. Prerequisite.

383. Research colloquium. (1-3) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1/2-hour discussion plus field work per week. For 1 unit, 1 1/2 hours of discussion plus 1/2 hours of field work will be required; for each additional unit, three hours of field work will be required. Ongoing review of student and faculty research. Schedule of topics will be announced at the beginning of the quarter, and topics as determined by practicum participants. Intended for students across divisions who are in the process of beginning or completing research projects.

390A-390B. Supervised Teaching. (7-8) One to three hours of lecture per week and 0 to 10 hours of field work per week. Prerequisites: Admission to a credential program. Credit and grade to be awarded upon completion of the sequence. The sequence in supervised teaching may begin with the opening of the public schools in the fall and extend through the spring semester. (F,SP) Lowery

481. Internship in Student Personnel and Counseling. (2-7) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Eight to twenty-eight hours of supervised field work per week. Prerequisites:
262A. Issues in Educational Administration and Policy. (3) Three hours of lecture per week. (Required of all students in the Division of Educational Administration. May be counted toward graduation requirements and issues in administration and evaluation. Application is made to governmental policy for school systems. (F) Grubb, Little

262B. Electronic Spreadsheets and Databases in Educational Administration. (2) One 2-hour lecture per week. This course is an introduction to the use of electronic spreadsheets and databases on microcomputers. Examples used will focus upon applications 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).

261A. Organization Theory in Education and Other Social Services. (3) Three hours of lecture per week. Concepts of power, authority, legitimacy, professions, controls, incentives, etc., as they apply to education or other social services (e.g., social work, human services).

261B. Management of Change and Planning. (3) New course. Three hours of lecture per week. This course will focus on techniques to facilitate change and planning in public service organizations. Topics to be included are: organizational dimensions of change, control, authority, and planning for change; concept of the multiplier, networking and coalition building, and planning as a management function.

262A. School Leadership and Management. (3) Three hours of lecture per week. (Required of students in the administrative credential program.) An analysis of the theories of leadership, motivation, small group dynamics, organizational climate, communication, etc., associated with site leadership and management.

262B. School Supervision: Theory and Practice. (3) Three hours of lecture per week. Concepts and practices associated with the analysis of teaching and clinical supervision of teachers. The role of the school leader in supervising teachers.

262C. Personnel Administration in School Systems and Social Organizations. (3) Three hours of lecture per week. Concepts and practices related to the administration of personnel services in education and other social organizations.

262E. Special Topics in Urban Education. (3) Three hours of lecture per week. An examination of topics such as student motivation, school-community relations, the school environment, and others associated with the analysis of teacher evaluation and teachers' professional development. Practical applications will be emphasized in course assignments. (SP) Little

263A. Legal Issues in Educational Practice. (1-3) Two hours of lecture per week for five weeks (1); 10-week course (2); 15-week course (3) Legal structures and practices in education for teachers and counselors. Teacher, pupil, and counselor rights and responsibilities. (SP) Staff

263B. Education and Professional-Client Law. (3) Three hours of lecture per week. FACETs of the law important for educational and social service professionals who have frequent contact with students in a client capacity. Emphasis on such topics as civil liberties, due process, confidentiality, school discipline, school exclusion, regulatory provisions for the handicapped, and legal claims to the fulfillment of educational needs.

263C. Concepts in Education Law. One 3-hour lecture per week. In-depth analysis of statutes, cases of historical importance which have had a major impact on school policy and practice. Exploration of the relevance of law and education decision-making at the state and federal level. Primarily for those interested in an in-depth research of law as it relates to educational issues.

264A. Intergovernment Relations in Social Sector Organizations. (3) Three hours of lecture per week. Emphasis on the evolution and constitutional basis of local, state and federal governmental arrangements for social agencies. Attention given to policy development, planning, budgeting procedures; policy implementation and evaluation. Reviews appropriate theoretical and empirical research findings regarding political processes of local, state, and federal agencies and officials.

264B. Special Topics in the Politics of Social Sector Services. (3) Course may be repeated for credit. Three hours of lecture per week. Exploration of legal and political topics related to politics and governance of education. Topics: local political consequences of federal categorical aid programs, effectiveness of intergovernmental relations and parameters of political reform within education. (F.SP)

265A. Economics of Education and Other Social Services. (3) Three hours of lecture and one hour of conference per week. Topics to be considered include the following: alternative methods of assessing the contribution of education to economic growth; demand for education services; education production functions; cost analysis and sectoral planning; economic aspects of innovation.

265B. Economic Development and Education in the Third World. (3) Formerly 170. Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Economics 100A-100B or Econ. 101A-101B or equivalent. Human capital theory and its influence on economic planning in developing countries. The effects of educational development on the distribution of income. The role of educated women in economic development. Proposals to improve external and internal efficiency of educational systems in developing countries. The role of basic education in Third World development.

266A. Finance of Education and Other Social Services. (3) Three hours of lecture per week. Fiscal policy and financing of social services. Sources of funding and cost analysis, sectoral planning; economic aspects of innovation.

266B. Economic and Financial Management in Higher Education. (3) Three hours of lecture per week. An examination of topics related to politics and governance of education. Topics: local political consequences of federal categorical aid programs, effectiveness of intergovernmental relations and parameters of political reform within education. (F.SP)

266C. Financial Management of Postsecondary Education. (3) One 3-hour lecture per week. Principles of financial management, management of research, and other postsecondary institutions. Bureaucratic and collegial controls. Higher education planning. Inter and intradepartmental politics of higher education. Topics vary to fit student interests.

266E. Seminar in the History of the American College and University. (3) Formerly ED 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, emphasizing major 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.

266F. The Student in Post-secondary Education. (3) One 3-hour lecture per week. Experiences of diverse populations in 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. One 3-hour lecture per week. Philosophical, 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.

269A. Inter-ethnic and Interpersonal Relations in Education. (3) Three hours of lecture per week. Educational implications and practices of intergroup and interracial minorities. Study of research regarding the etiology of prejudice and educational strategies for its elimination. Exercises in interpersonal and intergroup relations and field work are involved.

270A. Principles of Program Evaluation. (3) One hour and two hours of discussion per week. An overview of the models, methods and issues in educational evaluation. Includes basic concepts and procedures for evaluative analysis. Includes research in curriculum. Course format combines lecture/discussion and practical applications of evaluation principles to "real" educational programs or projects.

271A. Quantitative Analysis of Educational Systems I. (3) One 3-hour lecture per week. Prerequisites: A basic course in educational statistics, econometrics, or equivalent. Methods for estimating predictive models in education systems. Includes models in which outcome variables are either numerical or categorical.

271B. Quantitative Analysis of Educational Systems II. (3) Three hours of lecture per week. Prerequisites: 271A or equivalent. Uses methods for analyzing causal models in education, non-experimental data. Path analysis, structural equations, LISREL.

271C-271D. Methods of Analysis for Educational Research and Decision-Making. (3) Three hours of lecture/discussion per week. EDUC-AE
271C introduces students to quantitative statistical methods for educational research. EDUC-AE 271D covers qualitative research methods and analytical models for decision-making in education. EDUC-AE 271C is not a prerequisite for EDUC-AE 271D. Students and faculty development specialists who work closely with faculty, as well as for college teachers. The goal of the course is to prepare teachers to assess the effectiveness of their teaching by systematically studying their students' learning. Second, the course will prepare administrators to initiate and promote the use of classroom research as a means of improving student learning and effectiveness.

272A. Evaluation in the Schools. (3) New course. Three hours of lecture/discussion per week. This course will consider ways in which different groups socialize children for learning and ways in which learning patterns develop within schools. Student teachers will consider instructional approaches for working with linguistically and culturally diverse students in their classrooms. (SP) Fillmore

272B. Evaluation in Higher Education. (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 programs, projects, curricula, and courses.

273A. Qualitative Evaluation. (3) Course may be repeated for credit. Three hours of discussion/field work per week. Theory and applications of the role of the evaluator as the research instrument and the nature of valuing. Detailed treatment of ethnographic, naturalistic, illuminative, historiographic, and connoisseurship modes of inquiry.

274. 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.

275C. 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. Focuses on participant observation and other anthropological techniques applied in educational research.

277. Evaluation Colloquium. (1) Course may be repeated for credit. Must be taken on a passed/not passed basis. Three hours of lecture and discussion per week. Prerequisites: Consent of the instructor. Emphasis on student problem-solving and evaluation.

Education in Language and Literacy

Lower Division Courses

90. Learning From Text. (1) Course may be repeated for credit. Must be taken on a passed/not passed basis. One hour lecture plus discussion per week. This course assists undergraduates with reading and study skills. Students learn successful approaches for learning from their texts in such courses as anthropology, science, sociology, mathematics, and humanities. (F,SP) Staff

90A. Practicum in School Site Management I. (3) Three hours of lecture plus field work per week. Prerequisites: Admission to Administrative Services Credential program. Supervised field experience, conferences, and colloquium.

90B. 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.

90C-460D. Research Practicum in Administration. (2,2,2) Course may be repeated for credit. Two hours of lecture/discussion per week. Prerequisites: EP 209A, 209B, or equivalent and consent of instructor. This course enables Ed.D. students in collecting and analyzing data on efforts to improve educational practices or solve important problems in school systems.

144. Writing the Teaching of Writing. (3) New course. Two 1-hour lecture/discussion per week. Prerequisites: Consent of instructor. A writing course for students considering a teaching career in the secondary or elementary schools. Written assignments will be based on various approaches to writing. The Writing Project has identified its work with successful classroom teachers, K-13. Topics to be included: writing as a process, writing as learning, writing as art, writing about personal experience, writing as a professional practice will be examined in relation to current writing theory. (F) Freedman

Graduate Courses

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 levels. Attention will be given to such areas as: definitions and implications of reading, the teaching of reading, and writing processes. Connections will be made between research, theory, and practice. (F) Ruddell

242. Issues in Writing 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 writing. Attention will be given to issues in the acquisition and the writing process. Connections will be made between research, theory, and practice. (F) Freedman

243B. Approaches to Teaching English as a Second Language. (3) Three hours of lecture/discussion per week. Prerequisites: Admission to a teaching credential program. This course is primarily concerned with methods of teaching English as a second language. Educators and aspiring teachers will examine ways in which different groups socialize learning and ways in which learning patterns acquired in the home can conflict with the culture of school. Students will explore instructional approaches for working with linguistically and culturally diverse students in their classrooms. (SP) Filmore

243D. Issues in the Study of Bilingualism. (3) Three hours of lecture/discussion per week. Working within a sociolinguistic framework, students will examine key issues in the study of bilingualism. Attention will be given to such areas as: definitions and typologies of bilingualism, and the acquisition of bilingual ability, the description and measurement of bilingualism, and the nature of societal bilingualism. Much time and attention will be devoted to questions and controversies surrounding bilingualism and education.

244A. Staff Development in Reading and Language Instruction. (3) Formerly ELL 244. Three hours of lecture per week. Prerequisites: Consent of the instructor. Emphasis is placed on design, articulation, and implementation of instructional materials for primary grades through community college. Dynamics of personal leadership basic to successful curricula implementation is stressed.

244B. Issues in Languages Arts Instruction. (3) One hour of lecture 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 role of oral and middle school and high school teachers. Topics to be covered are the role of talk in learning, the use of the oral language arts, emergent literacy, and writing development. (F) Dyson

244C. Issues in Staff Development. (3) New course. Three hours of lecture/discussion per week. Students who are working on the teaching of writing. (3) New course. Two 1-hour lecture/discussion per week. Prerequisites: Consent of instructor. A writing course for students considering a teaching career in the secondary or elementary schools. Written assignments will be based on various approaches to writing. The Writing Project has identified its work with successful classroom teachers, K-13. Topics to be included: writing as a process, writing as learning, writing as art, writing about personal experience, writing as a professional practice will be examined in relation to current writing theory. (F) Freedman

246. Literacy and the Urban Setting. (3) Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. Attention will be given to such areas as: definitions and implications of literacy, its effects on cognitive functioning in individuals, and its relation to cultural, economic, and political development in societies. These relationships are analyzed historically, psychologically, and socially. (F) Fillmore

141. Language use in the Chicano Community. (3) Three 1/2-hour lectures per week. Introduction to the sociolinguistic study of bilingualism in general and of Chicanos in particular. Examination of the function and uses of language within minority communities in the U.S. using the Chicano experience as a primary example. Considerable attention given to the educational implications of bilingualism in immigrant communities.

*Not offered 1989-90
†On leave, spring
‡Recalled to active service
†Recipient of Distinguished Teaching Award

209A, 209B, 209E, 209F. Issues in the Study of Bilingualism. (3) Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. Emphasis is placed on design, articulation, and implementation of instructional materials for primary grades through community college. Dynamics of personal leadership basic to successful curricula implementation is stressed.

**246. Literacy and the Urban Setting. (3) Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. Attention will be given to such areas as: definitions and implications of literacy, its effects on cognitive functioning in individuals, and its relation to cultural, economic, and political development in societies. These relationships are analyzed historically, psychologically, and socially. (F) Fillmore

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will examine current models of staff development and compare them with programs to improve the teaching of English and the Language Arts against an overview of past practices. Students will be assisted in the planning and conducting of model workshops that demonstrate the application of the knowledge gained in language instruction. Connections will be made between current research and emerging staff development practice. Field work in the schools, participating in Bay Area Writing Project in-service workshops.

245A. The Social Context of Language Acquisition. (F,SP) Formerly 222C. One 3-hour seminar per week. Examination of social and cultural influences of language use and learning in contemporary society. Seminar discussions will focus on research and theories, relating language acquisition to the development of oral, written, and informational modes of social structure and change on language use and learning. Prerequisites: PHIL 285A. (S) Simulation and Technology

245B. Language Study for Educators. (3) One 3-hour lecture/discussion per week. This course will introduce instruction in early grades, give an overview of theory, and explore the implications of such study on teaching and learning. Among course topics are: the nature of language, the meanings of "grammar," the varieties of English, the development of the language in the preschool and school years. This course will be required for all Ed.D. students and recommended as an introductory course to all students who have had no formal course work in linguistics. (F) Dyson

247. Research on Technology and Literacy. (3) Course may be repeated for credit with consent of instructor. Two hours of lecture plus three hours of lab per week. Prerequisites: Consent of instructor. This course focuses on research and development of instruction in literacy. Students will use and evaluate instructional software, testing these programs against contemporary literacy theory and practice. Students will have the opportunity to design new software for literacy instruction and the development of the language arts classroom, particularly programs that speak to the needs of students from multiple cultural backgrounds. (F) Hull

248. Foundations in Reading in Grades K-8. (2) Two hours of lecture per week. Prerequisites: Admission to Developmental Teacher Education Program. Focus on research on the development of language and the language arts classroom, with particular emphasis on the uses of the computer and allied information technologies in literacy instruction. Students will use electronic text and software to develop strategies for teaching literacy to students with disabilities. (F) Hansen

249. Foundations for Teaching in Elementary School. (3-5; 3-6) One 3-hour seminar per week. Prerequisites: Admission to Developmental Teacher Education Program or consent of instructor. Focus on literacy instruction, methods for teaching language arts and science in elementary schools. (F,SP) Ruth

250A-250B. Seminar on Reading Disability. (3-5; 3-6) One 3-hour seminar per week. For an additional eight hours of field work per week, an additional 2 units of credit will be awarded. 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, during which students will diagnose and treat children with reading problems. (F) Simons

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) Simons

252. Research in Writing. (3) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Consent of 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

253A. Psycholinguistics and Discourse Analysis. (3) Formerly 253. 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 conversional pragmatics, speech-act theory, given-new contract, schematic theory and background knowledge, readability and comprehensibility, narrative structure and cohesion and text structure analysis. (SP) Hull

253B. Language-Interaction Analysis in Educational Settings. (3) Formerly ELL 253. One 3-hour lecture/discussion per week. Prerequisites: A course on language in Education, Anthropology, or Psychology, or consent of instructor. An introduction to the range of techniques currently in use for the collection, coding, and analysis of research materials on language interaction. Focus will be on interviewing and observational methods, as well as the collection of spoken language, and on the analysis of coding systems and conventions. The purpose of this course is to explore and apply various microanalytic approaches to the study of face to face interaction for educational settings and the study of children. (SP) Hull

254A. Research in Second Language Acquisition. (3) Publically funded. Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Linguistics, Language Acquisition, or ESL background; or consent of instructor. Theory and research on second languages acquisition by children and adolescents. Focus on cognitive and social variables of the learning process and on the sources of individual differences. Examination of educational programs encountered by second language learners. (F) Dyson

254B. Communication in School-Age Children. (3) One 3-hour seminar per week. Focus at development of language skills from preschool through adolescence in peer groups, family, and school. How peer interaction provides a counter-cultural force for the child in adolescence for situation where social and minority group status make school success problematic. (F) Dyson

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 children. The 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 ethnographic framework. (F) Dyson

256A. Research on Early Literacy Development. (3) New course. One 3-hour lecture/discussion per week. Prerequisites: 254B, 244B, or 242; or consent of instructor. This course is designed for advanced graduate students interested in the developmental and the historical; development of literacy which in particular attention is given to early writing. Emphasis will be given both to children's early experiences in the home and to their initial school experiences. (SP) Dyson

256B. Qualitative Research in Language/Literacy Education. (3) Formerly ELL 256. One 3-hour lecture per week. Prerequisites: 244B or 245B; or consent of instructor. This course focuses on students' and teachers' language use of language from interrelated perspectives: particular developmental, sociocultural, and ethographic. It is designed to provide students with a view of the classroom as a unique setting whose aims are fostered or hindered by the nature of language use. Study of children's use of language, including the role of self-regulated learning in order to acquire an understanding of the goals and nature of qualitative, observational study of language use in classrooms, including both oral and written language use. (SP) Dyson

258A-258B. Foundations for Reading in Grades K-8. (3-5; 3-6) One 3-hour lecture per week. Prerequisites: 244B or 245B; or consent of instructor. This course focuses on students' and teachers' language use of language from interrelated perspectives: particular developmental, sociocultural, and ethographic. It is designed to provide students with a view of the classroom as a unique setting whose aims are fostered or hindered by the nature of language use. Study of children's use of language, including the role of self-regulated learning in order to acquire an understanding of the goals and nature of qualitative, observational study of language use in classrooms, including both oral and written language use. (SP) Dyson

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, informational 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 three hours of seminar per week. Additional units earned by completing four hours of independent research per week per unit. Prerequisites: Consent of instructor. Recommended for students working on seminar papers, qualifying papers, thesis, and dissertation proposals in language studies. Section 1: Recommended for Ed.D. students and M.A. students working on curriculum projects. Section 2: Recommended for Ed.D. students and M.A. students working on research studies. (F,SP) Staff

298. Group Study for Graduate Students. (1-3) 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. Staff

Professional Courses

340A-340B. Foundations for Secondary School English. (2-2) Credit and grade to be awarded upon completion of the sequence. Two hours of lecture per week. Prerequisites: Admission to English Credential 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) Lane

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. Supervised teaching begins fall. Twenty-four to twenty-eight hours of supervised teaching in public school classroom and one hour of lecture per week. (F,SP) Lane

390C. Supervised Teaching. (1-8) 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 classrooms and school districts. (F,SP) McCaulum

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-oriented organizations. Introduction to Advanced teaching to persons considering it as a professional career. Selected topics in science, mathematics, and computing provide the central but not exclusive context for instruction. (SP) Miller

122B. Production of Mediated Programs. (3) Formerly 222B. Two hours of lecture and three hours of laboratory per week. This course will provide directed access to the experience and techniques of producing mediated programs, a developing appreciation for the work of production and program producers for producing and assessing an instructional/informational program. Guidelines for grades include attendance, collaborative workways, the development and display
of technical competence and conceptual care and forethought. (F) Stehr

123. Word Processing for Scientific Writing. (1) Formerly EDUCMST 191A. Must be taken on a passed/not passed basis. Self-paced with tutor including periodic group meetings. The course is a conceptual overview of scientific paper writing using word processing, teaching students to 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) Woodson

Graduate Courses

220. Artificial Intelligence for Cognitive Scientists. (New course) Two hours of lecture and three hours of lab per week. The goal of this course is to provide students with the ability to use computer programming skills in artificial intelligence (AI) relevant to modeling human cognition. The course is specifically aimed at students in artificial intelligence. (SP) Piroli

221B. Curriculum Development and Instruction in Science. (3) Three hours of lecture and one hour of discussion per week. This course provides an historical review of science curriculum development, examining instructional programs in the United States, including the development of social studies, cultural, historical, and international perspectives, and courses in the development of educational software; and application of design principles in writing computer-based instructional materials. (SP) Staff

222B. Programming and Problem Solving. (3) Three 1-hour lectures per week. This course will analyze how experts and novices solve programming problems, examining production and control aspects of programming and relating these investigations to recent research on learning and instruction. Using these insights current programming instruction will be examined. Other topics include: program environments such as MacPascal instruction, programming text books, and student behavior when solving programming problems. (SP) Staff

222B. Design of Computer-Based Instruction. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Consent of instructor. This study of the design of computer-based instruction and psychological literature related to the design of effective computer-based instruction; development of students' abilities to critically review educational software; and application of design principles in writing computer-based instructional materials. (SP) Staff

223A. Advanced Topics in Math, Science, and Technology Education. (Formerly EDUCMST 223) Course may be repeated for credit. Three hours of lecture and one hour of discussion per week. Prerequisites: 220A or 220A or consent of instructor. Problem solving, ethnography, etc. Subject matter changes from offering to offering. (SP) Staff

223B. Special Problems in Math, Science, and Technology Education. (1-2) Formerly EDUCMST 224. Course may be repeated for credit. Must be taken on a pass/no credit basis. In addition to the 3-hour lecture per week; an additional unit may be earned for an extra hour of discussion. Prerequisites: 220A or consent of instructor. Study of special problems and issues in these educational areas. Examples include issues of science and math for the learning of math anxiety, learning in mathematics, and advances in the learning of mathematics, and advances in the learning of mathematics. (SP) Staff

224A. Mathematical Thinking and Problem Solving. (3) One 3-hour lecture per week. This course explores contemporary research on mathematical cognition. The course is centered on the cognitive processing of the mind, learning, and problem solving. We discuss various frameworks for characterizing mathematical behavior and various methodologies for examining them. As an "action-oriented" course in the current curricular sequence, this course includes a major course project. In their project students engage in research incorporating the main ideas studied in the course. (F) Schoenfeld

224B. How People Learn Computer Science. (4) Two 2-hour lectures per week. In this course an attempt will be made to develop, test and refine theories of learning computer science. Major topics are presented in terms of experimental methods. Theories and experiments will initially be designed by the instructor; by mid-semester, the class will collectively generate theories and hypotheses of interest, 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. (F) Pirolli

225A. Introduction to Intelligent Computer Assisted Instruction. (2) One 2-hour lecture per week. An introduction to intelligent computer-assisted instruction environments augmented with an intelligent program that acts as a tutor, coach, or consultant. (SP) Pirolli

225B. Programming Intelligent Computer-Assisted Instruction. (4) Prerequisites: Concurrent enrollment in EMST 225A or consent of instructor. One 2-hour lecture and six hours of laboratory 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. (SP) Pirolli

225C. Cognitive Approaches to Computer System Design. (2) One 2-hour lecture per week. This course, based largely on readings and critical analysis, will survey and analyze some of the mental processes involved in understanding computer systems. Students will gain skills in analyzing computer systems, activity structures involving multiple operation modes and programming) as well as cognitive constructs being developed to understand human performance. Requirements include three analytical papers. (SP) Pirolli

225D. Computer System Design Project Laboratory. (1) One 3-hour laboratory per week. Prerequisites: Consent of instructor. The systems design project laboratory is an ancillary offering intended to put the ideas from EMST 225A and 225C into practice. The principal requirement will be a substantial software implementation and write-up. With instructor's consent, the project laboratory may be repeated for credit (SP) Pirolli

226. Constructive Epistemology. (3) Three hours of lecture per week. Major topics are metacognition, metacognition, executive control, and self-regulation in problem solving; belief systems and naive epistemology; inquiry from the following perspectives: philosophy, psychology, and mathematics. The major focus of the course will be the 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. (F) diSessa

227. Metacognition. (3) One 3-hour lecture per week. Major approaches to metacognition (metamemory, executive control, and self-regulation in problem solving; belief systems and naive epistemology; inquiry) and applications of metacognition to psychology and education. (SP) diSessa

228. Qualitative Methodology. (3) New course. Three hours of lecture/discussion per week. The course will be organized by activities: group readings, book reports, and presentations. This seminar analyzes selected research on the development of mathematics in children and adolescents and relates it to research on instruction and assessment. The seminar will include basic computation, word problems, algebra, and proportional reasoning. Through critical analysis of the readings and directed research projects this course will attempt to reconcile the current disjunctions between cognitive research and educational practice. (SP) Staff

229. Children's Problem Solving. (3) New course. Three hours of lecture/discussion per week. This seminar examines the nature and development of children's problem-solving from an information-processing perspective. It focuses on the procedures by which children formulate and solve problems, and how these procedures change across age and task-experience. The seminar analyzes these issues across a range of domains: mathematics, art, and science. (SP) Lowery

230A-230B. Instruction in Elementary Schools: Mathematics and Science. (3) Credit and grade to be awarded upon completion of the sequence. Must be taken on a satisfactory/unsatisfactory basis. Three hours of lecture and seminar plus two hours of fieldwork 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 include areas of mathematics and science for the multiple subject credential. (F,SP)
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 on methods of teaching for the single subject credential. Subject areas include educational psychology, instructional strategies, learning processes, and secondary school mathematics, science and technology. (F,SP) Staff

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,SP) Staff

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 elementary schools. (F,SP) Staff

291A. Exploring Mathematics with Computers: Turtle Geometry. (3) Formerly 220A. One 2-hour lecture and one 3-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 making it all happen effectively. Mathematical topics include elementary theory of planar paths, geometry on curved surfaces and Einstein's theory of special relativity. Some elementary programming recommended. (F,SP) Staff

291B. Cognitive Consequences of Computers in Classrooms. (3) One 2-hour seminar plus three hours of laboratory in the public schools. Prerequisites: Graduate status. To explore the cognitive consequences of computers in instruction and learning, the premise of computers in education will be examined and exemplary instructional software will be developed. A model of knowledge acquisition and knowledge change incorporating computer delivery of instruction will be developed. (F,SP) Staff

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 criteria for useful educational research. Emphasis is on 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. (1-6) Course may be repeated once for credit. One 2-hour seminar for six hours per week plus three to ten hours of laboratory per week. Internship on an educational research or development project on the campus or at a nearby cooperating institution such as the Exploratorium, Oakland Museum, etc. Two hour meeting bi-weekly to discuss the students' experiences. (F,SP) Staff

298. 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. Advanced group study in education. Topics vary from semester to semester. May consist of organized lectures or seminar discussions, related chiefly to one or more research area in which the group is working. (F,SP) Staff

Professional Courses

390A-390B. Supervised Teaching. (7.8) Credit and grade to be awarded upon completion of the sequence. One to three hours of lecture and 5-20 hours of field work per week. Prerequisites: Admission to a credential program. Field work for teaching credential. The sequence in supervised teaching may begin with the opening of the public schools in the fall and continue through the spring semester. (F,SP) Staff

Lower Educational Psychology

Upper Division Courses

100. 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) Cunningham

101. Learning and Memory Development in Education. New course. Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: Psych 1 and 5, or consent of instructor. Alternative theoretical perspectives and research on the character and sources of learning and memory development, including the uses that have been or might be made of these perspectives in analyzing and revising instructional programs in schools and colleges, and the uses that students might make of these perspectives to enhance their own intellectual development and academic achievement. (SP) Rohrer

112. The Exceptional Child. (2) One 2-hour lecture per week. Introduction to the social, psychological, and educational problems of exceptional persons. Included are persons with mental, emotional, sensory, motor, multiple handicaps, and the gifted. Must be taken concurrently with Education 111L. (F,SP) Staff

112L. The Exceptional Child Laboratory. (1-5) Course may be repeated twice for credit. Three to fifteen hours of field work per week. Conferences, observations, and supervised field experiences with a variety of exceptional children. (F,SP) Staff

114A-114B. Early Childhood Education: Policies, Practices, Theories. (4.4) One 2-hour seminar plus eight hours of field laboratory per week. Prerequisites: Consent of instructor. Course integrates child development theories with educational practices and field observations. The topics covered include models of child development; discipline and problem solving, cross-cultural and historical comparison, issues in current child care policy. Two hours of class per week and eight hours of field experiences each setting. The course involves readings, a final paper and systematic discussion of the field work requirements in the light of the theories being reviewed in class. (F,SP) Staff

200A. Cognitive Development. (3) One 3-hour session per week. A graduate level introduction to the development of thinking from early childhood through adolescence, with primary emphasis on Piagetian and neo-Piagetian theory and research. (F) Ammon, diSessa

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. (F) Turkel

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. (F) Rohrer

200D. Theories of Intelligence. (3) Two 1-hour lectures per week. Prerequisites: One course in intelligence. 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) Jensen

205E. Neuropsychology of Reading. (3) One 3-hour session per week. Prerequisites: Consent of instructor. Review and discussion of current research in neuropsychology related to information processing and reading. Includes discussion of processes in normally functioning individuals and information processing problems in adults. Topics may be specialized at a given offering of the course; e.g., eye movements, aphasia, etc. (F) Staff

201A. Psychology of Reading. (3) One 3-hour lecture per week. Topics covered include prerequisites to reading acquisition, word recognition and decoding skills, models of reading, comprehension, the literacy problems of minority students, and reading disability. (SP) Simons

202A. Seminars in Intellectual Development. (2) One 1-hour lecture and one 2-hour laboratory 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) Intellectual Development (4) Language (SP) Staff

202A. Motivation and Self Perceptions in Human Learning. (3) Two 1½-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. (F,SP) Staff

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 perspectives. Concept of play and games applied to analysis of new and classic games. Participants create new games for field testing. (F,SP) Staff

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 mental problems. With special emphasis on family, peer, and emotional roles—roles of family, peer play, and school experiences in promotion of mental health. (F,SP) Staff

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, in the areas denoted by the titles of the following sections:

(1) Social Development (2) Motivation (3) Personality Development

203A. Individual Differences: Behavioral Genetic Analysis of Human Abilities. (3) Two 1½-hour lectures per week. Prerequisites: Two courses in statistics, including correlation and analysis of variance. A consideration of the application of quantitative genetic methods to the study of human variability in educationally relevant abilities. Emphasis on cognitive abilities. The course examines the methodology of twin studies, adoption studies, mating systems, heritability estimation, and analysis of the interaction roles of genetic and environmental factors in determining the traits. (SP) Jensen

204A. Logic of Theoretical Inquiry. (3) One 2-hour seminar per week. Prerequisites: Consent of instructor. A review and discussion of theoretical positions concerning methodological issues, problems of scientific inference, measurement, and interpretation. A reasonable knowledge of statistics is helpful, although the course is not concerned with statistical calculations as such. (F,SP) Staff

204B. Critical Analysis of Empirical Inquiry. (2) Two 1½-hour sessions per week. Prerequisites: 204A-204B or consent of instructor. Critical review and detailed discussion of current research. Emphasis is not on content but on method, logic, and appropriateness of inference as represented in the research examined. (F,SP) Staff

204C. Research Seminars: Inquiry in Educational Research. (3) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: Consent of instructor. The doctoral program in educational psychology requires that students complete extensive projects documenting and identifying research. As they engage in these projects, students will enroll (ordinarily during alternate years) in appropriate sections of this seminar. At each meeting, participants will present their own projects, and analyze those presented by others. (SP) Staff

205. Instruction and Development. (3) One 3-hour lecture per week. Prerequisites: Consent of instructor. An examination of cognitive developmental 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, and classroom management.

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 school settings. In particular, examination of measurement, cognitive abilities, adaptive behavior and other tests commonly confronted by teachers and pupil personnel workers. (F) Staff

207B. Individual Appraisal of Intelligence. (4) One 3-hour lecture and six hours of field work per week. Prerequisites: Consent of instructor. Theorizing about intelligence as applied to the assessment of intelligence. Measurement concepts applied to intelligence tests, development, administration, and interpretation of the WISC-R, Stanford-Binet, and other instruments pertaining to intelligence testing. Current controversial issues in testing, including issues pertaining to test bias and legal aspects of testing. (F) Duncan

207C. Diagnosis of Human Handicaps. (4) One 3-hour lecture and six hours of field work per week. Prerequisites: Consent of instructor. Review current literature for eligibility programs for the handicapped and evaluates available procedures for making diagnostic decisions. Special topics may include diagnosis of learning disorders, emotional and behavioral disorders, and emotional and behavioral disorders. (SP) Goodman

207D. Assessment and Education of Exceptional Pupils in Regular Classes. (2) One 1-hour lecture and one hour of discussion per week. Methods for the assessment of handicapped children and implementation of their education in regular classes. Such topics as nondiscriminating testing, least restrictive environments, alternative programs, parent communication, interpersonal relationships, characteristics, behavior of exceptional pupils are covered in studies of individual exceptional children in regular classes. (F.SP) Staff

208A. 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 and development of tests. (F,SP)

208B. Educational Measurement II. (4) Two 2-hour lectures per week. Prerequisites: 208A or sufficient background to follow the mathematical development. An introduction to classical test theory and item response theory from a theoretical viewpoint. Application of these theories to measurement situations currently studied. Topics such as test bias, computerized and polytomous response modes will be discussed. (F,SP)

208C. Psychological Scaling. (4) Three 1½-hour lectures per week. An introduction to the measurement of psychological value. Emphasis will be placed on psychophysical judgment. Topics will include Weber's Law, Fechner's Law, Thurstone scaling, signal detection theory, debates on the use of category ratings versus magnitude estimation, the ratio–difference controversy, cross-modality matching of contextual effects, etc. 208C and Psych 208C will be offered in alternate years. (F)

208D. Factor Analysis in Educational Psychology. (4) Three 1½-hour lectures per week. Introduction to factor–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. 208D and Psychology 208D will be offered in alternate years. (F) Wilson

208E. Test Construction. (4) Three 1½-hour lectures per week. Prerequisites: 208B or Psychology 208B. Construction of tests 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 the fall of alternate years. (SP)

208F. Proseminar in Educational Measurement. (1) Course may be repeated for credit. One hour of seminar per week. Prerequisites: Consent of instructor. Current research and publications on educational measurement by faculty, students, and others is examined and critiqued. (F.SP)

209A. Data Analysis in Educational Research and Program Evaluation I. (4) Two 2-hour lectures per week. Methodological topics; descriptive statistics, hypothesis testing, explained variance, nonparametric procedures, contingency table analysis. (F) Marasco

209B. Data Analysis in Educational Research and Program Evaluation II. (4) Two 2-hour lectures per week. Prerequisites: 209A. Analysis of variance, correlation, simple and multiple regression, planned and post hoc comparisons. (SP) Marasco

209L. Educational Data Analysis Laboratory. (1) Course may be repeated for credit. One 3-hour lecture and one hour of field work per week. Supervised assignment of 10-15 hours per week. (F.SP)

210A. Nonparametric Procedures. (4) Two 2-hour lectures per week. Prerequisites: 209A-209B. Nonparametric correlation and association, contingency tables, log linear models, planned and post hoc comparisons. (SP) Staff

210B. Multivariate Procedures. (4) Two 2-hour lectures per week. Prerequisites: 209A-209B Simple, multiple and canonical correlation and regression, discriminant analysis and multivariate analysis of variance–principal components; contingency tables; planned and post hoc comparisons. (F.SP)

210F. Proseminar in Educational Data Analysis. (4) Course may be repeated for credit. Two hours of laboratory per week. Prerequisites: Consent of instructor. Current research and publications on educational data analysis, interpretation by faculty, students, and others is examined and critiqued. (F,SP)

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. Exercises and computer problems are presented and discussed. Outside assignments of 10-15 hours per week. (F.SP)

211A-211B. Human Development and Education. (3) Three 1-hour lecture/discussion per week. Prerequisites: Admission to Developmental Teacher Education Program or consent of instructor. Introduction to theories 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, Lambert, Titul

211C-211D. Advanced Human Development and Education. (3) Three 1-hour lecture/discussion per week. Prerequisites: Admission to Developmental Teacher Education Program or consent of instructor. Advanced principles of human development and their application to teaching and learning school subjects. (F.SP) Ammon, Black, Lowery

211L. Laboratory for Human Development and Education. (1) Three 1-hour lecture/discussion sessions per week. Prerequisites: Admission to Developmental Teacher Education Program or consent of instructor. Application of developmental principles to field experiences. Must be taken concurrently with 211A, 211B, 211C, and 211D. (F,SP) Black

212A. Advanced Topics on Exceptional Children. (4) Three 1-hour lecture and one hour of field work per week. Prerequisites: Consent of instructor. Topics will include problems of mildly handicapped children and social psychological perspectives on the education of exceptional children.

*Not offered 1989-90
*On leave, spring, fall
*On leave, fall

212B. Seminar on the Re-Education of Severely Emotionally Disturbed Children. (3) Course may be repeated for credit. One 3-hour seminar and one hour of field work per week. Prerequisites: Consent of instructor. Behavior management; remedial techniques in school subjects; working with parents and teachers in schools; utilization of community resources and agencies. Use of group processes with disturbed children; social and educational competence and the ecosystem, establishing comp/work settings for learning. (F)

212C. Advanced Seminar on the Re-Education of Emotionally Disturbed Children. (3) Course may be repeated for credit. One 3-hour seminar and one 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.

213A. Conceptual Bases for School Psychology. (3) One 3-hour lecture and six hours of field work per week. Historical and contemporary overview of the professional specialty of school psychology. (F) Duncan

213B. Theoretical and Scientific Bases for School Psychology. (3) One 3-hour lecture per week. Examines the empirical evidence for developmental and learning models in relation to the school curriculum and school organization from elementary through high school. (SP) Goodman

213C. School-Based Consultation. (3) One 3-hour lecture per week. Theories of consultation, consultation methods, and research on consultation applicable to primary and secondary prevention of school failure and school psychology practice.

213D. Educational Interventions for the School Psychologist. (3) One 3-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.

213L. Laboratory for School Psychology. (1) One 2-hour discussion and six hours of field work per week. Laboratory section to evaluate field work records and for supervision of school assignment. Must be taken concurrently with 213A-213B-213C-213D. (F.SP) Staff

294. Thesis Seminar. (1-4) Course may be repeated for credit. Three hours of discussion per unit per week plus independent research. Prerequisites: Consent of instructor. Recommended for degree students working on seminar papers, theses or dissertation proposals. Topic to include the adoption of a thesis topic, research design, statistical analysis. (F,SP)

298. Group Study and Research. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One to six hours per semester. Group study and research on special problems and topics. (F.SP)

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: Admission to a teaching credential program. Units and hours vary with individual credential programs and sites. (F,SP) Staff

411L. Inservice Practicum and Consultation in Development and Teaching. (1) Course may be repeated for credit up to a maximum of four units. Biweekly 1-hour lecture/discussion sections plus 23 hours of field work and consultation per semester. Prerequisites: Admission to an inservice program. One 1-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-B-C-D) to teaching practices. (F,SP)

413A-413B. Community-Based Internship in School Psychology. (1) One 3-hour lecture per week on a satisfactory/unsatisfactory basis. Two hours of lecture/discussion and one day field work per week. Supervised assignment
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 for IDS 110L with the same grading option as in IDS 110L and an equivalent departmental course. Primarily for students in the social sciences and humanities and in the professional schools other 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 spreadsheet, graphics and simulation, and telecommunication. Sponsoring departments: Engineering, Education, and Computer Science. (FSP) Staff

IDS 110L. Introductory Computer Laboratory. (1) Two 2-hour laboratories per week. Prerequisites: Upper-division standing. Students must also be enrolled for IDS 110L with the same grading option as in IDS 110L. 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 spreadsheet, graphics and simulation, and telecommunication. (FSP) Staff

IDS 121A-121B. Environmental Education. (3-3) 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 for 121B; consent of instructor. Theory and practice of translating ecological knowledge, environmental issues and values into educational forms for all age levels and into roles of society, including schools. Concentrated experience in particular school environment. Sponsoring departments: Education and Conservation and Resource Studies. (FSP) Hurst

IDS 130. Seminar on Social, Political and Ethical Issues in Health and Medicine. (2) Must be taken on a passed/not passed basis. One 1-hour lecture and one 1-hour 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 issues raised by the speakers. An optional SAHS 197G field study will place some students with health professionals in the community. Sponsoring departments: Social and Administrative Health Sciences, Education, and Zoology. (FSP)

IDS 134. Number Systems: Mathematical and Cognitive Foundations. (4) Students who have taken Math 15 will receive only 3 units for IDS 135. Three hours of lecture per week. Prerequisites: Math 1A or equivalent, or consent of instructor. Deductive developments (some axiomatic and other defined) of systems of natural, rational, and real numbers, compared with cognitive developments of these subjects. Detailed examination of mathematical induction, recursive definitions, and representations of numbers and arithmetical procedures in computational and cognitive systems. Especially recommended for prospective mathematics teachers (at precollege or college level). Sponsoring departments: Mathematics and Education. (SP)

IDS 191. Public Health and Nuclear War. (2) Formerly PH 291. 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 the technical, diplomatic, and political issues of preparing for nuclear war and preventive measures will be explored and tested. Sponsoring departments: Public Health, Peace and Conflict Studies. (SP) Winklheirn, Wurtz, Leonard

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 in neuropsychology. Discussion of problems 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) Hardyc

Related Courses in Other Departments


Public Policy 283. Organizational Drive and Cutback Management. (4) See listing under Public Policy for complete course description.

Program in Public and Nonprofit Management

IDS 205. 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. Strategic Management in the Public Sector. (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 Public and Nonprofit Management section of this catalog.
With rapid growth in technology, electrical engineering now encompasses solid-state devices, integrated circuits, microwave electronics, quantum and optical electronics, biotechnology, radiation and protection, computer systems, control systems, communications and information theory, circuit theory, large-scale networks and systems, ecological systems and pattern recognition.

Programs in computer science are offered by the department through its Computer Science Division. Undergraduate courses in computer science may do so either through the College of Engineering or the College of Letters and Science.

Computer science programs include such topics as analysis of algorithms, artificial intelligence, complexity theory, computer architecture and machine organization, computer graphics, data base management systems, formal languages and automata, information theory, numerical analysis, parallel and pipeline computers, performance analysis, programming languages and computers, operating systems, and symbolic algebraic manipulation.

Beyond satisfaction of the minimum requirements for the B.S. degree in EECS, students follow one of three basic paths in completing their major program. They may select the General Electrical Engineering and Computer Sciences Program in which they will receive an introduction to a large number of the areas outlined above. If they have particular interest in one of these areas, they may select particular areas within these paths. In the upper division computer science program, students may plan their individual program to suit their special needs or background.

Students should take part of the elective units in engineering, physical or life sciences, mathematics and statistics in order to strengthen and broaden their background and to satisfy some of the requirements in these areas. The upper division program balances a selection of courses in electric circuits, electronics, systems analysis, electromagnetic fields, communication and control theory, computer systems and programming, dynamic systems, thermodynamics, and modern physics. Details about the curriculum can be found in the Announcement of the College of Engineering to satisfy requirement 1(a) of 45 units in the College of Letters and Science courses, including:

- (a) 45 units in the College of Engineering, including 30 upper division units. These units must include 30 units officially designated as engineering science and 15 designated as design engineering. Students who have completed form 45 semester units by June 1988 must include at least one course chosen from the department's current list of courses that satisfy the engineering design requirement. Please refer to the list included in the department's Undergraduate Handbook.

For students in the Bachelor of Engineering degree, the requirement is the same, except that Molecular and Cell Biology 1A (formerly Biology 1A) may be substituted for one of the five courses listed above.

In the College of Environmental Engineering, students may be expected to include 16 units of upper division computer science coursework in their programs. This requirement takes effect in spring 1989.

2. 16 units of physical or life sciences, including Chemistry 1A and Physics 7A-7B-7C.

3. 16 units of mathematics or statistics from the current list of acceptable courses, including Mathematics 1A-1B, or 8 units of Mathematics 15.

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 43 units.

5. Bioelectronics is for students with an interest in biology or medicine as well as electrical engineering.

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 and 15 designated as design engineering. Students who have completed form 45 semester units by June 1988 must include at least one course chosen from the department's current list of courses that satisfy the engineering design requirement. Please refer to the list included in the department's Undergraduate Handbook.

(b) EECS 40 or EECS 401 or EECS 411; E45; and CS 60A, 60B.

2. 20 upper division units in EECS, not including EECS 100.

3. Three upper division laboratory courses in EECS.

4. Five units of engineering not in EECS or CS. Among IDS courses, only 124, 131, and 180 satisfy this requirement.

5. Computer engineering may be applied to this requirement, but they will not count toward the 45 or 45-15 units.

6. Students in the Bioelectronics Program, the requirement is the same, except that Molecular and Cell Biology 1A (formerly Biology 1A) may be substituted for one of the five courses listed above.

7. Computer courses in approved departmental computer science programs.

8. The requirement takes effect in spring 1989.

9. 16 units of physical or life sciences, including Chemistry 1A and Physics 7A-7B-7C.

10. 16 units of mathematics or statistics from the current list of acceptable courses, including Mathematics 1A-1B, or 8 units of Mathematics 15.

11. 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 43 units.

12. Students in the Bioinformatics and Computer Science programs.

13. Note: None of the 77 units in requirements 1, 2, and 3 may be taken on a passed/not passed basis except CS 9C, CS 9D, or 1(d) laboratory courses, in which case these courses cannot be used to satisfy requirement 1(a) of 45 units in the College of Engineering. Details of the undergraduate degree program and its options are available in the An-
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 a single sequence of courses is required, students are free to design programs to suit their particular needs and interests, in consultation with a faculty adviser in their major field of study.

Graduate degree programs are available as preparation for research and teaching (Master of Science and Doctor of Philosophy), and for careers in design, development, and management (Master of Engineering and Doctor of Engineering). The Master of Science program requires about one year of 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 in a technical subject outside the major and a second minor in a nontechnical subject such as law, business administration, etc. 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 with either a B.S. or an M.S. who intend to apply for the M.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 programs and procedures, see the Electrical Engineering and Computer Sciences Graduate Information booklet, available in 299 Cory Hall.

Computer Science Service Courses
The courses IDS 110, IDS 110L, E 7, E 7S, CS 6, CS 8, CS 8S, CS 9A-B8-BC-SD, and CS 91A are the current set of "computing service" courses. Introductory computing courses taught in other departments may be treated as computing service courses at some point in the future. The following restrictions to course selection on graduation apply to the current set of service courses:

Students get full credit toward graduation for the first of the computing service courses successfully completed and 1 unit toward graduation for any subsequent nonequivalent service course.

"Equivalent" courses are the following: E7 (formerly CS 7) is equivalent to 3 units of E 7S (formerly CS 7S); and CS 8 is equivalent to 4 units of CS 8S.

Students get 1 unit toward graduation for any computing service course taken after CS 60A.

Students may gain at most 5 units toward graduation for computing service courses.

Electrical Engineering

Upper Division Courses

100. Electronic Techniques for Engineering. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisites: Mathematics 5B and Physics 7B. Design of passive circuits, operational amplifiers, digital building blocks, digital systems, microprocessor control, power systems, and machines. This course is not for students majoring in Electrical Engineering. (SP) Stosh

104. Linear and Nonlinear Circuits. (5) Four hours of lecture and two hours of discussion per week. Prerequisites: 40 or 42 (may be taken concurrently). Analysis of passive circuits, sinusoidal steady-state response, transient response, operational amplifiers, digital building blocks, digital systems, microprocessor control, power systems, and machines. (F,SP) Schwartz

110. Electronic Circuit Interconnection. (2) Two 1-hour lectures per week. Prerequisites: 104, 140, 117A, and 150. A study of the problems associated with interconnecting electronic circuits, e.g., noise pickup in low level circuits, degradation of high speed signals in cables, printed circuit wiring, connectors, power distribution, and associated packaging and cooling considerations. (SP) Graham

112. Electrical Transformers and Machines. (4) Three hours of lecture and three 1-hour laboratories per week. Prerequisites: 40. Study of magnetic circuits, transformers, and electromagnetic energy conversion devices—including DC and AC motors and generators. (F) Hopkins

113. Power Electronics. (3) Three hours of lecture per week. Prerequisites: 104. Power semiconductor devices including bipolar, MOS, GTR, Thyristor, and thyristor converter circuits and techniques. Application to motor control, switching power supplies, and power systems. (SP) Lee

114. Power Systems Analysis. (3) Three hours of lecture per week. Prerequisites: 104. Introduction to electric power systems with emphasis on the transmission network. Load flow analysis and control, Economic operation, Introduction to stability analysis, synchronous machine modeling, and the control problem. Short circuit analysis. (F) Bergen


117A. Electromagnetic Fields and Waves I. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 104 (may be taken concurrently). Review of electromagnetic and magnetic fields and applications; Maxwell's equations; transmission line concepts and reflection of plane waves; introduction to guided waves. (F,SP) Van Duzer

117B. Electromagnetic Fields and Waves II. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 117A. General methods of solving field problems; microwave and optical waves; resonant systems; electrodynamics of materials; radiation and diffraction. (F,SP) Lichtenberg

118. Microwave and Optical Communication Systems. (2) Two hours of lecture per week. Prerequisites: 117B. Advanced operational amplifiers and microwave and optical communications and information processing systems with emphasis on bandwidth, dispersion, noise, sensitivity and tradeoffs among them. Studies of major components such as transmission lines, modulators, propagation paths, detectors, correlators, and Fourier-transforming devices. (F) Neureuther

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-transform; sampling theory. Solution of differential and difference equations using transforms. Vector differential and difference equations, state-space method of analysis. Frequency response, Bode and Nyquist plots, stability analysis. (F,SP) Messerschmitt, Varaiya, Wong

121. Noise Analysis of Communications Systems. (3) Three hours of lecture and one 3-hour laboratory per week. Prerequisites: 104; Mathematics 50A. Basic principles of operation of microwave and digital communication 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 discussion per week. Prerequisites: 104 and Mathematics 50A. Network architectures. 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 performance analysis. Some hardware issues (e.g. VLSI controllers, fiber optics). (F) Wainart

123. Digital Signal Processing. (4) Three hours of lecture and one 1-hour lab per week. Prerequisites: 120. Discrete time signals and systems: Fourier and Z transforms, DFT, two-dimensional versions. Digital signal processing topics: flow graphs, realizations, FFT, chip-Z algorithms, Hilbert transform synthesis, exponential functions, windowing, frequency transforms, 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 Laboratory. (1) One four hour laboratory every other week. Prerequisites: 120 (may be taken concurrently). Measurement of frequency spectra. Periodic waves; aperiodic waves, AM, FM, and PCM; voice and noise waves. (F,SP) Thomassian
125. Introduction to Robotics. (4) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 120 or equivalent; consent of instructor. Study of the kinematics, dynamics and control of robot manipulators, robotic vision, sensing and the programming of robotics. The course will cover forward, inverse kinematics of serial chain manipulators. The manipulator Jacobian, manipulator dynamics and control, and force control. Trajectory generation, collision avoidance, automatic planning of fine and gross motion strategies-robot programming languages. Proximity, tactile and force sensing. (F,SP)

128. Feedback Control. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisites: 120. Analysis and synthesis of continuous and sampled-data linear feedback control systems. Time lag and sensitivity to non-inducing forcing functions. Linear systems. State-space techniques. The describing function and Popov's stability criterion. Optimal control. Computational methods for optimizing compensators for feedback systems. (F,SP)

130. Integrated-Circuit Devices. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisites: 40 and Physics 7C. Overview of basic semiconductor physical mechanisms. The electronics of metal-semiconductor contacts, pn junctions, bipolar transistors, MOS transistors, dynamic MOS field-effect transistors. Properties that are significant to device operation for integrated circuits. Silicon device and circuit technology. (F,SP)

131. Semiconductor Electronics. (3) Three hours of lecture per week plus several one hour mini-labs. Prerequisites: 117B or Physics 110A-110B. Advanced treatment of semiconductor devices. The physics of semiconductor materials. The band structure of semiconductors. (F,SP)

135. Microwave, Optics and Plasma Laboratory. (2) One hour of lecture and four hours laboratory per week. Prerequisites: 117A and Physics 7C. Fundamental experiments in the introduction to microwave, optics, plasma devices and measurements. (F,SP)

136. Introduction to Quantum and Optical Electronics. (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 coherent microwave and beams; modulation and detection; other applications. (F,SP)

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 stage and two stage transistor amplifiers.Emitter coupled pairs, source coupled pairs, temperature and antenna arrays used in transmission and reception of radio waves. Classical and numerical methods are emphasized. (F,SP)

145A. Sensors, Actuators and Electrodes. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 40 plus elementary calculus and physics. Introduction to transducers, detection and measurement of physical parameters, sensors, and actuators. Design of sensor and actuator systems in acoustics, optics, mechanics, fluid dynamics, thermodynamics, chemical dynamics, and electrodynamics. (F,SP)

145M. 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 thermal, temperature, force, displacement, sound, light, gas, chemical, and pressure. Covers principles of operation, construction, response, signal to noise. Use of circuits for analog signal processing and microcomputers for digital sampling and storage. (F,SP)

145S. Introductory Microcomputer Interfacing Laboratory. (2) Three hours laboratory and one hour of lecture per week. Prerequisites: 140 and either Computer Science 7 or equivalent basic programming course. Laboratory exercises constructing basic circuits and interfacing them to computer for filtering and periodic sampling of analog signals. Programming exercises (FORTRAN or C) to sample analog signals, and perform digital filtering, numerical analysis, real-time control, etc. (SP)

146. Dynamic Networks in Biology. (3) Three hours of lecture per week. Prerequisites: 40 or Mathematics 50B. Introduction to the application of engineering modeling and analysis methods to continuous and discrete deterministic and stochastic biological processes. Network formats used to deal with cellular, organismal, and population phenomena. (F) Keller, Lewis

147. Electrical and Radiation Safety. (2) Two hours of lecture per week. Prerequisites: 104. Occupational and environmental hazards associated with electrical devices, notably in clinical situations, and administrative and technical measures for minimizing dangers. (F) Susek

198. Directed Group Study for Advanced Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. To vary with section. Prerequisites: 2.0 GPA or better; 80 units completed. Group study of selected topics in electrical engineering, usually relating to new developments. (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 passed/not passed basis. Individual conferences. Prerequisites: Consent of instructor. On leave, spring

Graduate Courses

205. Electronic and Gasous Devices. (2) Two 1-hour lectures per week. Prerequisites: 117A. Theory and applications of vacuum and gaseous devices, including ionization chambers and devices of the micro-arc and microfiber type used for microbeam analysis. (SP)


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 used in transmission and reception of radio waves. Classical and numerical methods are emphasized. (SP) Meier, Neureuther

217. Microwave and Optical Distributed Networks. (3) Three 1-hour lectures per week. Prerequisites: 117A-117B. Relations between field theory and network theory; applications of network theorems and concepts to the analysis and design of microwave and optical waveguides, resonators, oscillators, lasers, fibers, signal processing, and finite devices. Overview of high frequency solid-state devices. (SP) Whinnery, Wu


221A. Linear System Theory. (4) Three 1-hour lectures and two 1-hour recitations per week. Prerequisites: 120; Mathematics 112 recommended. Basic system concepts; state-space and I/O representation. Properties of linear systems. Controllability, observability, minimality, state and output-feedback. Stability. Observers. Characteristic polynomial. Nyquist test. (F,SP)

221B. Multivariable Feedback Systems. (3) Three 1-hour lectures per week. Prerequisites: 221A or equivalent and one undergraduate control course. MIMO feedback systems. Matrix fraction description. Stabilization, tracking, disturbance rejection. Two degrees of freedom.
freedom design. Robustness. Large scale interconnected systems. Linear Quadratic Optimal Control. (SP) Desoer, Sasytry

222. Nonlinear Systems Analysis, Stability and Control. (3) Three hours of lecture per week. Prerequisites: 221A (may be taken concurrently). Basic graduate course in non-linear systems. Second Order systems. Numerical methods, the describing function method, linearization. Stability—direct and indirect methods of Lyapunov. Applications to the Lure problem—Popov, circle criterion. Input-Output stability. Additional topics include: bifurcations of dynamical systems, introduction to the geometric theory of control, chaos in discrete systems, passivity concepts and dissipative dynamical systems. (SP) Sasytry


225. Digital Signal Processing. (3) Three 1-hour lectures per week. Prerequisites: 119; Statistics 134A or equivalent. Fourier transform, discrete-time, optimization, digital filters, convolution, and interpolation. Detailed treatment of one application area, such as speech, sonar, or image processing. (F) Messerschmitt


227A. Optimization Techniques. (3) Three 1-hour lectures per week. Prerequisites: Advanced courses in either math or engineering, first and second order optimality conditions and their role in the construction of optimization algorithms. Algorithms for unconstrained and constrained nonlinear programming and optimal control problems. Dualization. Convexity. Elementary linear and quadratic programming. (F, SP) Polak, Sangiovanni, Varaiya

227B. Optimization in Engineering Design. (3) Three 1-hour lectures per week. Prerequisites: 227A. Formulation of engineering design problems as mathematical programming problems. Case studies from electronic circuit, control system, and structural design. Semi-infinite and statistical optimization algorithms for engineering design, optimal control algorithms. (SP) Polak

228. Communication Networks. (2) Two 1-hour lectures per week. Prerequisites: 122 and 226, or equivalent. Principles of design and analysis of communication networks. Circuit, packet, and hybrid switching approaches. Protocols, including setup, routing, flow control, error recovery. MM/M/1 and M/G1 queueing theory and its application to analysis of networks, including delay and blocking. (SP) Wandal, Varaiya

229. Information Theory and Coding. (3) Formerly 164. Three 1-hour lectures per week. Prerequisites: Advanced calculus and linear algebra, Statistics 20A or equivalent, ECECS 226 recommended. Fundamental bounds of Shannon theory and their application. Source and channel coding theorems. Galois field theory, algebraic error-correction codes. Private and public-key cryptographic systems. (F) Thomasian, Wandal


231. Solid-State Devices. (3) Three 1-hour lectures per week. Prerequisites: 130 or equivalent. Physical principles and operational characteristics of semiconductor devices. Mechanisms of carrier transport in solids and at interfaces. Effects of electric fields. Advanced discussion of bipolar and field-effect transistors with emphasis on the behavior dictated by present and probable future technologies. (SP) Muller

232A-232B. Quantum and Optical Electronics. (3,3) Three 1-hour lectures per week. Prerequisites: 117A, Physics 137A, or equivalent. The laser principle: analysis of specific laser systems such as gas lasers, semiconductor lasers, and other solid-state lasers. Laser dynamics; noise phenomena; nonlinearities; guided-wave optics; selected applications of coherent optics. (F) Schwarz, Wang, Whinnery

237. Quantum Electronics of Solids. (3) Three 1-hour lectures per week. Prerequisites: 117B, Physics 137A or equivalent. Optical properties of solids; electrodynamics and magneto-optic effects; nonlinear optical effects; guided-wave optics; semiconductor lasers; recent developments in integrated optics and fiber optics. (SP) Wang


239A. Partially Ionized Plasmas. (3) Three 1-hour lectures per week. Prerequisites: 117A or Physics 114A; ECECS 117A, 131; Physics 137A recommended. Introduction to collisional, cold and plasmas, including collisional processes, diffusion, sources, sheaths, boundaries, probes and other diagnostics. DC and RF discharges. Electron and ion beams. Analysis and simulation of partially ionized plasmas. (SP) Broida, Lieberman, Lichtenberg

239B. Fully Ionized Plasmas. (3) Three 1-hour lectures per week. Prerequisites: 117A or Physics 114A; ECECS 117A, 131; Physics 137A recommended. Introduction to collisional, cold and plasmas, including collisional processes, diffusion, sources, sheaths, boundaries, probes and other diagnostics. DC and RF discharges. Electron and ion beams. Analysis and simulation of fully ionized plasmas. (SP) Broida, Lieberman, Lichtenberg

240. Advanced Analog Integrated Circuits. (3) Three 1-hour lectures per week. Prerequisites: 140. Analysis and optimization of monolithic operational amplifiers and wideband amplifiers; methods of achieving wideband amplification; gain-bandwidth product; analysis of noise in integrated circuits and low noise design. Precision passive elements, analog switches, amplifiers and comparators, voltage reference in NMOS and CMOS circuits, Serial, successive-approximation, and parallel analog-to-digital converters. Switched-capacitor and CCD filters. Applications to codecs, modems. (SP) Gray

241. Advanced Digital Integrated Circuits. (3) Three 1-hour lectures per week. Prerequisites: 141. Analysis and design of MOS and bipolar large-scale integrated circuits at the circuit level. Fabrication processes, device characteristics, parasitic effects static and dynamic digital circuits for logic and memory functions. Calculation of output and input noise margins, transient analysis of digital systems and digital design tools. selected applications of digital systems. (F,SP) Hodges

242. Advanced IC Processing and Layout. (3) Three 1-hour lectures per week. Prerequisites: 143 and either 130 or 141. The key processes for the fabrication of integrated circuits. Optical, X-ray, and e-beam lithography, ion implantation, oxidation and diffusion. Thin film deposition. Wet and dry etching and ion milling. Effect of phase and defect equilibria on process control. (SP) Neureither

244. Computer Aided Design of Integrated Circuits. (3) Three hours of lecture per week. Prerequisites: 140 or 141. This course will give 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 the results to practical problems, including details of implementation. Topics to be covered include, simulation, layout techniques, synthesis, verification, testing, and integrated design systems. (F,SP) Murod

245. Biomedical instrumentation. (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 clinical significance: nuclear magnetic resonance, electron spin resonance, viscosity determinations, etc. Transducers, amplifiers, 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. Advanced application of linear and nonlinear systems techniques to the modeling and analysis of biological phenomena. (SP) Lewis

290A. System Theory. (2) Two 1-hour lectures per week. Recent developments in system theory and related areas. Lectures oriented toward advanced students. (F) Staff

290B. Advanced Topics in Adaptive and Nonlinear Control. (3) Three hours of lecture per week. Prerequisites: 222A; Math 104A-104B. Model Reference Adaptive Systems—continuous and discrete. Proofs of stability, sufficient excitation, parameter convergence, robustness issues. Study of the combination of geometric approach to nonlinear control—controllability, observability, minimality, invariant distributions, disturbance decoupling. Singular perturbations and bifurcations, control problems in robotics. (SP) Volterra-Seraijsa

290C. 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, nonlinear circuit analysis and design of analog and digital circuits and systems, converter circuits, control and computer systems and chaos. (F,U) Chua, Kuh

290D. Nonlinear Feedback Systems. (2) Three hours of lecture per week. Prerequisites: 221A and 222. Advanced topics in nonlinear MIMO system theory. Conceptions of systems. I/O representation of nonlinear systems. Small gain theorems, passivity. Large scale systems. Feedback theory. (SP) Desoer

290E. Regular and Stochastic Motion in Dynamical Systems. (3) Three 1-hour lectures per week. Prerequisites: 222A; Math 104A-104B. Introduction to nonlinear systems theory and related areas. Lectures oriented toward advanced students. (SP) Electric

290F. Mathematical Methods in Electromagnetic Theory. (3) Three 1-hour lectures per week. Prerequisites: 110A-110B or consent of instructor. Integral and near integrable systems, canonical perturbation theory, Lie transforms, mappings, KAM theory, fixed points and linear stability, transfer of global stochasticity, KS entropy, Liouvillian exponents and diffusion, Arnold diffusion, strange systems and strange attractors. (SP) Lichtenberg, Lieberman

290G. Solar Cells and Semiconductor Power Devices. (3) Course may be repeated once for credit. Three 1-hour lectures per week. Prerequisites: 130. Topics include solar cells and a variety of power devices. Device physics, advanced concepts, production technologies. 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: Consent of instructor. Recent developments of algorithms and techniques for computer-aided design of integrated circuits. (SP) Sangiovanni-Vincentelli

290L. Advanced Topics in Statistical Communications Theory. (2) Two 1-hour lectures per week. Prerequisites: 222 and 226. Advanced topics in detection and estimation theory, information theory, and digital communications. Typical topics include advanced coding theory, fiber optics systems, multiple access and multiplexing. (F) M. Meservey

290J. Image Processing. (3) Two and one-half hours of lecture per week. Prerequisites: Basic programming skills and either 121 or 145B. Theory and practical application of two and three dimensional photon emission, transmission, and NMR imaging. Computer and hardware techniques for image acquisition, restoration, noise filtering, Fourier and iterative 3-D image reconstruction and multispectral imaging including display methods. Applications include biological, medical and physical sciences. (F) Buddingh

290K. Solar Thermal Electric Systems. (3) Three hours lecture and one hour laboratory per week. Prerequisites: Engineering 161 or equivalent. Systems to collect, store, transmit, and deliver to consumers solar and wind energy, electrical and thermal. Computer programming and performance of solar receptors, heat transport and storage, thermodynamic systems, and heat rejection systems. Cost minimization programs. Hybrid bottoming cycles. Environmental impact. (F) Smith


290LS. Solar Electric Systems Design. (3) Three hours lecture and one hour laboratory per week. Prerequisites: 290K and 290L. Prerequisites: Consent of instructor. Topics relating to the automatic synthesis, verification and testing of logic circuits. Topics include two-level logic minimization, minimization algorithms, multiple-value minimization, and multi-level circuit synthesis. (SP) Meyer

290M. Advanced Topics in Integrated Circuits for Communications. (2) Two hours of lecture per week. Prerequisites: 142. Analysis and design of monolithic amplifiers, oscillators, multipliers, and phase-locked loops, with application to communication systems. (F) Neureuther

290N. Integrated Circuit Technology Design. (3) One 2-hour lecture and one 3-hour lab per week. Prerequisites: 143 or equivalent. Current problems in 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) White

290Q. Microsensors and Microactuators. (2) New course. Two 1-hour lectures per week. Prerequisites: EECS 130 and 143, or consent of instructor. Physical and operational principles, fabrication techniques and constraints, and case studies of microsensors and microactuators made by integrated-circuit manufacturing processes and/or by a combination of other techniques for control, signal conditioning, and output. (SP) Howe, Muller

290R. Advanced Topics in Random Processes and Queuing. (2) New course. Course may be repeated for credit. Two hours of lecture per week. Prerequisites: 226 and 228. Advanced topics of instructor’s choosing in random processes and queueing theory. Typical topics include martingale theory, stochastic calculus, random fields, queueing analysis and queuing networks, stochastic control. (F,SP) Varajya

290S. Topics in Quantum Electronics. (3) Three hours of lecture per week. Prerequisites: 117A, Physics 115 and graduate standing. Topics in nuclear and electron magnetic spin resonance phenomena. Nuclear and electron spin resonance description, resonance instrumentation, spin echo, optical spin echo (with lasers). Problems of detection of resonance phenomena in noise. Coherent detection, signal averaging, computer processing of periodic signals. (SP) Varaja

290T. Advanced Topics in Signal Processing. (2) Course may be repeated for credit. Two hours of lecture per week. Prerequisites: 225 and 226. Advanced topics of instructor’s choosing in signal processing. Typical topics include signal estimation, inverse problems, matrix signal processing, adaptive and least-squares filter structure and design, real-time and multiprocessor implementations, dedicated IC architectures, image processing, advanced software techniques. (F,SP)

290U. Digital Computers in Experimental Systems. (2) Formerly CS 290U 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 204. Adaptive, control, and measurement systems responsive to changes in systems, disturbances, components, and models. Time-varying systems. Identification of unknown systems by use of adaptive models, error steerest descent, and instrumental variables. Nonlinear identification by automatic control functions. Convergence with noisy and noiseless state variables. (SP) O. Smith

290X. Radio Telescopes. (3) Three hours of lecture per week. Prerequisites: 117A. Synthesis of celestial brightness distribution from measurements on the ground. Parabolic, spherical, cruciform and interferometric antennas. Occultation and scintillation measurements. Atmospheric effects and intensity interferometers. (F) Weich

290Z. Advanced Topics in Robotics. (3) Three hours of lecture per week. Prerequisites: Course work in introductory robotics, 221A and Math 112 or equivalent. Advanced topics related to research and development in the field of robotics. Measures of manipulator workspace characteristics and condition. Kinematic and dynamic issues in the analysis and design of manipulators. Adaptive control of mechanical manipulators. Design and control of artificated mechanical hands. Trajectory planning, generation and control for mobile robots. Offline programming and graphic simulation of industrial robots and their workcells. Task-level language problems such as collision-free path planning. (SP) Fearing

298. Group Studies, Seminars, or Group Research. (1-4) Course may be repeated for credit. Sections 1-40: Must be taken on a satisfactory/un satisfactory basis; sections 41-49: letter grade. Lecture: hours to correspond with unit value. 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)

299. Individual Research. (1-12) Course may be repeated for credit. Must be taken for credit. Individual study; prearranged by consent of instructor. (F,SP)

302. Individual Study for Doctoral Students. (1-8) May not be taken for unit or resident requirements for the doctoral degree. Course may be repeated for credit. May be taken for independent study, independent research, independent study in consultation with faculty member. 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). (F,SP) Staff

Professional courses

301. Teaching Techniques for Electrical Engineering. (1) New course. Must be taken on a satisfactory/un satisfactory basis. One hour seminar per week. Prerequisites: Graduate standing. Weekly seminars and discussions of effective teaching techniques. Use of educational objectives, alternative forms of instruction, and special techniques for teaching key concepts and techniques in electrical engineering. Students and self evaluations. Course is intended to orient new graduate student instructors to teaching in the Electrical Engineering Department at Berkeley. (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 technological systems: communication, data processing, materials, energy generation. Sponsoring departments: Political Science and EECS. (F) Susskind

Upper Division Courses

IDS 100. History of American Technology. (4) Four lecture hours 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, inf usion of science in technology, industrialization and the use of corporations. Sponsoring departments: History and EECS. (SP) Susskind


Computer Science

Lower Division Courses

Please refer to the Computer Science Service Courses section preceding the Electrical Engineering course listings.

6. Workshop in Introductory Computer Science. (1) Must be taken on a pass/no pass basis. Two hours of lecture and one hour of discussion per week during the first eight weeks of term. Prerequisites: Concurrent enrollment in CS60A. Fundamentals of programming with accompanying experience who need additional preparation for course CS60A. (F,SP) Clancy

8. Introduction to Programming. (4) Refer to computer science service course restriction. Self-paced. Prerequisites: High school algebra. Introduction to computer programming, using the Pascal language. Variables and computation; subprograms and parameters; abstract structures; arrays and records. Productive programming techniques; style issues. Assignments and examples are drawn from nonnumerical applications. Students will write a program over 300 lines in length. Clancy

6S. Self-Paced Introduction to Programming. (1-4) Refer to computer service course restriction. Self-paced. Prerequisites: High school algebra. The same material as CS60B but in a self-paced format. Units assigned depend

*Not offered 1989-90
On leave, spring, fall
On leave, fall
on amount of work completed. Computer solution, using the Pascal language, of problems drawn from various fields, with emphasis on numerical applications. (F,SP) Clancy

9A. Introduction to Fortran for Scientific Computation. (F) The computer service course restriction. Prerequisites: CSE 8 or equivalent. Self-paced. Fortran for students who already know how to program. Solution of problems drawn from numerical applications, e.g., root finding, numerical integration, simulation, matrix manipulation, and graphing. Clancy

9B. Pascal for Programmers. (1) Formerly CS 8P. Must be taken on a passed/not passed basis. Refer to computing service course restriction. Self-paced. Prerequisites: CSE 8B or equivalent. Staff. Solution of problems drawn from non-numerical applications. Clancy

9C. C for Programmers. (1) Must be taken on a passed/not passed basis. Refer to computer service course restriction. Self-paced. Prerequisites: Programming experience with assembly 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 programming applications. (F,SP) Clancy

9D. Lisp and Functional Programming. (1) Refer to computer service course restriction. Self-paced. Prerequisites: CSE 8B or equivalent. Introduction to the functional 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) Staff.

60A. Introduction to Programming and Computer Science. (3) Two hours of lecture, one hour of discussion, and two hours of programming lab per week. Prerequisites: Math 1A (may be taken concurrently); previous computer experience (may be taken concurrently). Introduction to programming and computer science. The central idea is the control of program complexity through abstraction. Major topics are functional abstraction; data abstraction; modularity, objects, and state; metalinguistic abstraction; and register machines. Programming projects are done in the Lisp language. (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: Math 1A (may be taken concurrently); CSE 8B. Introduction to the principles and concepts of computer science. Lectures, discussion, and programming (lab). Prerequisites: Engineering 7 (formerly CS 7), or equivalent: GPA of 3.4 or better. A course for lower-division students with a minimum GPA of 3.4 who wish to undertake a program of individual inquiry initiated jointly by the student and a professor. There are no other formal prerequisites, but the supervising professor must be convinced that the student is able to profit by the program. (F,SP) Staff

Upper Division Courses

150. Components and Design Techniques for Digital Systems. (F) Formerly 150 and 150L. Three hours of lecture, three hours of laboratory, and two hours of discussion per week. Prerequisites: CS 60B and ECECS 40 or 42. Design of Boolean logic and finite state machines. Current technology. Minimization techniques, design standards, dependency notation. Implementation with different logic families, mainly TTL and MOS sticks. Synchronous system design. ALU, memory, tristate and open-collector buffers. Function blocks in microprocessors. Discussion of a typical example of a microprocessor. Simple I/O, switches, LED displays, A/D, D/A. (F,SP) Sequin, Katz

152. Computer Architecture and Engineering. (5) Three hours of lecture, two hours of discussion per week, and eight hours of laboratory per week. Prerequisites: CS 150, Engineering 164, 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 (loops, procedures, subroutines, and operating system I/O, interrupts, memory management, process switching). Assembly and high-level language programming. Assemblers and linkers. (F,SP) Clancy

160C. Introduction to Computer Science. (4) Students who have taken 55 may not receive credit for 60C. Three hours of lecture, one hour of discussion, and three hours of programming lab per week. Prerequisites: Math 55 or 113A (math courses may be taken concurrently); CSE 8B60 Advanced programming techniques. Mathematical reasoning about programs. Principles of 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) Staff.

91A. Introduction to Symbolic Programming. (4) Students who have completed more than 5 units in this course plus courses numbered less than 10 may not receive credit for this course. Two hours of lecture, one hour of discussion, and one lab (one hour average per week). Prerequisites: High school algebra. Introduction to computer programming, emphasizing symbolic computation and functional programmingstyle. The Logo programming language is used. Course is intended primarily for non-CS majors with a secondary interest in programming, but it can also serve as preparation for students who are considering CS60A later. (F) Clancy, Harvey

95. Topics in Computer Science. (1) Course may be repeated twice for credit. One hour of lecture per week. Prerequisites: Consent of instructor. This is a seminar course in which computer scientists discuss their professional activities and interests. The aim is to give students an overview and take personal responsibility for the field. Students will be required to write a term paper, based on relevant literature, exploring in greater depth one of the topics covered in the lectures. Staff

99. Individual Study and Research for Undergraduates. (1-2) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: 7 or equivalent. Students may for lower-division students with a minimum GPA of 3.4 who wish to undertake a program of individual inquiry initiated jointly by the student and a professor. There are no other formal prerequisites, but the supervising professor must be convinced that the student is able to profit by the program. (F,SP) Staff

164. Programming Languages and Compilers. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 60C or 188 or consent of instructor. Knowledge and knowledgerepresentation languages; Prolog and logic programming; query languages and relational models of data. Question answering, Inference, and object-oriented and alternative views of data. Higher-level interfaces including application generators, browsers and report writers. Introduction to transaction processing. Database system implementation to be done as term project. (F,SP) Stonebreaker

165. 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. Topics include heuristic search, problem solving, reasoning about knowledge, representation, logical inference, planning, reasoning under uncertainty, expert systems, learning, perception, language understanding. (F,SP) Wilensky

167. Introduction to Knowledge-Based Systems and Languages. (3) Three hours of lecture per week. Prerequisites: 60C or 168 or consent of instructor. Knowledge and knowledgerepresentation languages; Prolog and logic programming; query languages and relational models of data. Question answering, Inference, and information analysis, expert systems, reasoning about knowledge and large systems development projects. Prediction of future development of computer technology. Philosophical and ethical issues concerning artificial intelligence. (F,SP) Lawler

H106. Honors Seminar for Computer Science Majors. (3) Must be taken on a passed/not passed basis. Three hours of lecture per week and project work Prerequisites: 60C, 150, and 170 and consent of instructor. Study in depth of selected topics in computer science to be chosen by the instructor. Students will assess current literature
in the topics and present critiques to the class. Each student will carry out a project.

198. Directed Group Studies for Advanced Undergraduates. (1–4) Course may be repeated for credit. Must be taken on a pass/not passed basis with section. Prerequisites: 2.0 GPA or better; 60 units completed. Group study of selected topics in Computer Sciences, usually relating to new developments.

199. Supervised Independent Study. (1–4) Course may be repeated for a maximum of four units within a semester. Must be taken on a pass/not passed basis. Individual conferences. Prerequisites: Consent of instructor and major adviser. Supervised independent study.

200. Graduate Survey of Operating Systems. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Of systems using several levels of fault tolerance and redundancy reconfiguration. Microdiagnostics. Software systems, including advanced programming languages, programming methodologies, and project management. Students will be expected to participate in one or more small projects that will explore some standard and innovative techniques.

270. Combinatorial Algorithms and Data Structures. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: CS 170. Design and analysis of efficient algorithms for combinatorial problems. Network flow theory, matching theory, matroid theory; augmenting paths; minimum spanning trees; data structure techniques for efficient implementation of combinatorial algorithms; analysis of data structures; applications of data structure techniques to sorting, searching, and geometric problems.

271. Randomness and Computation. (3) New course. Two 1½-hour lectures or three 1-hour lectures per week. Prerequisites: CS 170 and at least one CS27X. Computational applications of randomness and computational theoretic randomness. Approximate counting and uniform generation of combinatorial objects, rapid convergence of random walks on expander graphs, explicit construction of expander graphs, randomized reductions, Kolmogorov complexity, pseudo-random number generation, semi-random sources.

272. Languages and Abstract Machines. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: CS 172. Context-free languages and pushdown automata, iteration theorems, deterministic pushdown automata, regular languages, closure results for language families, interesting theorems concerning regular languages, representation theorems for languages, decision problems in language theory, basic decidable and undecidable problems.

273. Recognition and Parsing of Languages. (2) Two hours of lecture per week. Prerequisites: CS 272 and Mathematics 113A-113B. Recognizer design techniques, formal language theory, parsing techniques, inference of context-free grammars, LL(k) and LR(k) grammars. Special classes of grammars such as precedence grammars, bounded (right) context, LALR, etc. Construction of compiler-compilers. Offered even-numbered years. (SP) Stahl


275. Microprocessor-Based System Design. (4) One and one-half hours of lecture and one hour of discussion per week. Prerequisite: CS 252. Methods for design of computer organizations covering: early systems, CPU design, instruction sets, control, processors, busses, ALU, memory, I/O interfaces, connection networks, virtual memory, pipelined computers, multiprocessors, and case studies. Term paper or project required.

250. VLSI Systems Design. (4) Three hours of lecture and four hours of design laboratory per week. Prerequisite: CS 150. Unified top-down and bottom-up design of integrated circuits and systems concentrating on architectural and topological issues. VLSI architectures, systolic arrays, self-timed systems. Trends in VLSI development. Time constraints, yield, and cost. VLSI design.

252. Graduate Computer Architecture. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: CS 252. The implementation of machine architectures, as well as design tradeoffs using bit slice processors. Design methodologies for the design of silicon chips. Case studies in computer system design and microprocessors, microcontroller development stations. (SP) Katz

253. Microprocessor-Based System Design. (4) One and one-half hours of lecture and six hours of laboratory per week plus extensive hardware project. Prerequisite: CS 252. 252 Methodologies, tools, and practical experience in the design and implementation of digital systems using microprocessors, memories, and peripheral devices. Proposal, design, implementation, and evaluation of individual projects. Use of logic state analyzers and microprocessor development stations.

255. Microarchitecture and Microprogramming. (2) Two hours of lecture per week. Prerequisites: CS 252. The implementation of machine architectures, considering alternative methodologies and cost/performance requirements. Characteristics of a microarchitecture and relationships to microprogramming. Case studies include different implementations of the same machine architecture and the tradeoffs among the components and a general microprogrammable host. Microprogramming. Tools for microprogramming. Applications. Theoretical issues. Offered even-numbered years. (F)


258. Parallel Processors. (2) Two hours of lecture per week. Prerequisites: CS 252. Parallelism, its representation models, and properties. Parallelism detection, scheduling of parallel processes. Principle of pipeline computation, classification, scheduling; current trends in pipeline architecture. Computer network, deadlock, processor routing, decision management, memory management, distributed operating systems and databases. (SP)

259. Fault Tolerant Systems. (2) A. Two hours of lecture per week. Prerequisites: CS 252. Fault detection, location, and correction in hardware and software systems. Testing methods. Functional testing, reliability modeling, and estimation static and dynamic redundancy. Examples of systems using several levels of fault tolerance and redundancy reconfiguration. Microdiagnostics. Software

Not offered 1989-90

In leave, spring, fall

On leave, fall

Ferrari, Smith

Harrison

Lawler

A. Smith

Katz

Harrison

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Manuscript received September 14, 1989.
of abstract complexity measures; determinism vs. non-
determinism; instruction set; space; complexity hierarchies
aspects of the P-NP question; relative power of various
abstract machines. (F) Malik

279. System Support for Scientific Computation. (3)
Formerly 291H. Three lecture hours per week. Pre-
requisites: Engineering 118 or Mathematics 128; and
Computer Science 101 or consent of instructor. Design
made by "architects" of hardware, languages, and op-
erating systems upon those who use the computer for
large-scale numerical computations in business, en-
gineering, and science. (F) Katz

280. Computer Vision. (3) Formerly 292X. Three 1-
hour lectures or 1/2-hour lectures per week. Pre-
requisite: Math 1A-1B, 50A-50B, or equivalent Par-
adigms for computational vision. Discussion of techniques for repre-
sentation and reasoning, with curves, surfaces, and vol-
umes. Illumination and reflectance models. Color per-
ception. Image segmentation and aggregation. Methods
for bottom-up and bottom-up dimensional shape recovery. Line
drawing analysis, stereo, shading, motion, texture. Use
of object models for prediction and recognition. (F) Lawler

hours of lecture per week. Prerequisites: CS188 or
consent of instructor. Learning from examples. Overview of
algorithms and contributions from philosophy and
psychology. Readings and discussion will cover con-
cept learning, compilation and intelligent caching,
knowledge-based generalization, reasoning by analogy, in-
telligence in general for systems, knowledge-level analysis of
learning systems. A substantial project will be undertaken. (F) Russell

282. Algebraic Algorithms. (2) Two lecture hours per
week. Prerequisites: CS 164, Math 113B or per-
mission of instructor. Theory and construction of symbolic
algebraic computer programs. Polynomial arithmetic,
GCD, factorization, integration of elementary functions,
analytic approximation, simplification, design of computer
systems and languages for symbolic manipulation. (F)
Fateman

283. Programming Technology for Artificial Intelli-
gence and Symbolic Manipulation. (3) Three hours
lecture per week. Prerequisites: CS 164. Advanced LISP
programming, AI programming languages, indexing
structures, unification pattern matching, production systems, predicate-calculus based systems,
frame-based systems, representations for mathematical
objects and symbolic and algebraic manipulation techniques.
(F) Malik

284. Computer-Aided Geometric Design and Mod-
eling. (3) Three hours of lectures per week. Prerequisites:
Mathematical skill in calculus and linear algebra. Math-
ematical techniques for curve and surface representation,
including: Hermite interpolation, interpolation of rou-
tine curves and surfaces, Bezier curves and surfaces, B-splines,
Coons patches, tensor product forms, as well as subdivision and bounding conditions, and com-
putational considerations. (SP) Barsky

285. Procedural Generation of Geometrical Objects. (3)
Formerly 292A. Three hours of lecture per week.
Prerequisites: CS 194 or equivalent. Object designs for
geometric modeling, computer graphics, and robotics.
Generation of geometrical surfaces, mechanical parts,
and solid models. Computer-aided design and computer-
trolled systems. Parametric design and the use of CAD
and CAD/CAM systems. (F) Srinivasan

286. Implementation of Database Systems. (3). Three
hours of lecture per week. Prerequisites: CS 162 and
166. Implementation of database systems on modern
hardware systems. Considerations concerning operating
system design, including buffering, page size, prefetching,
etc. Query processing algorithms, design of crash recov-
ery and concurrency control systems. Implementation of
large database and database machine systems. (SP)
Rowe, Stonestrauk

287. User-Interfaces to Computer Systems. (3)
Three hours of lecture per week. Prerequisites: CS 162 and
CS 164 recommended, or consent of instructor. Design
and implementation of user-interfaces to computer sys-
tems. Software and hardware architectures for personal
computers and other intelligent-line devices. Graphical user
interfaces and windowing systems. Form-based user-interfaces. Window and display man-
agement abstractions. Case studies of naive- and expert-
user interfaces. Students will complete a substantial project. Offered even-numbered years. (F) Rowe

288. Artificial Intelligence Algoqolph to Natural Lan-
guages. (3) Two lecture hours per week. Prerequisites:
CS 164. Representation of conceptual structures, language
analysis and production, models of inference and mem-
ory, high-level text structures, question answering and
conversation, machine translation. (F) Wilensky

289. Artificial Intelligence, Knowledge Representa-
tion, and Expert Systems. (2) Two hours of lecture per
week. Prerequisites: 188 or 189 or consent of in-
structor. Discussion of techniques for the construction of
expert systems, including: knowledge representation and
expert systems, Prolog and logic programming, frame representation languages and commonsense
reasoning. (F) Zadeh

290D. Concurrent Programming. (2) This course may
be repeated for credit. Two 1-hour lectures per week. Prerequisites:
162 or equivalent with 164 and 263 rec-
ommended but not required. Concurrent programming,
languages, semantics, algorithms, and supporting ar-
chitecture. Emphasis on design of concurrent systems, formal models and informal techniques. Comparison of
concurrent programming languages and methods. Highly
parallel algorithms and notations for expressing them.
Implementation of different models of concurrent
languages and design hardware design. (SP) Hilfinger

290E. Topics in Distributed Computing Environ-
mients. (1) Two hours of lecture every two weeks. Pre-
requisites: 262. This course will study several areas in
distributed computing such as communication between
processes, file migration, distributed file systems, name
servers, file servers, authentication servers, tcp/ip mech-
anisms and performance issues. (F) A. Smith.

290F. Probabilistic Analysis of Algorithms. (3) Three
hours of lecture per week. This course is concerned with
the application of probability theory to problems in
computer science. Probabilistic analysis of algorithms
for searching, sorting, packing, partitioning, routing, and
the construction of Hamiltonian circuits, matchings, cli-
qunes and colorings in graphs. Probabilistic analysis of
inductive inference models. Universal algorithms for
construction of expanders graphs and other combinatorial objects. (SP) Karp

290G. Advanced Text Processing Algorithms and
Systems. (2) Two lecture hours per week. Computers
to text processors. Source model versus WYSIWYG
model. Algorithm for line breaking, page breaking, hy-
phenation, spelling, etc., on computers. Digital repre-
sentation of printed material. Design, editing, repre-
sentation, compilation and distribution of documents,
Experiments with modern systems. (SP) Harrison

290H. Automatic Synthesis of Integrated Circuits. (2)
One and one-half lecture of hour of lecture per week plus a
project. Prerequisites: EEECS 244 and CS 250 or equi-
lalent. Algorithms and tools for the generation of мас-
layout and simulation models for standard cells, func-
tional modules and complete integrated circuits. Study
of relevant literature and experimentation in the frame-
work of a research project (SP) Sequin

290I. Topics in VLSI Chip Design and Implementation.
(4) May be repeated for credit. Three hours of lecture and
three hours of design lab per week. Prere-
quisites: CS250. Design implementation and testing of
VLSI multi-project chips. Apply the design tech-
niques learned in CS250 to build systems on silicon.
Design for testability, preparation of test system and
systematic testing of the fabricated chips. (SP) Katz

290J. Advanced Topics In Distributed Computing
Systems. (2) Course may be repeated for credit with
written approval. Two hours of lecture per week. Pre-
requisites: CS162; CS252 or CS282 recommended.
Building distributed computing systems, issues and tech-
niques; communication and computation, distributed
data, identification of resources and their distributed
management, decentralized synchronization mecha-
nisms, and protection of concurrent and mod-
elling of distributed systems, programming language
and system support for distributed applications. (SP) Ferrari

292L. Polyhedral Combinatorics. (3) Three hours of
lecture per week. Prerequisites: 162 and 270 or IEEOR
261. Review of linear programming, with emphasis on
duality theory and on network flow theory. Polyhedral
characterizations of combinatorial optimization problems.
Submodular set functions and polymatroids. Total dual
integrality. Computational techniques for general
network flows. (F) Lawler

292R. Analysis of Computer Networks and Their
Protocols. (3) Three hours of lecture per week. Pre-
requisites: CS 162 or equivalent and familiarity with
basic concepts of probability theory. Examples of com-
puter networks and their classification. Connectivity and
reliability. ISO reference model and protocols. Data link
layer. Flow control, congestion control and routing.
Transport layer and error handling. Polling and random
access. Protocol description and validation tech-
niques. (F) Staff

292T. Computational Geometry. (3) Course may be
repeated for credit. Three hours of lecture per week.
Prerequisites: CS 170 or equivalent. Constructive prob-
able geometric algorithms for systems of segments and
polygons, Voronoi diagrams, arrangements of hyper-
planes; relationships among these problems. Search
problems: advanced data structures; subdivision search;
geometric and combinatorial optimization problems.
Models of computation, lower bounds. (SP) Seidel

292V. Distributed Systems and Computer Networks. (3)
Three lecture hours per week. Prerequisites: 162.
Distributed systems, their motivations, applications, and
organization. The network component. Network archi-
tectures. Local and long-haul networks, technologies,
and topologies. Data link, network, and transport
protocols. Point-to-point and broadcast networks. Routing
and congestion control. Higher-level protocols. Naming,
Internetworking. Examples and case studies. (SP)
Ferrari

292Z. Computational Algebra. (3) New course. Three
hours of lecture per week. Prerequisites: CS170. Al-
gebraic algorithms for integers, matrices and polynomials.
Solution of polynomial systems. Decision algorithms for
theories of the real and complex numbers. Algebraic
analogue of the P versus NP question. Geometry of
real algebraic sets. Universal algorithms for polynomial
ideals. (F) Carrey

298. Group Studies, Seminars, or Group Research. (1-
4) Course may be repeated for credit. Sections 1-
25: Must be taken on a satisfactory/unsatisfactory basis;
sections 26-35: letter graded. Three to 20 hours dis-
ussion and consulting per week. Must be taken on a satisfactory/unsatisfactory basis. Three to 20 hours dis-
section of comprehensive design problems, or group
work on complete problems for analysis and ex-
perimenation. (F,SP) Staff

299. Individual Research. (1-12) Course may be re-
peated for credit. Independent study. Investigations of
problems in computer science. (F,SP) * Staff

602. Individual Study for Doctoral Students. (1-8)
May not be taken for unit or resident requirements for
the doctoral degree. Course may be repeated for credit.
Must be taken on a satisfactory/unsatisfactory basis.
Independent study, consultation with faculty member.
Individual study in consultation with the major field ad-
viser, intended to provide an opportunity for qualified graduate students to prepare for the various ex-
aminations required of candidates for the Ph.D. (and
other doctoral degrees). (F,SP) Staff

Professional Courses

300. Teaching Practice. (1-6) Course may be repeated
for credit. Must be taken on a satisfactory/unsatisfactory basis.
Three to 20 hours discussion and consulting per week.
Supervised teaching practice, in either a one-
one-on-one tutorial or classroom discussion setting. (F,SP)
Staff
Interspecialty Studies Courses

Upper Division Courses

IDS 110. Introduction to Computers. (3) Students who have completed Computer Science 7, 8, or 50 will 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 introductory computer course. Primarily for students in the social sciences and humanities and in the professional schools other 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 simulation, and telecommunications. Sponsoring departments: Education, Engineering, and Computer Science. (F,SP)

IDS 110L. Introductory Computer Laboratory. (1) Two 2-hour laboratories per week. Prerequisites: Upper division standing. Students must also be enrolled in IDS 110 with the same grading option as in IDS 110L. 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: Education, Engineering, and Computer Science. (F,SP)

Graduate Courses

IDS 237A-237B. Cognitive Science Seminar. (1-1) Course may be repeated for credit. One 1½-hour lecture and one 1½-hour discussion per week. Prerequisites: Consent of instructor. Weekly presentations by local and visiting researchers on a range of topics in cognitive science, with ensuing discussion.

The Graduate Program

The faculty associated with the program leading to the M.A. and the Ph.D. in endocrinology has diverse interests representing endocrinology in the broad sense: chemical mediators in the living world (autocrine, paracrine, endocrine and ectohormonal factors), with approaches from molecular and cellular endocrinology through organismal and comparative endocrinology to ecology.

Students who plan to work for higher degrees in endocrinology at Berkeley will be guided by a graduate advisor and by the professor who directs their research. These advisors will ascertain whether students have met the minimum requirements, will recommend to prospective committees what additional courses to take, and will guide them in 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.

Energy and Resources Group

(Interdisciplinary Advisory Program and Graduate Group)

Department Office: Bldg. T-4, Room 100, 642-1640
Chair: Jeffrey M. Romm, Ph.D.

Professors:

Mark Christensen, Ph.D. University of California at Berkeley. Indigenous resources, conservation.
Anthony C. Fisher, Ph.D. Columbia University. Resource and environmental economics.
John P. Holston (Vice Chair), Ph.D. Stanford University. Energy, environment, international security.
Gene I. Rochlin (Adjunct), Ph.D. University of Chicago. Finance, policy.

Associate Professor:

Richard Newell, Ph.D. University of Chicago. Resources, environment, development.

Lecturers:

Edward Kahn, Ph.D. University of California at Berkeley. Electric utility finance.

Professors:

Edward A. Arens, Ph.D. (Architecture)
David M. Auslander, Sc. D. (Mechanical Engineering)
Richard Bender, M.Arch (Architecture)
Charles K. Birdsell, Ph.D. (Chemical Engineering and Computer Science)
Richard Buxton, LL.M. (Law)
Elton Cairns, Ph.D. (Chemical Engineering)
John Carter, Ph.D. (Business Administration)
Paul Craig, Ph.D. (Applied Sciences, UC Davis)
John P. Dyer, M.D. (Medicine)
Sally K. Fairfax, Ph.D. (Conservation and Resource Studies, Agricultural and Resource Economics, Landscape Architecture)
T. Kenneth Fowler, Ph.D. (Nuclear Engineering)
David Freedman, Ph.D. (Statistics)
Richard Gilbert, Ph.D. (Economics)
C. Roger Glassey, Ph.D. (Industrial Engineering and Operations Research)
Edward Groes, Ph.D. (Chemical Engineering)
Lawrence Grossman, Ph.D. (Nuclear Engineering)
Ernest Hass, Ph.D. (Political Science)
Charles E. Hulse, M.A., LL.D. (Hon., D.Sc. (Hon.)) (Economics)
(Continued)

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

Ernest Koenigsberg, Ph.D. (Business Administration)
Todd LaForest, Ph.D. (Political Science)
John Leitch, Ph.D. (Economics)
Alan Lichty, Ph.D. (Chemical Engineering and Computer Sciences)
William Lidicker, Ph.D. (Zoology)
Mark Lieberman, Ph.D. (Chemical Engineering and Computer Sciences)
Scott Lyon, D. (Chemical Engineering)
C. Bart McQuire, M.A. (Public Policy)
Rory McNab, M.E.Sc. (Mechanical Engineering)
Richard Meier, Ph.D. (Environmental Design, City and Regional Planning, Architecture, Landscape Architecture)
Carolyn Merchant, Ph.D. (Urban and Regional Studies)
Laura Meier, Ph.D. (Anthropology)
John Neilands, Ph.D. (Biochemistry)
Mark Neubert, Ph.D. (Economics)
Seeley Perry Jr., Ph.D. (Mechanical Engineering)
Joseph Polese, Ph.D. (Chemical Engineering)
H. Franz Schurmann, Ph.D. (History, Sociology)
Neil Smelser, Ph.D. (Sociology)
Otto J.M. Smith, Ph.D. (Electrical Engineering and Computer Science)
Robert Speare, Ph.D. (Biomedical and Environmental Health Sciences)
S. Spiegel, Ph.D. (Mechanical Engineering)
Harriet O'Reilly Sternberg, Ph.D. (Geography)
Edward A. Arens, Ph.D. (Architecture)
David Teece, Ph.D. (Business Administration)
Robert H. Teiw, Ph.D. (Landscape Architecture)
Alan K. Meier, Ph.D. (Biomedical and Environmental Health Sciences)
Malvin W. Webber, M.C.P. (City and Regional Planning)
John Zysman, Ph.D. (Political Science)

Associate Professors:

Claudia Carr, Ph.D. (Conservation and Resource Studies)
Mary K. Firestone, Ph.D. (Plant and Soil Biology)
Louise P. Formann, Ph.D. (Business Administration and Resource Management)
Christopher Granger, Ph.D. (Geography)
Michael Hansmann, Ph.D. (Agricultural Resource Economics)
Robert G. Harris, Ph.D. (Business Administration)
Marshall Merriman, Ph.D. (Materials Science and Mineral Engineering)
Avital Ronell, Ph.D. (Comparative Literature)
Kenneth Train, Ph.D. (Adjunct) (Economics)
Laura Tyson, Ph.D. (Economics)
Michael Watts, Ph.D. (Geography)

Assistant Professors:

Catherine Koshland, Ph.D. (Biomedical and Environmental Health Sciences)
Christine M. Rosen, Ph.D. (Business Administration)
Gail Schiller, Ph.D. (Architecture)

Lecturers:

William Ahern, Ph.D. (Graduate School of Public Policy)
E. Philip LeVeen, Ph.D. (Conservation and Resource Studies)
Daniel Luten, Ph.D. (Economics, Geography)
Doris Sloan, Ph.D. (Environmental Sciences)

Research Associates:

Samuel Bernan, Ph.D. (Lawrence Berkeley Laboratory)
Carl Blumenthal, Ph.D. (Energy and Resource Group)
Irsh, Ph.D. (Lawrence Berkeley Laboratory)
Ted K. Bradshaw, Ph.D. (Institute of Governmental Studies)
Nancy Clough, Ph.D. (Lawrence Berkeley Laboratory)
Robert J. Burnst, Ph.D. (Future Resources Associates)
Wayne M. Gatz, 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. (Universewide Energy Research Group)
Gregory Morris, Ph.D. (Future Resources Associates)
Anthony V. Nero, Ph.D. (Lawrence Berkeley Laboratory)
Margaret S. Sauer, Ph.D. (College of Natural Resources)
Michael Rothkopf, Ph.D. (Lawrence Berkeley Laboratory)
Lee Schipper, Ph.D. (Lawrence Berkeley Laboratory)
Edward Vine (Lawrence Berkeley Laboratory)
Jerome Weinigert, Ph.D. (Jerome Weinigert Assc.)
Carl York, Ph.D. (System Development Foundation)

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, economic, 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 whose main appointments span all five colleges and four of the schools of the University's Lawrence Berkeley and Lawrence Livermore laboratories. The chair is drawn on a rotating basis from the affiliated faculty.
Students. There are approximately 40 graduate students enrolled in ERG degree programs, about one third of them doctoral candidates. The students come from a 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 society, and the intellectual and professional skills to survive a highly competitive admissions process (there are typically 10 applicants for each opening). All receive training at ERG in the technologies, environmental, economic, and sociopolitical dimensions of energy and resource issues while pursuing additional course work and individual research tailored to their interests and backgrounds.

Graduates. ERG graduates are employed across the U.S. and around the world in governmental and international agencies, legislative staff positions, worldwide laboratories, public and private utilities, and energy and resource companies, consulting firms, public interest organizations, and universities.

Undergraduate Courses. The undergraduate courses deal with the essence of energy and resource issues on both a national and global level in their technical, environmental, sociopolitical and economic aspects. The courses provide both basic insights and introduce students to interdisciplinary research methods. There are no prerequisites for enrollments in the courses unless specifically noted otherwise in the descriptions below.

Graduate Courses. The courses in ERG provide advanced training in interdisciplinary analysis and research. Energy and society review current developments in the field or emphasize particular disciplinary perspectives: economics, politics, public policy, or environmental and physical sciences.

Admission. Applications are considered once a year for fall semester admission only. Candidates for admission must apply by February 15, except those applying for a fellowship, who must apply by December 15. New students admitted to the Ph.D. program with a master's degree in a related field require, in addition to the requirements 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) Two 1 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 effects of energy in contemporary society. Energy and well-being: energy in international perspective, origins, and character of energy crisis. (F) Holden, Christensen

102. Quantitative Aspects of Global Environmental Problems. (4) Three hours lecture and one hour discussion per week. This course explores the administrative and international aspects of global environmental issues, particularly those related to global emission and management. (F) Holden, Christensen

140. Efficient End Use of Energy, (4) Three 1 1/2-hour lectures and one 3-hour laboratory per week. Prerequisites: Physics 7A-7B-7C; upper division standing. First and second laws of thermodynamics, efficiencies of various energy conversion processes, energy flows, energy efficiency, energy use, energy use in society, conservation. Concepts will be applied to space heating and cooling, transport, industrial processes. (F) Christensen

141. Residential Energy Conservation. (3) Three 1 1/2-hour lectures and one 1-hour laboratory per week. Prerequisites: Physics 7A-7B-7C, 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 impacts of modern technological evolution, environmental consequences of nuclear war. (SP) Holden, Harte

200. Interdisciplinary Energy Analysis. (4) Two 2-hour lectures per week. Prerequisites: Upper division standing, plus particular topic. (F) Staff

202. Modeling Ecological and Meteorological Phenomena. (3) May be taken on a satisfactory/unsatisfactory basis. Two 1 1/2-hour lectures per week. Prerequisites: Environmental Studies 102 or consent of instructor. Modeling methods in ecology and meteorology, stability analysis, effects of anthropic stress on ecological systems. (SP) Staff

241. Current Energy Problems in Historical Perspective. (2) Two 1 1/2-hour lectures and one 1-hour discussion per week. An exploration of the interaction between environment/technology and the socio-cultural evolution of Western society in time (history) and space (environment) that have shaped practical affairs, worldviews, and sense of identity; the implications of these links in choices of technologies. (SP) Staff

251. The Political Economy of Energy. (3) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisites: Some familiarity with current critical problems in energy policy and at least a broad general understanding of relevant technologies. The political economy of energy, such costs and benefits, policies and institutions at the regional, national, and international level in the United States. Emphasis on understanding the determinants of national and international energy policies. (SP) Staff

260. Critical Issues in Energy Technology. (3) Two 1 1/2-hour lectures per week. Prerequisites: Engineering 160 or equivalent. Quantitative examination of selected issues in energy technology combining analytical approaches and social/behavioral science perspectives. Issues selected for relevance to current policy formation. (SP) Staff

280. Energy Economics. (3) Two 1 1/2-hour lectures per week. Prerequisites: Economics 106A or equivalent; calculus is assumed. Energy economics, energy conservation, energy supply, demand; energy policy, energy policy analysis. (SP) Staff
Interdepartmental Studies Courses

IDS 235. Community Scale Energy Systems. (3) Two 1-hour lectures/discussions 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 energy assessment; 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.

Engineering (College of Engineering)

For a description of the programs in engineering, see page 72.

The following multidisciplinary courses are of interest primarily to students in the College of Engineering, regardless of their department affiliation. Most of these courses are broader in scope than those offered by a single discipline.

Lower Division Courses

**Introduction to FORTRAN Programming for Scientists and Engineers. (3) Formerly Computer Science 7. Two hours of lecture, one hour of discussion, and four hours of programming lab per week. Prerequisites: Mathematics 1A-1B or equivalent. Introduction to computer programming, using the FORTRAN language. Variables and computation; subprograms and parameters; control structures; arrays. Productive programming techniques; style issues. Assignments and examples are drawn from numerical applications, e.g., root finding, numerical integration, simulation, matrix manipulation. Students will write a program over 300 lines in length. (F,SP) Clancy**

**Self-Paced Introduction to FORTRAN for Scientists and Engineers. (1-3) Formerly Computer Science 73. Course may be repeated for credit up to 3 units. Self-paced. Prerequisites: Mathematics 1A. Self-paced version of E7. Unit 1: variables and computation; subprograms and parameters; control structures; arrays. Productive programming techniques; style issues. Assignments and examples are drawn from numerical applications, e.g., root finding, numerical integration, simulation, matrix manipulation. Students will write a program over 300 lines in length. (F,SP) Clancy**

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 drawing. Conventions, computer graphics and modeling. Graphical analysis, empirical equations, the documentation and presentation of engineering information. The engineering report. Sponsoring department: Mechanical Engineering. (F,SP) Steidel

36. Engineering Mechanics I. (2) Two hours of lecture per week. Prerequisites: Mathematics 1A-1B; Physics 7A. A vectorial treatment of the principles of statics of particles and rigid bodies. Application to problems of equilibrum and motion in two and three-dimensional systems. Work and potential energy, the principle of virtual work, stability of equilibrium. Sponsoring department: Civil Engineering. (F,SP) Sackman

45. Properties of Materials. (3) Two 1-1/2-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 semiconducting materials. Sponsoring department: Materials Science and Mineral Engineering. (FSP) Morris, Ritchie

47. Supplementary Work in Lower Division Engineering. (1-3) Course may be repeated for credit. Prerequisites: Limited to students who must make up a fraction of a required lower division course. May be taken only with permission of the Dean of the College of Engineering. Students with partial credit in a lower division engineering course may complete the work under this heading. (F,SP) Staff

49. Energy and Other Nonrenewable Resources. (2) Formerly E44 and E48. Two 1-hour lectures per week. Prerequisites: Mathematics 1A-1B or equivalent. Economics of renewable and nonrenewable energy resources. Energy supply, demand, and price. (F,SP) Staff

50. Environmental Engineering: Air Pollution. (3) Three hours of lecture per week. Prerequisites: Chemistry 1B; Mathematics 50B; Physics 5A (7A). An introduction to the technology of air pollution control, including air pollution sources, combustion processes, control technology and abatement. Sponsoring department: Civil Engineering. (SP) Koshland, 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 discussion of toxicology, and some background on current federal and state legislation. Sponsoring departments: Civil Engineering and Mechanical Engineering. (SP) Hunt

153. Introduction to Bioengineering. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Mathematics 50B; Physics 7C. Sources, conversion, transmission and requirements for energy in human society, concentrating on electric power. Thermodynamic principles; fossil fuel; nuclear fission and fusion and hydroelectric power generation. Geothermal and solar power. Direct energy conversion. Ecological and social problems. Sponsoring departments: Electrical Engineering; Environmental Sciences, Mechanical Engineering, and Nuclear Engineering. (F) Grossman, Lieberman, Sawyer

160. Energy and Power. (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. Thermodynamic principles; fossil fuel; nuclear fission and fusion and hydroelectric power generation. Geothermal and solar power. Direct energy conversion. Ecological and social problems. Sponsoring departments: Electrical Engineering; Environmental Sciences, Mechanical Engineering, and Nuclear Engineering. (F) Grossman, Lieberman, Sawyer


172. Introduction to Rock Mechanics. (3) Two 1-1/2-hour lectures per week with demonstrations. Prerequisites: Upper division standing in Engineering or Science. Introduction to analysis of rock structures and its application to fracture and deformation in rocks of all kinds. Applications in mining and civil engineering involving design of underground openings in competent, layered and failure prone rocks, slopes and dams, and rock solutions on weak or fractured rocks. Sponsoring departments: Civil Engineering and Materials Science and Mineral Engineering. (F) Cook
190. Technical Communication. (3) 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 a clear, economical style; 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) Staff

191A. Social Implications of Technology. (1) Must be taken on a pass/no pass basis. One hour of lecture 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 class will discuss ethical issues faced by engineers in industry and academia, concerns of public interest in specific technologies, and the transfer of technology to developing countries. Sponsoring departments: Electrical Engineering and Computer Sciences, Industrial Engineering and Operations Research, and Mechanical Engineering. (SP) Staff

193. California Engineering Staff. (1) Course may be repeated for credit. Must be taken on a pass/no pass basis. One 3-hour laboratory per week. Work on the California Engineering Magazine, in one or more of the following capacities: read candidate articles, edit articles, enter articles into UNIX computer system; type copy for type-setting, draw technical illustrations, photography, issue layout, issue paste-up, write articles on assignment, accounting, advertising sales, public relations. Sponsoring department: Electrical Engineering and Computer Science. (F,SP) Staff

Graduate Courses

201. Ocean Engineering Seminar. (2) Two hours of lecture per week. Prerequisites: Enrollment in Ocean Engineering M.Eng. program or consent of instructor. Lectures by resident and guest lecturers on new developments in ocean (including arctic) engineering. Students required to attend all lectures and write a 20-page term paper on an aspect of ocean engineering not covered in their other courses. Sponsoring department: Civil Engineering. (SP) Corcos, Webster

230A. Engineering Analysis. (3) Three hours of lecture per week. Prerequisites: Graduate standing; Mathematics 50A-50B, Laplace transforms, Fourier series and other techniques; basic knowledge of thin plate theory; ability to program in FORTRAN, C, or equivalent. Axiomatic analysis of linear operators and systems; integral equations; classical and modern orthonormal functions; existence and uniqueness of solutions of differential equations; asymptotic behavior of solutions of linear differential equations; stability of hydraulic systems. Recommended for graduate students majoring in ocean engineering. Sponsoring department: Mechanical Engineering. (I)


266. Numerical Methods in Fluid Mechanics. (3) Two 1½-hour lectures and one hour of discussion per week. Prerequisites: Engineering 230A or Math 115A or equivalent. Applications of finite difference and other numerical techniques to current problems of fluid dynamics, including high speed flow transonic flow, boundary layer and wake flow. Sponsoring departments: Mechanical Engineering. (SP) Coletta

290A. Clinical Aspects of Bioengineering. (3) One hour of lecture and six hours of laboratory per week. Prerequisites: Consent of instructor. This course, offered in conjunction with the Pacific Medical Center in San Francisco, is designed to introduce bioengineering students to the clinical and laboratory setting. Students are exposed to the analysis of clinical problems from an engineering point of view. Sponsoring department: Mechanical Engineering. Taught with lecturers from various departments. (SP) Staff

291A. Arctic Ocean Engineering. (3) One 2-hour lecture per week. Prerequisites: Consent of instructor. Arctic Sub-Arctic environment as pertaining to the undertaking of engineering projects with particular emphasis on ice mechanics and various ice structure interaction phenomena and their effects on engineering facilities. Objective of the course is to provide students with basic understanding of the various considerations affecting the design of coastal and offshore facilities in ice environments. (SP) Gerwick

296. Operational Management of Technology (3) Three hours of lecture per week. Prerequisites: Graduate standing in Engineering or Business Administration. The engineering process for realizing new technologies and product concepts is a key link in the innovation chain. The engineering interface to technology sources and market requirements is addressed. An integrated approach to the tools and organizational issues in the engineering infrastructure is framed as an information processing system. Management roles are focused on quality and minimizing concept-to-market time. The course does not assume a specialist technical background. Sponsoring department: Engineering Interdisciplinary Studies.

297. Management of Large-Scale Technology Projects. (3) Two 1½-hour lectures. Prerequisites: Graduate standing in Engineering or Business Administration. Very large and commercial products depend critically on management and organizational factors in order to meet technical objectives. These factors and their interrelationship with technology will be explored throughout the project life cycle. Common management principles and the role of information technology will be present. Sponsoring department: Engineering Interdisciplinary Studies. Staff

298A. Group Studies or Seminars. (1-6) Course may be repeated for credit. 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)

298B. Group Studies or Seminars. (1-6) Course may be repeated for credit. 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)

Engineering—Double Major Programs

(College of Engineering)

Double Major Programs of Study. The Double Major Program is designed for students who wish to undertake study in two major 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; Materials Science and Engineering/Nuclear Engineering; Electrical Engineering and Computer Sciences/Chemical Engineering/Nuclear Engineering/Nuclear 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 College of Chemistry are offered. These are: (1) Materials Science and Engineering/Chemical Engineering; and (2) Nuclear Engineering/Chemical Engineering. Details on these curricula can be found in the Announcements of the College of Chemistry and College of Engineering.

Environmental Engineering. The College of Engineering offers a series of courses in environmental engineering open to junior and 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 hydroelectric power generation; geothermal, tidal, and solar power; and direct energy conversion. Environmental and 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 center offers the interdepartmental course, Engineering 190, Technical Communication, and Interdepartmental 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 human technical issues 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, Interdepartmental 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 Intelligent Systems, Nuclear Engineering, Engineering 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 symposia. 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 the activities of an interdepartmental committee 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 from the Graduate Interdisciplinary Studies Center, 230 Bechtel Engineering Center; College of Engineering; University of California at Berkeley; Berkeley, CA 94720.

Engineering Courses

Upper Division Courses

110. The Startup Company. (3) Course may be re-peated for credit. One to three hours of lecture per week. The class will nominate and select a set of specific technical products. Four-person project teams will be established by individual nomination. Each team will select a project and specify a management, financial, technical and marketing staff. The structure of the course will be built around the progressive creation of a business model for the project team. Team presentations by one person on each team (management, finance, etc.) will be made weekly on a rotational basis. (SP)

190. Technical Communication. (3) Three hours of lecture per week. Prerequisites: English 1A or equivalent coursework. Principles of technical communication: analyzing one's audience; organizing material; developing a clear, economical style; using proper formats and rhetorical strategies for formal technical reports, feasibility studies, technical proposals, reports, letters, and memos. Practice in oral presentations to technical and nontechnical audiences. (F,SP) Staff

268. Operational Management of Technology. (3) Three hours of lecture and one half hour of laboratory per week. (F,SP) Staff

IDS 140. Technical Communication for Non-native Speakers of English. (3) Two 1½-hour lectures per week. Prerequisites: English 1A, or equivalent coursework; 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 180. Sponsoring departments: Engineering 140 and the College of Engineering. (F,SP) Staff

IDS 296. Management of Innovation and Policy. (3) Two 1½-hour lectures per week. Prerequisites: Graduate standing in Business Administration or Engineering. This course is designed to prepare students for those in the engineering science program to require a minimum grade-point average of 3.00. All engineering science programs must include a total of 18 units of humanities, social sciences, and seminars. An integrated approach to the tools and organizational issues in the engineering infrastructure is framed as an information management task. Management roles are focused on quality-control and management-concept time. The course does not assume specialized technical knowledge. Sponsoring departments: Engineering Interdisciplinary Studies. (F) Staff

Engineering Science

(College of Engineering)

The engineering science program includes closely related courses in natural sciences, mathematics, physics, and engineering. The options offered within the program prepare students.

Programs for the Bachelor's Degree

The undergraduate Engineering Science curriculum is multidepartmental and is administered by the Engineering Science Committee. Continued enrollment in Engineering 190 is required for upper division standing in the engineering science program. The engineering science curriculum requires a minimum grade-point average of 3.00. All engineering science programs must include a total of 18 units of humanities, social sciences, and seminars. An integrated approach to the tools and organizational issues in the engineering infrastructure is framed as an information management task. Management roles are focused on quality-control and management-concept time. The course does not assume specialized technical knowledge. Sponsoring departments: Engineering Interdisciplinary Studies. (F) Staff

Interdepartmental Studies Courses

Upper Division Courses

IDS 110. Introduction to Computers. (3) Students who have completed Engineering 10A-10B, 17, 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 110 with the same grading option or an equivalent departmental course. Primarily for students in the social sciences and humanities and in the professional schools other than Engineering. The conceptual foundations of computing and information technology. Structure and function of computer systems. Elements of programming. Applications programs. Examples are drawn mainly from word processing, database management, electronic spreadsheets, graphics and simulation, and telecommunications. Sponsoring departments: Engineering, Education, and Computer Science. (F,SP)

IDS 110L. Introductory Computer Laboratory. (1) Two 2-hour laboratories per week. Prerequisites: Upper division standing. Students must also be enrolled in IDS 110 with the same grading option as in IDS 110L. Primarily for students in the social sciences and humanities and in the professional schools other than Engineering. Elements of programming. Applications programs. Examples are drawn mainly from word processing, database management, electronic spreadsheets, graphics and simulation, and telecommunications. Sponsoring departments: Education, Engineering, and Computer Science. (F,SP)

Not offered 1988-89
*On leave, spring, fall
*On leave, fall

English

(College of Letters and Science)

Department Office: 322 Wheeler Hall, 442-3467

Professors:

Jennifer T. Anderson, Ph.D. Yale University, Shakespeare, Renaissance drama, Spenser

Philip W. Booth, Ph.D. Harvard University. 16th and 17th century English literature

John N. Logan, Ph.D. Harvard University. Renaissance literature, comedy, prose, style

Patrick Stewart, Ph.D. Oxford University. 19th and 20th century English literature, 19th century comparative literature (English, French and German)

Robert Bloom, Ph.D. University of Michigan. Modern British fiction and poetry

Sara Booth, Ph.D. Cambridge University, Literature, Renaissance, 16th century

James A. Ladenson, Ph.D. University of Minnesota. American poetry, modern literature

Nancy K. Brown, Ph.D. University of California at Berkeley, American literature: the Transcendentalists, historical and political poems, 1800-1860

Christian A. Ruyle, Ph.D. Yale University, Modern British literature, women in literature

Robert C. Allen, Ph.D. Harvard University. 17th century nonrationalist

Frederick C. Crews, Ph.D. Princeton University, American literature, modern British literature

Philip W. Damon, Ph.D. University of California at Berkeley, Dante, Chaucer, Greek and Latin poetry, medieval romance and medieval epic

Joel Fineman, Ph.D. SUNY Buffalo. Renaissance, critical theory

Anne F. Friedländer, Ph.D. Harvard University, 16th and 17th centuries, Milton, Shakespeare

Mary Anne Frascino, Ph.D. University of Massachusetts, Renaissance literature, tragedy, cultural history, Manierist aesthetics, literature and sociocultural anthropology

Ronald R. Hahn, Ph.D. Harvard University, Poetry, American literature

Donald K. Hall, Ph.D. University of Pennsylvania, Linguistics, stylistics and teaching of composition

Leonard Hyman, Ph.D. University of Michigan. Short fiction writing—theory and practice of writing short stories

Anne Middleton, Ph.D. Harvard University, Old and Middle English literatures, American literature, David A. Miller, Ph.D. Yale University, 19th century English and European novel

Charles Muscaltino, Ph.D., Yale University, Medieval English and French

Alan Nelson, Ph.D. University of California at Berkeley. History of drama, Medieval English literature

Brendan P. O’ Haire, Ph.D., Johns Hopkins University. 1600-1700, Classical and Neo-Classical genres (not novel, drama), and the 18th century

Kevin P. O’ Donnell, Ph.D. Stanford University, Languages and literature

Wayne O’ Gerber, Ph.D. Stanford University. Anglo-Saxon studies: history and theory of the short poem in English; Middle English verse, translation

Morton D. Paley, Ph.D. Columbia University. Romanticism, art and literature in 18th and 19th-century British culture

Thomas J. Parker, Ph.D. University of Chicago. American literature

Robert Finkley, Ph.D. Stanford University. Poetry

Carolyn Post, Ph.D. Rice University. American literature, American intellectual history

Margaret W. Stahl, Ph.D. Indiana University. 18th-century literature, Victorian literature, literary theory, the novel John H. Rinaldi, Ph.D. Princeton University, 18th and 19th-century English, American, Unification, Israel, and Russian novels and drama

Hugh M. Richmond, Ph.D. Oxford University. Renaissance literature and drama, comparative literature (European)

Peter S. Filene, Ph.D. University of Chicago. Comparative European literature (especially Latin) before 1300

George A. San, Ph.D. Princeton University. The novel, and social and intellectual history 1660-1800

Gayatri Ch. Joshi, Ph.D., Stanford University. Satire

*On leave, spring
*On leave, fall
*Recalled to active service
†Recipient of Distinguished Teaching Award
The Department of English offers courses in literature, language, and linguistics. Our courses in literature cover a wide range of topics, from ancient to modern times, from classical to contemporary cultures, and from theoretical to practical approaches. Writing courses are offered in both expository and creative writing. The major in English is designed to introduce students to literary history and to the major works of both British and American writers. To acquire them with a sense of the historic, periods and geographical and cultural regions of English language and writing, and to create an awareness of methods and theories of literary analysis, and to provide continued training in critical writing. Before declaring the major, students must have completed the Reading and Composition requirement of the college. Students are strongly urged, though not required, to take the required R&C courses and the English department: English 1A, and either B or the "writing-intensive" form of any one R&C introductory literature course—17W, 20W, 26W, 27W, 28W, 30W, 44W, or 44BW. A "W" course counts as one course in the major, and some of them fulfill major requirements; see below.)

In the sophomore year, students normally take English 46A-46B, Major British Writers, which provide an intensive survey of major authors from Chaucer through the eighteenth century and continued practice in critical writing; and, concurrently with either half of the course, Introduction to Literary Study, which examines fundamental issues in literary analysis through reading, writing, and discussion of literature representing a variety of literary forms, genres, and types. The latter three courses (15, 46A, 46B), as well as a course in American literature, and a course in the classical or Biblical backgrounds to English 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 prerequisites 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 re-mapping specifications of the major: a course in Shakespeare; a course in literature through Romanticism (exclusive of Shakespeare and English 150); a course in American literature, chosen from 161 or 162 (critical theory and history of criticism), or the 170 series (interdisciplinary perspectives on literature and criticism), or the 180 series (literary genres); a course in the cultural varieties of the English language and literature; and the Upper Division Seminar, English 150, which brings the student's critical skills and learning to bear upon a single literary event, to the writing of a long essay. Beyond these categorial 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 advisors. Collaborative 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 Department of English. For further information, see Subject A listings in the Academic subjects. (Listed in English Department's "Announcement of Classes").

Course B. The Department of English offers an examination waiver program for the Single Subject Credential in English. Students are permitted to take only two of the courses offered to complete the major on a pass/failed basis (this includes English 99, 130, 130B, 130C, 133, 134, 135, 136; d) one course in the classical or the Biblical backgrounds to English literature (English 44A is strongly recommended, but see the major program description available in the department office. c) one course in English literature, selected from the following: English 30, 37, 130A, 130B, 130C, 130D, 131, 132, 133, 134, 136; d) one course in American literature, selected from the following: English 26W, 27W, 28W, 30W, 44AW, 44BW, the literature component of any of these courses counts as one course toward the major.)

The Major: Besides 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. Any two need be taken by the time the student files the Declaration of Major.) a) English 46A, or one of the two upper division courses that may be offered as its equivalent. (b) English 46B, or one of the upper division courses that may be offered as its equivalent. (For these equivalents, see the major program description available in the department office.)

Note: The following requirements apply to students who complete the second half of the requirement; (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. Any two need be taken by the time the student files the Declaration of Major.) a) English 46A, or one of the two upper division courses that may be offered as its equivalent. (b) English 46B, or one of the upper division courses that may be offered as its equivalent. (For these equivalents, see the major program description available in the department office.)

Note: The semester in which a particular course will be offered and the instructor who will teach it can change after this catalog is printed. Please consult the department's "Announcement of Classes" (available well before the beginning of each semester). The department has a teaching credential, Teacher Training, which brings the student's critical skills and learning to bear upon a single literary event, to the writing of a long essay. Beyond these categorial 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 advisors. Collaborative 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.

Note: The semester in which a particular course will be offered and the instructor who will teach it can change after this catalog is printed. Please consult the department's "Announcement of Classes" (available well before the beginning of each semester). The department has a teaching credential, Teacher Training, which brings the student's critical skills and learning to bear upon a single literary event, to the writing of a long essay. Beyond these categorial 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 advisors. Collaborative 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.

Note: The semester in which a particular course will be offered and the instructor who will teach it can change after this catalog is printed. Please consult the department's "Announcement of Classes" (available well before the beginning of each semester). The department has a teaching credential, Teacher Training, which brings the student's critical skills and learning to bear upon a single literary event, to the writing of a long essay. Beyond these categorial 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 advisors. Collaborative 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.

Note: The semester in which a particular course will be offered and the instructor who will teach it can change after this catalog is printed. Please consult the department's "Announcement of Classes" (available well before the beginning of each semester). The department has a teaching credential, Teacher Training, which brings the student's critical skills and learning to bear upon a single literary event, to the writing of a long essay. Beyond these categorial 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 advisors. Collaborative 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.
Minor Program

The minor in English offers students the opportunity to complete a related group of courses in one of three areas. The areas are:

- Creative Writing: Five upper division courses, including two literature courses and three selected from the following: 130A, 130B, 130C, and 130D, and two selected from 131, 132, 133, and 136. (Note: Courses on this list that are not on special topics in American literature can count toward the minor with the permission of an English Department 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 on this list that are not on special topics in American literature can count toward the minor with the permission of an English Department adviser.)

- Literature in English: 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, and one must be selected from 105B, 121, 122, 125A, and 125B. (Note: Courses on this list can count toward the minor with the permission of an English Department adviser.)

Courses and grade requirements: All minors in English must complete the examination of five upper division courses. Of these five courses, at least three must be taken at Berkeley. Some of the five courses required for the minor may be taken for a letter grade. An overall grade-point average of 2.0 is required.

Preparation for Graduate Studies

Those interested in graduate studies in English at Berkeley should become familiar with the requirements 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 literature, and at least two in a 250 seminar. Of the eight courses in English, six will be distributed as follows: English 200, an introductory course in literary scholarship, normally 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 Milton. 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 at broad range of applicants including older students from a variety of academic and cultural backgrounds. It is designed to serve students who wish to undertake one year or more of graduate study in the 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 year with the advisor, and may or may not include a short thesis or approved special project. In special cases, study for the M.A. degree may be performed on a part-time basis. The M.A. degree 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. chair. A student undertaking a thesis 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 con-   ections as part of the expected student workload.

Some instructors in courses in the 43 and 143 series may offer their courses from a varied basis 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

1A-1B. First-Year Reading and Composition. (4,4)
Three hours of lecture per week. Prerequisites: Passing grade in Subject A (exam or course). Training in writing expository prose.

A. Instruction in writing and reading expository prose. (F,SP)
Staff

B. Further instruction in expository writing in conjunction with reading literary texts 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. Please see, under Courses in Literature: 17W, 20W, 26W, 27W, 28W, 30W, 44AW, 44BW. The literature component of each of the "W" courses also counts as one course toward the English major.

40. Intermediate Expository Writing. (4,4)
Three hours of lecture per week. Prerequisites: 1A-1B or equivalent and consent of instructor. Training in literary writing.

Staff

3A. Introduction to the Writing of Short Fiction. (4,4)
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.

3B. Introduction to the Writing of Verses. (4,4)
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.

3D. Introduction to the Writing of Nonfiction. (4,4)
Three hours of lecture per week. Prerequisites: Consent of instructor. A seminar in writing 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

41. Modes of Writing (Exposition, Fiction, Verse, Etc.). (4,4)
Course may be repeated once for credit with different instructor. Three hours of lecture per week. Prerequisites: 1A-1B or equivalent and consent of instructor. Writing in connection with reading in recent English literature and its continental background. (SP)
Soto

42. Advanced Composition for Potential Teachers of English in Secondary Schools. (4,4)
Three hours of lecture per week. Prerequisites: Consent of instructor. 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)
Kratine

Note: Not offered 1989-90

1On leave, spring, fall
2On leave, fall

142D. Advanced Composition for Potential College Teachers. (4,4)
Three hours of lecture per week. Special section in advanced prose for graduate student instruc-   tors, readers, and honors students in departments other than English.

143A. Short Fiction. (4,4)
Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. A seminar in writing short stories. (F,SP)
Michaels, Loewinson

143B. Verse. (4,4)
Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. A seminar in writing poetry. (F,SP)
Schweik, Scott, Eion, Gunn

143C. Long Narrative. (4,4)
Course may be repeated for credit. 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. (4,4)
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

Upper Division Courses

101. The English Language. (4,4)
Three hours of lecture per week. Structure and history of the English language.

102. Problems in English Linguistics. (4,4)
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. (F)
Boyd

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. (4,4)
Three hours of seminar per week. Study of literary and critical texts and of critical methods and theories. Enroll-ment limited to 25 students.

15. Introduction to Literary Study. (4,4)
Three hours of lecture and discussion per week. Designed for prospective English majors. Reading in a variety of literary texts and introduction as introduction to critical thought and writing about literature. Taught in limited-enrollment sections; readings vary from section to section. (F,SP)

2On leave, spring, fall
3On leave, fall
4Recipient of Distinguished Teaching Award
17. Shakespeare. (4) Three hours of lecture per week. Lectures on Shakespeare and reading of his best works.

17W. Shakespeare. (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. Course syllabus and format identical to 20, 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) Breitwieser

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 well before the beginning of the semester. (Sections limited to 15 students each.) (F,SP) Bloom, Parkinson, Breitwieser, Muscatine

20W. Modern British and American Literature. (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 per week devoted to writing instruction and additional writing assignments. Fulfills second half of Reading and Composition requirement.

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.

20W. Modern British and American Literature. (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 per week devoted to writing instruction and additional writing assignments. Fulfills second half of Reading and Composition requirement.

26. Introduction to the Study of Poetry. (4) Three hours of lecture per week. Lectures and discussion on poetry are intended to develop the student's ability to understand and evaluate a poem. Designed primarily for students whose major is not English, but majors and prospective majors are welcome. (SP) Schwelk

26W. Introduction to the Study of Poetry. (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 per week devoted to writing instruction and additional writing assignments. Fulfills second half of Reading and Composition requirement. (SP) Schwelk

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. (F) Abel

27W. Introduction to the Study of Fiction. (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 per week devoted to writing instruction and additional writing assignments. Fulfills second half of Reading and Composition requirement. (F) 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 understand, under- stand and evaluate plays. Designed primarily for students whose major is not English, but majors and prospective majors are welcome. (SP) Altman

28W. Introduction to the Study of Drama. (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 28 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) Altman

30. American Literature. (4) Three hours of lecture per week. An introductory survey of American literature. (SP) Breitwieser

30W. American Literature. (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) Breitwieser

11. Chaucer. (4) Three hours of lecture per week. Lectures on and discussion of Chaucer's major works. (SP) Justice

112. Middle English Literature. (4) Three hours of lecture per week. Middle English literature exclusive of Chaucer studied in the original language. (F) Nelson

114A-114B. English Drama. (4;4) Three hours of lecture per week.

A. English drama to 1603. (SP) Fineman

B. English drama from 1603 to 1700. (SP) O Hehir

115A-115B. The English Renaissance. (4;4) Three hours of lecture per week.

A. Beginnings of the English Renaissance, and literature of the 16th century. (F) Coolidge

B. Literature of the 17th century. (SP) Friedman

116. Backgrounds of English Literature in the Continental Renaissance. (4) Three hours of lecture per week. A survey of the principal documents which are important to an understanding of the English Renaissance.

117A-117B. Shakespeare. (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. (F) Paley

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 course satisfies the departmental requirement of a course on Shakespeare in the major. (F) Richmond

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 sources, changing concepts of comedy and tragedy, influence of theatrical conditions on technique. (F,SP) Adelman, Stout, Barish

117S. Shakespeare. (4) Three hours of lecture per week. Lectures on Shakespeare and reading of his best works. (F,SP) Fineman, Adelman

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 inter- relation of Elizabethan plays and stage practices. Classroom exercises, written assignments, and a final examination. (SP) Richmond

118. Milton. (4) Three hours of lecture per week. Lectures on and discussion of Milton's major works. (F,SP) Richmond

119. The Augustan Age. (4) Three hours of lecture per week. Lectures on and discussion of Dryden, Swift, Pope, and some of their contemporaries. (F) Feingold

120. The Age of Johnson. (4) Three hours of lecture per week. Lectures on and discussion of later 18th- century British literature.

121. Romantic Period. (4) Three hours of lecture per week. Blake, Wordsworth, Coleridge, Byron, Shelley, Keats, and contemporaries. (SP) Goldsmith

122. Victorian Period. (4) Three hours of lecture per week. Literature of the Victorian period with an emphasis on poetry and nonfictional prose. (SP) Langan

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) Oliver

125A-125B. The English Novel. (4;4) Three hours of lecture per week.

A. Defoe through Scott. B. Dickens through Conrad. (F) Tracy
125D. The 20th-Century Novel. (4) Three hours of lecture per week. Lectures on and discussion of major novels of the 20th century. (SP) 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) Gunn

128. Modern Drama. (4) Three hours of lecture per week. British and American drama: 1860 to the present. (SP) Sundquist

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. (SP) Padilla

130B. American Renaissance. (4) Three hours of lecture per week. Lectures on and discussion of the major texts of the American Renaissance. (F) Porter

130C. American Literature: 1865-1900. (4) Three hours of lecture per week. A survey of modern American literature from the Civil War through 1900. (F) Sundquist

130D. American Literature: 1900-1945. (4) Three hours of lecture per week. A survey of modern American novels. (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, Ffrancis, Bryant, Emerson, Longfellow, Poe, Whitman, Dickinson, Frost, Pound, Eliot, and Stevens. (F) Breslin

132. American Novel. (4) Three hours of lecture per week. Studies of the major American novels. (SP) Padilla

133. Black Writers in America. (4) Three hours of lecture per week. Black writers in the American cultural context. (SP) 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) Hudson

136. 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 backgrounds of modern American life. (SP) Zwerdling

138. American Studies in Third World Literature in English. (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 backgrounds of modern American life. (SP) Zwerdling

138. Studies in Third World Literature in English. (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 backgrounds of modern American life. (SP) Zwerdling

171. Literature and Sexual Identity. (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 backgrounds of modern American life. (SP) Zwerdling

177. Literature and Psychology. (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 backgrounds of modern American life. (SP) Zwerdling

180A. Autobiography. (4) Three hours of lecture per week. Lectures on and discussion of autobiographical novels. (SP) Padilla, Breslin

180C. Comedy. (4) Three hours of lecture per week. Studies of representative comic forms, techniques, and points of view. (SP) Padilla, Breslin

180E. The Epic. (4) Three hours of lecture per week. Readings and discussion of epics, considering their cultural and historical contexts, the nature of their composition, and the development of the form. (SP) Padilla, Breslin

180H. Short Story. (4) Three hours of lecture per week. Readings on and discussion of the form of the short story. (SP) Padilla, Breslin

180J. The Essay. (4) New course. Three hours of lecture per week. Study of the essay as a literary form, the circumstances of its use and development, and its fortunes in 20th-century culture. (SP) Padilla, Breslin

188. Special Topics. (4) Course may be repeated for credit with permission of the instructor. Three hours of lecture per week. Prerequisites: Consent of instructor. Designed primarily for English majors. Topics will vary from semester to semester. Students should consult the department's "Announcement of Classes" for offerings well before the beginning of the semester. (F,SP) Lloyd

188. Literature and Popular Culture. (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 backgrounds of modern American life. (SP) Zwerdling

189. British and American Folklore. (4) Three hours of lecture per week. A survey of the major forms of folklore. Emphasis on the oral tradition and written materials. (SP) Bishop

193. Computers in the Humanities: Literary Applications. (4) Course may not be counted as one of those required for the major or as a breadth requirement for a student in the sciences. Three hours of lecture per week. Prerequisites: Consent of instructor. An introduction to the use of computers in the study of literature, including analysis of texts, computer-aided bibliographic techniques. The course will include sufficient instruction in a programming language to enable students to program text manipulations. In addition to readings, students will be required to arrange training time on the computer for an average of three hours per week. No previous knowledge of computers is assumed.

Professional Courses

310. Field Studies in Tutoring Writing. (1-3) Course may be repeated for a maximum of 6 units. Must be taken on a passed/not passed or satisfactory/unsatisfactory basis. Two to four hours of supervised tutoring in the Student Learning Center and one 2-hour seminar per week. Prerequisites: Pre-enrollment interviews required. Tutoring Berkeley undergraduates in Subject A, B, C, 1A, 1B, and other writing and/or literature courses. Seminar topics: the writing process, responding to writing, composition theory, grammar, collaborative learning, tutoring methods. Tutors keep a weekly journal, read assigned articles, videotape their tutoring, and write a final paper. This course cannot be used toward fulfillment of the major requirements. (F,SP) Staff

Honors and Tutorial Courses

Lower Division Courses

99. Independent Study. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Independent. Prerequisites: Open to sophomore honors students with an overall GPA of not less than 3.3. Meetings to be arranged. Reading and regular 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 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

*Not offered 1989-90

1On leave, spring

2On leave, fall

*On leave

^Recalled to active service

^Not offered 1989-90

*Not offered 1989-90

1A, IB, and other writing and/or literature courses.
hours of lecture per week. Prerequisites: Open only to seniors, honor students (i.e., students with an overall GPA of 3.51 or higher and a GPA of 3.51 or higher in courses taken at Berkeley 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, credit may be transferred to students who write an honors thesis. Completion of the thesis is required for a passing grade in the course. (F,SP) Bader, Goldsmith

196A. Junior Seminar: Great Books of English and American Literature. (4) Three hours of lecture per week. Prerequisites: Writing placement or junior standing. Three hours of lecture per week. The Teaching of Composition. (3) Three hours of lecture per week. Prerequisites: Completion of 341 for the graduate major. Designed to acquaint students with typical community college English programs and to afford them the opportunity to observe, participate, and assist in community college English classes, especially at the remedial level of freshman writing classes.

Graduate Courses
For admission to some seminars, special competence in a foreign language level may be required at the instructor’s discretion.

200. Problems in the Study of Literature. (4) Three hours of lecture per week. Approaches to literary study, including textual analysis, scholarly methodology and bibliography, critical theory, and practice. (F) Breslin, Dinsmore, Knapf

201A. The English Language. (4) Three hours of lecture per week. Structure of the present-day English—pronunciation, grammar, vocabulary, dialects. (SP) Bantiff


202. History of Literary Criticism. (4) Three hours of lecture per week.

203. Graduate Readings. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Open to advanced undergraduate students, with the consent of the instructor. Graduate lecture courses surveying broad areas and periods of literary history, and directing student in wide reading. Offerings vary from year to year. Students should consult the department’s “Announcement of Classes” for offerings well before the beginning of the semester. (F,SP) Staff

205A-205B. Old English. (4) Three hours of lecture per week. Prerequisites: Open to undergraduates with the consent of the instructor. (F) Nieboer

206. Celtic Studies. (4) Course may be repeated for credit. Three hours of lecture per week. (SP) O’Hearn

207A. Readings in Medieval Latin. (4) Course may be repeated for credit with the consent of the instructor. Three hours of lecture per week. Prerequisites: Latin 2 or equivalent. An introduction to the central language and literature of the Middle Ages.

207B. Readings in Renaissance Latin. (4) Three hours of lecture per week. An introduction to the range of Renaissance Latin texts.

211. Chaucer. (4) Three hours of lecture per week. Discussion of Chaucer’s major works. (F) Muscatine

212. Readings in Middle English. (4) Three hours of lecture per week. Rapid reading of selections in Middle English, from the 12th century through the 15th. (SP) Damon

217. Shakespeare. (4) Course may be repeated for credit. Three hours of lecture per week. Discussion of selected works of Shakespeare. (F) Booth

218. Milton. (4) Three hours of lecture per week. Discussion of Milton’s major works. (SP) Coolidge

220. Theory of Composition. (4) Three hours of lecture per week. Prerequisites: Current or prior experience in the teaching of composition or consent of instructor. Readings in composition theory combined with consideration of practical applications.

243A. Fiction 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.

246. Graduate Proseminars. (4) Three hours of lecture per week. Prerequisites: Open only to students in the M.A. program. Qualified students should consult their advisers and the department’s “Announcement of Classes” for offerings well before the beginning of the semester. (Adelman, Bishop)
Entomological Sciences (College of Natural Resources)

Department Office: 218 Wellman Hall, 542-6660
Chair: David L. Wood, Ph.D.

Professors:
John R. Anderson, Ph.D. University of Wisconsin, Madison.
Elizabeth Bernays, Ph.D. University of London. Arthropod feeding relationships with plants.

Leonard E. Dalegrette, Ph.D. University of California at Berkeley. Biological control.

John E. Casida, Ph.D. University of Wisconsin, Madison. Insecticide chemistry and toxicology.
Donald L. Dake, Ph.D. University of California at Berkeley. Forest entomology, biological control.

(Woody) V. Daly, Ph.D. (Vice Chair) University of Kansas. Ecological entomology.

John T. Doyen, Ph.D. University of California at Berkeley. Ecological entomology.

Louis A. Feinio, Ph.D. University of California at Berkeley. Aquatic entomology.

Gordon W. Frewin, Ph.D. University of California at Berkeley. Ecological entomology.

Wayne M. Getz, Ph.D. University of Wisconsin, Madison. Insect behavior.

Andrew Gutierrez, Ph.D. University of California at Berkeley. Biological control.

Kenneth S. Hagen, Ph.D. University of California at Berkeley. Insect nutrition.

Marjorie A. Hoy, Ph.D. University of California at Berkeley. Acarology.

Werner L. Jebb, Ph.D. Imperial College, University of London. Insect behavior.


Vincent H. Resh, Ph.D. University of Minnesota. Aquatic entomology.

Edward S. Sylvestre, Ph.D. University of California at Berkeley. Vector entomology.

Clarence J. Weinmann, Ph.D. University of California at Berkeley. Experimental entomology.

David L. Wood, Ph.D. University of California at Berkeley. Forest entomology.

Richard T. Doutt, Ph.D. University of California at Berkeley. Biological control (Emeritus).

David F. Funk, Ph.D. University of California at Davis and Berkeley. Medical entomology, acarology (Emeritus).

William M. Hoskins, Ph.D. University of California at Berkeley. Insect toxicology (Emeritus).

Carl B. Hufkafer, Ph.D. Ohio State University. Biological control (Emeritus).

E. Gorton Linsley, Ph.D. University of California at Berkeley. Insect illustration (Emeritus).

David E. Middlekauff, Ph.D. Cornell University. Agricultural pest management (Emeritus).

Wayne K. Waters, Ph.D. Yale University. Forest entomology.

Associate Professors:
Wallace J. Allendorf, Ph.D. University of Florida. Biological control. Isao Kubo, Ph.D. Osaka City University, Japan. Insecticidal chemicals.

Robert S. Lane, Ph.D. University of California at Berkeley. Parasitology, tick biology.

Alexander H. Purcell, Ph.D. University of California at Davis. Insect vector ecology.


Assistant Professor:
Stephen C. Walter, Ph.D. University of California, Riverside. Orchard pest management.

Adjunct Professor:
Richard A. Chapman, Ph.D. University of London. Insect physiology.

Lecturers:
William W. Allen, Ph.D. University of California at Berkeley. Entomology, parasitology.

Reginald H. Dadd, Ph.D. Imperial College, University of London. Ecological entomology.

Richard Garcia, Ph.D. University of California at Berkeley. Biological control, mosquito biology.

Harold F. Gordon, Ph.D. Harvard University. Insect biochemistry.


Gary L. Simms, Ph.D. Cornell University. Nematology.

Charles H. Schaefer, Ph.D. University of California at Berkeley. Mosquito research.

Charles G. Summers, Ph.D. Cornell University. Agricultural entomology.

The Department of Entomological Sciences presents a diversified and highly interdisciplinary teaching and research program. This includes the following areas of emphasis:

- **Acarology**: the biology, ecology, and taxonomy of mites and ticks.
- **Agricultural Entomology**: the study of insects and other arthropods that attack agricultural crops; their life histories, mode of injury, economics, distribution, and methods of control.
- **Aquatic Entomology**: the taxonomy and ecology of insects inhabiting aquatic environments.
- **Biological Control**: the regulation of populations by natural enemies, and the utilization of parasites, predators, and pathogens for the control of insects, pests and weeds.
- **Forest Entomology**: the study of insects affecting forests and forest products; their life histories, mode of injury, economics, distribution, and control.
- **Insect Behavior**: the physiological mechanisms of behavior, with emphasis on feeding, reproduction, orientation, and circadian rhythms.
- **Insect Ecology**: the relationships of insects to their biotic and physical environments, including insect behavior and population dynamics.
- **Insect Morphology**: insect functional anatomy, with emphasis at the tissue and cellular levels.
- **Insect Pathology**: the principles of pathology and microbiology as applied to insects, the relation of insect diseases to insect control.
- **Insect Vectors of Plant Pathogens**: the role of insects in the transmission and causation of plant diseases with emphasis on plant viruses.
- **Insect Virology**: the characterization, pathobiology, and utilization of insect viruses in the management of arthropod populations.
- **Medical/Veterinary Entomology**: the role of insects and other arthropods in transmission and causation of diseases of humans and domestic animals.
- **Natural Products Chemistry**: the identification and testing of naturally occurring products that affect the growth and behavior of insects.
- **Nematology**: the taxonomy, morphology, host-parasite relationships, and control of nematodes that inhabit plants, invertebrates and soil.
- **Parasitology**: the study of insects, other arthropods, and helminths that attack human or domestic animals, or transmit disease agents; host-parasite interrelationships.
- **Pest Management**: the recognition and identification of pest problems and development of ecologically and economically sound corrective procedures.
- **Pesticide Chemistry and Toxicology**: the chemistry of pesticides and their actions on target and non-target organisms.
- **Physiology and Biochemistry**: the physiological and biochemical adaptations of insects.
- **Systematic and Evolutionary Entomology**: insect evolution, phylogeny, classification, nomenclature, and identification.

Facilities. The department occupies space in Gianelli Hall, Hillgard Hall, and Wellman Hall, to laboratories and classrooms, the facilities include an outstanding entomology museum, specialized laboratories for pesticide chemistry, pathology, natural products chemistry and physiology, and an extensive library collection, animal rooms, buildings, growth chambers, bioclimatic chambers, and greenhouses at the nearby Oxford Research Unit, and at the Division of Biological Control on the Gill Tract near Berkeley.

Undergraduate Programs. The entomology major provides training for research, teaching, and public service in the many commercial fields where knowledge of entomology and parasitology is applied.

*Not offered 1989-90

For lower division and upper division requirements, see the Announcement of the College of Natural Resources.

Minor Program. Students may declare a minor in entomology. A minimum of five courses in entomology are required, totaling a minimum of 12 units. Three of the courses must be upper division courses and must include Entomology 100. The other two courses may be either lower division or upper division. A minimum grade-point average of 2.0 must be obtained in the chosen courses.

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 requirements for the minor in entomology may be either lower division or upper division, and are fulfilled by a bachelor's degree in an entomology from an accredited institution. The preparatory undergraduate program should include: general entomology, insect classification, insect anatomy and physiology, systematic entomology, insect ecology, applied entomology, and a year of organismal and cellular biology.

Courses in genetics, statistics, inorganic or organic chemistry, and physics are also required. Deficiencies in these areas must be remedied at the outset of graduate study.

Lower Division Courses

1. **Natural History of the Insects.** (2) Must be taken on a pass/no pass basis. Two 1-hour lectures per week and optional field trips. An outline of the main facts and principles of biology as illustrated by insects, with special emphasis on their relations to plants and animals.

2. **Systematic Entomology.** (4) Two 1-hour lectures per week. Regulation of populations of organisms, especially insects, through interactions with parasites, predators, pathogens, competitors. Discussion of examples from structural, forest, urban, and recreational environments.

3. **Agricultural Entomology.** (4) Two 1-hour lectures and two 3-hour laboratories per week. Principles: Introductory course in a biological science. Biology of insects, including classification of orders and common families, morphology, physiology, behavior, and ecology.

4. **Parasitology.** (3) Two 1-hour lectures and two 3-hour laboratories per week. Principles: Comparative biology of insect orders; identification and classification of families. (SP) Daly, Purcell

5. **Insect Classification and Identification.** (4) Two 1-hour lectures per week. An introduction to the classification and identification of insects, including the use of keys, and examples from the insect orders. (SP) Purcell

6. **Functional Insect Anatomy.** (4) Two 1-hour lectures and two 3-hour laboratories per week. Principles: Comparative biology of insects; identification and classification of families. (SP) Doyen

7. **Insect Physiology.** (3) Two 1-hour lectures and one hour of discussion per week. Principles: General biology, zoology, or entomology. A survey of the biological mechanisms of insects, including the analysis of physiological systems at the cellular-molecular level. The minimum requirements are usually fulfilled by the students.

8. **Entomological Science Laboratory.** (2) Two 1-hour lectures and two 3-hour laboratories per week. Principles: Comparative biology of insect orders; identification and classification of families. (SP) Doyen

9. **Parasitology.** (3) Two 1-hour lectures and one hour of discussion per week. Principles: General biology, zoology, or entomology. A survey of the biological mechanisms of insects, including the analysis of physiological systems at the cellular-molecular level. The minimum requirements are usually fulfilled by the students.

10. **Systematic Entomology.** (4) Two 1-hour lectures and one hour of discussion per week. Principles: General biology, zoology, or entomology. A survey of the biological mechanisms of insects, including the analysis of physiological systems at the cellular-molecular level. The minimum requirements are usually fulfilled by the students.

11. **Agricultural Entomology.** (4) Two 1-hour lectures and two 3-hour laboratories per week. Principles: Comparative biology of insect orders; identification and classification of families. (SP) Doyen

12. **Medical/Veterinary Entomology.** (4) Two 1-hour lectures and two 3-hour laboratories per week. Principles: Comparative biology of insect orders; identification and classification of families. (SP) Doyen

13. **Parasitology.** (3) Two 1-hour lectures and one hour of discussion per week. Principles: General biology, zoology, or entomology. A survey of the biological mechanisms of insects, including the analysis of physiological systems at the cellular-molecular level. The minimum requirements are usually fulfilled by the students.

14. **Parasitology.** (3) Two 1-hour lectures and one hour of discussion per week. Principles: General biology, zoology, or entomology. A survey of the biological mechanisms of insects, including the analysis of physiological systems at the cellular-molecular level. The minimum requirements are usually fulfilled by the students.
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. Ecology covers interactions with the physical environment; population and community dynamics; description of different insect community types; applied insect ecology. (SP) Welter

108. Biology of Aquatic Insects. (3) Two 1-hour lectures and one 3-hour lab per week. Prerequisites: Introductory course in biology and ecology of aquatic insects, including their role as indicators of environmental quality. Offered even-numbered years. (F) Resh

110. Applied Entomology. (4) Two 1-hour lectures and one 3-hour lab 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. (F) Purcell

117. Pesticide Chemistry and Toxicology. (3) Three 1-hour lectures per week. Prerequisites: Introductory courses in organic chemistry and biology, or consent of instructor. Chemical composition of pesticides and related compounds, their mode of action, resistance mechanisms, and methods of evaluating their safety and activity. Offered odd-numbered years. (SP) Casida

117L. Laboratory in Pesticide Chemistry and Toxicology. (1) One 3-hour laboratory per week. Prerequisites: 117. Laboratory of insecticide (taken concurrently) and consent of instructor. Exercises and demonstrations on chemistry, metabolism and various biological effects of selected pesticides and related compounds. Limited enrollment. Offered odd-numbered years. (SP) Casida

119. Insect Behavior. (3) Two 1-hour lectures and one hour of discussion per week. Prerequisites: 105, or consent of instructor. An introduction to the evolution and physiological mechanisms of insect behavior, with special reference to reproductive behavior and communication. Offered odd-numbered years. (F) Resh

119L. Laboratory in Insect Behavior. (1) One 3-hour laboratory per week. Prerequisites: 119 (may be taken concurrently) and consent of instructor. Laboratories in locomotion, orientation, feeding behavior, communication, reproductive behavior, circadian rhythms. Offered odd-numbered years. (F) Purcell

120. Introduction to Pest Management. (4) Formerly Pest Management 120. 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). Principles of pest control, entomology, and methods of applying the integrated pest management approach in agriculture, forest, and urban situations. Includes sampling of harmful and useful species. Lecture and utilization of computerized and traditional technologies. Attention given to social, economic, political, and environmental aspects of pest control. Offered even-numbered years. (F) Falcon

130. Biological Control of Pests. (3) Three 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 control methods through practical applications, augmentation, and conservation of natural enemies. Offered odd-numbered years. (F) Hagen, Callagro

150. Medical-Veterinary Parasitology. (3) Two 1-hour lectures per week. Prerequisites: Upper division standing or consent of instructor. The physiology and helminth parasites of man and domestic animals. Host-parasite interactions, epidemiology, pathogenesis, treatment, and control. (SP) Weinmann, Silverman

153. Medical and Veterinary Entomology. (4) Three 1-hour lectures and one hour of pest management discussions per week. Prerequisites: Consent of instructor. The role of other arthropods in the transmission and causation of diseases of humans and domestic animals, including the geographical areas and types of ecosystems inhabited by the structural behavioral adaptations associated with parasitism. Pest management/discussion sessions focus on how aspects of the biology and behavior of vector and pest species influence the types of strategies used in control/management programs. Offered odd-numbered years. (SP) Anderson, Lane

153L. Medical and Veterinary Entomology Laboratory. (1) Formerly part of 153. One 3-hour laboratory per week. Laboratory identification of the major arthropod vectors of disease agents to humans and other animals, and study of the structural adaptations associated with triatomine and ptyaloproteid stages and with blood feeding. Offered odd-numbered years. Anderson, Lane

163. An Introduction to Acarology. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 100 or 110 or equivalent. An introduction to the 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) Hoy

165. Vector-Pathogen Relationships. (24) 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 parasitology and entomology and consent of instructor. A study of vectors of human and animal diseases and arthropods acting as vectors in the spread of plant diseases. Laboratory emphasis on rearing, manipulation, and use of auctorial insects in transmission of plant viruses and prokaroyces. Offered odd-numbered years. Purcell, Sylvester

170. Chemical Ecology. (2) Two 1-hour lectures per week. Prerequisites: Introductory courses in organic chemistry and biology or consent of instructor. Plant toxins and their effects on animals, hormonal interactions between plants and animals, feeding preferences, animal pheromones and defense substances, biochemical interactions between higher plants, and phytoalexins and phytotoxins. (F) Kubo

179. Field Studies in Entomology. (1-3) Course may be repeated for credit. Prerequisites: Consent of instructor. Field trips in off-campus organizations relate to specific aspects of entomology. Regular individual meetings with faculty sponsor and written reports required. (F,SP) Staff

186. Directed Group Studies for Advanced Undergraduates. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. One unit for three hours of work per week. Consent of instructor. Study or research on topics that may vary from semester to semester. (F,SP) Staff

189. Supervised Independent Study and Research. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. One unit for three hours of work per week. Consent of instructor. Enrollment is restricted by regulations listed on pages 87 and 88 of this catalog. (F,SP) Staff

200. Entomology Staff Seminar. (0) No credit. One session per week for graduate students to discuss the advances in insectology through individually prepared papers by students. (F,SP) Staff

204. Principles of Systematic Entomology. (2) Two 1-hour lectures per week. Prerequisites: Consent of instructor. The principles of insect control; insect ecology and integrated pest management. Offered odd-numbered years. (F) Anderson, Lane, Weinmann

205. Insect Population Ecology. (2) Two 1-hour lectures per week. Prerequisites: 105, Math 16A, 16B, or consent of instructor. Population dynamics, regulations, and measurement, theory of natural control. Emphasis on models in population ecology relevant to insect population, ecology and integrated pest management. Offered odd-numbered years. (F) Gutierrez

210. Principles and Problems in Agricultural Entomology. (3) Three 1-hour lectures per week. Prerequisites: 100 or 110. The principles of insect control; the side effects to plants and animals following insecticide usage; plot design and sampling techniques; legislative controls in agricultural entomology. (SP) Allen, Welter

214. Advanced Forest Entomology. (2) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 100 or Forestry 106 or consent of instructor. Concepts and practices in forest entomology and the research from which they are derived. Offered even-numbered years. (F) Ballinger

230. Biology of Parasitoids. (3) One hour of lecture and six hours of laboratory per week. Prerequisites: 130 or consent of instructor. The ecology, behavior, and developmental biology of parasitoids (protelean parasites). Emphasis is on laboratory and field studies of host-parasitoid relationships and the evolution of these specialized adaptations in a wide range of taxonomic groups. (F) Callagro

250. Plant-Arthropod Interactions. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: Consent of instructor. Behavioral ecology and physiological ecology of phytophagous Arthropods, particularly insects. Impact of plant chemistry on behavior and physiology of phytophagous insects, and the evolution of behavioral adaptations to arthropods on plants, adaptive morphology and physiology of arthropods and types of selective pressures involved, crop plant resistance to pests and aspects of plant variability. Offered odd-numbered years. (F) Bernays

254. Field Course in Medical Entomology-Parasitology. (1) Prerequisites: 150 and/or 153, or consent of instructor. Two weekend field trips; one a meeting to precede each field trip and one a half-day meeting at the end of each field trip. Techniques used for collecting blood-sucking arthropods and trapping selected vertebrate hosts; methods of processing specimens for study; examining bloods, etc., for parasites and identification of specimens. Offered odd-numbered years. (F) Anderson, Lane, Weinmann

272. Principles and Methods of Entomological Research. (3) Three 1-hour lectures per week. Techniques and purposes of the scientific method in entomology, with emphasis on problem selection and the collection of data. Research techniques and preparation of papers will be required. Offered odd-numbered years. (F) Sylvester

274. Presentation and Publication of Entomological Research. (2) One 3-hour session per week. Course will deal with topics such as organization of research and data collections, preparation of data collection; and preparation of slides and other visual aids, the scientific publication process, academic and other career options, and considerations about extramural funding. Research presentations and other assignments will be required. Offered odd-numbered years. (F) Resh

290. Special Seminar. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour lecture per week. Prerequisites: Consent of instructor. Reports and discussion of original research by staff and students. (F,SP) Volkman

298. Seminar in Insect Physiology. (1) Course may be repeated for credit. A 3-hour seminar held once a week for graduate students to discuss advances in insect physiology through individually prepared papers by students. (SP) Bernays, Loher, Mittler, Pipa, Weeks

288. Seminar in Parasitology. (1) Course may be repeated for credit. One 3-hour seminar held once a week for graduate students to discuss advances in medical entomology/parasitology through individual presentations prepared by students. (SP) Anderson, Lane, Weinmann

299. Special Seminar Topics. (1) 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

290. Seminar in Urban and Agricultural Entomology. (1) Course may be repeated for credit. A 3-hour seminar...
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Upper Division Courses

101. Writing About Environmental Design. (3) New course. Course may be repeated for credit. One 3-hour meeting per week. Prerequisites: English 1B or equivalent, and consent of instructor. An intensive workshop for students interested in writing about architecture, landscape, and the built environment. Different forms of expression—theoretical, critical, historical, professional, even fictional—will be considered through regular readings and weekly writing assignments and will be applied to selected topics in the field. Class periods will be spent discussing classic writings (ranging from John Ruskin to J. B. Jackson) and critiquing students' own papers. The course will emphasize critical reading skills, as well as the development of a clear, original writing style. (F) Litchez

104. Site Planning. (3) Two 1-hour lectures and two 2-hour studios per week. Prerequisites: LA 101 or Arch 1004. 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 1½-hour lecture, one 1½-hour discussion, and three hours of studio per week. Prerequisites: LA 1B and Arch 1004. 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 built environment.

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, 1783-1900. (3) Two 3-hour lecture and two 3-hour discussion per week. The evolution of American landscapes—our everyday homes, highways, farms, stores, and recreation areas—with an emphasis on how to read the landscape as a record of social and cultural processes. Sponsoring department: Landscape Architecture. (F,SP)

195. Senior Thesis. (4) Course may be repeated once for credit. Prerequisites: Limited to students with approved individual majors in the College of Environmental Design. Directed study leading to preparation of a senior thesis. (F,SP)

Environmental Design (College of Environmental Design)

Department Office: 224 Wurster Hall, 642-0832 Chair: Raymond Litchez

Professors:
- Norma D. Enerson (Architecture)
- Raymond Litchez (Architecture)
- Marc Treib (Architecture)
- Jim H. Van der Pyn (Architecture)

Associate Professors:
- Anthony Dubovsky (Architecture)
- Stanley Saitowitz (Architecture)

Assistant Professors:
- Paul E. Groth (Landscape Architecture)
- Patricia D'O'Brien (Landscape Architecture)
- Jill Stoner (Architecture)
- Chip Sullivan (Landscape Architecture)

For a description of the programs in environmental design, see page 73.

Lower Division Courses

1. Introduction to Environmental Design. (3) Two 1½-hour lectures and one 2-hour discussion/studio per week. Survey of representative ideas and critical approaches. The role of environment in design, including the development of a clear, original writing style. (F,SP)

4. People and Environment. (3) Two 1½-hour lectures; one hour of discussion per week. Survey of relationships between people and environments, and design of environments. Sponsoring department: Landscape Architecture. (SP)

11A. Environmental Design I. (4) Students who have taken 6A in the quarter system may not receive credit for 11A. Two 1½-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 engage and convey ideas regarding the environment. (F,SP)

11B. Environmental Design II. (4) Two 1½-hour lectures and two 3-hour studios per week. Prerequisites: 11A. Two 1½-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 engage and convey ideas regarding the environment. (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, colonial times to present.
Environmental Sciences
(College of Letters and Science)

Group Major Office: Undergraduate Interdisciplinary Studies (Division of Environmental Graduate Studies), 301 Campbell Hall, 642-2628

Instructor: Doris Sloan.

Major Advisers: William B.N. Berry, Head Adviser; Area I: Physical Science: Mark Christensen; Area II: Social Science: Herbert G. Baker, William Z. Lidicker; 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 social science. Details of course requirements appear below. Each program emphasizes broad and comprehensive training in the fundamentals of mathematics, physics, chemistry, 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 environmental 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 problems stemming from the interaction of people with other people in society; 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 Undergraduate Interdisciplinary Studies. Students are referred to this office for all administrative matters, and 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 1 and either Integrative Biology 105 (formerly Biology 150) or Forestry 170; Chemistry 1A-1B; Computer Science 7 or 8; Mathematics 1A-1B; Physics 8A-8B or 7A-7B.

Upper Division Courses. Energy and Resources 102; Environmental Sciences 125, 196A-196B; Anthropolgy 148 or Geography 125.

Additional courses from the following list to make a total of 30 upper division units. Anthropology 106, 108; Integrative Biology 105 (formerly Biology 150); Integrative Biology 120 (formerly Botany 115); Integrative Biology 130 (formerly Botany 125); Integrative Biology 154 (formerly Botany 154); Integrative Biology 154L (formerly Botany 154L); Civil Engineering 114; Conservation and Resource Studies 103-104B; Ecology 101A or 101B; Forestry 117, 122, 123, 125, 141-141L, 142, 143, 170, 177, 178; Geography 130, 131, 139, 148; Nutritional Sciences 100; Physical Education 105A, 105B; Pest Management 151; Plant Pathology 120; Biomedical and Environmental Health Sciences 150, 156; Plant and Soil Biology 100, 101; Economics 125; Geology 50, 106; Biomedical and Environmental Health Sciences 130A, 130B; Energy and Resources 100.

Area II: Social Sciences

Lower Division Courses. Biology 1A-1B or 11 and either Integrative Biology 105 (formerly Biology 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, 196A-196B; Anthropology 140 or 148; Integrative Biology 105 (formerly 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 148 or Geography 100 or 101; Anthropology 144, 164; City and Regional Planning 110 or Landscape Architecture 100 or 130; Conservation and Resource Studies 110, 115, 130 or 131, 132, 150 or 151 or Environmental Design 169A; 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 103 or 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; English 40 or 144; Geology 10; Civil Engineering 144; Statistics 2, 20 or 131A-131B-131F.

Lower Division Courses

10. Introduction to Environmental Science. (3) Three hours of lecture and one hour discussion per week. Survey of biological and physical environmental problems, focusing on geologic hazards, water and air quality, supply and demand, competition and endangered species, protected species, and society. Interaction of technical, social, and political approaches to environmental management. Emphasizing Bay Area problems. (F,SP)

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. (SP)

198A-198B. Senior Seminar in Environmental Sciences. (3) (F,SP) Three hours of seminar per week, field trips, community contacts, individual research tutorials. Prerequisites: Senior standing in the ES major and 125. Seminar and published research reports giving detailed attention to a current environmental problem in the Bay Area. (FSP)

199. 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: Enrolment is restricted by regulations listed on pages 87 and 88 of this catalog. (FSP)

Ethnic Studies
(Special Studies or College of Letters and Science)

Department Office: 3404 Dwinelle Hall, 642-0240
Chair: Alex M. Saragosa, Ph.D.

Professors: Paula G. Alte, Ph.D. (Native American Studies)
Mario Barrera, Ph.D. (Chicano Studies)
Ronald T. Taken, Ph.D. (Asian American Studies)

Associate Professors: Clara Sue Kidwell, Ph.D. (Native American Studies)
Elaine H. Kim, Ph.D. (Asian American Studies)
Margaret B. Melville, Ph.D. (Chico Studies)
Carlos M. Mufioz, Jr., Ph.D. (Chicano Studies)
Alex M. 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)
Amado Y. Cabezas, Ph.D. (Chicano Studies)
Rory Silverman Fauset, J.D. (Native American Studies)
Saul-ling C. Wong, Ph.D. (Asian American Studies)

Lecturers:
Lori Ding (Asian American Studies)
Michael A. Omi (Asian American Studies)

Undergraduate Major Advisors: Mr. Saragosa, 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 American 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.

The student majoring in ethnic studies works closely with an academic adviser and selects an area of emphasis—social sciences, humanities, community studies, or special area.
Breadth 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 course work 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

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 196.
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, Asian American studies, or Afro-American studies.

Lower Division Courses

20. Introduction to Ethnic Studies. (3) Two 1/2-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) (W) (R)

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) (W) (R)

30. Third World Cultural Patterns. (3) Two 1/2-hour lectures per week. A comparative analysis of Third World groups and cultures in America, with emphasis on patterns of thought, differences in strategy, and cognitive maps used by various groups in responding to common pan-cultural life situations.

98. Supervised Group Study and Research. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor: Limited to freshmen and sophomores. Supervised research by lower division students. (F,SP) Staff

Upper Division Courses

*100. Third World Literature in America. (3) Two 1/2-hour lectures per week. Analysis of how selected works (poetry, short stories, novels, drama, and oral literature) reflect Afro-American, Chicano, Asian American, and Native American consciousness and experiences.

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 racial attitudes and the subordination of Afro-Americans, Asians, Chicanos, and Native Americans within the context of American society and culture. (F) Takaki

*131. Responses to Racial Inequality in America: A Comparative Analysis. (3) Two 1/2-hour seminars per week. Prerequisites: 130. Seminar on the political, economic, social, and emotional responses to racial inequality in the United States.

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 child-rearing among Afro-Americans, Asian Americans, Chicanos, and Native Americans. Emphasis on 1880 to present with attention to diversity of historical experiences of these minorities in male/female relations, family structure, and childhood socialization.

135. Contemporary U.S. Immigration. (3) Two 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. Analysis of how selected works reflect Afro-American, Chicano, Asian American, and Native American experiences. Emphasis on 1880 to present with attention to diversity of historical experiences of these minorities in male/female relations, family structure, and childhood socialization.

140. 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 at the federal, state, and local levels on those communities. Understanding of political ideologies, values, and structures of political institutions. (SP) Muñoz

143. Electronic Images of Third World Communities. (3) One 2-hour lecture and three hours of laboratory per week. Prerequisites: Consent of instructor. Course in television media-making and its impact on Third World Communities. Designed to increase awareness of and encourage students to understand the effects of TV and the production of TV. Students will gain experience in the conception and production of electronic images. (F) (S)

*144. Law and Race: The Criminal Justice System. (3) Two 1/2-hour lectures 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 gang, and other related issues.

145. Religion and Ethnicity. (3) Three hours per lecture. 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 1/2-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 of racism on individual growth and personality development. Also considered will be the indirect effects via institutional racism in schools and government agencies.

*147. Third World Women. (3) Two 1/2-hour lectures per week. An examination of the contributions of Third World women in various fields: literature, art, politics, history, and economics. An analysis of the roles of Third World women within the family as an institution will also be made.

*148. Economic Development in Third World Communities. (3) Two 1/2-hour lectures and one 1-hour discussion per week. Covers various theories about economic development in Third World communities, explores current status, progress, barriers to, 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.

*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.

190. Advanced Seminar in Third World Studies. (3) Course may be repeated for credit as topic changes. Two 1/2-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) Fausett, Staff

*194. Quantitative Methods for Community Research. (3) Two 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 racial minority communities. Attention given to problem articulation, modeling, instrument design, data collection, statistical and data analysis, and interpretation in research in minority communities.

195. Selected Issues in Third World Research. (3) Course may be repeated once for credit. Two 1/2-hour seminars per week. Prerequisites: 20 or 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. This course may be repeated. (F) (SP) Staff

H196. Senior Honors Seminar for Ethnic Studies Majors. (3) Three hours of seminar per week. Prerequisites: 195. Research seminar designed to support and guide the 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: Upper division standing and consent of instructor. Group discussion, research, and reporting on a topic. (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 a topic which leads to the writing of major paper. Regular meetings with the faculty sponsor. (F,SP) Staff
**Ethnic Studies Graduate Group**

**Graduate Courses**

**200A. Major Issues in Ethnic Studies Scholarship:**

**World Context:** (4) One 4-hour seminar per week. Prerequisite: 200B 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 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 to designed to involve Ethnic Studies students to participate in the research process. Emphasis on examination and analysis of primary sources, methodology, and the development of theoretical constructs. 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. A term paper is required. (F,SP)

299. Directed Reading: Major Racial Minorities in the United States. (2-4) Course may be repeated for credit. Individual Instruction. A term paper is required. (F,SP)

299A. Major Works in Afro-American Studies. (2-4) Course may be repeated for credit. Individual Instruction. A major essay is required. (SP)

299B. Major Issues in Ethnic Studies Scholarship: World Context. (4) One 4-hour seminar per week. Prerequisite: 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 within a world context. A major essay required. (SP)

**200B. Major Issues in Ethnic Studies Scholarship:**

**World Context:** (4) One 4-hour seminar per week. Prerequisite: 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 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 to designed to involve Ethnic Studies students to participate in the research process. Emphasis on examination and analysis of primary sources, methodology, and the development of theoretical constructs. 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. A term paper is required. (F,SP)

299. Directed Reading: Major Racial Minorities in the United States. (2-4) Course may be repeated for credit. Individual Instruction. A term paper is required. (F,SP)

299A. Major Works in Afro-American Studies. (2-4) Course may be repeated for credit. Individual Instruction. A major essay is required. (SP)

299B. Major Issues in Ethnic Studies Scholarship: World Context. (4) One 4-hour seminar per week. Prerequisite: 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 within a world context. A major essay required. (SP)

**Film**

*(College of Letters and Science)*

**Group Major Office:** Undergraduate Interdisciplinary Divisions (Division of Undergraduate Studies), 301 Campbell Hall, 642-6843

**Advisory Committee:** William Nestrick, Head Adviser (English and Comparative Literature), Kermit Augst (French and Comparative Literature), Seymour Chatman (Rhetoric), Carol J. Clover (Scandinavian), Anton Kaes (German), Gabriel Moses (Italian).

**Film Major**

The group major in film is administered by the Undergraduate Interdisciplinary Divisions. It has been designed to place the history and theory of film in the larger context of humanistic studies.

To declare the film major: Film 25A (or Comparative Literature 25A) must be completed. In addition, the student must be progressing in the chosen language.

**Lower Division Courses**

25A. The History of Film. (4) Three hours of lecture and three to four hours of film laboratory per week. From the beginnings through the version to sound. (Fall 1930) (Film 25A, Comparative Literature 25A) and the development of the silent film through the New Wave and the emergence of new ethnic and national cinemas (1930-1971) (Film 25B, Comparative Literature 25B).

25B. The History of Film. (4) Three hours of lecture and three to four hours of film laboratory per week. Prerequisites: 25A or equivalent. The sound era through 1971. (Film 25A, Comparative Literature 25B).
28A. The Documentary Film. (3) New course. Three hours of lecture and one hour of laboratory per week. Prerequisites: 25A or equivalent. An analysis of the development of the documentary film, including examples by Flaherty, Grierson, Riefenstahl, Wiseman. Fabe.

28B. The Avant-Garde Film. (3) New course. Three hours of lecture and one hour of laboratory per week. Prerequisites: 25A or equivalent. A survey of experimental film, including examples by Vigo, Duchamp, Leger, Warhol, Dreyer, Brakhage, Kubelka, Riefenstahl, Gehm, Flampt, and Rainer. Staff.

100. History of Film Theory. (4) Three hours of lecture and three to four hours of film laboratory per week. Prerequisites: 25A or equivalent. The study, from a historical perspective, of major theorists of film. Staff.

108. Special Topics in Film Genre. (4) Course may be repeated for credit. Three hours of lecture and three to four hours of 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) Staff

151. Auteur Theory. (4) Course may be repeated for credit. Three hours of lecture and three to four hours of film laboratory per week. Prerequisites: 100 or equivalent. Staff.

153A. A Survey of American Film History. (3) Staff.

153B. A Survey of European Film History. (3) Staff.

155. History of Film Theory. (4) Three hours of lecture and three to four hours of film laboratory per week. Prerequisites: Consent of instructor. The study of the significant films of directors such as Kurosawa, Ford, Bergman, and others. Staff.

157. Latin American Film. (3) Three hours of lecture and three to four hours of film laboratory per week. Staff.

159. British Film. (3) Three hours of lecture and three to four hours of film laboratory per week. Staff.

161. Chinese Film. (3) Three hours of lecture and three to four hours of film laboratory per week. Staff.

163. Japanese Film. (3) Three hours of lecture and three to four hours of film laboratory per week. Staff.

250A. The World of the Camera. (3) Three hours of lecture and three to four hours of laboratory per week. Staff.

250B. The World of the Editor. (3) Three hours of lecture and three to four hours of laboratory per week. Staff.

250C. The World of the Sound Editor. (3) Three hours of lecture and three to four hours of laboratory per week. Staff.

250F. Advanced Editing. (3) Three hours of lecture and three to four hours of laboratory per week. Staff.

301. The Study of Documentary. (4) Staff.

309. Reading in Film Theory. (4) Three hours of lecture and three to four hours of film laboratory per week. Staff.

310. Undergraduate Film Production. (6) Staff.

311. Practice in Film Production. (3) Staff.

312. Practice in Film Editing. (3) Staff.

313. Practice in Film Sound. (3) Staff.

314. Practice in Film Lighting. (3) Staff.

315. Practice in Film Design. (3) Staff.

316. Practice in Film Production Management. (3) Staff.

317. Practice in Film Directing. (3) Staff.

318. Practice in Film Acting. (3) Staff.

319. Practice in Film Music. (3) Staff.

320. Practice in Film Writing. (3) Staff.

321. Practice in Film Production Research. (3) Staff.

322. Practice in Film Laboratory. (3) Staff.

323. Practice in Film Criticism. (3) Staff.

324. Practice in Film Distribution. (3) Staff.

325. Practice in Film Marketing. (3) Staff.

326. Practice in Film Sales. (3) Staff.

327. Practice in Film Distribution and Exhibit. (3) Staff.

328. Practice in Film Management. (3) Staff.

329. Practice in Film Production Planning. (3) Staff.

330. Practice in Film Production Control. (3) Staff.

331. Practice in Film Production Accounting. (3) Staff.

332. Practice in Film Production Auditing. (3) Staff.

333. Practice in Film Production Administration. (3) Staff.

334. Practice in Film Production Personnel. (3) Staff.

335. Practice in Film Production Law. (3) Staff.

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415. Practice in Film Production Accounting. (3) Staff.

416. Practice in Film Production Auditing. (3) Staff.

417. Practice in Film Production Administration. (3) Staff.
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) Wilcox

141. Mechanical Processing of Wood. (2) Two 1-hour lectures per week. The theory of converting logs into sawn, peeled, or other machine-produced products. (SP) Staff

142. Bonding Processes for Wood. (3) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisites: Consent of instructor. Principles of bonding, survey 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) Staff

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) Staff

190. Performance of Wood in Structures. (3) Formerly Architecture 159, section 2. Three 1-hour lectures per week. A survey of wood properties and wood products of importance to building design and construction. Case studies dealing with the use of wood products in structures to avoid wood biodeterioration failures. (F) Wilcox

198. Directed Group Study. (1-3) Course may be repeated for credit. Must be taken on a pass/no pass basis. Topics to be arranged. Prerequisites: Consent of instructor. Group study of special problems in forest products. (F,SP) Staff

Graduate Courses

221. Wood Formation and Structure. (3) Two hours of lecture plus one 2-hour laboratory per week. Prerequisites: 131 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 hormonal action. Formation of microfibrils in cell wall. Offered odd-numbered years. (F) Dodd

222. Advanced Wood Physics. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 132 or equivalent. Phenomenological approach to the adsorption of vapors and gases by wood. Shrinking and swelling in water, aqueous solutions, and non-aqueous liquids. Fluid flow including permeability and diffusion. Thermal properties with modes of heat transfer important in wood processing and usage. Offered even-numbered years. (F) Staff

223. 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) Staff

224. 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 degradation of terpenoids, fats, 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 even-numbered years. (SP) Staff

238. Special Topics in Wood Science and Technology. (1-3) Course may be repeated for credit. To be announced. Minimum of four hours of work per week per unit. Prerequisites: Consent of instructor. (F,SP) Staff

238A. Wood Anatomy. (1-3) Advanced study in wood anatomy primarily for advanced graduate students.

238B. Wood Chemistry. (1-3) Advanced study in wood chemistry primarily for advanced graduate students.

238C. 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/mechanical processing of wood primarily for advanced graduate students.

238G. Wood Products Pathology. (1-3) Advanced study in wood product pathology primarily for advanced graduate students.

238H. Wood Adhesion and Adhesives. (1-3) Advanced study in wood adhesives and adhesives primarily for advanced graduate students.

238I. Production Management. (1-3) Advanced study in forest products production management primarily for advanced graduate students.

238J. Wood Formation and Quality. (1-3) Advanced study in wood formation and quality primarily for advanced graduate students.

238K. Seminar in Wood Science and Technology. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. Current staff and student research and reports in wood science and technology. (SP) Staff

Forestry and Resource Management

(College of Natural Resources)

Department Office: 145 Mulford Hall, 642-3765

Professors:
Frank C. Beal, Ph.D. State University of New York, Syracuse. Forestry and resource management; forest products lab
Lawrence S. Davis, Ph.D. University of California at Berkeley. Forest management
Don C. Erman, Ph.D. Utah State. Fisheries ecology
John A. Helms, Ph.D. University of Washington. Silviculture
William J. Libby, Ph.D. University of California at Berkeley. Forest genetics
Robert E. Martin, Ph.D. University of Michigan. Wildland fire and management
Joe R. McBride, Ph.D. University of California at Berkeley. Forest ecology
Dale R. McCullough, Ph.D. University of California at Berkeley. Wildlife biology and management
William L. McDonald, Ph.D. University of California at Berkeley. Forest economics
Amy P. G. McPherson, Ph.D. University of Michigan. Mechanical behavior of wood materials
Arnold M. Schultz, Ph.D. University of Nebraska. Ecology
Dennis E. Teeguarden, Ph.D. University of California at Berkeley. Forest economics
W. Wayne Vose, Ph.D. University of Wisconsin, Madison. Biodeterioration
Eugen Zavin, Ph.D. University of California at Berkeley. Wood extractive chemistry
Paul J. Zinke, Ph.D. University of California at Berkeley. Soils and forest history
Harold H. Bliesl, Ph.D. (Emeritus) University of Nebraska. Fire ecology
David L. Brink, Ph.D. (Emeritus) University of Minnesota. Chemical properties and processing
Robert A. Cockrell, Ph.D. (Emeritus) University of Michigan. Wood packaging
Robert N. Cowell, Ph.D. (Emeritus) University at California at Berkeley. Remote sensing
Harold F. Hartman, Ph.D. (Emeritus) University of California at Berkeley. Range ecology and management
Edward C. Storm, Ph.D. (Emeritus) University of California at Berkeley. Silviculture forest nursery management
Henry J. Vaux, Ph.D. (Emeritus) University of California at Berkeley. Forest economics and policy
William E. Waters, Ph.D. (Emeritus) Yale University. Forest entomology
Lee C. Wenzel, Ph.D. University of Minnesota. Sampling inventory, measurement
John A. Zivnuska, Ph.D. (Emeritus) University of Minnesota. Forest economics and policy

Associate Professors:
Reginald H. Barron, Ph.D. University of California at Berkeley. Wildlife biology and management
James W. Bartolome, Ph.D. University at California at Berkeley. Range ecology and management
Gregory S. Bingham, Ph.D. University of Wisconsin, Madison. Forest management
Richard S. Dodd, Ph.D. University of Wales. Wood formation
Louise P. Fortmann, Ph.D. (Acting) Cornell University. Forest and wildland sociology

Michael L. Morrison, Ph.D. Oregon State University. Wildlife management
Jeffrey M. Romm, Ph.D. Cornell University. Forest and wildlife policy

Assistant Professors:
Barbara H. Allen, Ph.D. University of California at Berkeley. Range ecology and management
Robert G. Conant, Ph.D. Massachusetts Institute of Technology and State University. Forest photogrammetry and remote sensing
N. J. Gillett, Ph.D. University of Wisconsin, Madison. Forest economics
Keith L. LePage, Ph.D. University of British Columbia. Soil and wildland hydrology
Seth L. Guiles, Ph.D. University of Minnesota. Wood physics

Adjunct Professor:
Carrol W. Williams, Jr., Ph.D. University of Michigan. Forest pest management

Lecturer:
Donald P. Gasser, M.S. University of California at Berkeley. Forest harvesting systems


Undergraduate Program

Forestry Major. The forestry major is designed to prepare men and women to manage forests and wildlife to produce wood, water, forage, wildlife, recreational opportunities, and other environmental benefits. Graduates of the Department of Forestry and Resource Management are employed by the U.S. Forest Service, 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 conservation 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 their option. The final third of the upper division course work is made up of free electives. In consultation with a faculty adviser, students use these free electives to develop 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 in forestry provides four 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 credit towards licensing may be obtained by 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 are expected to complete 8 units of biology, 8 units of chemistry, 4 units of economics, 3 units of plane surveying, 8 units of English, 4 units of geology, 6 units of calculus, and 4 units of statistics. Additionally, freshmen on the Berkeley campus are required to take F10 (Forest and Wildland Resource Conservation) and sophomores on the Berkeley campus are required to take F31 (Forestry Computer Programming and Applications). Students elsewhere are required to take a course in computer programming. Sophomores may also elect to take F121 (Dendrology), F170
Minor in Forestry and Resource Management. A minor in Forestry and Resource Management is available 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 forestry, environmental administration, and civil engineering may find this minor complementary to their professional and career goals. A minor consists of any five departmental courses (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 must complete the upper division Field Program, a two-week residential seminar located in the northern Sierra Nevada. The program emphasizes the acquisition of practical field skills and the integration of knowledge about soils, water, trees, wildlife, forage, 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 Sierra Nevada. 

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 silviculture, ecological modeling, economics, fisheries, forestry, genetics, management, photogrammetry and remote sensing, range planning and policy, silviculture, sociology, soils watered, 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 forestry and resource management.

Master of Forestry. The department also offers a Master of Forestry degree. The degree is a graduate professional degree in forestry designed to enable students with a Bachelor of Science degree in forestry (or its equivalent) to further develop their grasp of the principles of forest management and to acquaint them with specific management problems. After the completion of a Bachelor of Science degree in forestry, completion of the Master of Forestry degree provides one year of credit towards the required seven years of qualifying education or professional experience for licensing as a professional forester in California.

Range Management and Wood Science and Technology. The department is closely affiliated with the interdepartmental graduate groups in Range Management, Wood Science and Technology, which offer the Master of Science degree in Range Management and the Master of Science and Doctor of Philosophy degrees in Wood Science and Technology, respectively. For more information on these degree programs refer to the section of this catalog on Interdepartmental Graduate Groups in the College of Natural Resources.

Departmental Facilities. Mulford Hall is the home of the Department of Forestry and Resource Management. It also houses the forestry library, which has subscriptions to a variety of periodicals on forestry and natural resources in the world, specialized laboratories for remote sensing and photogrammetry, tree physiology, and ecology, wildland research laboratories, a herbarium, and wildlife specimen collection. Departmental computing facilities include a microcomputer laboratory and a high speed printer, and two terminal rooms for using the campus IBM and UNIX computers. Greenhouses and growth chambers are located at the nearby Oxford tract and at the University of the Pacific campus. Other facilities include the Bra-...
116. Forest Recreation Use and Management. (3) Two 1-hour lectures and one 4-hour laboratory per week. Prerequisites: 101, 104, or consent of instructor. Group study of special problems relating to the use and management of forest recreation. 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 natural resource management: Social definition of natural resources; identification of publics; social organization of resource use, public involvement; and social impact analysis. (SP) McBride

120. Forest and Range Soils. (2) Two 1-hour lectures and one 1-hour laboratory per week. Prerequisites: Geology and chemistry. The properties of soil in relation to the influence of forest and wildlifecation. The relationship of these soil properties to forest management, site assessment, grassland productivity, erosion control, and the maintenance of forest and range productivity. Offered odd-numbered years. (F) Zinke

121. Trees: Taxonomy Growth and Structure. (3) Three 1-hour lectures and one 1-hour laboratory per week. Prerequisites: Introductory biology and mathematics. The influence of the forest and wildland vegetation on energy disposition and micrometeorology; on hydrology, the local waterbalance, and watershed processes involving water yield and water quality. Principles applicable to watersheds and environments of all forest types. Offered even-numbered years. (SP) Zinke

122. Forest Influences. (3) Two 1-hour lectures plus one 3-hour laboratory per week. Prerequisites: Introductory biology and mathematics. Major emphasis on the understanding of forest ecology as a basis for management of forest ecosystems. 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 for 124. 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. Offered even-numbered years. (F) Schulz

125. Principles and Practices of Silviculture. (4) Three 1-hour lectures and one 4-hour laboratory exercise per week plus two-day (weekend) field trip. Prerequisites: 100A, 8 units of biological science, and 8 units of chemistry. The ecology of forests from the perspectives of ecosystem analysis, physiological plant ecology, and vegetation dynamics. Major emphasis on understanding forest ecology as basis for management of forest ecosystems. Field laboratory exercises to illustrate ecological principles and develop techniques for the assessment of forest ecosystems. (SP) Staff

126. Forest Ecology. (4) Three 1-hour lectures and one 4-hour field lab exercise per week plus two-day (weekend) field trip. Prerequisites: 100A, 8 units of biological science, and 8 units of chemistry. The ecology of forests from the perspectives of ecosystem analysis, physiological plant ecology, and vegetation dynamics. Major emphasis on understanding forest ecology as basis for management of forest ecosystems. Field laboratory exercises to illustrate ecological principles and develop techniques for the assessment of forest ecosystems. (SP) Staff

127. Forest Genetics and Tree Improvement. (3) Two 1-hour lectures and one 1-hour discussion per week, plus field trips. Prerequisites: 1 or equivalent. Focuses on genetic and evolutionary theory in the context of tree improvement methods in Forestry. Examples of genetic architectures in forest trees are given, and the implications of this knowledge for forest management are presented. Classical tree improvement is reviewed and critically evaluated. Could be offered as an option to classical tree improvement. (SP) Teeguarden

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. (F) Dorr

141. Principles of Range Management. (4) Former 114L 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 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 of a land use plan for a small UC rangeland property. Field evaluation of the site, use of a GIS, ID team work and production 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) Staff

143. Range Animal Nutrition. (2) One 1-hour lecture plus one 2-hour laboratory per week. Prerequisites: General chemistry and biology. Nutritional principles of feeding practices of animals grazing rangelands. Coverage of relevant areas in nutrition: carbohydrate, protein, lipid, mineral, vitamin nutrition; composition of feeds; nutrition and livestock management and repro-duction, growth, etc. relative to environment and nutrient-ational factors. Supplementation; ration formulation. Offered odd-numbered years. (F) Mims

144. Range Ecology. (3) Three 1-hour lectures per week. Prerequisites: One course in ecology. The ecological basis for range management is considered in the context of western range ecosystems. Specific range improvement and range management practices are discussed in the context of ecosystem processes. (SP) Staff

150. Agroforestry Systems. (3) New course. Two 1-hour lectures and one 3-hour lab per week. Prerequisites: Upper division standing. Agroforestry principles and systems in use worldwide are examined, with emphasis on contemporary agroforestry systems design and management. Economic, biologic, social, and political conditions for successful agroforestry systems are ana-lyzed. Some laboratory sessions will be field trips that will extend beyond the scheduled lab time. (SP) Gasser

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 important recreational attributes, and on rare and endangered species is highlighted. (F) Morrison

176. Advanced Wildlife Management. (3) Two 1-hour lectures plus one 3-hour laboratory per week. Prereq-uisites: 101 and 170. An advanced coverage of the 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 2-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 1-hour discussion per week. Prerequisites: 5 semester units of biology; upper division standing. Description of the biota and their in-teractions in lakes and streams. Outside reading for weekly discussion on topics of entrophy, thermal pollution, reservoirs, introduced species, spawning of salmonids. Laboratory is an independent research proj-ect. (SP) Emman

198. Directed Group Study. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Meetings to be arranged. Prerequisites: Consent of instructor. Group study of special problems relating to forestry and resource management. (F,SP) Staff

199. Supervised Independent Study and Research for Undergraduates. (1-4) Must be taken on a passed/ not passed basis. To be arranged. Prerequisites: Consent of instructor. See regulations regarding restrictions on pages 87 and 88 of this catalog. (F,SP) Staff

201. Advanced Forest Sampling. (2) Two 1-hour lectures per week. Prerequisites: 101, 104, or equivalent, or consent of instructor. Application of advanced sampling theory to the measurement of forest and wildland resources, estimators, sampling designs, remote sensing, and multiple parameter surveys. (SP) Weeks

202. Remote Sensing of Forest and Other Natural Resources. (2) One 3-hour lecture/seminar per week. Students in previous courses may enroll for credit in 203. Advanced photographic systems including color and color infrared aerial photography, filters and films, and small format photography. Non-photographic systems including multi-spectral scanners, thermal, and RADAR. The use of image processing, geographic information systems, and accuracy assess-ment. Topics to be discussed in one 3-hour lecture including laboratories to be arranged. (SP) Congalton

204. Advanced Forest Mensuration. (2) One 2-hour lecture per week. Prerequisites: 101, 104; Statistics 20; Statistics 161 is recommended. An overview of research concerning growth modeling of forest stands and trees. Statistical and mathematical forest modeling techniques. (F) Staff

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) Staff

209. Research Concepts and Methods. (3) Two 1/2-hour lectures/seminars per week. Prerequisites: Basic courses in statistics. Conceptual and methodological bases of research design, data analysis, interpretation, case studies and individual projects critiqued. (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 econometrics. Advanced treatment of a range of topics including assessment of environmental impacts, analysis of forest products demand and supply, models of inter-regional trade, national and regional impact assess-ment, intertemporal allocation of forest resources, and role of forestry in economic development. (F) McGilp, Gilles

211. Seminar in Analysis of the Forest Economy. (2) One 2-hour lecture/seminar per week. Prerequisites: 8 semester units of economic theory, resource econ-omics, or forest economics. Analysis of national and regional forest economics. Introduction to the impacts of forest policy change. Timber output goals. Applied econometrics and input-output analysis. (F) Gilles

212. Seminar in Forest Economics. (2) Course may be repeated for credit. One 2-hour lecture/seminar per week. Prerequisites: Eight semester units of economics, resource economics, study of special problems. 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) Staff

213. Advanced Forest Management. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prereq-uisites: 113 and 114. Application of mathematical pro-gramming and other analysis techniques to timber har-vest scheduling. Comparative evaluation of even-aged
systems. Contemporary forest management issues. (F) Davis

214. Case Studies in Forest Management. (1-6) Course may be repeated for credit. Minimum of four hours per week. Consent of instructor arranged. Prerequisites: 101, 102, 104, 113, and 125, or equivalent. Individual case studies involving the inventory, analysis, and management of forest resources. Intended primarily for Managing Forestry students. (F,SP) Staff

215. Seminar in Forest and Wildland Resource Analysis. (3) Course may be repeated for credit. Two 1/2-hour lectures/seminars per week. Prerequisites: Consent of instructor. The seminar addresses (1) methods and tools 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. (3) One 3-hour lecture per week. Prerequisites: Consent of instructor. Individual projects and group discussions concerning social constraints and effects of natural 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. Enrollment limited. (SP) Fortmann

221. Genetics of Forest Trees. (2) Course may be repeated for credit. One 2-hour lecture per week. Prerequisites: 114 and 115 equivalent. Course attendance 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: Any upper division course in hydrology, climate, soil, or aquatic ecosystems or equivalent. Selected advanced topics concerning the role of forests and their management on energy balances, microclimate, hydrology, and elemental cycling. (F) Foy

223. Seminar in Forest Ecology. (2) New course. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 3-hour seminar per week. Prerequisites: Consent of instructor. A seminar course dealing with selected topics in the ecology of forest ecosystems. (SP) McIndoe

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 measurement. Includes weekly lab exercises on artificial sampling boards and/or in the field. Juniors and seniors are encouraged. Offered odd-numbered years only. (SP) Allen

243. Range Animal Management and Production. (3) Three 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 in production systems and animal management. Offered even-numbered years. (F) Staff

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 ecology of range-lands. 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. 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. Reading, conference, and discussion. Reports and discussion of recent studies in wildlife biology and management. Open to qualified graduate students from other departments. (F) McCullough

271. Wildlife-Habitat Relationships. (3) Two 1/2-hour lectures per week. Prerequisites: Consent of instructor. Reading, conference, and discussion. Reports and discussion of recent studies in wildlife biology and management. Open to qualified graduate students from other departments. (F) McCullough

272. Wildlife-Habitat Relationships. (3) Two 1/2-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, overlap and community similarity, etc. Writing and presentation of research proposal required. Offered every other year. (SP) Morrison

276. Wildlife Management Planning. (3) One 3-hour lecture per week. Prerequisites: 176 or equivalent. A review of the latest methodologies for developing wildlife 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) Barrett

278. Seminar in Freshwater Ecology. (2) One 2-hour lecture/seminar per week. Prerequisites: Knowledge of biology, ecology, and environmental science. Discussions and student presentations on topics or problems related to fisheries and aquatic ecology. Detailed analysis of data on secondary production and trout spawning. Offered even-numbered years. (SP) Emran

295. 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) Staff

296. Directed Group Study. (1-3) Course may be repeated for credit. Sections 1-5: 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) Staff

299. 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) Staff

601. Individual Study for Master's Students. (1-4) 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. Meetings to be arranged. Prerequisites: Consent of instructor. Individual study in consultation with the major field adviser, intended to provide an opportunity or qualitative field studies to prepare themselves for the various examinations required of candidates for the Ph.D. (F,SP) Staff

Professional Courses

300. Supervised Teaching in Forestry and Resource Management. (1-6) May not be used to satisfy 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 graduate student instructor. Supervised teaching experience in a departmental setting. (F,SP)

400. Professional Training in Research. (1-6) May not be used to satisfy 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) Staff
and artistic dimensions and introduces students to an interdisciplinary approach.

Option A. 102, 103A or 103B, three courses chosen from three different centuries (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.

Option B. 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.

Honors Program. Senior majors in French with a grade-point average of 3.5 overall and in the major must apply to the honors program in French. Students who meet specific criteria may obtain the application to the honors program from the undergraduate assistant. Upon admission to the honors program, students undertake research on an approved topic, with the option of writing under the supervision of a member of the regular faculty. Credit and grade are awarded upon completion of the sequence. The honors sequence is undertaken in addition to the course work for the major.

Prospective and current majors should consult the department's brochure, The Undergraduate Major in French.

The Minor

Required: five upper-division courses. 1. French 102; French 103A or 103B. 2. Three courses from French 112 to French 185 (excluding French 140, 145, 146). All courses taken in the minor must be taken for a letter grade. Conversation courses are not to be included as electives.

Graduate Study

The M.A. Program. A minimum of 32 units in French is required, including at least 16 units of graduate courses. The aim of the program is to provide a comprehensive historical knowledge of French literature, and to that end students are asked to familiarize themselves with the works on a departmental reading list. For purposes of study and examination, French literature is divided chronologically, and the student is asked to demonstrate competence in the literature by means of written and oral examinations. For more detailed information on the M.A. program, the student should consult the department's "Guide to Higher Degrees in French." The Ph.D. Program. The Ph.D. program in French includes two tracks, French literature and French linguistics. In the literature track, students are asked to choose three defined areas of study within French literature, with the additional choice of an adjunct field germane to these studies: 1) the work of a single major author; 2) the development of a genre or literary problematic; 3) a historical period in French literature. In the linguistics track, students are asked to choose areas of particular interest within the broad fields of 1) the structure of modern French; 2) the history of the language as applied to phonetics and the analysis of literary texts. Students also choose an adjunct field germane to these studies. The candidates take such courses as they and the adviser consider necessary in light of the approved program. The language requirement is a reading knowledge of two foreign languages other than French. For more detailed information concerning the Ph.D. program, students should consult the department's "Guide to Higher Degrees in French."

Ph.D. in Romance Languages and Literatures (emphasis in French). Students admitted for this degree have a choice of two plans of study. Plan I includes a detailed knowledge of French literature and an additional second Romance literature as a collateral field, and knowledge of a prescribed list of masterworks in a third Romance literature. Plan II requires a detailed knowledge of French literature and philology, and the command of a broad integrated field (period, movement or genre) in two other Romance literatures, to be conformed by the student and the graduate adviser in accordance with the student's special interest in French. The candidates take such courses as they and the adviser deem necessary for the approved Plan and program. Language requirement: Latin, French, Italian and Spanish. Knowledge of German is recommended. For more detailed information concerning this program, students should consult the department's "Guide to Higher Degrees in French."

Romance Philology. The department also collaborates in the doctoral program in Romance Philology; see the listing for this subject in the index.

Lower Division Courses

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. (8) Must be taken on a satisfactory/unsatisfactory basis. Three hours of lecture per week. Preparation for graduate reading examinations in the field of English and in all other disciplines.

3. Intermediate French. (5) Five 1-hour classes and one hour of laboratory per week. Prerequisites: 1 or equivalent. Elementary French. Continuation of French 1.

4. Intermediate Conversation. (2) Two 1-hour classes per week. Prerequisites: French 1 or equivalent. Intermediate French. Continuation of second-year French.


6. Advanced Conversation. (2) Course may not be repeated for credit. Three 1-hour classes per week. Prerequisites: 3 or equivalent. Advanced French conversation.

7. Practical Phonetics. (2) Two 1-hour classes and one hour of laboratory per week. Prerequisites: 3 or equivalent. Phonetics as an aid to pronunciation.

8. Seminar for 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. Enrollments are limited. Students must consult with the instructor before enrolling in the course.

9. 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.

10. Aspects of French Culture. (3) Three 1-hour classes per week. Examinations of various historical and aesthetic currents and problems in the development of French civilization. In English.

11. 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 in 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. A or B grade in French 4. Transfer students must meet the validation examination. The principles and practice of expository writing: development of correct and effective expression in French. May be taken concurrently with French 103.

103. Language and Culture. (3) Three hours of lecture per week. Discussion and composition based on the analysis of literary texts.

103B. Language and Culture. (3) Three hours of lecture per week. Discussion of 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. Joinville to Villon. Johnson

114A-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. Seventeenth-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 conflict in Renaissance values, formulation of new concepts in philosophy and psychology, experiments with traditional forms in poetry, fiction and the theatre. Preciosity, Descartes and rationalism.

B. The concept of classicism and the development of tragedy. Jansenism, the doctrine of Port-Royal. Social satire and comedy.

Lichtenstein

118A-118B. Eighteenth-Century Literature. (3;3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent.

A. Authors from the first half of the 18th century, with emphasis on the origins of the philosophical movement and the development of modern art forms in the theater and the novel.

B. A study of authors of the second half of the 18th century stressing the importance of the Movement Philosophique, and the development of Libertine values as well as the emergence of the pre-romantic aesthetics.

Guy, Rex

119A-119B. Nineteenth-Century Literature. (3;3) Course may be repeated once for credit as topic varies. Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent.

A. Authors from the first half of the 19th century. Romantic poetry and drama. Balzac, Stendhal and the novel. Michelet and the emergence of history.

B. Authors from the second half of the 19th century. The various poetic movements; Le Pamasse and Symbolism. Development of the novel, realism and naturalism.

Bersani, Lucey

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.
150A-150B. Women in French Literature. (33) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. Topics vary from year to year.

151. Francophone Literature. (3) Course may be repeated once with a different topic for credit. Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. A study of Francophone literature and civilization; novels, films, society.

152. Quebecois Literature and Culture. (3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. A study of Quebecos culture and civilization; novels, films, society.

154A-154B. Language Theory in the French Tradition. (4) Four hours of lecture per week. Prerequisites: 103A or 103B or equivalent. Historical analysis of sentences, structures, and models. Bioch.

155A-155B. Women in French Literature. (33) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. Topics vary from year to year.

156A-156B. History of the French Language. (3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. History of the French language. The Chroniquers, the humanists. Bossuet, Michelet are examples of the authors who may be studied. Topics vary from year to year.

157. French for Economics, Politics and Business. (3) Three hours of lecture per week. Prerequisites: 104A or 104B or equivalent. Introduction to the French vocabulary and syntax specific to economics, politics and business. Oral and written comprehension, written compositions (including correspondence), translations, training in oral expression. Conducted entirely in French.

158. History of the Middle Ages to the French Revolution. (33) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. Survey of literature and the practice of literary criticism in recent years.

159. 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 break-up into different languages and dialects, emergence of Parisian French as standard. Influence of other languages on French vocabulary. Study of brief texts from different periods to illustrate evolution of pronunciation and grammar.

160. Readings in French Literature. (33) Three hours of lecture per week. Prerequisites: 104A or 104B or equivalent. Introduction to the French vocabulary and syntax specific to economics, politics and business. Oral and written comprehension, written compositions (including correspondence), translations, training in oral expression. Conducted entirely in French.

161A-161B. A Concept in French Cultural History. (33) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. An examination of certain large cultural concepts from a double point of view, for example, the Baroque or Romanticism. Topics vary from year to year.

162A-162B. Psychoanalytic Theory and Literature. (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 real, and the development of psychoanalytic theory. Psychoanalysis and literature. The theory of literature and the practice of literary criticism in recent years.

163. Linguistics and Literature. (3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent; 176 or any introductory linguistics course, or consent of instructor. An introduction to the major branches of linguistic analysis (phonology, morphology—including word-formation-syntaxis, and semantics) as applied to the French language.

167. Introduction to French Linguistics. (3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. An introduction to the major branches of linguistic analysis (phonology, morpholgy—including word-formation-syntaxis, and semantics) as applied to the French language.

171A-171B. 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 poem, or musical score and literary text.

172A-172B. Psychoanalytic Theory and Literature. (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 real, and the development of psychoanalytic theory. Psychoanalysis and literature. The theory of literature and the practice of literary criticism in recent years.

173. Linguistics and Literature. (3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent; 176 or any introductory linguistics course, or consent of instructor. An introduction to the major branches of linguistic analysis (phonology, morphology—including word-formation-syntaxis, and semantics) as applied to the French language.

175. Readings in French Literature. (33) Three hours of lecture per week. Prerequisites: 104A or 104B 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 poem, or musical score and literary text.

176. Introduction to French Linguistics. (3) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. An introduction to the major branches of linguistic analysis (phonology, morphology—including word-formation-syntaxis, and semantics) as applied to the French language.

177A-177B. History and Criticism of Film. (33) 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.

178A-178B. Studies in French Film. (33) Three hours of lecture and one hour of laboratory per week. Prerequisites: 170 or equivalent. Topics vary from year to year.

180A-180B-180C-180D. French Civilization. (33) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. Survey of French civilization: history, art and society, through 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 Regime.
C. The 19th Century.
D. The 20th Century.

183A-183B. Configurations of Crisis. (33) Three hours of lecture 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 esthetic and social history.

184-184B. French Literature in Its Cultural Context. (33) Three hours of lecture per week. Prerequisites: 103A or 103B or equivalent. A study of French literature and thought. Smock

197. Field Studies. (1-4) New course. Course may be repeated for credit. Must be taken on a pass/not passed basis. Individual conferences. Prerequisites: Restricted to seniors with overall GPA of 3.0 and GPA of 3.0 in French. Enrollment restricted by regulations listed on pages 87 and 88 of this catalog. Individual instruction only in areas not covered by courses.

Graduate Courses
201A-201B. History of the French Language. (4,4) Three hours of seminar per week. Prerequisites: 100A or 100B or equivalent. A. External history of the French language.

B. Historical Grammar.

203. French Syntax. (4) Course may be repeated for credit as topic varies. One 3-hour seminar per week. Offered every year from year to year. Topics vary from year to year. Prerequisites: Consent of instructor. Supervised field programs involving experiences in schools and school-related activities. Regular individual meetings with faculty sponsor and written reports required.

209A. Supervised Independent Study and Research for Advanced Undergraduates. (1-8) Must be taken on a pass/not passed basis. Individual conferences. Prerequisites: Restricted to seniors with overall GPA of 3.0 and GPA of 3.0 in French. Enrollment restricted by regulations listed on pages 87 and 88 of this catalog. Individual instruction only in areas not covered by courses.

279. Not offered 1990-91
280. On leave, spring
281. On leave, fall
282. Recalled to active service
283. Recipient of Distinguished Teaching Award

French / 209
290. Morphological and Syntactical Analysis of English and French. (3) Three hours of lecture per week. A comparative analysis of French and English grammatical structures as well as of basic phonological differences.

210A-210B. Studies in Medieval Literature. (4/4) Course may be repeated for credit as topic varies. One 3-hour seminar per week. Offerings vary from year to year. Students should consult the department's "Course Description" for current topics. Bloch, Duggan

211A-211B. Reading and Interpretation of Old French Texts. (4/4) Course may be repeated for credit as topic varies. One 3-hour seminar per week. Offerings vary from year to year. Current topics may be found in the department's "Course Description." Bloch, Duggan

212A-212B. Old Provengal Literature. (4/4) Course may be repeated for credit as topic varies. One 3-hour seminar per week. Reading and analysis of 12th and 13th century texts written in the langue d'oc with special emphasis on troubadour lyric poetry. Duggan, Felman

218. Studies in Late Medieval Literature. (4) Course may be repeated for credit as topic varies. One 3-hour seminar per week. Offerings vary from year to year. Johnson

220A-220B. Studies in 16th-Century Literature. (4/4) Course may be repeated for credit as topic varies. One 3-hour seminar per week. Offerings vary from year to year. See the department's "Course Description" for current topics. Johnson

230A-230B. Studies in 17th-Century Literature. (4/4) Course may be repeated for credit as topic varies. One 3-hour seminar per week. Offerings vary from year to year. See the department's "Course Description" for current topics. Johnson

231. Baroque Literature. (4) Course may be repeated for credit as topic varies. One 3-hour seminar per week. Seminar study of baroque poetry, drama and novel, treating one genre each year. Rex

240A-240B. Studies in 18th-Century Literature. (4/4) Course may be repeated for credit as topic varies. One 3-hour seminar per week. Offerings vary from year to year. See the department's "Course Description" for current topics. Bersani

243. The 18th-Century Novel. (4) Course may be repeated for credit as topic varies. One 3-hour seminar per week. Offerings vary from year to year. See the department's "Course Description" for current topics. Bersani

251. Francophone Literature. (4) New course. One 3-hour seminar per week. Francophone literature. Seminar, directed at graduate students and advanced undergraduates with a reading knowledge of French. Focuses upon the relationship between oral and written cultures in Francophone Africa and the Caribbean: Lyric and narrative poetry, drama and novels; the presence of oral tradition in written forms, narrative techniques borrowed from storytelling tradition, the definition of traditional metaphors and imagery; idealization of lost worlds; the conflict of traditional culture and modernism; the role of political ideas and independent thought. Bersani

253. Nineteenth-Century Fiction. (4) Course may be repeated for credit as topic varies. One 3-hour seminar per week. Bersani

254A-254B. Nineteenth-Century Poetry. (4/4) Course may be repeated for credit as topic varies. One 3-hour seminar per week. Studies in 19th-century French poetry. Topics vary from year to year. Bersani

260A-260B. Studies in 20th-Century Literature. (4/4) Course may be repeated for credit as topic varies. One 3-hour seminar per week. Offerings vary from year to year. See the department's "Course Description" for current topics. Smock

265. Modern Theatre and Cinema. (4) Course may be repeated for credit as topic varies. One 3-hour seminar per week. August

270A-270B. Literary Criticism. (4/4) Formerly 270. One 3-hour seminar per week. A study of various critical approaches to literature. Bersani

275A-275B. Problems of Literary Theory. (4/4) Course may be repeated for credit as topic varies. One 3-hour seminar per week. Offerings vary from year to year. See the department's "Course Description" for current topics. Bersani

282. French Literary and Social History. (4) One 3-hour seminar per week. An analysis of patterns and trends in the literature and culture of France.

285. French Art Criticism and Literature: Late 19th Century. (4) New course. Course may be repeated for credit by graduate students only. One 3-hour seminar per week. Studies of ways in which texts and images figure painting in the second half of the nineteenth century. Emphasis on Delacroix, Courbet, Manet, Degas, the Impressionists, Van Gogh, Gauguin and Cézanne; readings from reviews, monographs, treatises, novels, diaries and letters of the period. Lichtenstein

298. Special Study. (1-4) Course may be repeated for credit. Individual conferences. Designed for students engaged in exploration of a restricted field, involving the writing of a report. May not be substituted for available graduate courses.

299. Individual Research. (4-12) Course may be repeated for credit. Individual conferences. Reserved for students directly engaged in writing the doctoral thesis.

601. Special Study for Graduate Students. (1-4) May not be used to satisfy units or residence requirements. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Individual study for the comprehensive in consultation with the field adviser.

602. Individual Study. (1-8) May not be used to satisfy units or residence requirements. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Prerequisites: M.A. or completion of at least 16 units beyond B.A. Individual study with an adviser, intended to provide an opportunity for qualified students to prepare for the various examinations required of candidates for the Ph.D.

22. Letters and Science. (1) 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 emeritus professors. The topics will vary and usually reflect an interdisciplinary approach. (F,SP)

Freshman and Sophomore Studies (Division of Undergraduate Studies, College of Letters and Science)

Office: 325 Campbell Hall, 642-8363
Associate Dean: Mitchell Breitwieser, Ph.D.

For a description of Freshman and Sophomore Studies programs, see Undergraduate Interdisciplinary Studies in the Courses and Curricula section and the College of Letters and Science section in the front of the catalog.

Letters and Science

Lower Division Courses

22. Letters and Science. (1) 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 emeritus professors. The topics will vary and usually reflect an interdisciplinary approach. (F,SP)

Genetics (College of Letters and Science or College of Natural Resources)

As a result of the reorganization of the biological sciences on the Berkeley campus, the faculty and programs of the Department of Genetics will become part of three new departments, effective fall 1989: faculty and programs concerned with molecular and developmental genetics will join the Division of Genetics in the Department of Molecular and Cell Biology; those concerned with population genetics and evolution will join the Department of Integrative Biology; and those concerned with plant genetics will join the Department of Plant Biology. Courses in genetics will be taught by all three departments.

For an explanation of the full scope of the biological sciences reorganization and its implications, see page 89.

Undergraduate Programs: Beginning fall semester 1989, students will no longer be accepted in the undergraduate majors in genetics. Students in the College of Natural Resources who are interested in majoring in genetics should consider the new major in plant biology or the existing major in bioresource sciences and should contact Ms. Pat O'Shay, Dean's Office, 106 Giannini Hall, University of California at Berkeley; Berkeley, CA 94720 or 642-0542. Students in the College of Letters and Science who are interested in genetics should consider one of the majors offered by the new depart-
ments, such as Track 3 (systematic biology, paleobiology, genetics, and evolution) of the major in the new Department of Integrative Biology, or Plan I (emphasis in genetics) of the major in the new Department of Molecular and Cell Biology. Interested students should contact the major adviser or undergraduate assistant. The names and locations of these advisers can be obtained by writing to Ms. Patricia Power, Staff Assistant to the Dean, College of Letters and Science, 301 Campbell Hall, University of California at Berkeley, Berkeley, CA 94720.

Continuing undergraduate students who declared the genetics major before fall 1989 in either college may elect to continue in the program. Such students in the College of Letters and Science must, however, complete all major requirements and graduate before fall semester 1993. (Beginning fall semester 1993, all students in the College of Letters and Science will be expected to complete an undergraduate major) and graduate in four years. Undergraduates in the genetics major in the College of Natural Resources who have not completed the courses Genetics 100A-100B before fall semester 1989 are strongly encouraged to consider changing their major to one of the programs listed above.

Declared students continuing in the genetics major in the College of Letters and Science should contact the major adviser or undergraduate assistant in the Office of Undergraduate Interdisciplinary Studies, 301 Campbell Hall. Such students in the College of Natural Resources should contact the Office of Student Affairs, 106 Giannini Hall, for referral to an adviser.

Graduate Program: Administered by an interdepartmental group, the Graduate Group in Genetics, 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. Genetics has important applications in such diverse disciplines as anthropology, medicine, forestry, nutrition, and molecular biology. Therefore, graduate work leading to the Ph.D. degree 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, genetics may be 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.

Concordance of Courses: On the following page is a list of courses formerly offered by the Department of Genetics, followed by their former names, numbers, and titles, and titles in the new departments. For a list of the courses offered by the new departments, followed by their former names, numbers, and titles, consult lists of catalog under the headings "Integrative Biology," "Molecular and Cell Biology," or "Plant Biology." At press time for this catalog, some course information was still not available. If you have questions, or if you do not find a course listed by its new name, number, and title, consult staff in one of the new departments for up-to-date information.

Geography

(College of Letters and Science)

Department Office: 501 Earth Sciences Building, 482-3903
Chair: David Stoddart, Ph.D.

Professors:
Orman E. Graninger, Ph.D. University of Toronto.
Climatologist, pure and applied
Peter Hall, Ph.D. Cambridge University. Urban, world cities, planning
David Hooson, Ph.D. London School of Economics. Soviet Union, history of geography
Bernard Neidhardt, Ph.D. University of Wisconsin.
Fourth World geography
Theodore M. Oberlander, Ph.D. Syracuse University.
Geomorphology, and lands
Allan Pred, Ph.D. University of Chicago. Social theory, local and regional phenomena
David Stoddart, Ph.D. Cambridge University. Coastal geomorphology, approach
James E. Vane, Jr., Ph.D. Clark University. Urban, transportation, Canada, United States
Michael J. Weber, University of Michigan. Agriculture, rural development, Africa
Carolyn Wrigley, Ph.D. (Emeritus) Johns Hopkins University
James Parsons, Ph.D. (Emeritus) University of California at Berkeley, Latin America, California, historical
Hilgard G.R. Sterner, Ph.D. (Emeritus) Louisiana State University. Environmental, tropics, Brazil, Amazon

Associate Professors:
Roger Byrne, Ph.D. University of Wisconsin. Biogeography, paleobotany
Robert R. Reed, Ph.D. University of California at Berkeley.
Cultural geography, comparativism, Southeast Asia
Richard A. Walker, Ph.D. Johns Hopkins University.
Economic geography; environmental studies

Assistant Professor:
Kristin Nelson, Ph.D. University of California at Berkeley.
Social, California, economic; women

Adjunct Professor:
David Lowenthal, Ph.D. University of Wisconsin.
Environmental perception, historic preservation, Caribbean

Lecturer:
Douglas Powell, M.A. University of California at Berkeley.
Field methods, physical, California

Departmental Major Advisers: Consult Undergraduate Assistant; Graduate Adviser: Mr. Vance.

Advice concerning requirements for undergraduate and graduate students is offered by the departmental advisers; guidance in the student's specialist field of interest is administered by the appropriate member of the student's major department. Students entering the department at any level must consult the departmental advisers until a specialty adviser has been selected or assigned to them.

The Geography Department aims to provide a broad-ranging perspective on humans as inhabitants and transformers of the face of the earth. The search for this kind of understanding involves thorough study of (a) the interlocking systems of the natural environment, including the important processes that operate within these systems; (b) the diverse historical, cultural, social, economic, and political structures and processes which affect the location and spatial organization of population groups and their activities; and (c) significant geographical units, whether described as cities, regions, nations or landscapes, where integrated interpretation can be attempted, and a variety of problems thereby better understood.

The undergraduate major in geography therefore includes the student of various aspects of human, physical, and regional geography as well as cartography, quantitative methods, and field work. Students, therefore, take courses from such diverse fields as the natural and social sciences and, 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 undergraduate adviser in order to avoid repeating lower division work.)

Upper Division. A minimum of 32 units. One course from each of the following groups: 100-105; 100-125; 130-136; 140-149; 150-168, and 180-189. 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 adviser, a student with an overall grade-point average of 3.5 or higher in upper-division courses may apply for admission to the honors programs. Application for acceptance in the program should be made by the beginning of the senior year. Students 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 or better in all courses must be maintained. Undergraduates in the College of Letters and Science must take (a) at least one course in the physical geography series (140-149) and (b) at least one course in either the cultural geography series (103-109), the urban-economic series (110-125), or the environmental series (130-139). Students planning to apply a course from the methodology series to the minor are advised that several offerings (180, 181, and 183) require permission of the instructor.

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 both the physical, cultural, economic, urban, and regional geography, it places strong emphasis on the interrelationships 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 exam. Ph.D. candidates must complete a minimum of two years of residence (normally at least three for those entering from other disciplines) and pass the oral qualifying examination. In the preparation of many theses they must also be prepared to spend a year in field or other research following their oral defense. 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 and one 2-hour laboratory per week. Origin of the Earth's major geological and climatological patterns and their influence upon the characteristics of landforms, vegetation, and soils. Physical factors relating to the: elements, biomes, and physical factors in the principal natural regions of the Earth. (F,SP)

2. Introduction to Cultural Geography. (4) Three hours of lecture and one 1-hour laboratory per week. Historical and contemporary cultural-environmental systems. The development and spread of cultural adaptations, human use of resources, transformation and creation of human environments. (F,SP) Reed, Nielschmann

3. The Local and the Global. (4) Three hours of lecture and one 1-hour laboratory per week. An introduction to geography, cartography, and a 1-hour obligatory section per week. An introduction to the geography major, the emphasis depending on the student's particular interests.

4. Economic Geography. (4) Three hours of lecture and one 1-hour laboratory per week. The development and spread of cultural adaptations, human use of resources, transformation and creation of human environments. (F,SP) Reed, Nielschmann

5. Recalled to active service

6. On leave, spring

7. On leave, spring

8. On leave, spring

9. On leave, spring
Concordance List for Genetics

Old No. Course Title Equivalent New Course, If Any

010 Heredity, Evolution, and Society MCellBi 041 Heredity and Society
100A General Genetics MCellBi 142 Survey of General Genetics
100B General Genetics MCellBi 142 Survey of General Genetics
100C General Genetics IntegBi 161 Population Genetics and Evolution
100L Genetics Laboratory MCellBi 140L Genetics Laboratory
102 Survey of General Genetics MCellBi 142 Survey of General Genetics
105 General Human Genetics IntegBi 141 Human Genetics
170 Plant Cell and Developmental Genetics PlantBi 100A Molecular, Cellular and Genetic Aspects of Plant Development

90. Seminars for Lower Division Students. (3) Three hours seminar and one hour consultation per week. A reading and research seminar for freshmen and sophomores. Topics to vary. (SP, F) Staff

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-nation 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, political, ecological and military invasions and disruptions. Pred, Nelson

101. Cultural Geography of Urban Environments. (4) Three hours of lecture per week. Population, environment, and urbanization: religious geography and human settlements; cities as expressions of varying cultural traditions. 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) Watts

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. (F) Watts

109. Prehistoric Agriculture. (4) Three hours of lecture per week. Agricultural origins in the light of recent biological and archaeological evidence. 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. Locational effects of developments in manufacturing, services, technology, labor relations, corporations, finance, and industrial restructuring. Industry, employment and the social fabric of cities and regions. The urbanization process. Emphasis on the U.S. (SP) Pred

111. Local and Regional Transformation (4) 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 of history and production of places. Detailed case studies from rural and urban settings, from the past and present, from North America, Europe, and the "Third World." (SP) Watts

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) Watts

115. World Agricultural Systems. (4) Three hours of lecture per week. An examination of world agrarian 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 development. 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 and trade systems, transportation, small-scale industry, the informal sector, and rural industrialization. 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. Are there enough energy, 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 abundance, 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. 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 development. Special attention is given to peasant economies, plantation agriculture, demographic growth, patterns of labor use, agroecology and rural development. Watts

136. Water Resources. (4) Three hours of lecture per week. Water use, supply and public policy: history, institutions, current controversies. Topics include agricultural irrigation, urban water, energy, project evaluation,
polution, environmental impacts, artificial scarcity and over development. Emphasis on California. Walker

140. Analysis of Landforms. (4) Three 11-hour lectures per week. Prerequisites: 1 or equivalent. Geomorphic processes and the origin of landforms in varying geological and climatic environments. (F) Oberlander

141. Topographic Map Analysis. (4) Two 2-hour seminars per week. Prerequisites: 140 or equivalent. The analysis of landforms portrayed by contours on the standard topographic map series published by the U.S. Geological Survey. (F) Oberlander

144. Principles of Meteorology. (4) Three 1-hour lectures and one 2-hour discussion per week. The role of air-sea interactions, volcanic eruptions, solar variability, human activities, etc., in regional and hemispheric climate anomalies. (F) Granger

147. Climatic Change. (4) Three 1-hour lectures per week. Fluctuations in climate during the period of instrumental record and their societal impacts. The role of air-sea interactions, volcanic eruptions, solar variability, human activities, etc., in regional and hemispheric climate anomalies. (F) Granger

148. Biogeography. (4) Three hours of lecture per week. Prerequisites: 1 or a lower division course in biology or earth science. Comparative study of biogeographical distributions of plants and animals on a variety of spatial and temporal scales. The effects of continental drift, Pleistocene climatic change, agricultural origins and disasters. The ecology of invasions and extinctions. Island biogeography. (F) Byrne

149. Vegetation of North America. (4) Three hours of lecture per week. Prerequisites: 1 or a lower division course in biology or earth science. Comparative study of biogeographical distributions of plants and animals on a variety of spatial and temporal scales. The effects of continental drift, Pleistocene climatic change, agricultural origins and disasters. The ecology of invasions and extinctions. Island biogeography. (F) Byrne

150. California. (4) Three hours of lecture per week. The uniqueness of California and its distinctive regions. Physical characteristics (landforms, climate, biota) of the state and how they have been perceived, modified, and organized by its inhabitants throughout the past. Current cultural and economic regions and landscapes. (F) Powell

151. The American West. (4) Three 1-hour lectures per week. The arid West, excepting California, as a settlement and resource frontier; historical and contemporary perspectives. (F) Vance

152. Historical Geography of the United States. (3) Two 1-hour lectures per week. The evolution of the settlement pattern, regional economies, and cultures of the United States as it related to the spread of the human landscape and its response to varying physical conditions. (F) Vance

153. Geography of Canada. (4) Three 1-hour lectures per week. The evolution of the settlement and economy of Canada as related to the physical base on which it has taken place during the last four hundred years. (F) Vance

154. Middle 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 historical development and present-day ecological, demographic, and economic problems. (F) Nietzschmann

155. Spanish South America. (4) Three 1-hour lectures per week. Environment and culture of the Andean and La Plata countries. (F) Vance

158. The Caribbean Region. (4) Three 1-hour lectures per week. The physical, cultural, political and socio-economic factors responsible for the diversity 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. (F) Granger

159. Alaska. (4) Three 1-hour lectures per week. Prerequisites: Upper division standing. A survey of Alaska's physical geography and human landscapes. (F) Granger

161. Sierra Nevada. (4) Three 1-hour lectures per week. Prerequisites: Upper division standing. A geographical survey of the Sierra Nevada range of California and Nevada geology, geomorphology, climate, hydrology, snow surveying, weather modification and settlement, economic development, recreational use, administration of public lands. (F) Wood

162. Soviet Union. (4) Three hours of lecture per week. A survey of population, natural resources and environmental conditions, historical background, the planned economy and the political and ethnic structures, followed by an attempt to integrate these topics in the context of distinctive regions. (F) Obergander

163. Southeast Asia. (4) Three hours of lecture per week. Environment, culture, and development of mainland and insular Southeast Asia. (F) Reed

165. Africa: Ecology and Development. (4) Three hours of lecture per week. The physical environments and human activities in the arid regions of the world, and resulting ecological and socio-economic problems in selected areas. (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 ecological and socio-economic problems in individual countries and the area as a whole. (F) Powell

168. Field Geography. (4) One hour of lecture plus nine hours (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) Powell

169. Urban Field Study. (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. (F) Powel

170. Field Geography. (4) One hour of lecture plus nine hours (one day) field work per week. Introduction to the metropolitan Bay Area: its history, economy, social makeup, and political appearance. Evaluation of spatial patterns, social justice and conflict in the city, business location, real estate and housing, images and ideologies. (F) Walker

180. Field Geography. (4) One hour of lecture plus 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) Two hours of lecture and six hours of laboratory per week. Problems in the representation of quantitative and qualitative data on thematic maps. (SP)

188. History of Geographical Thought. (4) Three hours of lecture per week. Recurring themes, problems, approaches, and controversies in the evolution 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) Houson

205. History of Geography. (4) Course may be repeated for credit. Three hours of seminar and one hour consultation per week. A survey of the literature in major areas of research in human and cultural geography. (F,SP) Byrne, Oberlander

218. Current Research Themes in Human and Cultural Geography. (4) One 3-hour seminar and one hour consultation per week. A survey of the literature in major areas of research in human and cultural geography. (F,SP) Byrne, Oberlander

219. Economic Geography and Development Theory. (4) Course may be repeated for credit. Two seminars and one hour consultation per week. A reading course on contemporary theories of economic growth and development of the developing world. Special topics include industrialization and capital flight to the periphery, peasant economy, agricultural policy, migration and ecological change. (F) Watts

223. Cultural and Human Ecology. (4) Course may be repeated for credit. Three hours seminar and one hour consultation per week. A reading course on contemporary theories of ecological growth and development of the developing world. Special topics include adaptation and maladaptation, household reproduction, hazards research, subsistence ecology and field methods. (F) Nietzschmann

242. Physiography of Western North America. (4) Three hours of seminar and one hour consultation per week. Prerequisites: 140 or equivalent. Physiographic development of western North America with emphasis on current research. (SP) Oberlander

251. Topics in Cultural Geography. (4) Course may be repeated for credit. Two hours seminar and one hour consultation per week. Prerequisites: Consent of instructor. Supervised experience in application of geography in off-campus organizations. Regular individual meetings with faculty sponsor and written reports required. (F,SP) Staff

260. 1991-90 Graduate Courses

198. Directed Group Study. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. One hour lecture, three hours of laboratory per week. Prerequisites: Consent of instructor. (F,SP) Staff

199. Supervised Independent Study. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: Senior standing. Overall GPA major of 3.00. (F,SP) Staff
consultation per week. Research seminar of selected topics in cultural geography.

Reed

252. Topics in Economic Geography. (Course may be repeated for credit. Two hours of seminar and one hour of consultation per week. Research seminar on selected topics in economic geography. (F, SP) Pred, Walker, Watts

253. Topics in Urban Geography. (Course may be repeated for credit. Two hours seminar and one hour consultation per week. Research seminar on selected topics in urban geography. (SP) Vance

255. Topics in Political Geography. (Course may be repeated for credit. Two hours seminar and one hour consultation per week. Research seminar on selected topics in political geography. (SP) Hooson

256. Topics in Historical Geography. (Course may be repeated for credit. Three hours of seminar and one hour of consultation per week. Research seminar on selected topics in historical geography.

257. Topics in Climatology. (Course may be repeated for credit. Two hours seminar per week. Research seminar on selected topics in social geography. (SP) Nelson

258. Topics in Biogeography. (Course may be repeated for credit. Two hours seminar and two hours consultation per week. Research seminar on selected topics in biogeography.

260. Topics in Social Geography. (Course may be repeated for credit. Three hours seminar and one hour of consultation per week. Research seminar on selected topics in sociological geography.

262. Topics in Latin America. (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.

280. 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. All day Saturday. Each additional unit requires four hours of field work per week. Extensive field project required. (F,SP) Staff

295. Geography Colloquium. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. 1 labours 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 paleoecological contexts. Discussion of selected case studies. Sponsoring departments: Geography and Integrative Biology. Byråde

IDS 116L. Pollen Analysis Lab. (3) Formerly part of IDS 216. Three hours of laboratory per week plus two full weekends and one 1-day field trip on campus. Prerequisites: Must be taken in conjunction with IDS 116E. An introduction to the techniques of Quaternary pollen analysis: recovery of sediment cores, collection of surface samples, graphical presentation of results. Sponsoring departments: Geography and Integrative Biology. Byråde

Geology and Geophysics

(College of Letters and Science)

Department Office: 301 Earth Sciences Building, 642-3992
Chair: George H Brimhall, Jr., Ph.D.

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 earth science are required to take, in addition to the regular program, six units of Geology H89.

The Major in Geophysics

The major in geophysics 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 105, 116, 124, 135, 151, 161) and Group B (Geology 107, 110, 111, 117, 162, Integrative Biology 182-182L), 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 H89.

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 an 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 Geo-
The Major in Engineering Geoscience

The College of Engineering with the cooperation of the Department of Geology and Geophysics offers a curriculum in engineering 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 7A-7B-7C.

3. For geology students, broad undergraduate training in geology, including paleontology, geophysics and geochemistry.

4. For geophysics 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 with the Department of Geology and Geophysics should include several areas 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 dissertation 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 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 prerequisite for a Ph.D.

Center for Isotope Geochemistry. The Center for Isotope Geochemistry, under the directorship of Professor Donald DePaolo, consists of solid-state mass spectrometers in studies on campus and facilities for stable isotopic measurements and microsampling/microanalysis at Lawrence Berkeley Laboratory. Research using the Nd, Sr, Pb, Ca, O, H and C isotopes is directed toward studies of geological processes and the structure and evolution of the oceans, the mantle, and the continental crust.

Seismographic Stations. The University operates 16 seismographic stations in northern California to study the seismicity here and in adjacent parts of Nevada and Oregon and 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 earthquakes, and the theory of the seismographs. Offices are in the Earth Science Building; seismographs and laboratories are in Haviland Hall and in an underground vault in Strawberry Canyon.

Center for Computational Seismology. The University at Lawrence Berkeley Laboratory houses a research facility for modern seismological research which relies heavily upon intensive computational analysis (e.g., imaging) or large database manipulations. The center is used in a number of Ph.D. research studies.

Geology

Lower Division Courses

10. Understanding the Earth. New course. Two 1 1/2-hour lectures and one hour of discussion. This course provides an overview of the materials that make up the Earth, the processes that change them, the organization of these processes into an Earth system, and the history that has developed on the Earth, and the theory of the seismographs.

50. Introduction to Geology. Students who have taken 10 may not receive credit for 50. Two 1 1/2-hour lectures per week. Prerequisites: Geology 50L must 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.

50L. Introductory Geology Laboratory. (1) Three hours of lab per week. Prerequisites: Must be taken concurrently with 50, except by declared geology majors. Practical study of minerals, rocks and geologic maps. Exercises on geologic processes.

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: None. Consent of Instructor: Elementary crystallography; crystal chemistry; classification and physical properties of common minerals; identification in hand specimens.

100B. Introduction to Rocks. (2) Two 1-hour lectures and two 3-hour laboratories for last 7 1/2-weeks; mini-course. Prerequisites: None. Consent of Instructor: Elementary crystallography; crystal chemistry; classification and physical properties of common minerals; identification in hand specimens.

101. Field Geology. (3) One hour of lecture and two 3-hour field trips per week. Prerequisites: 50, 100A-100B.

102. Optical Properties of Minerals and Rocks. (2) One 1-hour lecture and one 3-hour laboratory per week. Prerequisites: Chemistry 11 or 10A or equivalent. The optical properties of minerals and rocks will be taught concurrently. Study of minerals and rocks in thin sections with the petrographic microscope.

104. Ore Deposits. (4) Two 1 1/2-hour lectures, three hours of lab per week, and two field trips. Prerequisites: Chemistry 10A-10B; Geology 101. Major topics include the chemical elements, fractionation, crustal abundance patterns, systematics and evolution of supracrustal ore-forming environments. Mass balance and principles of solution transport by fluids. Beneficiation.

107. Plate Tectonics. (4) Two 2-hour lectures and one hour of discussion per week. Prerequisites: Mathematics 50A-50B; Physics 7A-7B; senior standing in geology, geophysics, or related field. Geometry of plate motions; applications of seismology, gravity, magnetics, and heat flow to plate tectonics; geological processes at plate margins; evolution of mountain belts; driving mechanism for plate tectonics; interrelationship of earth processes.

110. Tectonic Evolution of Western North America. (3) Two 1-hour lectures per week, one 3- or 4-day field trip per semester. Prerequisites: 107, 101. Tectonic development of regional stratigraphic, structural and tectonic analysis, based on plate tectonic theory. Emphasis on examples from Nevada and California; includes analyses of rifted margins; megascopic development; development of basins; accreted terranes; Mesozoic subduction complexes and related plutonic rocks; transform faults and Cenozoic continental disruption.


116. Structural Geology. (4) Two 1-hour lectures and one 3-hour laboratory per week, plus weekend field trips. Prerequisites: 50 and consent of instructor: Graphical methods in elementary structural geology; spherical projections; orthogonal projection; structure contours; cross sections; profiles and block diagrams. Introduction to the theory of stresses and strains and the origin of common structures in deformed rocks.

117. Geomorphology. (4) Three hours of lecture and one 3-hour laboratory per week, plus weekend field trips. Prerequisites: 50, 101A-101B. Senior standing in geology and consent of instructor. Geology 119 is strongly recommended. Six weeks of intensive field work including preparation of formal scientific reports. Extracredit.

119. Geologic Field Studies. (2) Course may be repeated for credit. Two to four weeksends in the field. Prerequisites: 101 and consent of Instructor. Field trips to localities of geological interest. (F, SP)

124. Isotope Geology. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 100A-100B or equivalent, and Chemistry 1A-1B. Methods of dating rocks using radioactive isotopes; the use of stable isotopes in solving many geological problems.

131. Introduction to Theoretical Geochmistry. (4) Three hours of lecture and three hours laboratory per week. Prerequisites: 101. Atoms and molecules, structure and bonding, electronic structures of elements, valence bond theory, molecular vibrations, rotational spectroscopy, molecular structure. Department of Geological and Planetary Sciences, University of California, Berkeley. (SP)

135. Mineralogy-Crystallography. (4) One 2-hour lecture, one 3-hour lab, and one hour individual discussion.

*Not offered 1989-90
1 On leave, spring, fall
On leave, fall
On leave, spring
*Recalled to active service
*Recipient of Distinguished Teaching Award
217. Ruvlal Geomorphology. (4) Course maybe repeated for credit. Prerequisites: Consent of instructor. High temperature solution chemistry; calculation of the thermodynamic properties of minerals at high pressures and temperatures; reaction kinetics; numerical prediction of the rate of movement of masses resulting from weathering, diagenesis, metamorphism, and hydrothermal metasomatism. (F, S) Helfgott

280. Research. (2-12) Course may be repeated for credit. Individual conferences to be arranged. Provided supervision in the preparation of an original research paper or dissertation. (F, S) Staff

290. Seminar. (2-6) Course may be repeated for credit. Two to six hours of lecture and discussion per week. Topics will be announced each semester. (F, S) Staff

288. Directed Group Study for Graduates. (1-9) Course may be repeated for credit. Section 1 must be taken on a satisfactory/unsatisfactory basis; sections 2-10 may be taken on letter-grade basis. Occasional group meetings and individual conferences. (F, S) Staff

162. Sedimentary Rocks and Processes. (4) Two 1½-hour lectures and one 3-hour laboratory per week. Prerequisites: 100A-100B, 102, and 131 (or Chemistry 14). Introduction to the properties of silicate liquids and to their cooling products, the igneous rocks. Use of mineral assemblages to determine intensive variables, and relations of these to geologic setting. (F) Staff

161. Igneous Petrology. (4) Three hours of lecture and four hours of laboratory per week. Prerequisites: 100A-100B, 102, and 131 (or Chemistry 14). Study of igneous rocks, microscopic and sedimentary petrography. Physical stratigraphy. (SP) Staff

H195. Senior Honors. (3) Individual conferences. Prerequisites: Limited to seniors and qualified students. Application of critical thinking and problem solving in independent study of a topic in the earth sciences. May be taken during two consecutive semesters of senior year and may be substituted for 6 units of the upper division requirement with consent of major advisor. (F, S) Staff

199. Supervised Independent Study and Research. (1-6) Course may be repeated for credit. Must be taken on a pass/no pass basis. Individual conferences. Enrollment is restricted by regulations. (F, S, P) Staff

Graduate Courses

201. Seminar in Geochemistry. (3) One 3-hour discussion per week. Prerequisites: Consent of instructor. Principles and problems in geochemistry. (SP) DePaolo

205. Advanced Ore Petrology. (3) Two 1-hour lectures and one 3-hour laboratory per week, plus one field trip. Prerequisites: 104A-104B, 106, and 131. Geological and geochemical evaluation of theories of ore transport and deposition, including field, theoretical, and experimental approaches.

209. Accretionary Tectonics in the Circum-Pacific Region. (3) Course may be repeated for credit. One 3-hour discussion per week and several field trips. Prerequisites: Senior or graduate standing in geology. 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, surficial and extraterrestrial processes.

214. Advanced Igneous Petrology. (4) Two 1½-hour lectures and two 3-hour laboratories per week. Prerequisites: 131 and 131A. Advanced treatment of the composition and properties of igneous rocks, the physical and thermodynamic properties of silicate liquids. (SP) Staff

217. Fluvial Geomorphology. (4) Course may be repeated for credit. Three hours of lecture and one 2-hour laboratory per week; some field work is required. Prerequisites: Consent of instructor. Application of fluid mechanics to sediment transport and development of river morphology. Form and process in river meanders, the pool-riffle sequence, aggradation, grade, and base-level.

225. Advanced Geomorphology. (3) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Consent of instructor. Discussion of problems in fluvial processes, sediment transport, and hillside development. Topics vary from year to year. (F) Dietrich

231. Equilibrium, Mass Transfer, and Kinetics in Geochemical Processes. (4) Four hours of lecture per week. Prerequisites: Consent of instructor. High temperature solution chemistry; calculation of the thermodynamic properties of minerals at high pressures and temperatures; reaction kinetics; numerical prediction of the rate of movement of masses resulting from weathering, diagenesis, metamorphism, and hydrothermal metasomatism. (F) Helfgott

280. Research. (2-12) Course may be repeated for credit. Individual conferences to be arranged. Provided supervision in the preparation of an original research paper or dissertation. (F, S) Staff

290. Seminar. (2-6) Course may be repeated for credit. Two to six hours of lecture and discussion per week. Topics will be announced each semester. (F, S) Staff

288. Directed Group Study for Graduates. (1-9) Course may be repeated for credit. Section 1 must be taken on a satisfactory/unsatisfactory basis; sections 2-10 may be taken on letter-grade basis. Occasional group meetings and individual conferences. (F, S) Staff

501. 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 study for the comprehensive or language requirements in consultation with the field advisor. (F, S, P) Staff

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. Individual conferences. 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. (F, S, P) Staff

Professional Courses

300. Professional Preparation: Supervised Teaching of Geology and Geophysics. (1, 4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour of discussion per week. Prerequisites: Graduate standing and consent of instructor. Theory and practice teaching in geology and geophysics. (F, S, P) Staff

401. The Use of the Electron Microprobe. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Eight hours of laboratory per week. Prerequisites: Graduate standing and consent of instructor. Theory, instrument, specimen preparation, and ancillary equipment, for the analysis of inorganic solids. (F, S, P) Staff

402. Electron Microscopy and X-Ray Diffraction. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Eight hours of laboratory per week. Prerequisites: Graduate standing and consent of instructor. Use of an electron microscope, X-ray diffraction apparatus, and ancillary equipment. (F, S, P) Staff

403. The Physics of the Earth and Planetary Interiors. (4) Three 1-hour lectures and one 2-hour discussion per week. Prerequisites: Geophysics 108, Physics 110A. Fundamental structure of the earth. Chemical composition of the mantle and core, temperature distribution and energetics of the earth's interior. The geodynamic field; paleomagnetism; the geodynamo. (S, P) Jeanloz

104. Mathematical Methods in Geophysics. (4) Three 1-hour lectures and one hour of computer laboratory per week. Prerequisites: Mathematics 50A-50B. Linear algebra and analysis, differential and integral equations, vectors, physical interpretation of linear algebra, Fourier and Laplace transforms, the generalized inverse matrix and Lagrange constants; splines; probability and scientific inference; significance tests; time-series analysis; spherical harmonics; fast-fourier transformations; differential equations of geophysics. (F) Johnson

108. Geodynamics. (4) Three 1-hour lectures and one 2-hour discussion per week. Prerequisites: Geophysics 7A, Mathematics 50A-50B. Basic principles in studying the physical properties of earth materials and the dynamic processes of the earth. Theoretical geodynamics, mechanics of earthquakes, etc., to augment course material. (S, P) Richards

121. Seismology. (4) Two 1-hour lectures and two 2-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 for the velocity distribution; refraction and reflection methods of seismic exploration. Theory of the seismograph; interpretation of seismograms; causes, effects and distribution of earthquakes; mechanics of earthquakes; earthquake hazard and risk. (F, S) McEvilly

122A. Physics of the Earth and Planetary Interiors. (4) Three 1-hour lectures and one hour of discussion per week. Prerequisites: Geophysics 108, Physics 110A. Fundamental structure of the earth. 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. (S, P) Wang

122B. Physics of the Earth and Planetary Interiors. (4) Two 1½-hour lectures and one 2-hour discussion per week. Prerequisites: Geophysics 108, Physics 110A. Fundamental structure of the earth. Chemical composition of the mantle and core, temperature distribution and energetics of the earth's interior. The geodynamic field; paleomagnetism; the geodynamo. (S, P) Jeanloz

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. Generation of seismic waves. Synthetic seismograms. Instrumentation to measure strong ground motion. Estimation of seismic motion at a site. Ground motion spectra. Influence of soils and geologic structure. Seismic risk mapping.

199. Supervised Independent Study. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual conferences. Enrollment is restricted by regulations. (F, S, P) 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; effects of anelasticity and anisotropy; representation theorems; reflection and refraction; propagation in layered media; free-surface waves and finite-element methods. (S, P) Staff

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 elastic media. Lamb's problem; waves in inhomogeneous media; eigenvibrations; seismic source models; synthetic seismograms.

206. Geophysical Inverse Methods. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Geophysics 104 or equivalent. Survey of the mathematical methods used in solving 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. (S, P) Johnson

Geophysics

Lower Division Courses

20. Earthquakes. (3) Three hours of lecture and one hour of discussion per week. Introduction to earthquakes, their causes and effects. General discussion of basic principles and methods of seismology and geophysics and their applications. Tectonics, distribution of earthquakes in space and time, mechanics of earthquakes, effects of earthquakes and earthquake hazard and risk. (F) McEvilly
German

(College of Letters and Science)

Department Office: 5317 Dwinelle Hall, 642-7444

Professors:

Gerd Hillen, Ph.D. Stanford University
Anton Kaebernick, Ph.D. Stanford University
Winfried Kudszus, Ph.D. University of California at Berkeley
Joseph Mickle, Ph.D. California Institute of Technology
Imangard Rauch, Ph.D. University of Michigan
Hinrich C. Seeba, Ph.D. University of Tübingen
Blaise Lee Spackman, Ph.D. University of Berkeley
Frederic C. Tubach, Ph.D. University of California at Berkeley
Kenneth D. Weisengruber, Ph.D. University of California at Berkeley
Richard Binkmann, Ph.D. University of Tübingen

Associate Professors:

Blume Goldstein, Ph.D. Harvard University
Robert C. Holub, Ph.D. University of Wisconsin, Madison
Thomas F. Shannon, Ph.D. Indiana University
Johan P. Snapper, Ph.D. University of California at Los Angeles
Queen Beatrix, Ph.D. University of Amsterdam
Elaine C. Tennant, Ph.D. Harvard University
W. Daniel Wilson, Ph.D. Cornell University

Senior Lecturer:

Jeanne van Oosten, Ph.D. University of California at Berkeley

Major Adviser: Frederic C. Tubach.
Graduate Advisers: Literature: Winfried Kudszus (pre-M.A.)
Simultaneously completed with work for the undergraduate major.
Hinrich Seeba (post M.A.); Linguistics: Imangard Rauch.

The Department of German offers undergraduates the opportunity to obtain a broad background in the field of German language, literature, and culture, and to introduces them to the principles of literary analysis and 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 a more specialized area. The graduate offerings in linguistics constitute a complete program of study in Germanic languages. Instruction in methodology is provided for graduate student instructors and professional 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 of which a minimum of 14 must be taken at Berkeley. The following courses are required: 100, 101A, 101B, and 102A or 102B.

Students who have not achieved at least a B average in that part of the German 1–4 sequence taken at Berkeley must normally complete 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 assistant.

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 (H designates both) must be taken at Berkeley. 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 upper division courses (excluding courses in English translation); 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 counted as one of the four electives with prior approval of the minor advisor.

A letter grade of C or better is required for each upper division course applied to the minor.

Graduate Program

The M.A. Program: A Bachelor of Arts degree (or its equivalent) in German is required for admission to either the literature or the linguistics option.

1. Literature Option: The program is designed to provide students with a comprehensive knowledge of the major periods and works of German literature. Students have to complete at least 37 units, 28 of which must be in graduate courses. The Proseminar (200), Middle High German (203), and at least one elective in literature and one elective in linguistics are required. Students are granted the degree upon passing either a written or an oral examination.

2. Linguistics Option: The program offers a broad range of courses in contemporary and historical language and the methods of German and Germanic linguistics, including recent directions in such approaches as discourse grammar, linguistic field work, and semiotics. Students have to complete at least 37 units, 28 of which must be in graduate courses. A knowledge of Middle High German as well as proficiency in oral and written New High German are required. Students are granted the degree upon passing a written examination.

For more detailed information on the M.A. program in literature and linguistics, students should consult the German Department's "Graduate Student Information Sheet."

The Ph.D. Program: The German Department offers a Ph.D. in both German literature and German linguistics.

1. Doctor of Philosophy: Literature. An M.A. or its equivalent is a prerequisite for admission. Students pursue an individualized program. By the end of the third semester of Ph.D. work, students are expected to develop a prospectus that argues a particular issue, perspective, or critical approach and involves major tests and methods of German literature from the Middle Ages to the present. The qualifying examination, based on this prospectus, consists of both written and oral aspects. Students 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. Language requirements: a reading knowledge of two foreign languages other than German or native fluency in one foreign language other than German.

2. Doctor of Philosophy: Linguistics. An M.A. in German linguistics or its equivalent is a prerequisite for admission. Students are expected to take an oral and an advanced written examination. 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. As part of their training, students are encouraged to participate in public lecture forums, both on and off campus, and to learn to write publishable papers. Language requirements: a reading knowledge of two foreign languages other than German or native fluency in one foreign language other than German.

For more detailed information on the Ph.D. program in literature and linguistics, students should consult the German Department’s “Graduate Student Information Sheet.”

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 languages, literature, history, and culture of the Netherlands, offered by the Department of German follow the German courses.

German

**Lower Division Courses**

German 25 is strongly recommended as a complement to all lower division language courses.

1. Elementary German. (5) Five 1-hour class meetings per week and laboratory practice. Beginner’s course. (F,SP)
2. Elementary German. (5) Five 1-hour class meetings per week and laboratory practice. Prerequisites: 1 or equivalent. (F,SP)
3. Intermediate German. (5) Five 1-hour class meetings per week and laboratory practice. Prerequisites: 2 or equivalent. (F,SP)
4. Advanced German. (5) Five 1-hour class meetings per week. Prerequisites: 4 or equivalent. (F,SP)

**Upper Division Courses**

**Prerequisite:** Unless otherwise stated, four lower division German language courses (20 units) or their equivalent.

100. Introduction to German Literature. (3) Three hours of lecture/discussion per week. Introduction to German literature and major trends in German literature from the fourteenth century to the present. To familiarize students with literary methodologies and bibliographical tools. Required 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. Emphasis on correct use of the German language. Systematic review of German grammar. Weekly written assignments. No midterm or final examination. Required of all German majors. (F,SP) Staff

101B. Prerequisites: 101A or consent of instructor. Three hours of lecture/discussion per week. Introduction to writing and speaking skills of students in their third year of German studies. Emphasis on emphasis on correct use of the German language. Systematic review of German grammar. Weekly written assignments. No midterm or final examination. Required of all German majors. (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)

103. 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 major figures in German literature. Literature, philosophy and aesthetics of the Romantic period. (SP) Tennant

104. Introduction to the Linguistic Study of German. (4;4) Four hours of lecture/discussion per week. Systematic review of German grammar. Weekly written assignments. No midterm or final examination. Required of all advanced students of German. (F,SP) Staff

105. Middle High German for Undergraduates. (3) Three hours of lecture/discussion per week. Basic course on the grammar and usage of Middle High German. Students will be expected to learn the fundamentals of Middle High German and their ability to understand and speak Middle High German. Required of undergraduates with no knowledge of Middle High German. (SP) Tennant

106. Readings in Middle High German. (3) Three hours of lecture, translation and discussion per week. Students will learn the fundamentals of Middle High German grammar and vocabulary through readings in major narrative works of the Hohenstaufen period. (F) Staff

108. Literary Translation. (3) Three hours of lecture/discussion per week. Prerequisites: 105 or equivalent. Reading course designed to increase students’ Middle High German repertory. May not be substituted for but may be taken concurrently with German 203.

110. From 800-1648. (3) Three hours of lecture/discussion per week. Early German literature, particularly that of the classical age. To familiarize students with literary methodologies and bibliographical tools. Required of all German majors. (F,SP) Staff

111. From 1500-1800. (3) Three hours of lecture/discussion per week. To familiarize students with literary methodologies and bibliographical tools. Required of all German majors. (F,SP) Staff

112. From 1800 to the Present. (3) Three hours of lecture/discussion per week. The period that gave rise to classicism and modern German literature. Dramas (especially Lessing), novels, poetry and philosophical and political texts in their historical settings. (SP) Tennant

121. Renaissance, Reformation, and Baroque. (3) Three hours of lecture/discussion per week. Major authors and their works from the 15th through the 17th centuries. (SP) Staff

122. Enlightenment and Sturm und Drang. (3) Three hours of lecture/discussion per week. The period that gave rise to Classicism and Modern German literature. Dramas (especially Lessing), novels, poetry and philosophical and political texts in their historical settings. (SP) Staff

123. Classicism. (3) Three hours of lecture/discussion per week. Problems of classicism, particularly in the light of contemporary discourse, will be discussed. Traditional interpretations will be weighed against contemporary readings of the major works of the period. (SP) Staff

124. Romanticism. (3) Three hours of lecture/discussion per week. Literature, philosophy and aesthetics of the Romantic period. (SP) Staff

125. 19th-Century Literature. (3) Three hours of lecture/discussion per week. Major trends and problems in 19th-century German literature. (SP) Staff

126. Modern Literature. (3) Three hours of lecture/discussion per week. Introduction to philosophical, ideological, and aesthetic trends of the 20th century. Analyzes of literary texts by T. Mann, G. Kittel, G. George, R. M. Rilke, G. Benn, B. Brecht. (SP) Staff

127. Contemporary Trends. (3) Three hours of lecture/discussion per week. (SP) Staff

127A. German Literature of the Seventies. Three hours of lecture/discussion per week. A discussion of the literary, political and sociological concerns in the 1970s. (SP) Staff

127B. Major Trends in German Literature since 1945. Three hours of lecture/discussion per week. The Post-War Novel. German history, social criticism, and existential concerns as reflected in the novels of H. Nossack, H. Böll, G. Grass, M. Frisch, and M. Walser. (SP) Staff

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 Wilhelm von Humboldt. (SP) Staff

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 relationship between literature and society: patriarchy, class ideology, political significance, and modernization. (SP) Staff

133B. German Literature and the French Revolution. (3) Three hours of lecture/discussion per week. Course will reflect recent attempts to redefine the traditional periods of German literature by taking background to Medieval literature from the Age of Charlemagne to the Empire of Charles V.
account of the central importance of the German re-
response to the Revolution for the development of Weimar
Classicism and early Romanticism. We will also look at
the political charged rejection of German Classicism
in the 19th century, and at a 19th-century and a 20th-
century literary confrontation with the Revolution (Büch-
ner, Weiss).

*135. Psychological Approaches to Literature. (3)
Three hours of lecture/discussion per week. Prereq-
uisites: 100.
*135A. Robert Walser. The course will focus on the
interrelatedness of writing and silence, and on various
modes of creating and negating meaning.

E. Author Courses

*140. Goethe. (3) Three hours of lecture/discussion per
week. An introduction to Goethe's prose, drama, and poetry.

*141. Schiller. (3) Three hours of lecture/discussion per
week. An introduction to the work of Rilke and Hofmannsth.

*143. The Poetry of Rilke and Hofmannsth. (3)
Three hours of lecture/discussion per week. An introd-
uction to the work of Rilke and Hofmannsth.

*144. Thomas Mann, Franz Kafka, HeAnann Hesse.
Three hours of lecture/discussion per week. Attention will be
drawn to dramatic theory, prose, and poetry.

*145. Thomas Mann. (3) Three hours of lecture/disc-
ussion 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) Mickel

*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 cen-
tury; analysis of lyrical texts from 1890-1920. (SP)
Goldstein

F. Special Topics

*150. Literature of the German Democratic Republic.
(3) Three hours of lecture/discussion per week. An intro-
duction to the major writers of prose and drama.

*151. Austrian Literature. (3) Three hours of lecture/
discussion per week. An introduction to the major writers of

*153. Feminist Perspectives in Literature. (3) Course
may be repeated when topic changes. Three hours of
lecture/discussion per week. Texts and instruction in
English. Does not count toward the major/minor unless
prior arrangement is made with the major/minor adviser
and the instructor. For specific topic contact departmental
counselor.

*154. Jewish Writers and Thinkers in the German-
Spooling World. (3) New course. Three hours of lecture/
discussion per week. This course will explore attempts
of German-speaking Jews to try to come to terms with
the dominant German (or Austrian) European culture
during the period extending from their emancipation
from the ghetto in the 18th century to their expulsion
or extermination in the Nazi era. The course will examine
the texts of Jewish writers about Jewish-German identity
and nationality and try to understand them in their so-

*155. Studies in Poetry. (3) Three hours of lecture/
discussion per week.

155A. 18th- and 20th-Century German Poetry. Rep-
 resentative texts from 18th- to 20th-century German
to

156. Studies in Prose. (3) Three hours of lecture/
discussion per week.

156A. Experimental Contemporary Prose. Kudszus

157. Studies in Drama. (3) Three hours of lecture/
discussion per week.

157A. German Drama from the Forties to the Sev-
enties. The course will focus on major dramatic trends.
Attention will be drawn to the dramatic theories underlying
epic treatments of major historical events, the absurd,
anti-theatrical, and neo-naturalist. Representative
plays by major playwrights will be studied both in
terms of manner and matter. (F) Mickel

*158. Introduction to Contemporary Germany. (3)
Two hours of lecture and one hour of discussion per week.
Introduction to the major filmmakers of the post-
World War II period and the political back-
ground of the Federal Republic of Germany today. Open
to all undergraduates with an interest in contemporary
Germany but particularly intended for students who will
participate in the 1986 to 1987 exchange program with
Germany. (F) Kaes

*159. German Cinema. (3) Three hours of lecture/
discussion per week. Designed expressly for Undergraduates
and open to all students with a working knowledge
of German. (SP)

*160. Issues and Problems in German Literary and
Cultural History. (3) Three hours of lecture/discussion per
week. Texts and instruction in English. Does not count

*161. German Cinema. (4) Three hours of lecture and
two hours of film screening per week. Films have English
subtitles. Texts and instruction in English. Does not

*162. Carnival: Folk Customs, Literature, and Theory.
(3) Three hours of lecture/discussion per week. This
course will survey, in a geographical and historical setting,
seasonal mythologies and social satirical commentary as
two key themes of European carnival. Also, a series of
literary documents in which the carnivalesque rep-

*164. Proseminar in German Literature. (4) Two
hours of lecture/discussion per week. Designed expressly
for Undergraduates and open to all students with a working
knowledge of German. (SP)

*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

*201A. Middle Ages. Sun/ey of medieval German literature
from year to year. (F,SP)

*201B. 1500-1700. An introduction to major trends and
authors of this period beginning with the Reformation.
Luther, Muenzer, Opitz, Gryphius, Lohenstein, and

*201C. 18th Century. An introduction to major texts from
the Enlightenment, Sturm und Drang, and Classicism

*201D. 19th Century. Astudyof major texts from Nefalils
to Fontane to explore the changing functions of literature,
its ideological implications and social significance within
the 19th-century German frame. (F) Seeba

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 pro-
tagonists, the enigmatic world they try to inhabit, and
the various ways in which their stories are presented
in literary prose. Kudszus

175B. 20th-Century Poetry. (3) New course. Analysis
of various kinds of poetry from the beginning of the cen-
tury to today, including works by Trakl, Benn, Bach-
late, Goethe, Celan, and Briinn. (F) Search

195. Research Seminars for Undergraduates. (3)
Course may be repeated for credit. Three hours of seminar per week. One course offered under this topic is
required of all students participating in the departmental
Honors Program. Variable topic. For specific topic contact
departmental office. (F,SP)

195. 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 B. Individual conference.
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 German
literature, draw attention to bibliographical and re-
sources but open to all students with a working knowledge
of German. (SP)

*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. can-
didates but open to all students with a working knowledge
of Middle High German.

201B. 1500-1700. An introduction to major trends and
authors of this period beginning with the Reformation.
Emphasis on German, 17th-century literature. Texts by
Luther, Muenzer, Opitz, Gryphius, Lohenstein, and
Grimmelshausen. (F) Spring

201C. 18th Century. An introduction to major works of
the Enlightenment, Sturm und Drang, and Classicism
in the work of Schiller. (SP)

201D. 19th Century. A study of major texts from Novalis
and Schiller to explore the changing functions of literature,
its ideological implications and social significance within
the 19th-century German frame. (F) Seeba
B. Literary History Courses

205. Studies in Medieval Literature. (4) Course may be repeated for credit. Two hours of seminar plus one hour of tutorial per week. Prerequisites: 106 or 203. Variable topic. For specific topic contact departmental office. (F) Spath

206. Literature of the Renaissance and Reformation. (4) Two hours of seminar plus one hour of tutorial per week.

206A. Literature of the 16th Century. Survey of monuments of German and Latin literature from the 15th and 16th centuries. Particular attention is given to Northern Humanism and the Reformations. A good reading knowledge of Middle High German is recommended. Tennant

209. Literature of the 17th Century. (3) 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. (SP) Hillen

211. Studies in the 18th Century. (4) Two hours of seminar plus one hour of tutorial per week.

211A. Age of Enlightenment. Literary texts will be studied as historical documents illustrating changes in literary styles and genres. The Enlightenment. Texts by Lessing, Herder, and Kant. The French Revolution. And some Storm and Stress plays. Hillen

211B. The Writer and Enlightened Absolutism. A sociopolitical approach: the writer and the court, the book trade, 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 realism.

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.

218. Studies in 20th-Century Literature. (4) Course may be repeated for credit as subject changes. Two hours of seminar per week.

C. Genre Courses

220. Bildungsroman. (4) Two hours of seminar per week plus one hour of tutorial.

226. Drama of the 20th Century. (4) Two hours of seminar plus one hour of tutorial.

228A. From Gerhart Hauptmann and Naturalism to Franz Xaver von Schubert. The early 20th century. Naturalism will be drawn to the dramatic theories underlying naturalism, expressionism, epic theater, theatres of the absurd, documentary theater, and metatheater, and to the characteristic concerns and formal features of these trends. Representative dramas by major playwrights will be studied both in terms of substance and of form. (SP) Milliek

228. 20th-Century Novel. (4) Two hours of seminar per week plus one hour of tutorial. Modern German novel.

D. Author Courses

230. Lessing. (4) Two hours of seminar per week plus one hour of tutorial. Emphasis on the plays and their sociopolitical-political-religious. Theological and theo- retrical writings. The writer's relation to authority and the literary market.

233. 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 major works of the author will be examined in the course of research in this period. (F) Weisgerber

234B. Goethe's Faust II: This and other works of Goethe's later period will be read and discussed in the light of contemporary dramatic theory. Weisgerber

236. Schiller, (4) Two hours of seminar per week plus one hour of tutorial. Plays and aesthetic works of Schiller will be read and discussed. Emphasis on the historical and dramatic problems of the works.

240. Heinrich von Kleist. (4) Two hours of seminar per week plus one hour of tutorial. A study of Kleist's dramatic works with emphasis on non-narrative language and aesthetic representation within Kleist's concept of Gebrechlichkeit der Welt.

241. Heinrich Heine. (4) Two hours of seminar plus one hour of tutorial per week. A study of Heine's works in his political and social contexts.

242. Hoffmannsthal. (4) Two hours of seminar per week plus one hour of tutorial. A study of Hoffmannsthal's works and their role in the development of 20th-century drama.

247. Hermann Hesse. (4) Two hours of seminar per week plus one hour of tutorial. A study of Hesse's novels and their historical and thematic significance. (SP) Sparr

250. Thomas Mann, Franz Kafka, and Herman Hesse. (4) Two hours of seminar per week plus one hour of tutorial. A study of Mann's prose and novels, Kafka's short stories and the effects of the modernist period on the major% authors and their evolution.

253. Franz Kafka. (4) Two hours of seminar per week plus one hour of tutorial. A study of Kafka's novels and short stories with emphasis on Kafka's themes and their evolution.

255A. Topic: Holderlin. (F) Kudszus

255B. Georg Trakl. Kudszus

268. Aspects of Literary and Cultural History. (4) Two hours of seminar per week plus one hour of tutorial. A critical overview of the major literary and cultural developments of the 20th century. (SP) Rauch

270. Introduction to the History of the German Language. (4) Two hours of seminar per week plus one hour of tutorial. The development and evolution 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. Prerequisites: 270. Advanced topics in Germanic phonology, morphology, syntax, semantics, pragmatics. The principal Germanic dialects viewed within laryngeal theory and reconstructions. Recommended for all candidates for the M.A. with linguistics emphasis.

273. Gothic. (4) Two hours of seminar per week plus one hour of tutorial. Study of the linguistic structures of the oldest Germanic dialect with a sizable corpus. Indo-European origins, historical and societal developments. Gothic as a synchronic construct are considered. (SP) 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 11th century within the framework of current linguistic method.

278. History of the Dutch Language. (4) Two hours of seminar per week plus one hour of tutorial. The history and development of the Dutch language and its influence on English and German. See also Dutch 107.

282. Old Saxon. (4) Two hours of seminar per week plus one hour of tutorial per week. Study of the most primitive of the major Germanic languages in terms of structural identification. The literary and ethnographic setting of the Heil and its shared isogloss.

285. Approaches and Issues in the Study of Modern German. (4) Two hours of seminar per week plus one hour of tutorial. Prerequisites: 103. A survey of relevant contemporary issues and their theoretical and linguistic research on the structure of modern German.

290. Seminar in German Linguistics. (4) Course may be repeated for credit. Three hours of seminar and one hour of tutorial. Variable topic. For specific topic contact departmental office. (F,SP)

291. Methods and Issues in German Morphology. (4) New course. Two hours of seminar per week. The seminar will deal with the methods and results of mor-
phological analysis as applied to the German language. It will introduce basic concepts and means of morphological analysis, as well as study and apply various theories of word structure to German. The primarily-concern will be the synchronic analyses of modern German word formation, but questions of a diachronic nature as well as ones about inflection will also be discussed. 

292. German Syntax. (4) Formerly 290G. Two hours of seminar per week. Discussion of current syntactic theories as applied to a number of issues in modern German syntax with an eye toward their description, and explanatory potential. Typological comparison, especially with English. Shannon

293. German Semantics. (4) Formerly 290L. Two hours of seminar per week. 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 pathological language. Rauch

294. Contrastive Grammar. (4) Formerly 290E. Two hours of seminar per week. 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. (F) Rauch

295. Diacritology. (4) Formerly 290F. Two hours of seminar per week. Discussion of modern methods and results in the investigation of present-day German dialects. (F) Shannon

296. Semiotics. (4) Formerly 290D. Two hours of seminar per week. 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. (F) Rauch

Group and Individual Study

298. Directed Group Study. (2-6) Course may be repeated for credit when topic changes. Must be taken on a satisfactory/unsatisfactory basis. Seminar. (F) Snapper

299. Individual Study for Graduate Students in Literature and Linguistics. (2-12) Course may be repeated for credit. Individual conference. Primarily for post-M.A. students. Can only be taken twice, once for each credit. Prerequisites: IVIA. in German, independent qualifying examination. (F,SP) Staff

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. (F) Staff

301A-301B. The Teaching of German in College. (3,3) Credit and grade to be awarded upon completion of the sequence. Two hours of seminar per week. Required for all new graduate student instructors. This two-semester course provides instruction in the theory and practice of foreign-language teaching and learning. (F,SP) Staff

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. Supervised teaching of lower division courses, including orientation workshop. (F,SP) Staff

Yiddish

Lower Division Courses

1. Elementary Yiddish. (5) Three 1½-hour lecture/discussion periods per week. Alphabet, reading and writing, conversation practice. An introduction to Yiddish linguistics, Yiddish expressions and songs, and discussion/readings/guest speakers on the Yiddish cultural context. (F) Rauch

2. Elementary Yiddish. (5) Three 1½-hour lecture/discussion periods per week. Reading and writing, conversational practice, Yiddish linguistics, Yiddish newspaper articles and simple literature, songs and discussions, and discussion/readings/guest speakers on the Yiddish cultural context. With a gradual increase, classroom interchange will be conducted in Yiddish. (F) Shannon

Upper Division Courses

110. Advanced Yiddish. (3) Three hours of lecture/discussion per week. Prerequisites: 2 or consent of instructor. Reading and Yiddish of similar works of literature by authors like Sholem 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) Snapper

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. Beginner's 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. (F) 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. (F) 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 lecture/discussion per week. Prerequisites: Dutch 110 or consent of instructor. A course in spoken Dutch. (F) Van Oosten

120B. Advanced Dutch Conversation. Prerequisites: 120A, 130 or consent of instructor. A course in spoken Dutch. (F) Van Oosten

130. Advanced Grammar and Composition. (3) 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. (F) Snapper

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. (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 major contemporary Dutch and Flemish writers and their works. (SP) Snapper

165. Flemish Literature in English Translation. (3) Three hours of lecture/discussion per week. Variable topic. Study of the major contemporary Dutch and Flemish writers and their works.

165A. The Second World War: Novels, short stories, and poetry dealing with the war by such writers as Hugo Claus, Louis Paul Boon, and Ward Ruyslinck.

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 secession 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, morality plays, and the Abela 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

H195. Honors Studies in Dutch. (1-4) Course may be repeated for credit up to 4 units. Prerequisites: Advanced standing. Supervised independent study and research course for honors students. (F,SP) Snapper

198. Directed Group Study. (2-4) Course may be repeated for credit. Must be taken on a passed/not passed 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 passed/not passed basis. Individual conference. Prerequisites: Overall GPA of 3.0. Enrollment is restricted by regulations listed on pages 87 and 88 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 topics and genres in Netherlandic literature from the Middle Ages to the modern period. Offerings vary from semester to semester.

299. Individual Studies in Dutch for Graduate Students. (1-6) Course may be repeated for credit. Individual conference. For graduate students engaged in exploration of a restricted field, involving the writing of a research paper. (F,SP) Snapper

*Not offered 1989-90
1On leave, spring
2On leave, fall
3On leave, spring, fall
4On leave, winter
5On leave, summer
6Recipient of Distinguished Teaching Award
Health and Medical Sciences Program

Program Office: Room 106, Building T-7, 642-5479
Gerald N. Heyneman, Ph.D.

Faculty:

Jeremy Berge, M.D.
Washington Burns, M.D.
J. E. Coon, M.D.
John Collin, M.D.
James Collmeyer, M.D.
James Cuhbertson, M.D.
Richard S. Dubnow, M.D.
Eugene Eisenberg, M.D.
Paul Ferrer, M.D.
Bonnie Frank, M.D.
Rose Grolstein, B.S.
Heather A. Harper, B.A.
Neal Halton, M.D.
Jonathan Holland, M.D.
Gordon Holmes, M.D.
Ernest Hook, M.A., M.D.
Marc Kimmelman, M.D.
Tommasini Kuhnert, Ph.D.
Daniel Lane, M.D.
Paul Lasewich, M.P.P.
Joy Pito, M.D.
Bernard Rapaport, M.D.
Lawrence Smyth, M.D.
Richard Ury, M.D.
Judy Tidrok, M.S.W.
David Troxel, M.D.
K. F. Kay Woodruff, M.D.
James Yee, M.D.

Health and Medical Sciences is a pioneering program on the Berkeley campus whose aim is to devise new models of training for existing and emerging health professions. It consists of two health-related degree programs at the graduate level. These programs are based upon a combination of the basic sciences, applied sciences, and the humanities. Students are expected to acquire a solid familiarity with the selected area of interest and mastery of the basic skills that will enable them to do independent work in this area. The master's program is interdisciplined 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 enhance 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 work, the medical degree by UC San Francisco upon completion of the fourth and fifth years. Students selected for this program must have focused intellectual interests in a field that would complement their medical training. They must have completed 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 the prevention and detection of 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, will have an undergraduate upper division grade-point average of at least 3.0, along with a bachelor's degree 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 642-6328 or 642-6553.

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 interview. The physical examination of fellow students, lectures, demonstrations, and organization of demonstration cases. The system approach will be used.
B. The complete patient interview and complete physical examination with case presentation. All students do on a weekly basis. A lecture on the examination of various organs systems will precede each weekly examination (neurological, exam., etc.). (F,SP)

206A-206B. 206C-206D. Introduction to Clinical Medicine. (3,3,3,3) Three hours of lecture and 2½ hours of clinical presentation per week. Prerequisites: Graduate standing in HMS Joint Medical Program. A four-semester sequence introducing basic principles of clinical medicine taught by organized teams of instructors. The students will be arranged in groups of approximately 12, meeting twice weekly. One session is didactic, meeting 1½ hours; the second weekly session is held at various hospitals, and has a 1½-hour lecture followed by 2½ 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. Staff will be instructed in the specific skills of psychiatry, along with a knowledge of 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,SP)

209A-209B. Principles of Human Pathology. (5,5) Formerly BCHS 209A-209B. Two 2-hour lectures and two 2-hour laboratories per week. Prerequisites: Graduate standing in HMS Joint Medical Program or consent of instructor. An in-depth study of general pathological processes (cell injury and death; inflammation and repair; hyperplasia-neoplasia; immunity) and a detailed study of the pathologic basis of diseases affecting specific organ systems. (F,SP)

210. Physical Basis of Radiology and Nuclear Medicine. (2,2) One clinical hour per week plus occasional laboratory field trips. 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 physicians. Topics: radiological anatomy, histology, physiology, biochemistry and consent of instructor. An in-depth study of general pathological processes (cell injury and death; inflammation and repair; hyperplasia-neoplasia; immunity) and a detailed study of the pathologic basis of diseases affecting specific organ systems. (F,SP)

211. Medical Neurobiology. (3) Two 1½-hour lectures and two 2-hour laboratories per week. Prerequisites: Graduate standing in HMS Joint Medical Program or consent of instructor. A review of the basic principles of neurobiology concentrating on the structural and functional properties of the components of the central nervous system: electrical properties; synaptic transmission; visual pathways and other sensory processes; the cerebellum. Later, a review of the general functional aspects and their relationship to activity and behavior, such as consciousness, E.E.G.; sleep; coma; aging; pain; regeneration, etc. (SP)

215. Clinical Pathology. (4) Five hours of seminar per week. Prerequisites: Graduate standing in HMS Program or consent of instructor. Focus is on development of observation, interviewing, and interpersonal communication skills. (F,SP)

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 per week. Prerequisites: Graduate standing in HMS Program or consent of instructor. First semester develops theoretical foundations appropriate to counseling in health settings; normal development, counseling theory, ethics, and managing client normal devotopment, counseling setting and similar topics. Field trips to community sites may be arranged. (F,SP)

234. 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: 247 or consent of instructor. This seminar will review methodologies of research from different disciplines in 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 protocols. The relationship between research, policy, ethics, and social and medical sciences will be stressed. Credit and grade to be awarded upon completion of the sequences. (F,SP)

248A-248B. Seminar in Research Methodology. (2,2) Two hours of seminar per week. Prerequisites: 247 or consent of instructor. This seminar will review methodologies of research from different disciplines in 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 protocols. The relationship between research, policy, ethics, and social and medical sciences will be stressed. Credit and grade to be awarded upon completion of the sequences. (F,SP)

250A-250B. 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: Graduate standing in HMS Program or consent of instructor. Focus is on development of observation, interviewing, and interpersonal communication skills. Specific topics are developed in consultation with students and instructors. Topics: duties of physicians to society; social organization of medicine, licensure, insurance, medical liability, economics, and judicial issues. Course field work will be utilized to highlight certain issues discussed in the seminar. (F,SP)

260A-260B. Seminar in Advanced Genetic Counseling. 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)

272. Introduction to the Clinical Process. (2) Must be taken on a satisfactory/unsatisfactory basis. One 1½-hour lecture and one 1½-hour laboratory per week. Prerequisites: Graduate standing in HMS program. An interdisciplinary approach to basic knowledge and skills necessary for knowing and working in the professional-client interaction. Focus is on development of observation interviewing, gathering, and interpersonal communication skills. (F,SP)

293A-293B. Principles and Practices of Counseling in Health Settings. (3,3) Credit and grade to be awarded upon completion of sequence. Three hours of lecture per week. Prerequisites: Graduate standing in HMS Program or consent of instructor. First semester develops theoretical foundations appropriate to counseling in health settings; normal development, counseling theory, ethics, and managing client normal devotopment, counseling setting and similar topics. Field trips to community sites may be arranged. (F,SP)

296. Special Study. (1-10) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual meetings with faculty members. Prerequisites: Graduate standing. Designed to permit qualified graduate students to pursue special study under the direction of a faculty member. (F,SP)

222 / Health and Medical Sciences Program
History
(College of Letters and Science)

Department Office: 3229 Dwinelle Hall, 642-1971

Professors:
Richard M. Abrams, Ph.D. Columbia University. Recent U.S., political, economic
Thomas G. Bassett, Ph.D. Harvard University. Britain since 1609, Tudor-Stuart, legal
Gunter B. Barth, Ph.D. Harvard University. Recent U.S., urban, social
Gene A. Brucker, Ph.D. Harvard University. Medieval
Paula S. Pass, Ph.D. Columbia University. America since 1607, social, urban
Barbara Shapiro, Ph.D. Harvard University. English intellectual, 1500-1700. (Rhetoric)

Assistant Professors:
Robin L. Einhorn, Ph.D. University of Chicago. U.S., economic, Eighteenth Century
Henry S. N. bez, Ph.D. University of California at Berkeley. Latin America, social, cultural
Wen-Hsing Yen, Ph.D. University of California at Berkeley. Modern China, social and cultural

Visiting Professors:
Leona C. Turino, Ph.D. University of California at Berkeley. Latin America, medieval
Virginia S. Smith, Ph.D. University of California at Berkeley. Latin America, modern

Major Advisers: Consult Undergraduate Office.

The Department of History offers a program of instruction ranging widely over the historical record and seminars are available to students at introductory and advanced levels.

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:

1. Western Civilization to 1400: 4A, 4B, 30A, Undergraduate Interdisciplinary Studies (formerly Special Progams) 44A, 44B.
2. European History since the Renaissance: 5, 15, 30B, Undergraduate Interdisciplinary Studies 44C, 44D.

A freshman-sophomore seminar (History 39) may be substituted in one of the areas required for admission.

Upper Division Courses

1. History 103 (Seminar in Historical Research and Writing for History Majors) in one of the fields selected for History 103.

2. Two seminars (History 103) in two different fields as listed in 1 above (for purposes of the requirement sections of History 103 in European history pre-1600 and post-1600 may be counted as seminars 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 member of the faculty 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 studies.
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 102.
   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 History 102, the oral examination, and the research essay. If the student's work is of honors quality in the committee's estimation, 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 apply for admission to 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 the spring term 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 (714) 787-3820 or write to Education at Home 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 master's degrees in 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 is 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. Further information is available in the departmental office.

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.

John E. Leach, Ph.D. Princeton University. History of science, biology, life sciences
Linda Lewin, Ph.D. Columbia University. Latin America, Brazil, family
Richard J. Saller, Ph.D. Princeton University. Latin America, colonial economy

Associate Professors:
Susanna I. Barrows, Ph.D. Yale University. Latin 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.
James H. Kettler, Ph.D. Harvard University. U.S. colonial, revolutionary, legal to 1860

*On leave, spring
Recalled to active service
Recipient of Distinguished Teaching Award
A. China. (4)
B. Japan. (4)
C. Africa. (4)
D. 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) Kent

15. Topics in the History of Modern Europe. (3) 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 week each semester.

17A-17B. Studies in American History. (4;4) Four hours of meeting 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 to two-hour meeting per week. Prerequisites: Consent of instructor. Seminar sections in 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 precise schedule of offerings, see department catalog during advanced class enrollment each semester. This course requires at least twelve hours per week of effort 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 examination questions. Required of all graduating majors. Topics and instructors vary. Consult department catalog for details.

101. Seminar in Historical Research and Writing for History Majors. (5) Three hours of seminar meetings per week. Individual research projects carried out in seminar sections in various historical fields resulting in a longer 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.

H102. Colloquium on Historical Thought. (4) Two hours of seminar meeting. Prerequisites: Completion of 101; either junior honors standing or senior non-honors standing. Consideration of the nature and function of historical thought as manifested in major historical classifications and selected historical problems. Required of honors program juniors; open, by permission of instructor, to non-honors program seniors upon completion of 101.

103. Preseminar: Problems in Interpretation in the Various 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 methodology. Emphasis will be placed on writing and discussion. For precise schedule of offerings, see department catalog during advance class enrollment each semester.

105A. Ancient. (4)
105B. Europe. (4)
105C. England. (4)
105D. United States. (4)
105E. Latin America. (4)
105F. Asia. (4)
105H. Africa. (4)
105N. Canada. (4)
105S. History of Science. (4)
105U. 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.

105. 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 explores the evolution of Republican government, the growth of Roman imperialism, and the internal disruptions of the age of the Gracchi, Sulla, 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 an expression 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, forces, trends 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 struggles in light of intellectual and cultural currents.

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 Sasanian 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 Empires, 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 empires and the formation of the Middle East: Seljuks, Mongols, Ottomans, and Safavids.

109C. The Middle East From the 18th Century to the Present. (4) Students who have taken 163B (quarter system) should receive half credit. Three hours of lecture and one hour of discussion per week. The break-up of pre-modern empire 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; the history of the Scythians, Hsiung-nun, Huns, Turks, and Mongols; their relations with Greece, Rome, Iran, China, and Russia; conquest 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.

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.

117B. 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 165B (quarter system) should receive half 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
half credit. Three hours of lecture and one hour of discussion per week.

124. The Recent United States. Students who have taken 166B (quarter system) should receive 1.5 units of credit. Three hours of lecture and one hour of discussion per week.

124A. Late 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 backgrounds, slave experience, social and cultural experience since emancipation. The course will consider race relations, particularly between blacks and whites in America.

125A. 1550-1685. (4)

125B. 1685 to the Present. (4)

125A-125B. The West in United States History. (4;4) Three hours of lecture and one hour of discussion per week. A cultural and social history of western 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 expansions 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: family and racial relationships, 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;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 Orthodoxy, and non-theist humanism.

134A-134B. The Age of the City. (4;4) Three hours of lecture and one hour of discussion per week. A social and cultural 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. This course is equivalent to Modern Economics 112; students will not receive credit for both courses.

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.

137. The Repeopling of America. (4) New course. Three hours of lecture and one hour of discussion per week. This course examines the coming together of people from five continents to the United States and provides an historical perspective on migration patterns of immigration. The course begins in the colonial era when servants and slaves typified the migrant to America. It then follows the migration of the preindustrial immigrants, through migration streams during the industrial and "post-industrial" era of the nation. (F)

138. Topics in United States History. 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 half 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 half 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 (15th century) to the present.

143. Brazil. (4) Students who have taken 163A or 163B (quarter system) should receive half 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, slavery, export economy, and the transition 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.

145. Medieval England. Students who have taken 150B or 150C should receive half 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 Doomsday 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 12th and 14th centuries.

151. Modern Britain. Three hours of lecture and one hour of discussion per week. Pre-requisites: 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)

*Not offered 1988-90
3On leave, spring
4On leave, spring
5On leave, fall

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) Formulation 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 heresy; culture 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. 200-600 A.D. (4) Emphasis on the symbolist (rather than the sequential) 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, ca. 1050-1270. (4) Emphasis on the interplay between the symbolist non-linear thinking found mostly in monastic circles and the new forms of thought: new forms of linear, 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 half 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 16th century.

158. Modern Europe. Students who have taken 122, 123, or 124 under the quarter system will receive only half credit. Three hours of lecture and one hour of discussion per week.

158A. Old Regime and Revolutions to 1815. (4)

158B. 1815-1914. (4)

158C. 1914 to the Present. (4)

159. European Economic History. Students who have taken Econ. 111A, 111B, or 126A or 126B (quarter system) should receive half credit. Three hours of lecture and one hour of discussion per week.

159A. 1000 to 1750. (4) Students who have taken Econ. 111A may not receive credit for 159A. Survey of the economic and social developments of Europe up to the eve of industrialization. Including the transformation of peasant-based, agrarian economies into market-oriented agricultural economies, colonial expansion, and international trade.

159B. 1750-1914. (4) Students who have taken 111B may not receive credit for 159B. The Industrial Revolution and the rise of the European economy to world dominance in the 19th century, emphasizing the diffusion of the industrial system to Third World countries; social development in the 20th century; the rise of modern industrialism.

160. The International Economy of the 20th Century. (4) Students who have taken Econ. 115 may not receive credit for 160. Three hours of lecture and one hour of discussion per week. Disaggregates 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 develop-
173A. From Earliest Times to ca. 1500. (4) (SP)
173B. Russia 1700-1917. (4)
173C. The Soviet Union, 1917 to the Present (4)
173D. Eastern Europe. Students who have taken 128A, 128B, 128C, or 128D will receive only half credit. Three hours of lecture and one hour of discussion per week. Thought and art considered in their social and political contexts.
173E. From the Enlightenment to 1870. (4)
173F. From 1870 to the Present. (4)

174. Modern Jewish History, 1646 to the Present. (4) (SP)
175. History of Christianity. Students who have taken 108B (quarter system) should receive half credit. Three hours of lecture and one hour of discussion per week.
176. History of Science. (4) 
177. History of Technology. (4) (SP)

178. From 1500 to 1900. (4)
179. History of the Physical Sciences. Three hours of lecture and one hour of discussion per week.
180. Topics in the History of Biology. (4) Three hours of lecture and one hour of discussion per week.

182. 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.
184. Topics in the History of Religion. (4) Three hours of lecture and one hour of discussion per week.
185. History of Christianity. Students who have taken 108B (quarter system) should receive half 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.
186. The Revolution in European Culture since the Late 18th Century. (4)
187. France. Three hours of lecture and one hour of discussion per week.
188. Medieval France. (4)
189. The Old Regime, Revolution, and Reaction (1750-1849). (4)
190. Modern France. (4)

191. Modern Germany. (4) Three hours of lecture and one hour of discussion per week.
192. Historical Method and Theory. (4) Two to three hours of meeting per week. Designated 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.

193. History of the Reformation. (4) Three hours of lecture and one hour of discussion per week.
194. History of Religion. (4) Three hours of lecture and one hour of discussion per week.
195. Modern European Intellectual History. Students who have taken 128A, 128B, 128C, or 128D will receive only half credit. Three hours of lecture and one hour of discussion per week. Thought and art considered in their social and political contexts.
196. The Enlightenment. (4)

200. 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)

210. Senior Honors. (4) Independent. Prerequisites: Senior honors standing. Limited to senior honors candidates. Directed study centered upon the preparation of an honors thesis. Supervisors will be assigned to each student after consultation with the honors committee.
211. Directed Dissertation Research. (3-12) Course may be repeated for credit. Must be taken on a passed/not passed basis. Independent. Prerequisites: Enrollment is restricted by regulations listed on pages 87 and 88 of this catalog. Graduate Courses

220. Directed Research. (2-12) 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.
221. Modern Europe. (4) Three hours of lecture and one hour of discussion per week.
222. Modern European Intellectual History. Students who have taken 128A, 128B, 128C, or 128D will receive only half credit for 128A and/or 128B. Three hours of lecture and one hour of discussion per week.
223. From Earliest Times to ca. 1500. (4) (SP)
224. From 1500 to 1900. (4)
225. From 1900 to the Present. (4)
Humanities

Field Major: Undergraduate Interdisciplinary Studies (Division of Undergraduate Studies), 301 Campbell Hall, 642-6984
Major Adviser: Kathleen Moran

Upper Division Courses

IDS 100. History of American Technology. (4) Four hours lecture per week. Survey of American technology from colonial times to the present. Analysis of technological innovation in its cultural, economic, and political setting. Topics include the Industrial Revolution, technology of war, infusions of science in technology, industrialization and the use of corporations. Sponsoring departments: History and EECs.

Upper Division Courses

IDS 100. History of American Technology. (4) Four hours lecture per week. Survey of American technology from colonial times to the present. Analysis of technological innovation in its cultural, economic, and political setting. Topics include the Industrial Revolution, technology of war, infusions of science in technology, industrialization and the use of corporations. Sponsoring departments: History and EECs.

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 intensive study in consultation with the graduate adviser, to prepare students for language examinations and the master’s examination.

Interdepartmental Studies Courses

Upper Division Courses

H195. Humanities Senior Honors Thesis. (4) Individual conferences and attendance at workshops. Prerequisites: Humanities 100. 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, bibliography to the prospective thesis supervisor. The completed thesis will be read by the thesis supervisor and one faculty member. In addition, there will be a seven-week thesis workshop which meets for three hours each week during the first half of the semester.

Industrial Engineering and Operations Research

Graduate Programs

Graduate programs leading to the M.S., M.Eng., Ph.D. and D.Eng. are offered in two 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, control, 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 system science. It emphasizes the development and use of quantitative models for the analysis, design, and optimization of complex systems. Students may choose to concentrate on the theoreti. cal studies in preparation for doctoral level research, or on applications of state-of-the-art techniques to real world problems.

Undergraduates from scientific disciplines other than engineering may be accepted into these programs. A master's degree may be earned by thesis or by comprehensive examination. Doctoral degrees require oral examination in the major and two minor fields, followed by successful demonstration ability to conduct independent advanced research. Graduate research facilities are available in the Human Engineering and Organizational Sci-
ences Laboratory and in the Engineering Systems Research Center.

The department requires all graduate applicants to submit verbal and quantitative aptitude scores of the Graduate Record Examination. Further information on graduate programs may be obtained from the Industrial Engineering and Operations Research Office, 4135 Etcheverry Hall and in the Announce-
ment of the College of Engineering.

Upper Division Courses

110. Interactive Computer Programming and Mod-
eling Applications. (4) Three hours of lecture and two hours of labora-
tory per week. Prerequisites: Knowledge of a computer programming language. Projects and software design using the interactive APL language. Prior knowledge of APL is not required. Lecture topics include machine-imitated APL mathematical functions, data manipulation operators, and file control functions. Important user-defined recursive functions and user-defined outer products as applied to computer simulations, file search, and optimization. (F) Oliver

115. Industrial and Commercial Data Systems. (3) Two hours of lecture and two hours of labora-
tory per week. Prerequisites: Engineering 7 and EIOR 110. Re-
view of information system functions, technology, and organization, emphasizing industrial and commercial applications. Use of economic performance criteria. Introductory survey of systems analysis methods and modeling and implementation tools and techniques. Design-oriented term project. (SP) Adiga

130. 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 systems of moderate complexity. Simulation of nonlinear and stochastic systems. (SP) Adiga

131. Computer Simulation of Industrial Engineering Systems. (3) New course. 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 the various generation procedures for a variety of common types of random variables. Techni-
ques to reduce the variance of the resultant estimator as well as a statistical analysis of the output of the simulation are considered. A final project will be required. (SP) Ross

150. Production Systems Analysis. (3) Three hours of lecture per week. Prerequisites: 152; Engineering 120; Statistics 134. Operations analysis of integrated production systems; use of operations models and quantitative methods of operations research. Goal setting, formulation, and solution of cases. Hall

153. Facilities Planning and Design. (3) Two hours of lecture and 2 hours of discussion per week. Prere-
quities: Statistics 150. Consideration of mathematical models of layout and balancing of conveyor systems. Analysis of integrated material and resource systems. Fitting functions of storing, recalling, delivery, inventory, and computer control. Design of automated warehousing and order- picking system simulation. (SP) Adiga

160. Operations Research I. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Mathematics 181. Deterministic models in research operations. Unconstrained and constrained optimization. Equality, inequality, and integer constraints. Decision theory; dynamic programming. Resource allocation, replacement, inventory, and combi-

199. Supervised Independent Study. (1-4) Course may be repeated for a maximum of four units per se-

215. Analysis and Design of Databases. (3) Two hours of lecture and one 2-hour project meeting per week. Prerequisites: 215 or consent of instructor. Data requirements determination and analysis. Conceptual database design and an introduction to logical and physical database design. Implementation using database manage-
ment system software on mainframe and 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: 220A (may be taken concurrently), Statistics 134. Modeling and analysis of production-con-
service systems and engineering 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) Glassy

221. Forecasting and Time Series. (3) Two 1-hour lectures and one 1-hour laboratory session per week. Prerequisites: 220A. Prediction and forecasting methods; time series: decision-making; emphasis on model-building through the use of conditional independance 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 absolute error forecasts, linear predictors and discrete time series formulations of autoregressive and moving average models. State-space and Bayesian forecasting models; Kalman filters; updating algorithms for real-time forecasting; sensitivity analysis; and applications. (SP) Ross

224. Process Planning and Scheduling. (3) Three hours of lecture per week. Prerequisites: 224A and 220. Mathematical and computer methods for production planning, scheduling, and control. Topics treated include: aggregate capacity planning; manufacturing requirements planning; and hierarchical linkage of production planning and control. (SP) Leachman

252A. Mathematical Programming I. (4) Three hours of lecture and one hour of discussion per week. Prere-
quities: Mathematics 111. Basic graduate course in linear programming and introduction to network flows and non-linear programming. Formulation and model building. The simplex method and its variants. Duality theory; Sensitivity analysis, parametric programming, convergence (theoretical and practical). Special structures such as upper bounds and decomposition. (F) Adiga

252B. Mathematical Programming II. (3) Three hours of lecture per week. Prerequisites: Math 111 or Math 112. Basic first year graduate course in optimization of non-linear programs. Formulation 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) Oren
263A. Applied Stochastic Process I. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Statistics 134 or Statistics 200A. Conditioned Expectation. Poisson and renewal processes. Renewal reward processes. Applications to traffic congestion, and replacement models. Discrete and continuous time Markov chains; with applications to various stochastic systems—such as exponential queues, inventory systems, inventory models and reliability models. (F,SP) Ross, Wolff

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. Stopping Rule Problems. (SP) Ross

265. Reliability Theory. (3) Three hours of lecture per week. Prerequisites: 263A (may be taken concurrently). A second year graduate course concerning system 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,Baro


276. Queuing Theory. (3) Three hours of lecture per week. Prerequisites: 263A. Review of elementary queuing models. "L = (lambda) w" and other conservation laws. "PASTA." Work, Markovian queues; products for M/M/1, M/G/1, G/M/1. Fluctuations theory and GI/G/1 queues. Approximations and bounds. Priorities. (F) Wolff

280. Applied Dynamic Programming. (3) Three hours of lecture per week. Prerequisites: Math 51A [51]. Dynamic programming formulation of deterministic decision process problems, analytical and computational methods of solution, application to problems of equipment replacement, resource allocation, scheduling, search and routing. Special emphasis on decision making under risk and uncertainty. (SP) Dreyfus

290. Neural-Net Modeling—Connectionism. (3) Formerly 290F. Three hours of lecture per week. Prerequisites: 262A and 266. Formulation of combinatorial problems as integer programming problems; integer programming applications to network flow problems. Matching and weighted matching. Convergence dual and primal cutting plane algorithms; general-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 voluntary and involuntary labor to modern mass production and service processes. Emphasis motivation, task-level planning, performance evaluation. Intrinsic motivation, job design, quality of work life. Authority and communication structures, participative decision-making, goal setting, and motivation. (F) Staff

280. Systems Analysis and Design Project. (3) Three hours of lecture per week. Prerequisites: 262A-262B and 263A. A project course for students interested in applications of operations research and engineering methods. One or more systems, which may be in the public sector, will be selected for detailed analysis and redesigned by student groups. (SP) Oliver

290A. Dynamic Production Theory and Planning Models. (3) Three hours of lecture per week. Prerequisites: 200A. Development of dynamic and hierarchical organization of production management. (SP) Leachman

290B. 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. (F) Leachman

290C. Statistical Aspects of Discrete Event Simulation. (2) Two hours of lecture per week. Prerequisites: 267. Statistics 200B and knowledge of Fortran or an appropriate computer language. Simulation design and analysis of computer simulation of queuing and other stochastic models. The initial transient and optimal starting conditions. Variance estimation techniques including the regenerative method, time series methods, and batch means. (SP) Ross

290D. Bayesian Decision Analysis. (3) Two 1-hour lectures per week. Prerequisites: 262A or equivalent. A Bayesian decision oriented course at the graduate level concerned with solving engineering problems of a statistical nature. Emphasis will be on using influence diagrams to model and solve problems in the design of experiments, multivariate subjective decision making, calibration of measuring instruments, quality assurance, etc. (SP) Barlow


290G. 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, convexification of market conditions point theory, mathematical programming algorithms (including linear programming).

290H. Advanced Theory of Reliability with Applications. (3) Three hours of lecture per week. Prerequisites: 262A and 268. 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. (F) Staff

290L. Logistics Modeling. (3) One 2-hour lecture and one 2-hour laboratory per week. Prerequisites: 266 (may be taken concurrently). 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 are to teach students how 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 networks, analytical approximations, graphs, and physical models. (SP) Staff

290N. Neutral-Net Modeling-Connectionism. (3) 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 systems. (SP) Staff

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. Differences and connections compared with various pricing policies and their implications for consumers and producers. Emphasis on mathematical

*Not offered 1989-90
1On leave, spring, fall
2On leave, fall

290Q. Advanced Topics in the Theory of Queues. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 262A or consent of instructor. Recent research in topics such as queueing networks, bounds and comparison methods, heavy and light traffic approximations, priorities, and models with special structure such as communication networks. (F,SP) Wolff

290R. Risk Theory. (3) Three hours of lecture per week. Prerequisites: 263A, Introduction to mathematical risk theory, with emphasis on various models of insurance operations: utility theory; insurance and gambling; life and other stochastic models of optimization; credibility theory; risk reserves; risk-sharing; objectives of the firm. (F,SP) Wolff

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)

299. Individual Study or Research. (1-12) Course may be repeated for credit. Sections 1-18: Must be taken on a satisfactory/unsatisfactory basis; sections 19-35: letter grading. Individual conferences. Individual conferences in advanced industrial engineering problems. (F,SP)

601. Individual Study for Master's Students. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One meeting per week with faculty member. One meeting per week with departmental discussion group, including text selection, clarity of oral delivery; use of visual aids, media resources; discussion hours. (F,SP)

298, 299, 601 Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One meeting per week with faculty member. One meeting per week with departmental discussion group, including text selection, clarity of oral delivery; use of visual aids, media resources; discussion hours. (F,SP)

Integrative Biology (College of Letters and Science)

Department Office: Chair: Marvalee Wake, Ph.D.

Professor: George W. Barlow, Ph.D. Columbia University. Cytology
Herbert G. Baker, Ph.D. University of London. Evolutionary biology
George W. Barlow, Ph.D. University of California at Los Angeles. Ethology and neuroethology
Howard A. Bern, Ph.D. University of California at Los Angeles. Endocrinology and tumor biology
William W. Crother, Ph.D. Yale University. Paleozoic, paleoceanography, community paleontology
Paul F. Delano, Ph.D. Columbia University. Cytology
David C. Gr SLay, Ph.D. University of California at Berkeley. Mammalian paleontology, faunal analysis
Lorraine N. Cooney, Ph.D. University of Illinois at Urbana-Champaign. Mammalogy and mammology

Marian C. Diamond, Ph.D. University of California at Berkeley. Functional morphology and biomechanics
Barbara S. Field, Ph.D. Stanford University. Invertebrate paleontology
Ned K. Johnson, Ph.D. University of California at Berkeley. Functional morphology and biomechanics
Marilyn S. Lockett, Jr., Ph.D. University of Illinois at Urbana-Champaign. Mammalogy and ecology

3On leave, spring
4Recalled to active service
5Recipient of Distinguished Teaching Award

Integrative Biology / 229
The Department of Integrative Biology offers a program of instruction that focuses on the integration of structure and function in the evolution of diverse biological systems. It investigates integration at all levels of organization from molecules to the biosphere, and in all taxa of organisms from viruses to higher plants and animals. The program emphasizes understanding the fundamental processes of inheritance, the specializations in the disciplines of morphology, organismal physiology, ethology, ecology, systematic biology, paleobiology, and evolution. It provides the foundation for the deeper understanding of the processes of evolution and natural history. A series of courses representing both of the following groups are required: Morphology and development: PB 130 (4), IB 110 (2/110L) (2), IB 111 (2/111L) (2), IB 162 (4), IB 163 (3), IB 181 (2/181L) (3), IB 182 (2/182L) (2), IB 183 (3/183L) (1), IB 184 (1/184L) (1), IB 130 (4) 130L (2), IB 137 (3/137L) (2), IB 135 (3). Physiology and development: PB 100A (4), PB 100B (4), PB 101 (4), IB 148 (3)/148L (3), MCB 131 (3), MCB 138 (4), MCB 160 (4), IB 150 (3).

Track 2. Specialization in the area of behavioral biology. Three courses are required: either IB 145 (3) or IDS 122 (3), IB 146 (3), IB 153A (3)-153B (3). Recommended: IB 160 (4), MCB 160 (4), MCB 160L (4), IB 162 (3). Psychology 111 (3), 116 (3), and course work in statistics through analysis of variance.

Track 3. Specialization in the area of systematic biology, paleobiology, genetics, and evolution. Three courses chosen from the following options are required: IB 108 (3), IB 160 (4), IB 161 (3), IB 166 (3). Recommended: IB 137 (3), 137L (2), and statistics through analysis of variance.


Track 5. Specialization in the area of integrative human biology. Three courses are required: IB 131 (3)/131L (2); either IB 132 (3)/132L (2) or MCB 212 (4)/210L (4); A 106 (3). For biological completion of this option, the student must finish their work with a 3.3 grade-point average or higher overall in the major.

Graduate Program in Integrative Biology

For fall semester 1989, new students may be admitted into existing graduate programs in the biological sciences. Graduate programs for the new biological sciences departments have been reviewed and approved by the department's Graduate Committee. The new graduate programs will be reviewed annually. New and continuing graduate students will be notified when these programs are approved. At that time, students will have the option of continuing in the program to which they were admitted or requesting transfer to a related new program. For details of existing programs, consult the appropriate graduate advisers in the new Department of Integrative Biology.

Students planning to enter graduate study in integrative biology are expected to have the equivalent of a major in a biological science. However, students with the necessary background are encouraged to enter the program. Completion of the integrative biology major or equivalent courses must pass a departmental language examination in German, French, or Russian (another lan...
guage may be acceptable if it is of scientific importance). Alternatively, the foreign language requirement may be satisfied by course work (five quarters of four semesters of college-level work with a grade of C or better, or competence at an equivalent level). The Department of Integrative Biology offers the M.A. by either thesis or examination plan, details of which may be obtained from the department office. The program for the Ph.D. varies considerably, according to the background and interests of individual students. All candidates for the Ph.D. must satisfy qualifying examinations. The crucial part of the Ph.D. program is the thesis, based upon 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 integrative biology. Details of the Ph.D. program may be obtained from the department office.

Research Facilities

The Botanical Garden in Strawberry Canyon provides opportunities for research with living plants, supplies teaching material for classes on campus, and serves as an outdoor laboratory for students. Its collections are especially rich in succulents and South American, Southern Hemisphere and Australian plants. Inquiries should be addressed to the Director, Botanical Garden, University of California at Berkeley; Berkeley, CA 94720.

The Cancer Research Laboratory is a research institute that carries out basic research, teaching, and service program designed to foster interdepartmental participation in cancer research. Some of the Department of Integrative Biology faculty are also members of the Cancer Research Laboratory. The central research program represents a multidisciplinary approach to an understanding of the mechanism of neoplastic transformation in systems. Graduate and postdoctoral research programs are supported in various areas of tumor biology: biochemistry, cell biology, endocrinology, genetics, immunology, molecular biology, and tumor virology. Those interested in the laboratory's program may address inquiries to the Director, Cancer Research Laboratory, University of California at Berkeley; Berkeley, CA 94720.

The Field Station for Behavioral Research is a research facility that caries out basic research, teaching, and service program designed to foster interdepartmental participation in cancer research. Some of the Department of Integrative Biology faculty are also members of the Cancer Research Laboratory. The central research program represents a multidisciplinary approach to an understanding of the mechanism of neoplastic transformation in systems. Graduate and postdoctoral research programs are supported in various areas of tumor biology: biochemistry, cell biology, endocrinology, genetics, immunology, molecular biology, and tumor virology. Those interested in the laboratory's program may address inquiries to the Director, Cancer Research Laboratory, University of California at Berkeley; Berkeley, CA 94720.

The Gump Field Station, French Polynesia, was recently established on the island of Moorea, one hour from Tahiti. A modern dormitory has been constructed to accommodate the students. The living quarters and diving equipment is being built. The station supports research in marine, freshwater, and terrestrial biology. The environment offers diverse habitats ranging from coastal areas to the tropical forests. The field station maintains and observes a variety of animal species. Faculty from several Berkeley departments including Integrative Biology conduct research at the station. Its facilities are available for graduate and postdoctoral research with the approval of the director. Persons interested in the field station may contact the director via the Department of Integrative Biology.

The Museum of Vertebrate Zoology is a research institute and repository for specimens and information 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 cytogenetics, and their applications. The museum serves many educational functions and houses a number of graduate students. The museum also operates the Frances Simes Hastings Natural History Reservation in upper Carmel Valley. The flora and fauna of the 2,000-acre tract are protected for study of ecological relations in undisturbed communities. Qualified graduate students are assigned to the program in study and use the facilities of the museum and reservation under the sponsorship of a member of the museum staff. Persons interested may write the Director, Museum of Vertebrate Zoology, University of California at Berkeley; Berkeley, CA 94720, or Dr. James R. Griffin, in charge of Hastings Reservation, Carmel Valley, CA 93924.

The combined University and Jepson Herbaria offer a worldwide, floristic, reference research collection and library that will be the focal point of research that is systematic in systematic botany, ecology, physiography, and evolution, not only for faculty, staff, and students but also for visiting scholars and biologists throughout the United States and other countries. Inquiries should be addressed to the Director, The University Herbarium, University of California at Berkeley; Berkeley, CA 94720.

Lower Division Courses

Biology 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 and animal biology. Principles and concepts as they relate to animal behavior, with broad coverage for those not specializing in biology. Natural history of humans in the topics, with emphasis on ecological relationships between humans and other species. (F,SP) Black, Diamond

15. Plant and Fungal Biology. (2) Formerly lecture portion of Botany 10. Two 1-hour lectures per week. Prerequisites: Open without prerequisite to all students and designed for those not specializing in the biological sciences. Must be taken concurrently with IB 15. Fundamental concepts of biology illustrated by the structure and function of plants. (F) Fieldman, Rest

16.Vertebrate Adaptation. (2) Formerly Paleontology 2H. Two hours of lecture per week. Open without prerequisite to all students and designed for those not specializing in paleontology. Vertebrate evolution (from jawless fish to birds, dinosaurs, and mammals) emphasizing the diversity of adaptation. Topics will include evolutionary theory, reconstructing fossil animals and their relationships, evidence for understanding those of the past. (SP) Berry

30. Animal Biology. (3) Formerly Zoology 30T. Three 1-hour lectures and one hour of discussion per week. Prerequisites: Open to all students; must be taken with concurrent enrollment in IB 15. An overview of fossil land plants from the last 400 million years with emphasis on reconstructions of and events that took place throughout geologic time. Emphasis is placed on using knowledge of modern ecologic relationships to understand those of the past. (SP) Littman

31. Animal Biology: A Behavioral View. (3) Formerly IB 15T. One 2-hour lecture and one 1-hour discussion per week. Prerequisites: Open to all students; must be taken with concurrent enrollment in IB 15. Two 1-hour lectures, one hour of films/demonstration and one hour of discussion per week. Prerequisites: Open to all students; designed for those not specializing in biology. Principles of ecology as they relate to animal behavior, with broad coverage for those not specializing in biology. Special attention will be paid to the emerging discipline of behavioral ecology. (SP) Caldwell

32. Primate Biology. (2) Formerly Zoology 14. Two 1-hour lectures per week. An introduction to the order of mammals of which we are members. Special emphasis on ecology, behavior, and reproductive biology. (F) Rasmussen

33. Topics in Paleontology: The Age of Dinosaurs. (2) Formerly Paleontology 2A. More than one course in the series of IB 33, 34, and 81 may be taken for credit with consent of instructor. Two 1-hour lectures per week. Prerequisites: 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) Rabin

34. Topics in Paleontology: The Age of Mammals. (2) Formerly Paleontology 2E. More than one course in the series of IB 33, 34, and 81 may be taken for credit with consent of instructor. Two 1-hour lectures per week. Prerequisites: Open without prerequisite to all students and designed for those not specializing in paleontology. Evolution, history, and ecology of the mammals and their world, including the earliest mammals and birds. (SP) Diamond

39. Topics in Integrative Biology. (1) Formerly Zoology 1. Must be taken on a passed/not passed basis. One 2-hour seminar per week. Prerequisites: Preferably open to freshmen; consent of instructor is required. Reading and discussion of the literature on particular topics in the field of integrative (organismal, populational, evolutionary) biology. Selections will vary from semester to semester in regard to offerings. (F,SP) Staff, Simmons

40. Evolutionary Biology—An Introduction for Non-Biology Majors. (2) Formerly IDS 16. Two lectures per week. This course offers background in science. It will cover the history of evolutionary ideas, Darwin's theory, and more modern general theories of evolution and the major features of the fossil record. This course will be offered to recent controversial in evolutionary biology. (F) Hickman, Slatkin

Life, Climates and Ecologies of the Past. (2) Formerly Paleontology 15. Two 1-hour lectures per week. Changes in plant and animal associations and interactions between species and their environments. (F,SP) Staff, Simmons

80. Life, Climates and Ecologies of the Past. (2) Formerly Paleontology 15. Two 1-hour lectures per week. Changes in plant and animal associations and interactions between species and their environments. (F,SP) Staff, Simmons

81. Topics in Paleontology: Ancient Landscapes. (2) Formerly Paleontology 16. Two 1-hour lectures per week. An introduction to the oceans and their environments. (F) Light

82. Introduction to the Oceans. (2) Formerly Paleontology 16. Two 1-hour lectures per week. Introduction to the oceans and their environments. (SP) Light

The museum also operates the Frances Simes Hastings Natural History Reservation in upper Carmel Valley. The flora and fauna of the 2,000-acre tract are protected for study of ecological relations in undisturbed communities. Qualified graduate students are assigned to the program in study and use the facilities of the museum and reservation under the sponsorship of a member of the museum staff. Persons interested may write the Director, Cancer Research Laboratory, University of California at Berkeley; Berkeley, CA 94720.
101. DIVERSITY OF PLANTS AND FUNGI. (2) Formerly Botany 100. Two 1-hour lectures per week. Prerequisites: Biology 1A-1B. An introduction to the nature and evolution of the major groups in the plant and fungal kingdom. Must be taken concurrently with IB 101L. (SP) Schmid

101L. LABORATORY IN THE DIVERSITY OF PLANTS AND FUNGI. (2) Formerly Botany 100 laboratory portion. Two 2-hour laboratories per week. Prerequisites: Biology 1A-1B. Laboratory for 101. Must be taken concurrently with IB 101. (SP) Schmid

102. INTRODUCTION TO CALIFORNIA PLANT LIFE. (2) Formerly Botany 125. Two 1-hour lectures per week. Prerequisites: Must be taken concurrently with IB 102L. The relation of California plants and plant communities to soils, climate, and the geologic history and recent history. Use of keys and examination and identification of the native and introduced members of the California flora. (SP) Omduff

102L. LABORATORY IN CALIFORNIA PLANT LIFE. (2) Formerly Botany 125L. Two 3-hour laboratories per week. Prerequisites: Must be taken concurrently with IB 102L. Survey of major California plant families and the uses of keys in identification of the native and introduced flowering plants, conifers, and ferns of the state. (SP) Omduff

103. INVERTEBRATE ZOOLOGY LABORATORY. (3) Formerly Zoology 106. Three 1-hour lectures per week. Prerequisites: Biology 1A-1B. 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 IB 103L. (SP) Koehl

104. NATURAL HISTORY OF THE VERTEBRATES. (3) Formerly Zoology 107. Three 1-hour lectures per week. Prerequisites: Biology 1A-1B. Biology of the vertebrates, exclusive of fish. Must be taken concurrently with IB 104L. (SP) Johnson, Greene, Patton

104L. VERTEBRATE NATURAL HISTORY LABORATORY. (2) Formerly Zoology 167. One 3-hour laboratory and one 4-hour field trip per week plus special field projects. Prerequisites: Biology 1A-1B. Laboratory and field study of local vertebrates exclusive of fish. Must be taken concurrently with IB 104L. (SP) Johnson, Greene, Patton

110. EVOLUTIONARY MORPHOLOGY OF LAND PLANTS. (2) Formerly lecture portion of Botany 110. Two 1-hour lectures per week. Prerequisites: Biology 1A-1B; IB 101 and 101L recommended. An analysis of the evolution and comparative morphology of vascular plants studied from the viewpoint of both fossil and living representatives. Must be taken concurrently with IB 110L. (SP) Lüdicke

110L. LABORATORY IN THE EVOLUTIONARY MORPHOLOGY OF LAND PLANTS. (2) Formerly lecture portion of Botany 110. Two 2-hour laboratories per week. Prerequisites: Biology 1A-1B; IB 101 and 101L recommended. Laboratory for 110 (Evolutionary Morphology of Land Plants). Must be taken concurrently with IB 110L. (SP) Lüdicke

111. ANATOMY OF VASCULAR PLANTS. (2) Formerly lecture portion of Botany 112. Two 1-hour lectures per week. Prerequisites: Biology 1A-1B; IB 101, 101L. A consideration of the functional and developmental aspects of cell, tissue, and organ structure of plants, including their adaptations to ecological factors such as pollution, dispersal, and water availability. Must be taken concurrently with IB 111L. (SP) Baker

111L. LABORATORY IN THE ANATOMY OF VASCULAR PLANTS. (2) Formerly laboratory portion of Botany 112. Two 2-hour laboratories per week. Prerequisites: Biology 1A-1B; IB 101, 101L. Laboratory for 111. Must be taken concurrently with IB 111L. (SP) Baker

121. THE BOTANICAL GARDEN. (1) Formerly Botany 129. Must be taken on a passed/not passed basis. One hour of lecture per week. Prerequisites: Consent of instructor. An introduction to the collections, facilities, and programs of the University Botanical Garden. Special emphasis is on curatorial, managerial, and administrative methods. Must be taken concurrently with IB 121L. (F, alternate years) (SP) Omduff

121L. LABORATORY AT THE BOTANICAL GARDEN. (1) Formerly laboratory portion of Botany 129. Must be taken on a passed/not passed basis. One 3-hour laboratory per week. Prerequisites: Consent of instructor. Practical experience with the scientific, educational, and horticultural aspects of the University Botanical Garden. Must be taken concurrently with IB 121L. (F, alternate years) (SP) Omduff

132. SURVEY OF MAMMALIAN PHYSIOLOGY. (3) Formerly Physiology 119. Three 1-hour lectures per week. Prerequisites: IB 121 and 132L. An introduction to mammalian physiology and comparative mammalian systems. (SP) Nicoll

132L. LABORATORY OF MAMMALIAN PHYSIOLOGY. (2) Formerly Physiology 109L. One 1-hour lecture and one 3-hour laboratory per week. Prerequisites: IB 132L. Laboratory experiments demonstrating the functional mechanisms underlying life processes in mammalian systems. (SP) Nicoll

134. PALEOECOLOGY AND FUNCTIONAL MORPHOLOGY. (3) Formerly lecture portion of Paleontology 112. Two 1-hour lectures per week. Prerequisites: Consent of instructor. Laboratory in paleobiological approaches to the interpretation of morphology and techniques for studying the functions of fossil individuals, populations, and communities. Advanced paleontological patterns and processes will be considered in terms of modern ecological and evolutionary theory, with examples from both marine and terrestrial systems. Must be taken concurrently with IB 134L. (SP) Baker

135. THE MECHANICS OF ORGANISMS. (3) Formerly Zoology 127. Three 1-hour lectures and one hour discussion per week. Prerequisites: Senior standing and Biology 1A-1B. Functional morphology in terms of mechanical design principles; basics 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. (SP) Allert

137. CYTOLOGY. (3) Formerly Zoology 110. Three 1-hour lectures and one hour discussion per week. Prerequisites: Biology 1A-1B or equivalent. Cell structure, function, and developmental patterns. Methods of studying cells and their organelles from a historical perspective. Mitosis, meiosis, sex determination, introduction to cytogenetics, chromosomal changes in evolution. (SP) Allert

137L. CYTOLOGY LABORATORY. (2) Formerly Zoology 110L. Two 3-hour laboratories per week. Prerequisites: A course in cytology, cell biology, or genetics. Microscopic study of cell types and organelles; determination of the cell cycle; selected staining and preparatory methods. (SP) Allert

138. BIOLOGY OF CHEMICAL MEDIATION. (4) Formerly Zoology 120. Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1A-1B or equivalent. The evolution and development of chemical communication in invertebrates; the development of communication systems and their behavioral and physiological implications. Must be taken concurrently. (SP) Bernt

139. VERTEBRATE REPRODUCTIVE BIOLOGY. (3) Formerly Zoology 129. Three 1-hour lectures per week. Prerequisites: IB 121 and 129L. An introduction to vertebrate reproduction, in particular a survey of morphological, developmental, physiological, behavioral, ecological and evolutionary aspects of the reproductive biology of vertebrates. (SP) Bernt

139L. VERTEBRATE REPRODUCTIVE BIOLOGY LABORATORY. (1) Formerly Zoology 178. One 3-hour laboratory per week. Prerequisites: IB 139L recommended. Prepared dissections, models and microscopic slides. (F) Diamond
evolutionary aspects of the reproductive biology of vertebrates.

140. Biology of Human Reproduction. (3) Formerly Physiology 162. Two 1 1/2-hour lectures per week. Prerequisites: Biology 1A-1B. Anatomy and physiology of reproductive organs, puberty, endocrinology of the menstrual cycle; psycho-physiology of copulation and orgasm; infertility and sexual dysfunction; contraception and abortion; birth and lactation; sexual differentiation of brain and reproductive organs; homosexuality. Offered even-numbered years. (F) Nicoll

141. Human Genetics. (2) New course. One 2-hour lecture per week. Prerequisite: Course in general genetics. Development of theories and models for the study of congenital and other human diseases which do not show simple Mendelian inheritance. Emphasis on the integration of theory and current molecular techniques and application to the many diseases associated with the human incompatibility (HLA) system. (F) Simmons

*145. Animal Behavior. (3) Formerly Zoology 135. Three 1 1/2-hour lectures per week. Prerequisite: Biology 1A-1B or equivalent. Must be taken concurrently with IB 143L. Introduction to the biology of protozoan and metazoan parasites; general and comparative features of parasitism, including properties common to different protists and metazoa. Students prepare a research project involving the phenomena and concepts and their physiological correlates. (SP)

145L Laboratory and Field Studies of Animal Behavior. (3) Formerly Zoology 135L. Two 3-hour laboratories; one hour of lecture plus 5-10 hours of unscheduled laboratory or field work per week. Prerequisites: IB 145, IDS 122 or Psychology 155, and consent of instructor. Offered irregularly.

146. Eco-Ethology. (3) Formerly Zoology 138. Two 1 1/2-hour lectures and one hour of discussion per week. Prerequisites: Biology 1A-1B; IDS 135, 145, 150, and consent of instructor. Students prepare a research project involving the phenomena and concepts and their physiological correlates. (SP) Boppart

148. Comparative Animal Physiology. (3) New course. Course may be repeated for credit. Three 1-hour lectures per week. Prerequisites: Biology 1A-1B. Comparative study of physiological systems among animal phyla. General physiological principles will be illustrated by examining variation in neural, muscular, endocrine, cardiovascular, respiratory, digestive, and osmoregulatory systems. (F) Nicoll, Full, Licht

148L Comparative Animal Physiological Laboratory. (3) New course. Two 3-hour laboratories plus one 1-hour discussion per week. Prerequisites: Biology 1A-1B; previous or concurrent enrollment in 148. Basic laboratory techniques and experiments comparing physiological systems among animal phyla.

150. Physiological Ecology of Animals. (3) Formerly Zoology 128. Two 1 1/2-hour lectures per week. Prerequisites: Biology 1A-1B, or equivalent. Comparative study of physiological systems with emphasis on adaptation to the various aspects of the physical environment, such as gases, temperature, water, and ions. (SP) Full

150L Animal Physiologic Ecology Laboratory. (3) Formerly Zoology 178. Two 3-hour laboratories plus one 1-hour discussion per week. Prerequisite: Consent of instructor; Biology 1A-1B or equivalent; previous or concurrent enrollment in IB 150. An introduction to the measurement of physiological responses to environmental stresses. (SP) Full

153A. Ecology of Biological Populations. (3) New course. Two 1 1/2-hour lectures and one hour of discussion per week. Prerequisites: Biology 1B or consent of instructor. Principles of microbial, plant, and animal population ecology, illustrated with examples from terrestrial, freshwater, and marine habitats. Topics will include population structure and dynamics, and elementary calculus. Discussion section will review recent literature in ecology. Power, Chapin, Sousa

153B. Ecology of Biological Communities. (2) New course. Two 1-hour lectures and one hour of discussion per week. Prerequisite: IB 153A or consent of instructor. Considers quantitative methods for analyzing biological processes in structuring natural communities of microbes, plants, and animals. Observational, experimental, and theoretical approaches will be discussed, with examples from terrestrial, freshwater, and marine habitats. Discussion section will review recent literature in ecology. Power, Chapin, Sousa

153L. Laboratory in Population and Community Ecology. (3) New course. Two 1-hour laboratories per week plus one or two weekend field trips. Prerequisites: IB 153A or IB 153B (may be taken concurrently) or consent of instructor; introductory course in statistics strongly recommended. Introduction to field and laboratory study of ecological patterns and processes in nature. Course begins with a series of short field exercises conducted in local terrestrial, aquatic, and marine habitats. These exercises emphasize sampling methodology, experimental design, and statistical interpretation of results. Latter half of course devoted to independent research projects. A written report and class presentation of project results are required. Power, Sousa

154. Plant Ecology. (2) Formerly Botany 154. 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. (F) D. Wake

154L. Laboratory in Plant Ecology. (2) Formerly Botany 154L. One 1-hour laboratory per week and two or three 1-day field trips. Prerequisites: IB 154 (may be taken concurrently). Laboratory for 154.

160. Evolution. (4) Formerly Zoology 109. Three 1-hour lectures and one hour of discussion per week. Prerequisites: Biology 1A-1B; MCB 142 or equivalent. A course in evolutionary biology and its use in understanding basic processes, selection theory, adaptive responses, and patterns of speciation and phylogeny. (F) D. Wake

161. Population Genetics. (3) Formerly Genetics 100C. Three 1-hour lectures and one hour of discussion per week. Prerequisites: IB 110 or general biology, general genetics, or consent of instructor. A survey of basic ideas in population genetics including elementary theory, experimental population genetics, quantitative genetics and molecular evolution. The emphasis will be on the relationship between population genetics and evolutionary biology. (SP) Statkin, Thomson

162. Quantitative Methods in Evolutionary Biology. (3) Formerly Zoology 148. Two 1 1/2-hour lectures per week. Prerequisites: One year college-level mathematics (calculus) and a course in population genetics or evolution. A survey of mathematical and statistical techniques used in evolutionary biology. Topics include quantitative genetics, demographic models in paleontology, clustering and similarity measures, and methods of phylogenetic reconstruction. The emphasis will be on the assumptions made in using these methods, the techniques for actually using the methods, and the kinds of conclusions that can be drawn. (F) Full

163. Evolution Above the Species Level. (2) Formerly Paleontology 130. Two 1-hour lectures per week. Prerequisites: IB 160 or consent of instructor. Processes and patterns of evolution outside the realm of population biology: the exploration of diversity through time; rates of evolution and the origins of major groups and adaptations, rates and causes of extinctions; and the determinants of morphological and behavioral changes. Special attention will be given to the applicability of paleontological and neontological theory to the fossil record and to the living world. (F) Full

*166. Biogeography. (3) New course. Two 1 1/2-hour lectures per week. Prerequisites: Senior or graduate standing. Principles underlying distribution and animal distribution, based on critical analysis of evidence from selected groups, with special attention to each history, vicariant processes, the action of barriers, dispersal, colonization, and extinction. (F) Johnson

168. Systematics of Vascular Plants. (2) Formerly lecture portion of Botany 120. Two 1-hour lectures per week. Prerequisites: Biology 1A-1B; IB 101, 101L recommended. Must be taken concurrently with IB 168L. A comparison of the philosophy, principles, techniques, and history of botanical systematics. An outline of the major groups of vascular plants and their evolution. (SP) Duncan

168L. Systematics of Vascular Plants Laboratory. (2) Formerly laboratory portion of Botany 120. Two 3-hour laboratories per week. Prerequisites: Biology 1A-1B; IB 101, 101L recommended. Must be taken concurrently with IB 168. A laboratory course devoted to a survey on a worldwide basis of vascular plant families. (SP) Duncan

172. Mammalogy. (3) Formerly Zoology 163. Two 1-hour lectures per week. Prerequisites: IB 104. Must be taken concurrently with IB 173L. An advanced course in the biology of mammals. Simon

173. Mammalogy Laboratory. (3) Formerly Zoology 183. Two 3-hour laboratories per week plus two 3-day field trips. Prerequisites: IB 172 and IB 173L. Must be taken concurrently with IB 173. An advanced laboratory and field course in the biology and diversity of mammals. (SP) Simon

174. Ornithology. (2) Formerly Zoology 164. Two 1-hour lectures per week. Prerequisites: IB 104 or consent of instructor. Must be taken concurrently with IB 174L. An advanced course in the biology of birds. (F) Johnson

174L. Ornithology Laboratory. (2) Formerly Zoology 164L. Two 3-hour laboratories per week plus one 2-day field trip. Prerequisites: Must be taken concurrently with IB 174. An introduction to the diversity, morphology, and general ecology of birds of the world. (F) Johnson

175. Herpetology. (2) Formerly Zoology 165. Two 1-hour lectures per week. Prerequisites: IB 104. Must be taken concurrently with 175L. Lectures and assigned readings will introduce students to the diversity of amphibians and reptiles on a worldwide scale, with emphasis on behavior, ecology, functional morphology, and evolutionary history. Grade is based on two examinations (midterm, final) and an independent research paper. (SP) Greene

178L. Herpetology Laboratory. (2) Formerly Zoology 165L. Two 3-hour laboratories per week plus one 2-day field trip. Prerequisites: IB 104. Must be taken concurrently with IB 175. Laboratories will teach students the diagnostic characteristics and some functional attributes of air and reptiles on a worldwide scale, with emphasis on behavior, ecology, functional morphology, and evolutionary history. Grade is based on two examinations (midterm, final) and an independent research paper. (SP) Greene

176. Ichthyology. (2) Formerly Zoology 166. Two 1-hour lectures per week. Prerequisites: Biology 1A-1B; IB 104 recommended. Course must be taken concurrently with 176L unless 176L is over-subscribed. A basic course in the natural history and phylogeny of fishes. (SP) Johnson

178L. Ichthyology Laboratory. (2) Formerly Zoology 166L. Two 3-hour laboratories per week plus three 3-day field trips. Prerequisites: IB 104. Must be taken concurrently with IB 178. Laboratories will teach teachers the diagnostic characteristics and some functional attributes of air and reptiles on a worldwide scale, with emphasis on behavior, ecology, functional morphology, and evolutionary history. Grade is based on two examinations (midterm, final) and an independent research paper. (SP) Greene

180. Micropaleontology. (2) Formerly lecture portion of Paleontology 115. Two 1-hour lectures per week. Prerequisites: IB 182 and 183L. A course in marine geobiology recommended. Must be taken concurrently with IB 180L. Marine Proalts that are common in the fossil record. Study of algae, diatoms, radiolaria, foraminifera, and coccolithophores. The biology, ecology, deposition, preservation, biostratigraphy, pa-
leogeography, and special research applications of each group will be considered. (SP) Lips

180L. Micropaleontology Laboratory. (3) Formerly laboratory portion of Paleontology 115. Two 3-hour labora-
tories per week. Prerequisites: IB 182 or 182L. Coreq. IB 182 or 182L recommended. Must be taken concurrently with IB 180. Laboratory studying the various marine fossils of the fossil record, including planktonic, benthi-

cic, and reef organisms. Use of various microscopes for study. (F,SP) Staff

181. Origin and Evolution of Plants. (2) Formerly lecture portion of Paleontology 120. Two 1-hour lectures per week. Prerequisites: Courses in paleontology and/or botany. Must be taken concurrently with IB 181L. Advanced study of plants found in the fossil record. Emphasis is on land vascular plant origins, colonization of the land, diversification and evolution. (F,SP) Staff

181L. Origin and Evolution of Plants. (3) Formerly laboratory portion of Paleontology 120. One 3-hour labora-
tory per week. Prerequisites: Courses in paleontology and/or botany. Must be taken concurrently with IB 181L. A laboratory designed to accompany IB 181. Fossil evidence for plant origins will be examined. (SP) Staff

182. Invertebrate Paleontology. (2) Formerly lecture portion of Paleontology 111. Two 1-hour lectures per week. Prerequisites: Must be taken concurrently with IB 182L. Laboratory in invertebrate paleo-
tontology, with practical study of their uses in ecosys-
temates and chronostatigraphy. (F) Barry

182L. Invertebrate Paleontology Laboratory. (3) Formerly laboratory portion of Paleontology 111. Two 3-
hour laboratories per week. Prerequisites: Must be taken concurrently with IB 182L. Laboratory in invertebrate paleo-
tontology, with practical study of their uses in ecosys-
temates and chronostatigraphy. (F) Barry

183. Vertebrate Paleontology. (2) Formerly lecture portion of Paleontology 125. Two hours of lecture per week. Prerequisites: Must be taken concurrently with IB 183L. Introductory course in vertebrate paleontology, focusing on the history and phylogeny of vertebrates ranging from fishes to man. Emphasis on evolution, taxonomy, functional morphology, faunas through time, and problems in vertebrate history, including diversity through time and extinction. (F) Clemens, Padian

183L. Vertebrate Paleontology Laboratory. (1) Formerly laboratory portion of Paleontology 125. One 3-
hour laboratory per week. Prerequisites: Biology 18B; introductory courses in earth history and zoology are recommended. Must be taken concurrently with IB 183L. An introductory to vertebrate paleontology, focusing on the history and phylogeny of vertebrates. (SP) Staff

184. Morphology of the Vertebrate Skeleton. (1) Formerly lecture portion of Paleontology 126. One hour lecture per week. Prerequisites: Biology 1B or Anthropology 1 or IB 30, 33, or 34. Must be taken concurrently with IB 184L. Lectures on comparative vertebrate anatomy. (F) Clemens

184L. Laboratory of the Vertebrate Skeleton. (1) Formerly laboratory portion of Paleontology 126. One 2-
hour laboratory per week. Prerequisites: Biology 1B, IB 30, 33, or 34, or Anthropology 1. One must be taken con-
currently with IB 184L. Laboratory on comparative vertebrate anatomy. (F) Clemens

185. Marine Geobiology. (2) Formerly Biology 160. Two 1-hour lectures per week. Prerequisites: 1A-1B or equivalent. Interrelationships between marine organisms and physical, chemical and geologic proc-

esses in oceans.

190. Seminar for Integrative Biology Majors. (1) Formerly Botany 190. Course may be repeated for credit. Must be taken on a pass/fail basis. Offered irregularly per semester, with student presentations. Prerequisites: Senior standing in Integrative Biology majors. Staff

195A. Thesis Course. (3) Formerly Zoology 195A. Bi-
tany 195. Course may be repeated for credit. Individual and group study of problems related to honors program. Individual study and research for at least one academic year on a special problem to be chosen in consultation with a member of the staff; preparation of thesis on broader aspects of this work. (F,SP) Staff

195B. Thesis Course. (3) Formerly Zoology 195B. Bot-
tany 195. Course may be repeated for credit. Individually arranged. Prerequisites: Open only to students in Honors Program. Individual study and research for at least one academic year on a special problem to be chosen in consultation with a member of the staff; preparation of the thesis on broader aspects of this work. (F,SP) Staff

196. Supervised Field Studies by Upper Division Students. (1-4) Formerly Zoology 196. Course may be repeated for credit. Must be taken on a pass/fail basis. Supervised experience in off-campus field work. Regular meetings with instructor and written report. (F,SP) Staff

198. Supervised Group Study and Research by Up-

per Division Students. (1-4) Formerly Zoology 198. Anatomy 198, Paleontology 198. Course may be re-
peated for credit. Must be taken on a pass/fail basis. Independent study and research for at least one academic year on a special problem to be chosen in consultation with a member of the staff; preparation of the thesis on broader aspects of this work. (F,SP) Staff

199. Supervised Independent Study and Research. (1-4) Formerly Zoology 199, Zoology 199, Botany 199, Physiology 199, Anatomy 199, and Genetics 199. Course may be repeated for credit. Must be taken on a pass/fail basis. Independent conferences. Enrollment is restricted to juniors and seniors. (F,SP) Staff

201. Scientific Photography—Theory and Method. (1) Formerly Zoology 201. Course may be repeated for credit. Must be taken on a pass/fail basis. Supervised experience in off-campus field work. Regular meetings with instructor and written report. (F,SP) Staff

202. Computer-Assisted Methods In Systemat-
ics and Ecology. (4) Formerly Botany 223. Two 1-hour lectures and one 4-hour laboratory per week. Prerequisites: IB 180 and 180L, Plant Biology 130 or consent of instructor. An advanced treatment of the biology of higher vertebrates. Offered irregularly per semester. (SP) Staff

203. Application of Multivariate Statistics to Problems in Paleontology. (3) Formerly Zoology 247. Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: Biomedical and Environmental Health Sciences 203A or consent of instructor. The use of computer programs for performing statistical tests such as cluster analysis, principal component factor, and discriminant analysis in paleontology is explored. Offered irregularly. (SP) Staff

204. Introduction to Research in Integrative Biology. (1-12) Formerly Zoology 204. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual arrangement. Prerequisites: Limited to students working in this department. Closely supervised experimental work under the direction of individual staff members; an introduction to experimental methods and research approaches in particular areas in Integrative biology. (F,SP) Staff

210. Pteridology. (3) Formerly Botany 222. Two 1-hour lectures and one 3-hour laboratory per week. Prere-
quisites: 110, 110L, Plant Biology 130 or consent of instructor. An advanced treatment of the biology of ferns.

211. Seminar in Plant Morphology and Anatomy. (1) Formerly Botany 212. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour meeting per week. Prerequisites: Instructor. A study of the general, comparative, and special morphologies and anatomy of various plants. Topics will be announced each semester.

230. Biology of Mollusks. (3) Formerly Paleontology 230. Two hours of lecture and one 3-hour laboratory per week. Prerequisites: Consent of instructor. Systematics, ecology, functional morphology, evolution, biogeography of selected mollusk groups.

231. Invertebrate Review. (1) Formerly Zoology 251. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour laboratory per week. Prerequisites: 103 or equivalent; senior or graduate standing; consent of instructor. Reports and discussion of original research in invertebrate zoology. (F,SP) Staff

232. Seminar in Invertebrate Zoology. (2) Formerly Zoology 259. Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: IB 103 and consent of instructor. Topics in a selected area of invertebrate zoology. Individual seminar reports on topics selected in consultation with the instructor, and centered around a currently active field of invertebrate zoology, which will vary from year to year.

233. Vertebrate Review. (1) Formerly Zoology 268. Course may be repeated for credit. One 1-hour seminar per week. Review of current literature on ecology and evolution of higher vertebrates. Offered irregularly per semester. (F,SP) Staff

234. Seminar on Biology of Amphibians and Reptiles. (1) Formerly Zoology 265. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar every other week. Prerequisites: Consent of instructor. Readings in the current literature on amphibians and reptiles. (F,SP) Staff

235. Biology of Fishes. (2) Formerly Zoology 266. Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: IB 176 or consent of instructor. Topics will vary from year to year depending on the group but will be functional aspects of fish biology, such as behavior, physiology, ecology, zoogeography, evolution, and fish as a resource. (SP) Barlow

236. Seminar in Avian Biology. (1) Formerly Zoology 276. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1/2-hour seminar per week. Prerequisites: Consent of instructor. Reviews of original research and recent literature. Offered alternate years. (F) Johnson

237. Advanced Studies in Morphology. (2) Formerly Zoology 206. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. Prerequisites: Consent of instructor. Current problems, questions, and techniques in morphology. Topics will vary from year to year.

238. Advanced Mammalian Biology Reviews. (1) Formerly Zoology 263. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. Prerequisites: Consent of instructor. Advanced study of mammalian biology in an international format. (F,SP) Liddicker, Patton

239. Seminar in Reproductive Biology. (2) Formerly Zoology 264. Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: Consent of
240. Seminar in Parasitism. (Formerly Zoology 261) 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 invertebrate animal associations.

241. Seminar in Biology of Chemical Mediation. (Formerly Zoology 220) One 2-hour lecture per week. Prerequisites: Consent of instructor. Topics will vary from year to year. Offered alternate years.

242. Seminar in Comparative Endocrinology. (Formerly Zoology 221) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: Consent of instructor. Lectures and discussions regarding the relationship between the genetic composition of populations and physiological processes. Specific topics will vary from year to year.

243. Seminar in Cytology. (Formerly Zoology 210) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: A course in cell science. Critical discussion of basic problems and recent literature in descriptive cytology and cytochemistry.

244. Seminar in Neuroendocrinology and Reproductive Biology. (Formerly Physiology 216) 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-numbered years. (FSP) Diamond

245. Functional Neuroanatomy. (Formerly Anatomy 203) 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.

246. Seminar in Advanced Neuroanatomy. (Formerly Anatomy 204) Course may be repeated for credit. One 2-hour seminar per week. One 4-hour laboratory portion of Botany 251. One 4-hour laboratory per week. Prerequisites: IB 135 or MCB 135H. Topics to vary.

247. Seminar in Controversies in Comparative Physiology. (Formerly Zoology 232) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two 1-hour lectures per week. Prerequisites: IB 245 and consent of instructor. Current research in functional neuroanatomy. Offered odd-numbered years. (FSP) Full

248. Comparative Physiology and Endocrinology Seminar. (Formerly Zoology 222) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour meeting per week. Reviews and reports of current research in vertebrate endocrinology and physiology. (F,SP)

249. Seminar on Evolutionary Genetics. (Formerly Zoology 249) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour discussion per week. Prerequisites: Consent of instructor. Recent developments in evolutionary genetics will be discussed in a seminar format. (F,SP) Slakin, Thomson

250. Seminar in Animal Ecology. (Formerly Zoology 244) Course may be repeated for credit. One 2-hour seminar per week. Prerequisite: IB 153A, B 15B. Topics to vary.

251. Evolutionary Ecology. (Formerly Zoology 251) One 2-hour lecture and 3-hour discussions per week, plus three full-day laboratory field trips. Prerequisites: IB 168, 168L or 102, 102L; a course in ecological principles. IB 251 must be taken concurrently. Laboratory on the study of evolutionary ecology. (SP) Baker

252. Physiology Ecology. (Formerly Botany 252) Two 1-hour lectures and one 2-hour discussion per week. Prerequisites: PB 1008, IB 145, 154, and 154L. Physiological aspects of adaptation in higher plants, with emphasis on water relations and photosynthetic carbon metabolism.

253. Genetic Ecology. (Formerly Zoology 248) Two 1-hour lectures per week. Prerequisites: An upper division course in genetics and one in ecology. IB 153A-153B or equivalent. Lectures and discussions concerning the relationship between the genetic composition of populations and evolutionary processes. Specific topics will vary from year to year.

254. Ecological Research Reviews. (Formerly Zoology 245) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1/2-hour seminar per week. Prerequisites: Graduate standing and consent of instructor. Reports and discussions of original research. (F,SP) Caldwell, Liddicker, Rowell, Power, Greene, Soua

255. Seminar in Marine Ecology. (Formerly Zoology 229) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: Consent of instructor. Topics to vary.

256. Seminar in Physiological Ecology. (Formerly Zoology 231) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: Consent of instructor. Topics to vary.

257. Seminar in Animal Behavior. (Formerly Zoology 237) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: Consent of instructor. Topics to vary. Report and discussion of current literature. (F,SP) Caldwell, Barlow

258. Seminar in Trophic Ecology. (Formerly Zoology 241) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: Consent of instructor. Topics to vary. (SP) Power

259. Advanced Paleobiology. (Formerly Paleontology 243) 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 paleobiology of major groups of organisms or major environments from population, community evolutionary, or taphonomic perspectives.

260. Advanced Botanical Systematics. (Formerly Botany 221) Two 1-hour lectures per week. Prerequisites: IB 168, 168L or equivalent and consent of instructor. Lectures will cover 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.

261. Seminar in Plant Nomenclature. (Formerly Botany 224) One 1-hour lecture per week. Prerequisites: Consent of instructor. Principles, articles, recommendations of current International Code of Botanical Nomenclature; analysis of Code through application to examples, nomenclatural resources; comparison with Zoological Code.

262. Topics in Systematic Botany. (Formerly Botany 225) One 1-hour lecture per week. Prerequisites: Consent of instructor. Principles, articles, recommendations of current International Code of Botanical Nomenclature; analysis of Code through application to examples, nomenclatural resources; comparison with Zoological Code.

263. Topics in Ecology and Evolutionary Biology. (Formerly Botany 226) course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour discussion per week. Prerequisites: Consent of instructor. Advanced study in topics of current research. Topics will be announced in advance of each semester. (F,SP) Duncan, Omhuff

264. Seminar in Evolutionary Biology of the Vertebrates. (Formerly Zoology 260) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour seminar per week. Prerequisites: Graduate standing; consent of instructor. Presentation of original research by students, faculty, and visitors. (SP) Greeno, Johnson, Liddicker, Patton, D. Wake

265. Evolutionary Cytogenetics. (Formerly Zoology 261) Two 2-hours lectures and three hours of laboratory per week. Prerequisites: 161, MCB 142 or equivalent; cytology recommended; graduate standing or consent of instructor. Chromosome rearrangements (including their evolutionary role in species evolution) are considered in relation to their stability, segregation, transmission, and effect on gene action. Evolutionary implications at the population level is stressed in the context of adaptation, speciation, and phylogeny.

266. Seminar on Speciation in Vertebrates. (Formerly Zoology 267) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: IB 104; graduate standing or consent of instructor. Review of problems of speciation and isolating mechanisms in vertebrates, with emphasis on current literature.

267. Evolution and Systematics of Mammals. (Formerly Paleontology 226) Two hours of lecture, two 3-hour laboratories, and one 1-hour discussion per week. Prerequisites: IB 183, 183L, 184, 184L or equivalent. Study of fossil record of Mammalia; comparative research on modern animals contributing to determination of mammalian phylogenetic relationships. One weekend field trip will provide experience with collecting techniques.

268. Seminar in Evolution Above the Species Level. (Formerly Paleontology 246) Course may be repeated for credit. Two hours of seminar per week. Current issues in macroevolution and paleobiology, using both neontological and paleontological data. Intensive study of a small number of broad questions in one semester, to be determined by interest of participants and current developments in the field. (F,SP) Radinsky

270. Population Genetics. (Formerly Genetics 225) Two hours of lecture per week. Prerequisites: General genetics and probability, or consent of instructor. Analysis of genetic variation and processes of evolutionary change within populations and species. Emphasis on one- and two locus mathematical models. (F) Thomson

275. Human Genetics. (Formerly Genetics 205) Students may not receive credit for both IB 141 and 275. Two hours of lecture per week. Prerequisites: General genetics and elementary probability or consent of instructor. Advanced topics in human genetics. Discussion of modern molecular techniques and theoretical approaches for studying human diseases. Emphasis on discussing the many diseases associated with the human incompatibility (HLA) system. Offered alternate years. (F) Thomson

280. Seminar in Paleontological Research. (New course) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour seminar per week. Prerequisites: Graduate standing; consent of instructor. Presentation of original research by students, faculty, and visitors. (F,SP) Staff

281. Paleontology and Evolution of Fishes. (formerly Paleontology 224) Two hours of lecture and two 3-hour laboratories per week. Prerequisites: IB 183, 183L, 184, 184L and 185L or equivalent. Problems in evolution, systematics, functional morphology, paleontology of fishes. Offered alternate years.

282. Paleontology and Evolution of Amphibians, Reptiles, and Birds. (Formerly Paleontology 225) Two hours of lecture and two 3-hour laboratories per week. Prerequisites: IB 183, 183R, 184, 184R and 185L or equivalent. Evolution, morphology, functional morphology, and paleontology of the non-mammalian land vertebrates, with emphasis on the Mesozoic Era. Offered alternate years. (SP) Radinsky

283. Mammalian Paleofaunas of the World. (Formerly Paleontology 227) Two hours of lecture and two 3-hour laboratories per week. Prerequisites: IB 183, 183R, 184, 184R, 185L or equivalent. Evolution, morphology, functional morphology, and paleontology of the non-mammalian land vertebrates, with emphasis on the Mesozoic Era. Offered alternate years. (SP) Radinsky

284. Advanced Stratigraphic Paleontology. (Formerly Paleontology 240) 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 palaeontologic disciplines in stratigraphy and geochronology.
emphasizing established scientific principles, global terminology, evolutionary biological theory. (F,SP)

285. Advanced Marine Micropaleontology. (2) Formerly Paleontology 255. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two hours of seminar per week. Environments and history of foraminifera, radiolaria, diatoms, nanofossils and other marine microfossils. (F) Lipps

286A-288H. Seminars in Paleontology. (2) Formerly Paleontology 250. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two hours of seminar per week. Advanced study and current literature in various fields of paleontology. Topics vary from year to year. (F,SP) Staff

287. Systematics Research Reviews. (1) New course. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour lecture/discussion per week. Discussion of current research in plant systematics.

288. Plant Evolutionary Ecology Research Reviews. (1) New course. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour lecture/discussion per week. Discussion of current research in plant evolutionary ecology.

289. Tropical Biology—An Ecological Approach. (8) Formerly Biology 290. Ten 1-hour lectures and 30 hours of laboratory sections. Field course to Central America. Includes study of the application of mathematics to economic theory; This course is intended for upper division students in mathematics. Prerequisites: Graduate standing. Staff

290. Tropical Biology—An Ecological Approach (Special Studies). (1) Formerly Biology 290. Zoology 290. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two 1-hour lecture/discussion per week. Review and discussion of topics in current interest. Topics to vary. (F,SP) Staff

291. Research Seminar. (1) Formerly Botany 280, Zoology 290. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour lecture/discussion per week. Reading and discussion of articles and current literature. (F,SP) Staff

292. Integrative Biology Colloquium. (0) Formerly Botany 280. No credit. One 1-hour meeting per week. Meetings for the presentation of original work by the faculty, visiting lecturers, and graduate students. (F,SP) Staff

293. Special Study for Graduate Students. (1-4) Formerly Zoology 296. Course may be repeated for credit. Individual conferences. Reading or other advanced study arrangements with a staff member. (F,SP) Staff

294. Directed Field Studies. (1-4) Formerly Zoology 297. 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

295. Special Study in Integrative Biology. (1-12) Formerly Physiology 298, Anatomy 298. Course may be repeated for credit. Individual arrangements to be made. Permission of department of instructor: Graduate study arranged by small groups. (F,SP) Staff

296. Graduate Research. (1-12) Formerly Botany 299, Paleontology 299, Physiology 299, Anatomy 299, and Zoology 299. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual study. Credit awarded according to work planned and accomplished. Prerequisites: Graduate standing. Graduate student research. (F,SP) Staff

297. Individual Study for Master's Students. (1-8) Formerly Paleontology 601, Zoology 601. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Independent study for the comprehensive 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) Staff

602. Individual Study for Doctoral Students. (1-8) Formerly Paleontology 602, Zoology 602, Botany 602, Physiology 602, and Anatomy 602. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual study in consultation with the major field advisor. Prerequisites: Consent of instructor 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

Professional Courses

*301. Preparation in Graduate Teaching. (2) Formerly Zoology 301, Paleontology 395. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. 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 Integrative Biology. (2) Formerly Zoology 302, Anatomy 302, Physiology 302. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour discussion and three hours laboratory per week. (F,SP) Staff

IDS 116. Pollen Analysis. (2) Two hours of lecture per week. Prerequisites: Must be taken concurrently 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 "pollen rain" and modern vegetation. The taxonomy of pollen. Use of pollen analysis in archaeological and paleoecological contexts. Discussion of selected case studies. Sponsoring departments: Geography and Geology and Integrative Biology. (F,SP) Clemens

IDS 116L. Pollen Analysis Laboratory. (3) Three hours of laboratory per week plus two full weekends, plus three one-day field trips for report on laboratory. An introduction to the techniques of Quaternary pollen analysis. Emphasis is on the handling of surface samples, graphical presentation of results. Sponsoring departments: Geography and Geology and Integrative Biology. (F,SP)

IDS 122. Animal Behavior. (3) Three hours of lecture, one hour of demonstration, plus one hour of discussion per week. Prerequisites: Biology 1A-1B or 11, or Environmental Science 100. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour discussion and three hours laboratory per week. (F,SP) Staff

Interdepartmental Studies Courses

IDS 204. Animal Behavior Research Reviews. (1) Course may be repeated for credit. One 1/2-hour seminar per week. Prerequisites: Graduate standing; basic course in animal behavior. Assignment 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: Integrative Biology and Psychology. (F,SP) Staff

IDS 215. Faunal Analysis in Archaeology. (4) One hour of lecture, one hour of discussion, and two 3-hour laboratories per week. Prerequisites: IB 184, 184L or a course in comparative anatomy. Introduction of systems of animals commonly found 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 Integrative Biology.

IDS 222. 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 current research in paleoanthropology and related subjects. Sponsoring departments: Anthropology and Integrative Biology.

IDS 282. Tumor Biology 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 reports on current research in tumor biology. Sponsoring departments: Integrative Biology and Molecular and Cell Biology.

IDS 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 physics, physiology, equipment, techniques of compressing, air tables, waves, currents, navigation, physical fitness, psychology, environment, subtidal marine life, research methods, life support equipment, and University regulations. Leading to University certification to use underwater life support apparatus for study or research under University auspices. Sponsoring departments: Integrative Biology and Plant Biology. (SP)

Interdepartmental Studies

(Special Studies)

The following courses, sponsored by two or more departments, because the content of each course transcends the boundaries of individual departments, 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 EESCS. (F)

20. 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 from the role of technology in social and political issues. Sponsoring departments: Conservation and Resource Studies and Physics.

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. Includes the Industrial Revolution; technology of war, infusion of science in technology, industrialization, and the use of corporations. Sponsoring departments: History and EESCS. (SP)

103. Introduction to Mathematical Economics. (3) Communicates that 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 math-
# Concordance List for Integrative Biology

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110. Introduction to Computers. (3) Students who have completed Computer Science 7, 8, or 90 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 in IDS 110) or an equivalent departmental course. Primarily for students in the social sciences and humanities and in the professional schools other 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 simulation, and telecommunication. 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 110 with the same grading option as in IDS 110L. 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 telecommunication. Sponsoring departments: Education, Engineering and Computer Science. (F,SP)

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 (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) Timiras, Minkler

115. Pollen Analysis. (2) Formerly part of IDS 216. Three hours of laboratory per week, two full weekends, and three one-day trips for reports. 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 paleocological contexts. Discussion of selected case studies. Sponsoring departments: Geography and Integrative Biology. (F) Byrne

115L. Pollen Analysis Lab. (3) Formerly part of IDS 216. Three hours of laboratory per week plus two full weekends, plus three one-day field trips for report on laboratory. Prerequisites: Must be taken in conjunction with IDS 115. An introduction to the techniques of Quaternary pollen analysis: recovery of sediment cores, collection of surface samples, graphical presentation of results. Sponsoring departments: Geography and Integrative Biology. (F) Byrne

119. Multidisciplinary Studies and Field Experience in Aging. (2) New course. Seven weeks of one 2-hour seminar each week and a total of six hours of field work. Prerequisites: Upper division or graduate student standing and consent of instructor. Multidisciplinary study of older adults 70 years and older. Students will visit older patients from a local geriatric clinic and confer with clinic staff. One hour of weekly seminar consists of a lecture by faculty on aging from a specific discipline. The other hour is devoted to a case presentation by a student on a patient’s condition. Course grade based on student participation and a final paper demonstrating understanding of the interdisciplinary nature of aging and caring for older people. Sponsoring departments: Optometry, Social Welfare, Public Health. (F) Timiras, Arnold

121A-121B. Environmental Education. (3,3) 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 121B; consent of instructor. Theory and practice of translating ecological knowledge, environmental issues and values into educational forms for all age levels and all facets of society, including schools. Concentrated experience in participatory education. Sponsoring departments: Education and Conservation and Resource Studies.

122. Animal Behavior. (3) Three hours of lecture, one hour of demonstration, plus one hour of discussion per week. Prerequisites: Biology 1A-1B or 11, or Entomology 100. Molecular and Cell Biology 102 strongly recommended. An introduction to comparative animal behavior and behavioral physiology to evolutionary perspective, including analysis of behavior, genetics and development.

130. Seminar on Social, Political and Ethical Issues in Health and Medicine. (2) Must be taken on a passed/not passed basis. One hour of lecture and one hour of discussion per week. An interdisciplinary approach to health issues that involves the dynamics of 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. Sponsoring departments: Social and Administrative Health Sciences, Education. (F,SP)

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. Two 1-hour lectures and one or two 1-hour courses on topics such as the impact of the 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 Cosi fan Tutte, both composed in response to the success of Le Nozze di Figaro. Don Giovanni will be studied in conjunction with Molière’s Don Juan. Sponsoring departments: Music and French. (SP)

140. Technical Communication for Non-native Speakers of English. (3) Two 1-hour lectures per week. Prerequisites: English 2A or equivalent. Instruction on the content, organization, and structure of technical texts; emphasis on improving language skills and use of the rhetorical conventions of technical writing (see course description for Engineering 191). Sponsoring departments: Chemistry and Nuclear Engineering. (SP)

151. Toxic and Hazardous Waste Management. (3) Prerequisites: Math 1A-1B, Chemistry 1A. Three 1-hour lectures. Quantitative analysis of waste generation, treatment and disposal alternatives, and environmental transport on the land as well as in the water and the atmosphere. Waste management issues and properties that make hazardous waste a waste hazardous, a brief discussion of toxicology, and some background on current federal and state legislation. (SP)

157. Introduction to Chinese Philosophy. (4) Two 1-hour lectures and one 2-hour discussion section per week. Survey of the history of Chinese philosophy from late Chou times through the Ch’in dynasty. Treated in some depth are a number of major Chinese thinkers including Confucius, Mencius, Hsiin 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 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. An introduction to the economic theories of business. The 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, what bosses do and how bosses are themselves kept in check. Public policy issues related to the regulation of economic activity, including antitrust law, are discussed in the last part of the course. Broader organizational issues, such as the structure of government and the organizational properties of socialism, are also considered. Sponsoring departments: Business Administration and Economics. (SP)

173. Technology, Doctrine and Politics in the Nuclear Age. (3) Prerequisites: Arms Race 111 or consent of instructor. One 1-hour lecture per week. Prerequisites: Upper-division standing or consent of instructor. This survey course will examine the interaction of technological innovation, strategic planning, and political processes to understand the dynamics of the superpower race. The course will provide an intensive introduction to the literature; and the history of the subject will be studied critically to help in understanding contemporary conditions and the possibilities of future developments. Sponsoring departments: Physics and Peace and Conflict Studies. (Schwartz)


191. Public Health and Nuclear War. (2) Formerly PH. 291. One hour of lecture and one hour of discussion per week. Prerequisites: Consent of instructor. This introductory course will examine the impact on public health of the current arms race and the threat of nuclear weapons. Topics to be considered through lecture, discussion, and directed readings include: the physical and medical effects of nuclear effects; the economic and psychological, and health dimensions of destruction from preparation for detonation. Conflict resolution and other preventative measures will be explored and tested. Sponsoring departments: Public Health, Peace and Conflict Studies. (SP) Winkelman, 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. 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. (SP)

219. Financing Tools for Public Managers. (3) (For credit see Public and Nonprofit Management section of this catalog.)

221. Ecology and Epidemiology of Arthropod-Borne Zoonoses. (2) New course. Two hours of lecture per week. Prerequisites: Consent of instructor. An interdisciplinary graduate course will focus on the ecology and epidemiology of zoonotic diseases transmitted to humans by arthropods. Basic principles, procedures for conducting field and laboratory investigations, and recent advances in diagnostic and control methodologies will be discussed. Presentation of findings stemming from recent studies concerning mosquito- and tick-borne diseases will be emphasized. Additionally, zoonotic disease agents transmitted by fleas and other arthropods will be covered. Students will be required to prepare a term paper, and there will be a final examination (no midterms). Offered even-numbered years. Sponsoring departments: BIOS, Public Health, and Environmental Health Sciences and Entomological Sciences. (SP) Lane, Hardy

228. Human Evolution, Prehistory, and Palaeoenvironments. (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. This seminar course devoted to consideration of current research in paleoanthropology and related subjects. Sponsoring departments: Anthropology and Integrative Biology. (SP)

229. Mechanisms of Enzyme Action. (3) Three hours of lecture/discussion per week. Prerequisites: Graduate standing or consent of instructor. Current concepts of the mode of action of enzymes. Binding of substrates and allosteric effectors to enzymes, and analysis of the thermodynamics and kinetics of these interactions. Mechanistic and kinetic mechanisms utilized by enzymes and correlation of mechanism with three-dimensional structure. The design of mechanism-based enzyme inhibitors. Sponsoring departments: Molecular and Cell Biology/Chemistry.

234A-234B, 235A-235B. Understanding Families. Methods in Family Research. (1) Course may be repeated for credit. Two-semester course with grade of in progress for the first semester. Two hours of seminar every other week. Prerequisites: Consent of instructor. This seminar will focus on the relationship between research and method in understanding family structure and function. It will examine historical, cultural, and psychological perspectives on studying couples, parent-child relationships, and families in crisis as they change and sometimes are given to processes within the family and to the connections between the family and other social institutions. Methods for understanding the role of the family in both individual and dysfunctional development will be considered. (F,SP)

235. Community Scale Energy Systems. (3) Two 1½-hour lectures/discussions 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 design; review of conservation methods 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.

236. Cognitive Science Research Discussion. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1/2-hour meeting per week. Prerequisites: Student must be the cognitive science research assistant for one of the professors assigned to the Cognitive Science Program. Students will interact on the cognitive science-related research that they are carrying on as research assistants with the aim of broadening both their experience and the understanding of the group. The group will discuss relevant readings. This course is required of all cognitive science research assistants. Sponsoring departments: Linguistics, Philosophy, and Psychology. (F,SP)

237A-237B. Cognitive Science Seminar. (1,1) Course may be repeated for credit. Must be taken on a pass/fail or satisfactory/unsatisfactory basis. One 1/2-hour lecture and one 1/2-hour discussion per week. Prerequisites: Consent of instructor. Weekly presentations by students and invited researchers on various topics in cognitive science, with ensuing discussion. Sponsoring departments: EECS, Linguistics, Philosophy, and Psychology. (F,SP)

241. The Urban Environment. (3) Two 1-hour seminars and 1-hour discussion per week. The components of urban 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)

248. Urban Design in Planning. (3) Three hours of seminar and discussion per week. Prerequisites: Consent of instructor. 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. (SP)

251. Plant-Arthropod Seminar. (1) Must be taken on a satisfactory/unsatisfactory basis. One hour of lecture per week. Prerequisites: Consent of instructor. Seminar on plant-arthropod interactions held Interdepartmentally with Entomology and Botany. Will include topics of current or current interest, as well as standards of pollination, crop resistance, plant stress and insects, weed control, etc. (F,SP) Baker, Bemays, Omduff

252. Stellar Structure and Evolution. (3) Three hours of lecture per week. Prerequisites: Physics 110A-110B, 112A-112B. Equations of stellar structure, radiation transfer and convection, thermonuclear reactions and stellar energy generation; stellar models, degenerate configurations, evolutionary sequences; supernovae; neutron stars; black holes;cosmological problems. (F,SP) Baker, Bemays, Omduff

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 cosmologies. Sponsoring departments: Physics and Astronomy. (SP)

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, from areas which came to expand into 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. (F,SP)

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: Doctoral standing or consent of instructor. This special interdisciplinary seminar will be organized to celebrate the 50th anniversary of the publication of Chester Barnard's The Functions of the Executive (1938). Classic organizational issues will be presented in the context of 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 remains uncertain with respect to the economics of organizations. The course will also feature guest lecturers from a variety of eminent scholars of economics and organization. Sponsoring departments: Business Administration and Economics. (SP) Williamson

271. Seminar in Neurophysiology. (3) Course may be repeated for credit. One 3-hour lecture and one 2-hour laboratory per week. Lectures and case presentations in neurophysiology. Discussion of problems of cognition using techniques described in cases of aphasia, dementia stroke, traumatic injury, and other 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)

272. Tumor Biology Seminar. (1) Must be taken on a satisfactory/unsatisfactory basis. One hour of seminar per week. Prerequisites: Consent of instructor. Reviews and reports of current research in tumor biology. Sponsoring departments: Integrative Biology and Cell Biology. (F)

283. Modernity: Nietzsche, Weber, Heidegger and Foucault. (3) Formerly IDS 183. Two hours of seminar per week. Prerequisites: Consent of instructor. Thinking about modernity as crisis has produced some of the most important works of our age. In this course we will examine the problematicatization 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. Sponsoring departments: Anthropology, and Philosophy. (SP)

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)

290. International Food and Nutrition Policies. (3) 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 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, Viter, Saby

295. 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: Molecular and Cell Biology and Nutritional Sciences. (SP) Forte, Hayes, Suszkrid, Williams

296. Management of Innovation and Policy. (3) Formerly BA 296. Two 1-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) Teece

Professional Courses

407. Introduction to Scientific Diving. (4) Two 1-hour lectures, one 3/4-hour 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 physics, physiology, medicine, rescue, first aid, recompression, air tables, waves, currents, navigation, physical fitness, psychology, environment, subtidal marine life, research methods, life support equipment, and University regulations. Leading to University certification to use underwater life support apparatus for study or research under University auspices. Sponsoring departments: Integrative Biology and Plant Biology. (SP)

Italian

(College of Letters and Science)

Department Office: 5125 Dwinelle Hall, 542-2704
Chair: Gustavo Costa, Dottore in Filosofia
Professors: Gian-Pedro Biasin, Ph.D. 20th-century criticism
Louise George Clubb, Ph.D. Renaissance
Gustavo Costa, Dottore in Filosofia, 18th century
Nicholas J. Perella, Ph.D. Romanticism, 19th century
Ruggiero Stefanini, Dottore in Lettere, Middle Ages, philosophy
Enrico de Negri, Dottore in Filosofia (Emeritus)
Associate Professor: Gavriel 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. Stefanini.

The department gives undergraduates the opportunity to acquire proficiency in the Italian language and a broad background in Italian literature from its beginning 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 be enrolled in Italian H165 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 linguistics proficiency. Recommended: Italian 200, 201.


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 must be at the graduate level. This program 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 a 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 course work in the others. A reading knowledge of German is recommended. The precise nature of the qualifying examination will depend on the student’s choice of two alternative plans of preparation, both of which require a detailed knowledge of Italian literature and familiarity with Romance philology, with emphasis on Italian. Plan I further requires a knowledge of a second Romance-language as a collateral, and of prescribed masterpieces in the third. Plan II further requires a command of one broad field of development (period, movement, or genre) in both Spanish and French literature.

Lower Division Courses

1. Elementary Italian. (5) Five 1-hour classes and one laboratory per week. Basic grammar for: beginners. Part one. (F,SP)

10. Beginning Italian for Graduate Students. (6) Must be taken on a satisfactory/unsatisfactory basis. Three 1-hour classes per week. Basic grammar, reading, and translation. (F,SP)

2. Elementary Italian. (5) Five 1-hour classes and one laboratory session per week. Prerequisites: 1 or 14A. Basic grammar for: beginners. Part two. (F,SP)

3. Intermediate Italian. (5) Five 1-hour classes per week. Prerequisites: 2 or 14B. Grammar review, reading, and written composition. (F,SP)

4. Advanced Italian. (5) Five 1-hour classes per week. Prerequisites: 3 or 14C. Selected readings in modern Italian prose; a review of the essentials of grammar; written and oral compositions. (F,SP)

14. Individualized Language Instruction. (1-5) In any given semester students may receive credit for additional units completed beyond those for which they originally filed. Split grading is optional. One group meeting per week plus individual conferences as needed. A self-paced course corresponding to 1. Students may not enroll for less than two units—except when one unit is needed to complete the last unit of the course. (F,SP)

14B. Individualized Language Instruction. (1-5) In any given semester students may receive credit for additional units completed beyond those for which they originally filed. Split grading is optional. One group meeting per week plus individual conferences as needed. Prerequisites: 1 or 14A. A self-paced course corresponding to 2. Students may not enroll for less than two units—except when one unit is needed to complete the last unit of the course. (F,SP)

14C. Individualized Language Instruction. (1-5) A group meeting per week plus individual conferences as needed. Prerequisites: 2 or 14B. A self-paced course corresponding to 3. Students may not enroll for less than two units—except when one unit is needed to complete the last unit of the course. In any given semester students may receive credit for additional units completed 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) Moses

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 lectures per week. Readings in Virgil’s Aeneid; Ovid’s Metamorphoses and Dante’s Inferno will be used 1) to introduce students to three major works of Western literature, 2) to medieval culture and its relationship with its classical heritage, and 3) to the problem of literary intertextuality and critical responses to it. (SP) Feuchtwanger

85. Vision of After Life: Homer, Vergil, Dante (In English). (3) Three 1-hour seminars per week. Prerequisite: Consent of instructor. A 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 democracies. (SP) Blasi

90. Princes, Servants, Citizens (In English). (3) Two 1-hour seminars per week. Prerequisite: Consent of instructor. A reading of the narrative poems which stand as pillars of Western literature: the Iliaz, Odyssey, Aeneid, and Divine Comedy. The poems will be examined from an inter-related literary standpoint and as repositories of our cultural identities. (SP) Moses

93. History and Consciousness in the Contemporary Novel (In English). (3) Three 1-hour lectures and discussions per week. Prerequisite: Consent of instructor. A reading of the narrative poems which stand as pillars of Western literature: the Iliaz, Odyssey, Aeneid, and Divine Comedy. The poems will be examined from an inter-related literary standpoint and as repositories of our cultural identities. (SP) Moses

101A-101B. Advanced Grammar Composition and Conversation. (3) Three 1-hour classes per week. Prerequisite: 4. Reading and grammatical analysis of representative texts; advanced written and oral composition. (F) Petrucci

103A-103B. Introduction to Italian Literature. (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) Stefanini

109A-109B. Dante’s Divine Commenda. (3) Three 1-hour lectures and discussions per week. A course which examines the major works of Dante’s masterpieces. (SP) Bottiroli

110A-110B. Literature of the 13th and 14th Centuries. (3) Three 1-hour lectures per week. Emphasis on the "Stil Novo" and Dante’s minor works. (SP) Bottiroli

115. Fifteenth-Century Literature. (3) Three 1-hour lectures per week. Humanism and the Early Renaissance. (F) Costa

112A-112B. Sixteenth-Century Literature. (3) Three 1-hour lectures per week. (SP) Clubb

113. Seventeenth-Century Literature. (3) Three 1-hour lectures per week. The main trends in the prose and poetry of the age of the Baroque. (SP) Perella

114. Eighteenth-Century Literature. (3) Three 1-hour lectures per week. Emphasis on the works of Vico, Goldoni, Parini, Alfieri. (SP) Perella

115. Nineteenth-Century Literature. Three 1-hour lectures per week. (SP) Perella

116A. From Neoclassicism to Romanticism. (3) Monti, Fo, and early Leopardi. (SP) Perella

116B. Romanticism. (3) The mature Leopardi and Manzoni. (SP) Perella

116C. "Decadentismo" and "Verismo." (3) Emphasis on Carducci, Pascoli, Verga, D’Annunzio. (F) Perella

117. Twentieth-Century Literature. Three 1-hour lectures per week. (SP) Perella

117A. Fiction. (3) (F) Perella

117B. Poetry. (3) (F) Perella

117C. Theatre. (3) (F) Perella

120. Dante’s Divine Comedy (In English). (3) Three 1-hour lectures per week. An introduction to Dante’s thought and works. Emphasis on a critical reading of the Divine Comedy. (SP) Perella

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. (SP) Moses


151. 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. (SP) Perella

150A. Italian Culture During the Fascist Period (In English). (3) Three 1-hour lectures per week. An examination of the politico-cultural climate of the fascist regime. (SP) Perella

156. 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. (SP) Perella

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 hours 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-expressive 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, auteur. (F) Moses

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 film theories, film novels, and the work of outstanding directors. Literature shaped by film experience and films dealing with the essence of cinematic form will be studied. This course may fulfill the film major requirement in theory. (SP) Perella

H195. Special Studies for Honors Candidates. (2-4) Individual conferences. Prerequisites: Limited to 4th-year honors candidates. Directed study relating to the writing of an honors thesis. (F,SP)

3On leave, spring
4Recalled to active service
5Recipient of Distinguished Teaching Award
197. Field Studies. (1-4) 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 activities. Regular individual meetings with faculty sponsor and written reports required. (F,SP) Feucht

198. 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 87 and 88 of this catalog. (F,SP)

Graduate Courses

200. Italian Syntax, Lexicon and Composition. (3) One 3-hour meeting per week. An analysis of Italian syntax and lexicon, with exercises in critical language explication. Required for the M.A. in Italian. (SP) Costi

201. Historical Grammar. (3) One 3-hour seminar per week. Studies in the main thought and writings of the Renaissance. One 3-hour seminar per week. Studies in literary criticism from De Sanctis to Gramsci. (SP) Stefanini

202. Bibliography and Methods of Research. (3) One 3-hour seminar per week. A pragmatic inquiry into bibliography and the methodology of research. (SP) Costa

203. Literary Criticism. (3) One 3-hour seminar per week. Studies in literary criticism from De Sanctis to Gramsci. (SP) Costa

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. (SP) Stefanini

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. (SP) Costa

208. Minor Medieval Authors. (3) One 3-hour seminar per week. Lyric and religious-didactic poetry, chronicles, novelle, and treatises. (SP) Costa

209. Seminar on Dante. (3) One 3-hour seminar per week. Studies in the Divina Commedia and Dante's minor works. (SP) Costa

211. Seminar on Petrarcha. (3) One 3-hour seminar per week. Studies in Petrarch's poetry. (F) Bottinelli

211 Seminar on Boccaccio. (3) One 3-hour seminar per week. Studies in the Decameron and the minor works. (SP) Costa

217. Studies in the Renaissance. One 3-hour seminar per week. (F) Clubb

217A. Humanism. (3) (F) Clubb

217B. Theatre. (3) (F) Clubb

217C. Ariosto. (3)

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. (SP) Costa

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 19th Century. One 3-hour seminar per week. (F) Pera

221A: Literary Theory and Polonica. (3)

221B. Leopardi. (3) (F) Pera

221C. Manzonl. (3)

221D. Verga. (3)

223A-223B. Studies in the 20th Century. (3-3) One 3-hour seminar per week.

A. Poetry and Theatre. (SP) Baslin

B. Prose. (SP) Baslin

228. Special Study. (2-4) Course may be repeated for credit. Individual conferences. Prerequisites: 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 satisfactory/unsatisfactory basis. Individual conferences. Prerequisites: Restricted to senior students with overall GPA of 3.0 or better. Enrollment restricted according to regulations listed on pages 87 and 88 of this catalog. (SP)

601. Individual Studies for M.A. Candidates. (1-3) Course may be repeated for credit with consent of grad adviser. May not be used for unit or residence requirement for the master’s degree. Individual conferences. Limited to students engaged in research for the doctoral dissertation. (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 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

Director: Tom Goldstein, J.D.

Professors:

Ben H. Bagdikian, A.B. Clark University. Media criticism, social issues, reporting

William Drummond, M.B. Columbia University Graduate School of Journalism. Broadcast journalism, foreign policy, reporting

Timothy Ferris, B.S. Northwestern University. Science writing, reporting

Tom Goldstein, J.D. Columbia Law School, M.B. Columbia University Graduate School of Journalism. Media criticism, journalism ethics, reporting

Thomas C. Leonard, Ph.D. University of California. Journalism, media studies, writing

David Littlejohn (Associate Dean), Ph.D. Harvard University. Criticism, cultural reporting

A Kent MacDougall, M.B. Columbia University Business Writing

Edwin R. Bayley (Emeritus), B.A. Lawrence College. Political and general reporting

Joseph P. Lyford (Emeritus), B.A. Harvard University. Urban affairs, community studies

Albert G. Pickens (Emeritus), Ph.D. Stanford University. Law of journalism

Bernard B. Taper (Emeritus), M.A. Stanford University. Magazine writing, biographical writing

Assistant Professor:

Susan Cohen, M.J. University of California. Newspaper reporting

Senior Lecturers:

Andrew A. Stern, B.A. Dartmouth University. Broadcast journalism, television documentaries

James C. Spaulding (Emeritus), B.A. University of Michigan. Science writing, reporting

Lecturers:

John Carra, J.D.

Judith Coburn, B.A.

Bruce Colvin, B.A.

Judith Epstein, B.A.

Barbara Erickson, M.J.

Cyntia Grotz, B.A.

Janet Hopson, M.A.

Ken Light, B.A.

Richard Reinhardt, M.S.

Marlon Riggs, M.J.

Rosalie Stemer, M.A.

William Turner, J.D.

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 75.

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,SP) Staff

110. Colloquium (Undergraduate). (1) Course may be repeated for credit. Must be taken on a passed/not passed basis. One and one-half 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) Reinhardt

140. History of the American Press. (3) Three hours of lecture per week. Critical analysis of the structure and dynamics of contemporary mass media and their impact on society. (SP) Leonard

141. The Mass Media and Society. (3) Three hours of lecture per week. Critical analysis of the structure and dynamics of contemporary mass media and their impact on society. (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 per week. Critical analysis of the structure and dynamics of contemporary mass media and their impact on society. (SP) Leonard

165. Legal Aspects of the News Media. (3) Three hours of lecture, discussion and field work 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) Staff

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, film, drama, music, art and architecture). (F) Littlejohn

180. Issues in Television Journalism. (3) Three hours of lecture, discussion and field work per week. An evaluation of television news and documentaries from 1950 to the present. Course will analyze local and network news programs, examine problems journalists face working with the broadcast industry, 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 public affairs reporting with consent of instructor. Must be taken on a passed/not passed basis. Supervised experience in the practice of journalism in off-campus organizations. Individual conference with faculty sponsor and written reports required. See Additional Information, Field Study and Internships. (F,SP) Staff

197. Field Study in Journalism. (1-2) Course may be repeated for credit. Must be taken on a passed/not passed basis. Supervised experience in the practice of journalism in off-campus organizations. Individual conference with faculty sponsor 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 passed/not passed 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)

199. Supervised Individual Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed 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) Bagdikian, Drummond, Goldstein, MacDougall

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 styles. (SP) Colvin, Stermer

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, copyreading, headline writing, and makeup, with emphasis on creative editing and critique of manuscripts. (F,SP) Bagdikian, Goldstein

228. Political Reporting. (4) Three hours of lecture and discussion plus eight hours of field work per week. Prerequisites: 200 or equivalent; for others, consent of instructor. Advanced study of biographical writing including conflicts of interest, questions of privacy, confidentiality of sources, withholding of news, relationships with the community and with authorities. (F,SP) Bagdikian, Goldstein

231. Reporting as Literature. (3) Three hours of lecture and discussion per week in seminar. A study of outstanding examples of journalistic literature. (SP) Littlejohn

232. Science Writing. (4) Three hours of lecture 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) Farris

233. Reporting International Affairs. (3) Three hours of lecture and discussion per week. Study and analysis of techniques of reporting international affairs, and production of discussion papers and news reports. Enrollment limited to 15. (F,SP) Drummond

234. Reporting International Affairs. (3) Three hours of lecture and discussion per week. Study and analysis of techniques of reporting international affairs, and production of discussion papers and news reports. Enrollment limited to 15. (F,SP) Drummond

240. History of American Journalism. (3) Three hours of 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 evaluation of the mass media; discussion of problems of ethics and responsibility, and the production of several research papers. (SP) Bagdikian, Goldstein

248. Ethical issues in Journalism. (3) Three hours of lecture and discussion per week. Study and research in the 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, Goldstein

250. Investigative Reporting. (4) Three hours of lecture and discussion 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) Weil

251. Reporting as Literature. (3) Three hours of lecture and discussion per week in seminar. A study of outstanding examples of journalistic literature. (SP) Littlejohn

252. Magazine Article Writing. (4) Three hours of lecture and discussion and four hours of field work per week. Prerequisites: For journalism students, 200 or equivalent; for others, consent of instructor. Advanced study of the techniques of writing and editing of articles for publication. (F,SP) Cohen, Taper

253. Public Opinion, Propaganda and the Mass Media. (3) Three hours of lecture per week. Prerequisites: Consent of instructor: Advanced study of public opinion and information techniques important to journalists from World War I to the present. Each student will do major research. (SP) Leonard

257. Law for Journalists. (3) Three hours of lecture and discussion per week. Study of courts and procedures, legislative bills, criminal law, evidence, prior restraints, fair trial, free press, libel, privacy, subpoena of reporters, access, copyright, broadcast law, relationship of reporter to publisher. (F,SP) Carne, Epstein, Tumer

258. Law for Legal Affairs Reporting. (3) Three hours of lecture and discussion per week, plus field work in the courts. Examination of the structure and philosophy of the legal system to prepare the journalist for reporting legal affairs. (SP) Leonard

275. Radio News Reporting. (4) Four hours of lecture and discussion and four hours of field and laboratory work per week. Study of techniques, practices, and methods of gathering and writing radio news. Students will produce weekly live radio news programs. Enrollment limited to 15. (F,SP) Drummond

284. 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. Production, directing, writing, and videotaping of live weekly television news programs. (SP) Stern

288. Professional Project (Thesis) Seminar. (3) Must be taken on a satisfactory/unsatisfactory basis. Group meetings plus individual tutorial. Prerequisites: 200 or 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. (F,SP)

299. Independent Study. (1-3) Course may be repeated for credit. Units of credit to be determined by the instructor. Group study. For students who wish to pursue a special program of study and research not covered by any other course or seminar. (F,SP)

601. Individual Study for Master's Students. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual study. Individual study for the comprehensive or language requirement in consultation with the field adviser. Units may not be used to meet either unit or residence requirement for a master's degree. (F,SP)

Landscape Architecture (College of Environmental Design)

Department Office: 202 Warster Hall, 642-4022
Chair: Randolph T. Heater, Jr., M.L.A.

Professor: David B. Simons

Fayolle, J. M. Urban design and planning
Collins, B. Urban design and planning
McAfee, R. Urban design and planning

*Not offered 1989-90
1On leave, spring, fall
2On leave, fall
3Recalled to active service
4Recipient of Distinguished Teaching Award
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 contexts of both the 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 a general education in environmental design or serve as preprofessional preparation for subsequent graduate education or entry-level work in the field. The A.B. degree is approved by the State of California's licensing board; students who earn the degree will become eligible to take the state examination after fulfilling a two-year of detailed form to that of the regional landscape architecture. The department's only professional degree, accredited by the American Society of Landscape Architects, is the Master of Landscape Architecture. Undergraduate 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 intensively in 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.

Graduate Program
The Master of Landscape Architecture Degree. The Master of Landscape Architecture degree is a professional degree accreditied by the American Society of Landscape Architects. The program offers advanced work in landscape architecture from the standpoint of design and development. It should be noted that all the programs in landscape architecture are available at other educational institutions.

Graduate Program Course Descriptions
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 standpoint of design and development. It should be noted that all the programs in landscape architecture are available at other educational institutions.

Upper Division Courses
100. Landscape Architecture Studio I. (4) Two hours of lecture and six hours of studio per week. Prerequisites: ED 11A and upper-division standing. Introductory studio problems in landscape architecture; the design process and sources of form. (SP) Staff
101. Landscape Architecture Studio II. (4) Two hours of lecture and six hours of studio per week. Prerequisites: LA100 and ED11B. Intermediate studio problems; ecologic, functional, and social systems in site design. (F) Staff
102. Landscape Architecture Studio III. (3) Two 1-hour lectures and two 2-hour studios per week. Prerequisites: 101 and 120. Advanced studio problems; integration of sitting, planting and details for gardens, parks, street improvements, and community facilities. (SP) Staff
103. Landscape Design for the Neighborhood. (3) Course may be repeated once for credit. Two 1-hour lectures and four hours of studios per week. Prerequisites: 101. Development of plans and approaches to specific projects in collaboration with neighborhood organizations or agencies. (F) Staff
105. Landscape Planning. (3) Two 1-hour lectures and two 2-hour studios per week. Prerequisites: 101. The relationship of physiography, cultural factors, function, and landscape quality to land use planning and community form. Offered every other year; alternates with 103. (F) Hester
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 hours of field laboratory per week. Prerequisites: Recommended: Botany 10 and Geology 50/50L Analysis of environmental factors, ecosystem functions, and ecosystem dynamics, as related to decision-making for landscape planning and design. (SP) Staff
111. Introduction to Landscape Plants in Design. (2) Two 1-hour lectures per week. Prerequisites: Botany 10 or equivalent. Fundamentals of plant growth, nomenclature and design characteristics, cultural influences on plant growth, climate and landscaping. Economics of plants in design; planting design principles. (SP) Staff
111L. Field Identification of Landscape Plants. (2) Two 3-hour field laboratories per week. Prerequisites: 111 (concurrent or prior) or consent of instructor. Field observation and identification of plant species most suitable for use in central California. Individual graphic exercises in field observation of plants; plant composition and special uses. (F) Beauty
112. Landscape Horticulture (Special Schedule Course). (2) Two 3-hour workshops per week for seven weeks. Prerequisites: 111 and 111L; Botany 10 or equivalent. Horticultural techniques for landscape installation and maintenance including planting and early care, pruning, artificial soils, turf grass, disease and pest management. Personalized System of Instruction course. (SP) Staff
113. Regional Landscape Plants (Special Schedule Course). (2) Two 3-hour field laboratories per week for seven weeks. Prerequisites: 111 and 111L. Field observation, identification and discussion of native and introduced plants for landscape design; emphasis on plant growth, ecological adaptation and landscape management. Individual graphic exercises on selected topics. (SP) Beatty
120. Topographic Form and Design. (4) Two 1-hour lectures and six-hours of studio per week. Recommended: Civil Engineering 86. Theory, methodology, studio projects, and technical topographic site design and shaping for surface drainage. (SP) Staff
121. Design of Landscape Structures. (4) Formerly LA 121A and LA 121L Students who have taken LA 121A and LA 121L may not receive credit for LA 121. Two hours of lecture and six hours of studio per week. Prerequisites: 120. Theory and materials; design of landscape structures and utilities. (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 and place, including the garden, parks, and public open spaces. Land use planning and environmental protection. Discussion of design process and planning methods, materials, and techniques of professional practice. (F,SP) Staff
131. Design Implications in Forestry and Resource Management. (2) Two hours of lecture and two hours of field work per week. An exploration of wildlands as a landscape resource, stressing visual composition as a basis for which forestry and resource management decisions may be given form and relationships through design. (SP) Staff
134. Advanced Graphics for Landscape Architecture. (3) Two 3-hour studios per week. Prerequisites: Environmental Design 11A or 11B or 230 or consent of instructor. Freehand and formal 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 studio per week. An exploration, which requires intensive study of how people use and value open spaces. Post-occupancy evaluation as a tool for understanding design of 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
170. History and Literature of Landscape Architecture. (3) Two 1/2-hour lectures per week. Developmental History of landscape design practice; relationships to society, climate and topography. (SP) Staff
187. Field Study in Landscape Architecture. (2-4) Field study in selected areas of landscape architecture. Prerequisites: Permission of instructor. Enrollment restricted by regulations listed on pages 87 and 88 of this catalog. (F,SP) Staff
199. 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 passed/not passed basis. Enrollment restricted by regulations listed on pages 87 and 88 of this catalog. (F,SP) Staff

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. Inves-
200B. Urban Landscape Design. (4) Two 4-hour studios per week. Prerequisites: 200A. Principles and determination of scale factors as inspiration for the 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 they 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: 200B 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 involving a variety of environmental criteria and desired land uses in a complex institutional and political setting. Student teams will identify needed data, define problems, and develop action proposals; 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) Sullivan

220. Environmental Geology for Planners. (4) Three days of laboratory per week. Consideration of current problems in landuse and environmental planning. Topics will include: nuisance law, constitutional constraints, environmental impact assessment, permit systems for development control, pollution control, natural resources planning law. (SP) Staff

224. Vegetation Analysis and Management. (3) Two 1½-hour lectures per week and two field trips (total of three days). Visual analysis of wildlands landscapes, inventory procedures, problems in landscape evaluation, and design policy development, especially related to public wildlands. (SP) Hester

233. Environmental Law and Resource Management. (3) Two 1½-hour seminars per week. Prerequisites: Consent of instructor. An introduction to the American legal system governing the utilization and management of natural resources; and an overview of the major techniques that have been developed by courts, legislatures, and administrative agencies for environmental protection. Topics will include: nuisance law, constitutional constraints, environmental impact assessment, permit systems for development control, pollution control, natural resources planning law. (SP) Staff

223. Advanced Seminar in Landscape Architecture. (3) Two 1½-hour lectures and one 3-hour laboratory per week. Intermediate introduction to the application of computers in landscape design; covers applications in computer mapping, landscape design, planning design, and data base management; class 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 model-making, slide photography, video-taping, use of the environmental simulation in film-making, script writing, and presentation design. Exercises and projects. (SP) Bosselmann

236. Advanced Seminar in Land Use and Environmental Planning. (3) Course may be repeated for credit. Two 1½-hour seminars per week. An advanced and intensive investigation of current problems in land use and environmental management, with a focus on the development of proposed policy responses and implementation strategies. Topics will vary from year to year. Likely topics include: the regulation of sensitive lands; environmental impact assessment; the regulation of design; supra-local land use controls; water resources law and policy; public lands, coastal zone management; hazardous lands; resource extraction. (SP) Staff

237. The Process of Environmental Planning. (3) Two 1½-hour seminars per week. Prerequisites: 233 or consent of instructor. A review of the techniques used in environmental planning, and evaluation of alternate means 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 address recurrent planning problems, such as the limitations of available data, legal and political constraints on plans, and the role of planning agencies in the planning process. (F,SP) 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 are problems of pace-setting lifestyles. (SP) Meier

250. Faculty Research Seminar. (1) Must be taken on a satisfactory/unsatisfactory basis. One 1½-hour seminar per week. Examination of current status and future scope of professional practice in landscape architecture and environmental planning. (F) Staff

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, aesthetics, protection/conservation, and the role of the professional. (F) Staff

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 projects and proposals for the thesis or professional project. (SP) Staff

255. Doctoral Seminar in Environmental Planning. (1) Course may be repeated for credit. Three hour seminars on alternate weeks. Prerequisites: Doctoral student or consent of instructor. Analysis of a forum for presentation of doctoral student research, discussions with faculty researchers and environmental planning practitioners, and examination of topical issues in environmental planning. Topics may be announced at the beginning of each semester. (F,SP) Staff

256. 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. Office management and organization. Contrast between practices in the private and public sectors. Visits to professional offices. (F) Staff

270. The Urban Park. (2) Formerly 291A. Students who have taken 291A may not receive credit for 270. Two 1½-hour seminars per week. Particular emphasis will be given to the origins and development of the public as a component of cities. Particular emphasis will be given to contemporary issues of conservation, changing uses and expectations, and future directions. (SP) Laurie

275. 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/or environmental planning. Research papers and reports with faculty supervisor required. See departmental sheet for other limitations. (F,SP) Staff

276. Directed Dissertation Research. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Hours to be arranged. Prerequisites: Advancement to Ph.D. candidacy. Open to qualified students who have been advanced to candidacy for the Ph.D. degree and are directly engaged upon the doctoral dissertation. (F,SP) Staff

277. Supervised Field Study. (2-3) Any combination of 265 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 and sponsor. Supervised experience relative

On leave, spring
Recalled to active service
Recipient of Distinguished Teaching Award
to specific aspects of practice in landscape architecture and/or environmental planning. Regular meetings with faculty and outside sponsors as well as final report required. See departmental information sheet for other limitations. (F,SP)

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. (F,SP)

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 6 units will be counted toward the M.LA 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. (F,SP)

301. 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. Must be taken on a satisfactory/unsatisfactory basis. Hours to be arranged. Prerequisites: Last semester of residence in M.LA program. Individual study for final degree requirements in consultation with adviser. (F,SP)

302. Individual Study for Doctoral Students. (1-8) 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 doctor's degree. Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various special requirements of candidates for the Ph.D. (F,SP)

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 under graduate courses. Regular meetings with faculty sponsor. See departmental sheet for other limitations. (F,SP)

Interdepartmental Studies Courses

Graduate Courses

IDS 235. Community Scale Energy Systems. (3) Two 1½-hour lecture/discussions per week. Prerequisites: Consent of instructor. Energy supply at the community scale through the 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)

IDS 241. The Urban Environment. (3) Two 1½-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)

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, and alternatives generation, environmental media and presentation, design guidelines and review, environmental evaluation and impact assessment. Case studies. Sponsoring department: City and Regional Planning and Landscape Architecture. (SP)

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 Dwinelle Hall, 642-6471

Adviser: Arthur L. Askins (Spanish and Portuguese)

The group major in Latin American studies is designed to present 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. The 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: Portuguese 101A (or the equivalent); 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 appearing on the list of approved courses (given below) and selected in consultation with a group major adviser.

List of approved courses: Anthropology 175, 176, 177, 178; Geography 131, 154, 155, 156, 157, 158; History 103E, 140, 141A, 141B, 142, 143, 144; Music 137; Political Science 148A, 148B; Portuguese 102, 104, 114, 116, 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 topic class or special course other than 189 may be approved by the adviser as the 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 upper division courses in Latin American studies may be allowed to 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 Spalding Street, 642-2088

Advisers: David Hayes-Bautista (Public Health), Candace 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 offers an opportunity for interdisciplinary work on Latin America at the 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 test, and foreign students must achieve a minimum score of 550 on the Test of English as a Foreign Language (TOEFL). Only one of these tests will be desirable. Samples of written work must also be submitted. Admission is limited by the number of places allotted to the program.

The formal requirements for the M.A. degree are 20 units of course credit and a thesis, following the University's Plan I for a master's degree of 24 units of course work following Plan II. Students should take courses concentrated primarily in two or three departments, although courses in a broader range of departments may be taken if appropriate to a student's intellectual concerns. Students' programs must include at least two courses or 8 units (three courses or 12 units under Plan II) at the graduate level in each of two departments, in addition to the graduate credit earned for writing the master's thesis. The remaining courses for the required units are chosen in consultation with an adviser. While the program will consist primarily of courses focused explicitly on Latin America, at least one course with a comparative, theoretical, or methodological focus that contribute to students' work on Latin America must also be taken. The language requirement for the degree is a high level of proficiency in Spanish or Portuguese and a basic reading and speaking knowledge of the other language. Work on the master's thesis will be carried out in consultation with a three-member thesis committee. No final examination is required.

Doctoral Degree. The Ph.D. program in 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 will choose well-defined interdisciplinary interests that do not fit within the confines of traditional 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 will 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 writing knowledge of the other language in two languages, and a reading knowledge of a third language chosen in consultation with an adviser. Upon successfully completing the examination, 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 conferences. Prerequisites: Senior standing with a minimum grade-point average of 3.0 in the major, and 3.0 in all work completed in the University. Consent of group major adviser. Honors thesis. (F,SP)

Graduate Courses

200. Latin American Studies Seminar. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1½-hour lecture per week. Prerequisites: Consent of instructor. Mandatory.
for Latin American studies graduate students. Seminars
of three hours of seminar and one hour of individual
and write-up of field data. Supervised field exercises.

Acting Professors:

Steven M. Bundy, B.A., J.D. Alternating dispute resolution,

Criminal Law, torts

John P. Dwyer, B.A., Ph.D. J.D. Environmental law, law

and science, property

Bryan S. Ford, A.B., J.D.

Sanford H. Kadish, B.S.S., LLB. (Alfred F and May T.

Herma Hill Kay, B.A., J.D. Conflict of laws, familylaw, sex

(Chair, Jurisprudence and Social Policy Program) Criminal

Constitutional law, federal courts

Milton B. Redlich, B.A., J.D. Civil law, administrative

law and technology

Sheldon L. Messinger, B.A., M.A., Ph.D. (Chair,

Instruction in legal research and writing in the fall semester, and a moot court program in the

Spring.

Second and Third Year

205. Administrative Law. (3) A study of administrative

process and of agency rules, orders, and discretion

(federal and state). Emphasizes the problems that law-

yer encounters when they deal with government agencies

and their innumerable officers and employees. (F)

206. Administrative Law. (3) A study of administrative

process and of agency rules, orders, and discretion

(federal and state). Emphasizes the problems that law-

yer encounters when they deal with government agencies

and their innumerable officers and employees. (F)

207. Advanced Criminal Law & Procedure Seminar. (2)

John E. Coons, B.A., J.D. Law and Education, contracts

Richard M. Buxbaum, A.B., LL.M. Corporations,

Constitutional law, torts

Melvin E. Eisenberg, A.B., LL.B. Corporations, contract,

Criminal law, jurisprudence

William A. Fletcher, B.A., J.D. Federal courts, administrative

Law and education, financial institutions

Edward C. Halbach, Jr., A.B., LL.M., LL.D. (Walter Perry

Johnson Professor) Employment and gift taxation, trusts and

estates

John R. Hefland, B.S.L., J.D. Real estate law

James C. Holcomb, B.B.A., J.D. (Shannon Cecil Turner

Professor) (Emeritus) Business, law and science, property

Steven M. Bundy, B.A., J.D. Alternate dispute resolution,

International business transactions

Law School Admissions Office, 220 Boalt Hall,

For a description of the graduate programs in law,

see page 75.

Explanation of Course Numbering

The following list indicates the courses usually offered
each academic year, although changes in instructors
and in 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 ex-
ceptions: Prescribed first-year courses are numbered
200 to 205, and special programs are numbered
255 to 299.

2. Courses that substantially are the same (although
given the same number, but a different identifying
number following a hyphen).

3. Where no integral number is available at the
point and another number.

4. Two-semester courses are identified by letters
(e.g., 2004, 2005) followed by a different identifying
number following a hyphen.

5. Where no integral 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.

6. Two-semester courses are identified by letters
(e.g., 2004, 2005) followed by a different identifying
number following a hyphen.

6. Two-semester courses are identified by letters
(e.g., 2004, 2005) followed by a different identifying
number following a hyphen.

7. No course numbering, including course numbers
and course titles, has been changed during a given
academic year.

8. The section is an introduction to basic antitrust law and economics. Em-
phasis will be upon the law governing horizontal restraints
including monopoly, cartels, oligopolistic interdepend-
ence, miscellaneous cooperative activities among com-
petitors, and horizontal mergers. (F)

208. Antitrust Law. (3) This course is a semester

Introduction to basic antitrust law and economics. Em-
phasis will be upon the law governing horizontal restraints
including monopoly, cartels, oligopolistic interdepend-
ence, miscellaneous cooperative activities among com-
petitors, and horizontal mergers. (F)

209. Antitrust Law. (3) This course is a semester

Introduction to basic antitrust law and economics. Em-
phasis will be upon the law governing horizontal restraints
including monopoly, cartels, oligopolistic interdepend-
ence, miscellaneous cooperative activities among com-
petitors, and horizontal mergers. (F)

210. Bilingualism and the Law. (2) This seminar

will offer a historical treatment of linguistic minorities
in the United States as well as some materials on the
philosophy of language. The course will then go on
to examine the legal approaches to the provision of bilingual
assistance in four areas: education, voting, judicial pro-
ceedings, and immigration. The course will give special
consideration to the roles that lawyers play in dispute
resolution and to the sources of the present widespread
interest in non-litigation alternatives. (SP)

211. Business, Law and Ethics. (3) A modestly

theoretical 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 intro-
duce students to the full range of ethical questions, to
suggest the range of tools available for their resolution,
and to encourage an increased use of disciplined ethical
thinking in making choices. This course is open also

on leave, fall
214. California Marital Property. (2) The study of California law governing the property rights of husband and wife. The course includes an analysis of the general principles governing classification of community property and separate property, the management and control of community property, liability of marital property, the division of property in divorce, and the ownership and usufruct of marital property. (F)

215. Chinese Legal System. (2) The seminar will consider both the traditional concepts that underlie the legal system of China and the modern form of legal system in the People's Republic of China. The seminar will be spent on the legal concepts embodied in Confucian thought, the Legalist tradition, and the various Dynastic Codes. (F)

218. Communications Law. (2) Consideration of the selected problems of law and policy involving the media, particularly television. Study of media access, media control, the relationship between government and the press, and the functioning of today's communications media in the light of the purposes of the First Amendment. (SP)

222. Conflict of Laws. (3) Jurisdiction, choice of law, and recognition of judgments in cases involving international transactions, particularly in the context of element of procedure, torts, workmen's compensation, contracts, property, domestic relations, estates, and business associations. (F)

224. Constitutional Law II. (4) Constitutional provisions dealing with individual rights including freedoms of expression, association and religion, equal protection, right of privacy and other fundamental rights; congressional power to enforce individual rights. (F)

224b. Constitutional Law IIa. (3) Prerequisites: Constitutional Law I. Constitutional provisions dealing with individual rights, including freedoms of expression, association and religion, equal protection, right of privacy and other fundamental rights; congressional power to enforce individual rights. (F,SP)

223. Constitutional Law III. (2) Prerequisites: Constitutional Law I. Constitutional provisions dealing with individual rights, including freedoms of expression, association and religion, equal protection, right of privacy and other fundamental rights; congressional power to enforce individual rights. (F,SP)

224c. Construction Law Seminar. (2) The seminar will treat legal aspects of the design and construction process. (F)

227. Copyright. (3) Statutory and common law protection of literary, musical, and artistic works, including the principles of unfair competition and trademark. (SP)

228A. Corporations I. (3) Course will cover the formation and operation of the corporation, the latter including the division of powers and responsibilities between shareholders, directors and officers. It will develop the distinction between the publicly held corporation and the private, or close corporation, and the contractual flexibility of the latter form. (F,SP)

228B. Corporations II. (3) Prerequisites: 228A (Corporations I). Course will emphasize the relationships among the participants in the corporate venture with particular attention to the fiduciary principles governing the relationship between the corporation and its directors and officers. The course will also deal with litigation concerning the corporation, particularly but not exclusively with derivative suits. It will not cover financial structure matters except to treat the fiduciary aspects of the basic financial issues. (SP)

228C. Corporations III. (3) Prerequisites: 228B (Corporations I). Course will cover corporation and fiduciary law and the taxation of corporation and distribution of profits (by way of dividends and of repurchase of shares). It will also include enabling and fiduciary aspects of corporate reorganization and other fundamental corporate structural changes. The course will deal, more than the others, with economic theory and policy materials, but also with more statutory and accounting materials. It will also involve substantial creditor-debtor law material. (SP)

231. Criminal Procedure. (3) A survey of criminal trial and pretrial procedure. Topics include the law of arrest, search and seizure, pretrial motions, investigation, identification, entrapment, pretrial motions and hearings, plea bargaining, jury trial and double jeopardy. (F)

236B. Economics and Public Policy Analysis. (3) This course will provide a broad basic introduction to the fundamental economic aspects of public policy. 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 our economy. (F)

237A. EEC Competition Law. (2) A basic introduction to the competition law of the European Community. Some stress will be placed on new aspects that differentiate the Community law from American antitrust law, such as community law emphasis on vertical restraints (aimed at inhibiting barriers between national markets) and community law limitations on subsidization by states of firms producing within their borders. Antitrust law is not a prerequisite though familiarity with American antitrust policy will be an advantage. (F)

237C. Employment Discrimination Law. (3) Survey of employment discrimination law including substance and procedure, and federal and state statutes prohibiting discrimination on the bases of race, national origin, ancestry, sex, religion, age, physical handicap, and marital status. Includes discussion of disparate impact and disparate treatment theories and application of statistical techniques. Includes constitutional issues and evolving tort and contract series permitting recovery for wrongful discharge. (SP)

239. Estate and Gift Taxation. (1) A basic study of the federal estate and gift taxes through text and code. This course is geared to students with little or uncertain background in probate practice and estate planning who wish to develop an understanding of the tax rules and regulations that pertain to these areas. Coverage will be less detailed and the treatment more concise than in Law 239-3 but provides some background for those who may later decide to practice in this area. (SP)

239D. Estate Planning and Taxation. (3) Prerequisites: 240A. A basic study of federal and state estate and gift tax laws and how they operate on, and affect planning for, gratuitous inter vivos and testamentary transfers. (F)

241. Estates and Trusts. (3) The law of intestate succession and wills; the nature, creation, and termination of trusts; probate administration of trusts and decedents' estates. (F,SP)

244. Family Law Seminar I. (3) Family law, marriage, and family. Prerequisites: 228A. Course will consider divorce, custody, visitation, financial aspects of divorce, and premarital agreements. Enrollment is limited. A paper is required. (SP)

245. Federal Courts. (4) The jurisdiction and function of federal courts, the distribution of power between the federal and state systems, and the roles of substantive and procedural law in the two systems. (SP)

249. Immigration Law. (2) This course will consider the practical and theoretical aspects of immigration law, and the effect of the laws in the context of national interests. (F)

250/250A. Income Taxation I. (4) A study of statutory, judicial, and administrative material constituting the federal income tax as applicable to the individual. (F)

250B. Income Taxation II. (3) Prerequisites: 250A. A study of the distribution of income tax, with emphasis on the taxation of business enterprises, including partnerships and corporations, and other financial intermediaries. (SP)

250E. Insurance Law. (2) Attention will be focused upon materials which explain the arcane and almost unintelligible language of the insurance policy. Also, it will be important to explore the function of insurance, the carrying out of specialties of risks, and the develop- ment 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 development. (SP)

251. International Human Rights: Problems of Law and Policy. (2) The seminar will be based 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, the carrying out of specialties of risks, 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 development. (SP)

251C. International Human Rights: Problems of Law and Policy. (2) The seminar will be based 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, the carrying out of specialties of risks, 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 development. (SP)

2542A-2542B. Jurisprudence and Social Policy Seminar. (3) A two-semester seminar required for all students in the Graduate Program in Jurisprudence and Social Policy. Through intensive reading and discussion in each of two seminar sessions that meet once a week, the seminar will explore the role of government in planning and controlling the use of land, with particular emphasis on the roles of governmental entities in the process of comprehensively planning land-use, zoning, subdivision controls, aesthetic regulation, the regional obligations of municipalities, and constitutional issues raised by land-use and development control. (F,SP)

2543A. Jap: Readings in the Literature Seminar. (3)

2543B. Jap: Readings in the Literature Seminar. (3)

255. Labor Law. (3) The law governing relations between employer and employees and the impact of state and federal legislation in the area of collective bargaining, the strike, the boycott, and picketing. (F)

2572. Land Use Planning and Control. (3) This course will explore the role of government in planning and controlling the use of land, with particular emphasis on the roles of governmental entities in the process of comprehensively planning land-use, zoning, subdivision controls, aesthetic regulation, the regional obligations of municipalities, and constitutional issues raised by land-use and development control. (F)

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 all phases of practice. Emphasis is given to the origin of the legal profession and the conflict of interest problems that it raises. (SP)

2701. Remedies. (3) The function of awarding remedies, the varying types of remedies that can be awarded and their usefulness, and the extent to which legal rules establish by legislation are increasingly regulatory remedies. The types of remedies which will be discussed include money damage awards, including expectation and restitution, and the importance of specific performance and injunctive relief. (SP)

272A. Securities Regulation. (2) Prerequisites: Law 216A, 216B (Corporations) or their equivalent. Law 272B is not a prerequisite. This course concentrates on the theory and practice of the distribution of securities under the Securities Act of 1933 and under state Blue Sky laws, including the registration under the 1933 Act, practice before the Securities and Exchange Commission, and
the underlying process of certain distributions of securities. (F) Sonnini

295. Securities Regulation. (2) Prerequisites: Law 218A, 218B (Corporations), or their equivalent. This course concentrates on the regulation of trading of stocks and shares in the over-the-counter market; disclosure obligations in securities transactions; broker-dealer regulations; the enforcement of federal securities laws; civil liabilities under state and federal securities acts, including responsibilities and liabilities of attorneys, accountants, and other professionals. (SP) Kay

273. 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 remedies including those drawn from state and federal constitutional laws, 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) Kay

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 metropolitan areas. Limits on power and responsibility as they vary from place to place. Operational problems: personnel, financing, contracting, torts, and resource allocation. (F)

287. 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; mislabeling practices (false advertising; disparagement); predatory practices (interference with business relations; appropriation of trade secrets); trademarks; patents; regulation of fraud and the per se rule. (F)

288. Water 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 appraises the efficiency of these doctrines as well as the roles and conflicts of various governmental units in meeting this responsibility. (SP) Sato

295.6 Student Initiated Course. (1-4) 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 and group research, writing, editing for professional journals, student-taught courses, or other legal projects of a serious, educational nature. Requires the approval of the assistant dean. (F,SP)

295.7 Clinical Semester. (5-10) Must be taken on a satisfactory/unsatisfactory basis. Students placed in selected law offices (e.g., law firms, governmental agencies, legal staffs of various programs). Students engage in ongoing work of the office under the supervision of an instructor. Intended to share the role of educator between the practicing and the academic world. (F,SP)

295.8 Judicial Externship. (1-10) Must be taken on a satisfactory/unsatisfactory basis. Full-time clerkships for one semester with Judges of the California Supreme Court, California Courts of Appeal, and with Judges of California Superior Courts and U.S. Circuit and District Courts. (F,SP)

296. Legal Dissertation. (8-13) Must be taken on a satisfactory/unsatisfactory basis. Open to third-year students who have completed a qualifying seminar in the second year. Research and writing looking toward a major piece of legal scholarship under the direction of an individual faculty member pursuant to faculty consent. (F,SP)

297. Self-Tutorial Seminar. (1-4) Must be taken on a satisfactory/unsatisfactory basis. Open to students who have completed the first-year curriculum. A permit to enable individual self-instruction, primarily in subject matter areas not covered by the regular curriculum. Requires the consent of a member of the faculty to serve as supervisor and approval of the dean. (F,SP)

298. Group Research Project. (1-4) Must be taken on a satisfactory/unsatisfactory basis. Open to students who have completed the first-year curriculum. A program to enable groups of students to study or research special legal topics of common interests, primarily in subject matter areas not covered by the regular curriculum. Requires the consent of a member of the faculty to serve as supervisor and the approval of the dean. (F,SP)

299. Individual Research Project. (1-4) Must be taken on a satisfactory/unsatisfactory basis. Open to students who have completed the first-year curriculum. A program to enable individual study and research in depth of selected topics under the supervision of a member of the faculty with a goal of producing an original paper or report. Requires the consent of a member of the faculty to serve as supervisor and the approval of the dean. (F,SP)

299A. Research-Individual Project. (1-5) Credit and grade to be awarded upon completion of the sequence. (SP)

299B. Research-Individual Project. (1-5) Credit and grade to be awarded upon completion of the sequence. (SP)

601. Individual Study, JSP Masters. (1-12) Must be taken on a satisfactory/unsatisfactory basis. (F,SP)

602. Individual Study, JSP Doctorate. (1-12) Must be taken on a satisfactory/unsatisfactory basis. (F,SP)

Professional Courses

300. Professional Training: Supervised Teaching. (4) Must be taken on a satisfactory/unsatisfactory basis. (F,SP)

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 and 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. Strategic Management in the Public Sector. (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 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 how the law works and of the policies that underlie it. The major is based firmly on the view that the study of law and justice has a rich humanistic tradition and that law pursuit can encourage sustained reflection on fundamental values.

Legal studies courses are taught by members of the Law School faculty, including humanities scholars and 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 School of Law, and this major has not established for the purpose of preparing students for law school. It is designed for undergraduate students who are interested in law as a field of study, 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 must be taken for a letter grade.

Upper Division Requirements. A minimum of 32 upper division units is required for completion of the major. All of these units must be taken for a letter grade. 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. At least 18 upper division units must be taken for a letter grade. The remaining 14 units may be taken from 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 thought about each of the four course groupings referred to above. The Group A requirement insures that all students are exposed to conceptual analysis and broad intellectual perspectives. Group B courses are meant to limit parochialism and to assure 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 some of the terms of legal ordering—e.g., the substantive law of crimes, property, negligence—and to assure that students can relate legal doctrines to social policies 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. (3,3) A: Three hours of lecture and one hour of discussion per week. B: Three hours of seminar per week. Prerequisites: 100A is prerequisite to 100B. Introduction to law for the liberal arts major. This course 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. Nonet

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.

*On leave, spring
**On leave, fall

Recalled to active service

Recipient of Distinguished Teaching Award
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 rights, utilitarianism, and moral linguistics. The course will also include an introduction to contemporary discussion of higher law, fairness, civic 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 are applied. Possible topics include: identity and 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?

110. Legal and Political Obligation. (4) New course. Course may be repeated for credit. Three hours of lecture and one hour of discussion per week. The course will focus on the political and social dimensions of political obligation. Why should I obey the law? We will examine what claims the law makes on us as citizens, and the morality of various ways of responding to those claims. We will discuss ideas about civil disobedience and legitimate resistance, and we will examine theories of political obligation based on consent, fairness, democracy, and justice. (SP) Waldron

111. The Making of Modern Constitutionalism. (4) Two 1 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; coverage from the 16th to 18th centuries. The discussion will cover the debate over ratification of the U.S. Constitution.

145. Law and Economics I. (4) Two 1 1/2-hour lectures and one hour of discussion per week. Introduction to economic analysis of law. Courses need not be taken in numerical order; nor is it a prerequisite to one course to take the other. The course will apply microeconomic theory analysis to legal issues and procedures. Emphasis will be given to the economic consequences of various sorts of liability rules, remedies for breach of contract and the allocation of property rights.

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.

145. Law and Economics I. (4) Two 1 1/2-hour lectures and one hour of discussion per week. Introduction to economic analysis of law. Courses need not be taken in numerical order; nor is it a prerequisite to one course to take the other. The course will apply microeconomic theory analysis to legal issues and procedures. Emphasis will be given to the economic consequences of various sorts of liability rules, remedies for breach of contract and the allocation of property rights. The jurisprudential significance of the analysis will be discussed.

147. Law and Economics II. (4) Two 1 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 or both courses. Government use of economic information, e.g., consumer surplus, has increased, and as a consequence, economists and lawyers have developed a critique of these mechanisms which has prompted substantial reforms in recent years, e.g., deregulation in transportation. The course examines this critique.

148. The Politics of the American Legal System. (4) Two 1 1/2-hour lectures and one hour of discussion per week. Prerequisites: Upper division standing. A study of the American legal system, from both behavioral and normative perspectives. Topics will include: the generation of ideas for new laws and the entry of individuals and groups into politics to push for such laws, 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 introduced.

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 condition 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

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 and potential uses of social science research in the American legal system. 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; theories of crime and sentencing; 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 per week. Analysis of conventional family formation and dissolution, and focuses on selected topics in child welfare law. Topics include: the state role in reproductive decisions, entry into marriage, and 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. Criminal punishment in the United States. (1) Forms, justifications, and relation to larger cultural and societal changes, colonial period to the present. (2) Speculation about the meaning and direction of courses yet to be repeated for credit. Two hours of lecture and one hour of discussion per week. Analysis of the conditions by which suspected criminals are apprehended, tried, sentenced, punished? Past and current trends and policy issues will be discussed.

174. From Bracton to Brandeis. (3) Two hours of lecture and one hour of discussion per week. This course will examine Anglo-American legal history in terms of the lives and judicial opinions of ten leading English and American judges—Bracton, Bacon, Coke, Mansfield, Blackstone, Marshall, Story, Holmes, Cardozo, and Brandeis.

177. American Legal and Constitutional History. (4) Three hours of lecture and one hour of discussion per week. History of American law and the constitutional system. Topics include: the colonial heritage, the four branches of American government, the nature of the law in the imposition of social control and the regulation of economic interests, styles of judicial reasoning, and the common-law tradition.

178. Seminar on American Legal and Constitutional History. (3) One 2-hour meeting per week. Prerequisites: Consent of instructor. The purposes of this seminar are to explore in depth selected topics in American legal and constitutional history. The aim is the production of a substantial research paper. Preference given to students who have had 177.

179. Comparative Constitutional Law. (3) Three hours of lecture per week. An examination of constitutional decision-making in a number of countries based on selected high court opinions.

180. Mental Health, Law, and Social Policy. (4) Four hours of seminar per week. Prerequisites: Preference given to upper division students with background in psychology, law, and/or sociology. Seminar on selected current controversies of legal and social policy issues of mental health such as involuntary commitment, prediction of dangerousness, right to treatment, right to refuse treatment, social class and mental illness, confidentiality, and informed consent.

181. Mental Health Issues and the Law. (3) One 2-hour lecture and one hour of discussion per week. Major issues in the interface of law and mental health. Application of the behavioral sciences to criminal and civil law. Legal regulation of mental health practice. (SP) Diamond

182. Law, Politics, and Society. (4) Two 1 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 and 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 consider alternative perspectives on social control and social change.

183. Law and the Evolution of the State. (4) New course. Three hours of lecture and one hour of discussion per week. The course is an historical examination of the genesis of the state as a legal institution. It will focus on the formation of legal doctrines of the state and its subsequent rationalization as a property-owning entity in modern society. It will also examine how and why the birth of jurisprudence in Western culture has contributed to the radical transformation of a traditional political system into an abstract and therefore quasi-absolute form of power. (SP) Mayall
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 interaction. Two-thirds will be devoted to problems in the United States from 1945 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. Honors is 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 course is a formal seminar and one under 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/no pass basis. To be arranged. Prerequisites: Consent of instructor and approval of program chair. Enrolment is restricted by regulations listed on pages 87 and 88 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, online searching
- Michael K. Buckland, Ph.D. International librarianship, library planning and management
- Mary K. Duggan, Ph.D. History of printing and publishing
- Michael Cooper, Ph.D. Economics of information, design information systems
- William S. Cooper, Ph.D. Information processing and retrieval
- Robert D. Harlan, Ph.D. Printing, publishing, bibliography
- M.E. Maron, Ph.D. Information retrieval theory
- Nancy Van House, Ph.D. Managing, economics of information, evaluation
- Patrick Wilson, Ph.D. Bibliography and information service
- J. Perlan Danton, Ph.D. (Emeritus)
- Fredro, John Mosher, Ph.D. (Emeritus)
- Raymond C. Swank, Ph.D., LL.D. (Hon.) (Emeritus)

**Associate Professors:**
- Yale M. Breunstein, Ph.D. Economics of information and communication systems
- E. Ray H. Ehr, Ph.D. (Emeritus)

**Assistant Professors:**
- Ray R. Larson, Ph.D. Bibliographic Information retrieval systems
- Judith Weinman, M.L.S. (Acting) Children's services, online searching

**Senior Lecturers:**
- Fey M. Beleze, Ph.D. (Emerita)
- Max Dauenh Roper, B.L.S. (Emerita)

**Lecturers:**
- Julia J. Cooke, M.L.S. (Associate Dean) Cataloging and organization of materials
- Charlotte Nolan (S.O.E.) M.L.S. Field studies, cataloging, reference
- Grete Frue Cubie, Cert. in Library Science (Emerita)

**Programs**

For a description of the programs in Library and Information Studies, see page 80.

**Lower Division Courses**

1. Methods of Library Use. (2) Formerly Bb 1. Two 1-hour lectures per week. Students will learn how to use the UC 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) Berring

10. Computers and Information. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. A nonmathematical introduction to computer concepts, programming, information retrieval, and database systems. (3) M. Cooper

129. Survey of Children's Literature. (3) Formerly Bb 129. Two 1 1/2-hour lectures per week. Children's literature as a genre of literature. Its role in the lives of children. Historical perspective milestones and the current scene in publications. All types of books read by children will be included. (F, S, P) Weedman

125. Design and Analytical Bibliography. (2) Two 1-hour lectures per week. Prerequisites: 200, 210, or consent of instructor. Analytical bibliography as a method of research of the book as a physical object. The method of descriptive bibliography based upon Bowes. A critical survey of the state of analytical and descriptive bibliography. (S, P) Harlan

220. Systems Analysis in Information Services. (3) Formerly Bb 220. Two 1 1/2-hour lectures per week. The systems approach to decision making and policy analysis in libraries and information centers. The role of the systems analyst in library and information center management. (S, P) 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 bibliographical retrieval systems: comparative classification, indexing, thesaurus construction, design of purpose-specific retrieval systems through standardization, specification writing. (S, P) Larson

227. Information and Records Management Practice. (2) Two hours of lecture per week. The various components of professionally managed records and information systems, including records inventory and disposition techniques, vital records management, correspondence systems, micrographics and storage, reports management, personal privacy protection, and rights of public access to information. (S, P)

228. Office Information Systems. (2) Two 1/2-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, document-based information systems and end-user computing. Implementation strategy. (S, P) Ober

230. Introduction to Computing for Information Studies. (2) 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, S, P) W. Cooper

235. Data Processing for Librarians and Information Management. (3) Two 1/2-hour lectures and two hours laboratory per week. An introduction to computer programming with emphasis on algorithm development and structural programming techniques for solving library and information center data processing problems, using the PASCAL programming language. (F, S, P) Larson

236. Computer Manipulation of Bibliographic Data. (3) Two 1 1/2-hour lectures per week. Prerequisites: 235. 220 recommended but not required. Development of computer programs for manipulation of bibliographic records using the MARC monograph format. Computer file organization techniques for bibliographic data. (S, P) W. Cooper

237. Design and Implementation of Computer-Based Information Systems. (4) Six hours of lecture per week. Prerequisites: 235, 236. Class jointly develops functional specifications and design for an automated library subsystem, such as acquisitions, cataloging, and acquisitions. Class then writes and tests computer programs to implement system they design. (F, S, P) W. Cooper

*On leave, spring
Recalled to active service
Recipient of Distinguished Teaching Award
238. Use of Database Management Systems. (3) Two 1/2-hour lectures per week. Prerequisites: 230, 235, or equivalent, or consent of instructor. Analysis of computer programs (DBMS) for the organization, maintenance, and access to information. Discussion of relational, hierarchical, and network databases. Design and implementation of a database on several commercial DBMS. Selection and evaluation of DBMS. (F,SP) M. Cooper

239. Implementation of Bibliographic Database Systems. (3). Two 1/2-hour lectures per week. Prerequisites: 230, 235 or equivalent; or 238. Advanced group design and implementation of a bibliographic application utility under a database management system. M. Cooper

244. Information In Society. (3) Two 1/2-hour class lectures per week, plus 60 hours of on-site activity. 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 1-hour lectures and one hour of discussion per week. Prerequisites: 200. Exploration of bibliographic organization in specialized subject fields. Printed and online sources of bibliographic and biographical data; information analysis, evaluation, and synthesis. Studies of literature use. Information service problems and policies. (F,SP) Wilson

250P. Practicum in Information Services. (1) Must be taken concurrently. Two 1-hour class meetings per semester plus 60 hours of on-site activity. Prerequisites: Consent of Instructor; 200; 250 must be taken concurrently. Practicum. Sixty hours per semester of approved on-site activity in an agency providing reference service, plus 2-hour meetings to be arranged. (FSP) Cooke

251. Bibliography and Information Service: Health Sciences. (2) Formerly 251D. Four hours of lecture per week for 15 weeks. Prerequisites: 200. Search strategies, selection, and evaluation of information sources in health sciences. (FSP) Cooke

253. Bibliography and Information Studies: Law. (2) Formerly 251F. Four hours of lecture per week for 15 weeks. Prerequisites: 200. Search strategies, selection, and evaluation of information sources in law. (SP) Berring

257. Evaluation of Reference Services. (2) Ten 1-hour class meetings per semester plus 60 hours on-site activity in an agency providing reference service. Prerequisites: 200, 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. (FSP) Nolan

261. Information Services in Organizations. (2,3) Students who have taken 282, 284, or 263 will receive only 2 units of credit for 261. Two 1/2-hour lectures per week. General introduction to the provision of specialized library services and other information management activities in both private and public sectors: governmental agencies, non-profit organizations, and private corporations. Mission, problems, opportunities. Management function as a service institution: planning, organizing, staffing, budgeting, controlling. (F,SP) Weedman

262. Public Libraries. (2,3) Students who have taken 261, 262 or 263 will receive only 2 units for 262. Two 1/2-hour lectures per week. General introduction to public libraries: Functions and services, and relationships to the community. Management of public libraries: Planning, organizing, staffing, budgeting, controlling. (SP) Van House

263. College and University Libraries. (2,3) Formerly 263A. Students who have taken 261, 262, or 264 will receive only 2 units for 268. Three hours of lecture per week. General introduction to the organization and administration of college and university libraries and their role in the institution as a whole. Problems and practices with respect to governance, functions, collections, and building. Management functions as applicable: planning, organizing, staffing, budgeting, controlling. (SP) Buckland

264. Work with Children and Young Adults in School and Public Libraries. (2,3) Two 1/2-hour lectures per week. Systematic planning, implementation, management, and evaluation of multimedia 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 1/2-hour lectures per week. Historical backgrounds and developments of folklore, fantasy, and modern children's literature: their role in library progress. (SP) Weedman

267. 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 modern media center, evaluation of materials, the use of media in education, design of media centers, and some aspects of media technology. (F,SP) Weedman

268. 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) Weedman

272. Measurement and Evaluation of Library and Information Services. (3) Three hours of lecture per week. Topics in bibliography, information sciences, and statistics with applications to evaluation of library and information services. (SP) Weedman

274. Economics of Information. (3) Three hours of lecture per week. Prerequisites: Any of 220, 261, 262, 263, 284, or equivalent; or consent of instructor. Analysis of the role of information in the economy of the developed world: production and distribution of information, the role of information in the economy, and the role of information in the economy. Topical topics. Concepts of economics applied to the study of information resources. (F) Wilson

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. (SP) Braunstein

280. Development of the Book. (3) Three 1-hour lectures per week. Prerequisites: Consent of Instructor; 200. Technical aspects of the processes of publication; contemporary trends and problems. (F,SP) Harlan

290. Special Topics in Library and Information Studies. (1-3) Formerly 218, 259, and 279. Course may be repeated for credit with change in content. Two to six hours of lecture per week for 7/2 weeks or one to three credit hours. Prerequisites: (F) Consent of Instructor. Specific topics, credit may vary from section to section, year to year. (F,SP) Berring

295. Quantitative Social Science Research Methods in Library and Information Studies. (3) Three 1-hour lectures per week. The use of quantitative research methods to 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 candidates. (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 printing and libraries, librarianship, library education, and related fields. Specific topics vary from year to year. (F,SP) Berring

297. Field Study. (1-4) Course may be repeated for credit. Regular consultation with faculty supervisor. Prerequisites: Consent of instructor. Individual or group study of specific 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) Nolan

298. Directed Group Study. (1-3) Course may be repeated for credit. One to three hours of meeting per week. Group study of specific problems in library and information studies under faculty supervision. Group meetings with instructor. Reports required. (F,SP) Berring

299. Individual Study. (1-12) Course may be repeated for credit. Varies. Individual study in library and information studies under faculty supervision. (F,SP) Berring

Professional Courses

310. Teaching Assistant 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 during the academic year including class time. Dismissal, reading, preparation, and practical experience, under faculty supervision, in the problems and opportunities of teaching specific topics in library and information studies. The student will record the time spent on the transcript for learning experience even though this would not count toward a degree. (F,SP) Cooke

384. Special Practicum in School Libraries. (2) Six hours of practicum per week. Prerequisites: 200, 210, 264, 265, of which 264 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 terms of their special needs; communication; education, organizational, technical, and interpersonal considerations. Extensive analytical paper required. May satisfy the practicum requirement for the School Library Services Credential. (F,SP) Weedman

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 including class time. Individual research work under faculty direction. Group meetings with instructor. Group meetings with instructor. Reports required. May satisfy the practicum requirement for the School Library Services Credential. (F,SP) Weedman

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 degrees. 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
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. Strategic Management in the Public Sector. (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 Public and Nonprofit Management section of this catalog.

Linguistics

(College of Letters and Science)

Department Office: 2337 Dwinelle Hall, 642-2757
Chair: Paul Kay, Ph.D.
Professors:
Charles J. Fillmore, Ph.D. University of Michigan. Syntax, language semantics, phonology
Larry M. Hyman, Ph.D. University of California at Los Angeles. Phonology, African linguistics
Paul Kay, Ph.D. Harvard University. Syntax, semantics, pragmatics, variation
John J. Ohala, Ph.D. Indiana University. Syntax, semantics, cognitive linguistics
Murray B. Emeneau, Ph.D., L.H.D. (Emeritus) Yale University.
Madison S. Beeler, Ph.D. (Emeritus) Harvard University.
William S-Y Wang, Ph.D. University of Michigan. Biology of language, phonetics, phonology, language change
John H. Chafe, Ph.D. University of California at Los Angeles. Experiential phonology/phonetics
William Y. Wang, Ph.D. University of Michigan. Biology of language, phonetics, phonology, language change
Karl E. Zimmer, Ph.D. Columbia University. Word formation, Turkish
Madsen B. Beeler, Ph.D. (Emeritus) Harvard University.
Murray B. Emeneau, Ph.D., L.H.D. (Emeritus) Yale University.
Mary R. Haas, Ph.D., D.Lit. (Emeritus) Yale University.
Yaakov Matalon, Ph.D., L.H.D. (Emeritus) University of Berlin.

Associate Professors:
Jeanette M. Hinton, Ph.D. University of California at San Diego. American Indian languages, sociolinguistics, language change, language and music
Richard A. Rhodes, Ph.D. University of Michigan. American Indian languages, grammatical theory, phonology and lexicography

Assistant Professors:
Gary B. Holland, Ph.D. University of California at Berkeley. Indo-European Languages, historical linguistics, history of linguistics
Sam Mchombo, Ph.D. University of London. Syntax, African linguistic structure, Swahili
Eve Sweetser, Ph.D. University of California at Berkeley. Semantics, syntax, historical linguistics

The Major

The undergraduate major in linguistics introduces students to the traditions and techniques of research into the structure, functions, and histories of languages. Since the study of language draws from and contributes to many other fields of study, students choosing the linguistics major are strongly urged to acquire a more than superficial acquaintance with some related but independent field: anthropology, mathematics, computer science, philosophy, rhetoric, English literature, or the literature of a foreign language.

Requirements: Lower Division. By the end of the sophomore year, the student should take Linguistics 5.

Requirements: Upper Division. The major consists of a five-course core (Linguistics 100, 110, 115, 120A, and 130) which includes phonetics and phonology, syntax and semantics, morphology, and language history and comparison.

Four or five other courses totaling a minimum of 12 additional upper division units are added to the core through consultations between students and major advisers to complete the major's minimum degree requirements. Of these units, six must be selected from upper division and graduate level offerings within the Linguistics Department. The remaining six upper division units must be related to linguistics. A list of courses which have already been approved by the Department is available from the Linguistics Department office (2337 Dwinelle Hall). Many related other courses are in the catalog, but require the prior written consent of an undergraduate adviser to be counted in fulfillment of your Linguistics Department requirements.

Because the major varies greatly from student to student, each student is encouraged to plan a program of study with an undergraduate adviser and to see the adviser on a regular basis (at least once a semester).

Linguistics majors who have completed the core courses are encouraged to enroll in linguistics graduate courses whose prerequisites they satisfy.

Honors Program. With the approval of the major adviser, a student with a grade-point average of 3.3 or higher, both overall and in the major, may apply for admission to the honors program. This consists of two or more units of Linguistics H195 units per semester for at least two semesters. Under the direction of a faculty member, students carry out an approved program of independent study in which they attain a reasonable mastery of an appropriate linguistic topic. As evidence of each semester's work, they must submit an acceptable term paper summarizing critically the material they have covered.

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. The major should include 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 approved for the thesis, so Plan II requires 30 units. Both plans include at their culmination, normally at the end of the second year, a three-hour comprehensive examination. Required courses (or equivalence demonstrated by examination) for the Linguistics M.A. are Linguistics 200, 210, 211, 220, 230 plus any approved three-unit course in historical, comparative, or typological linguistics. Students are encouraged to supplement their reading in upper division 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 department office.

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 co-sponsoring university. Students in linguistics, at both the graduate and the undergraduate level, are strongly encouraged to take part in such linguistic institutes. These programs offer a wide range of courses, seminars, conferences, workshops, and lecture series, covering developments in the field and areas of interest which no single university can offer.

Lower Division Courses

1A-1B. Elementary Swahili. (4) Four 1-hour recitation sessions and one hour of laboratory per week. (F, SP)
2A-2B. Elementary Language Tutorial. (3) Course may be repeated for credit. To be arranged. Prerequisites: Requires special permission. Apply to Linguistics office. Specially designed tutorial for individuals or small groups needing instruction in an Asian language not normally offered on the Berkeley campus. (F, SP)

10A. Intermediate Swahili. (3) New course. Three 1-hour classes and one hour of lab per week. Prerequisites: 1B or equivalent. This course includes review and development of grammatical concepts taught in first year Swahil as well as further practice in speaking and writing. (F, SP)

10B. Intermediate Swahili. (3) New course. Three 1-hour classes and one hour of lab per week. Prerequisites: 1A or equivalent. Continuation of 1A. Emphasis on listening comprehension, pronunciation accuracy, and speaking fluency by means of oral expression practice. (SP)

11. Writing Systems. (3) Two 1-hour meetings per week. Examines different writing systems in terms of their historical origin and their cognitive properties. Enrollment limited to 15 students.

16. The English Vocabulary. (3) Three 1-hour lectures per week. The sources and the resources of the English language are examined. The study of etymology and pronunciation of complex words in English. Native and borrowed word-formational processes. The development of technical terminologies. Etymology and semantic change. (SP)

51. The Politics of Language. (3) Three 1-hour lectures per week. The political uses of language. Dialects, prestige forms, bureaucratese, male and female language, politeness and indirectness, language planning, bilingualism, language attitudes. Enrollment limited to 15 students. (SP)

71. Development of the Chinese Language. (3) Three 1-hour lectures per week. The sources and the resources of the Chinese language are examined. The study of etymology and pronunciation of complex words in English. Native and borrowed word-formational processes. The development of technical terminologies. Etymology and semantic change. (SP)

54. The English Vocabulary. (3) Three 1-hour lectures per week. The basic statistics of English. Dialects, prestige forms, bureaucratese, male and female language, politeness and indirectness, language planning, bilingualism, language attitudes. Enrollment limited to 15 students. (SP)

90A-90B. Lower Division Seminar. (2;2) Course may be repeated for credit. One 2-hour or two 1-hour meetings per week. A seminar style class for freshmen and sophomores.

98. Directed Group Study. (1-5) New course. Course may be repeated for credit. Must be taken on a passed/ not passed basis. Group study of a topic not included in the regular department curriculum. (F)

100. Introduction to Linguistic Science. (4) Three 1-hour lectures and one hour of section per week. Prerequisites: 5 or concurrent enrollment. An introduction to the nature and origin of language and language change. Practice in phonological and morphological analysis; basic steps in grammatical parsing and textual analysis. (F, SP)

110. Introduction to Phonetics and Phonology. (4) Three 1-hour lectures and one hour of section per week. Prerequisites: 100 or concurrent enrollment. Description,
transcription, and analysis of human speech sounds in their physiological and acoustic aspects, especially as this aids our understanding of sound change and the psychological mechanisms serving speech. (F) Ohala

111. Phonological Analysis. (3) Three 1-hour lectures per week. Prerequisites: 110. Research methods in phonetics and phonology. (SP) Hyman

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) Hyman

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) Rhodes

120A. Introduction to Syntax and Semantics I. (4) Three 1-hour lectures and one 1-hour of section per week. Prerequisites: 100. An introduction to the study of meaning and sentence structure, beginning with transformational grammar and extending to current approaches. (F) & 120B. Introduction to Syntax and Semantics II. (4) Three 1-hour lectures and one 1-hour of section per week. Prerequisite: Linguistics 120A. Intermediate syntax. Covers some topics covered in 120A in greater depth, including new topics. Emphasizes the differences between the traditional transformation approach and the newer approach of the Government and Binding theory, in which transformations play a much smaller role. Coverage while constraints exterior to the transformational system become the central focus of the theory. (SP) Kay

121. Logical Semantics. (3) Three 1-hour lectures per week. Prerequisites: 120A. Basic logic for linguists. Basic speech act theory and pragmatics. Issues in compositional semantics. (SP) Fillmore

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 subsystems 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. Prerequisites: 120A. The relation between language use and human actions. Some topics to be emphasized are conversational logic, speech act theory, personal social role, psychological perception of oneself and language, variation in language use. (SP) R. Lakoff

124. Discourse. (3) Two 1 1/2-hour meetings per week. Prerequisites: 5 or 100. Language beyond the sentence. Global and local properties of connected speech and writing. Narrative structures, new and old information, subjects and topics, foregrounding and backgrounding, etc. (SP) M. Harris

130. Comparative and Historical Linguistics. (3) Three 1-hour lectures and one hour of discussion per week. Prerequisites: 113. Methods of reconstruction. Types and explanations of language change. Dialectology. The establishment of language relationships and subgroupings. (SP) Sweetser

131. Indo-European Comparative Linguistics. (4) Three 1-hour lectures per week. Prerequisites: 130. The Indo-European languages, their relationship to the reconstruction of their common ancestor. (F) Holland

140. Introduction to Field Methods. (3) Three 1-hour lectures per week. Prerequisites: 110 and 115. Training in discrimination and transcription of the sounds of a particular language. Methods and practice in collecting and processing data from a particular language. (SP) Rhodes

150. Sociolinguistics. (3) Two 1 1/2-hour lectures per week. Prerequisites: 100. The principles and methods of sociolinguistics. Topics to be covered include linguistic pragmatics, variation theory, social and regional sociolinguistics, and oral styles. (F) & 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 1/2-hour lectures per week. Prerequisites: 5. The relation between the form of communication and its pragmatic and sociolinguistic effects. Topics include: conversation; misunderstanding, pronominal speech and its dialectal and bilingualism; attitudes towards linguistic variation; political and advertising language; language in the courtroom, the classroom, and psychotherapy.

158. The Use of Computers in Linguistics. (3) Three 1-hour lectures and one 1-hour lab per week. Prerequisites: 100. Topics will be chosen from the following: computer-aided instruction of foreign languages, simulating language change by programmed rules, estimating linguistic relationship using methods of bio- computer science, dealing with large amounts of language data, digitizing and manipulating speech signals; depending on resources available, emphasis will be on hands-on experience.

160. Biological Foundations of Language. (3) Three 1-hour lectures per week. Prerequisites: 120A. The dependence of language on biological attributes, considered by comparison of human and nonhuman communication. The physiological control of speech production and reception. Hereditary and environmental factors in language development. Language in the context of overall behavior.

170. The Structure of English. (3) Three 1-hour lectures per week. Prerequisites: 120A. Examination of selected patterns of contemporary English syntax, semantics, and pragmatics, from a functional perspective.

175. American Indian Languages. (3) Three 1-hour lectures per week. Introduction to the native languages of the Americas. (SP) Rhodes

180. Introduction to Cognitive Linguistics. (3) Three 1-hour lectures per week. Prerequisite: Consent of instructor. An introductory survey of topics used in cognitive linguistics. Topics include: schema theory, frame semantics, and the general theory of cognitive models, including metaphor, metonymy and image-schemas; prototype theory; some non-Western conceptual systems; the theory of mental spaces. (SP) G. Lakoff

181. Lexical Semantics. (3) Three 1-hour lectures per week. Prerequisites: 120A. Logical exercises in the description of word meanings, the organization of lexical systems, the lexicalization of particular semantic domains (kinship, color, etc.), and contrastive lexicology: lexicalization pattern differences across language families. (F) Sweetser

185. Metaphor. (3) Two 1 1/2-hour meetings per week. Prerequisites: Lower division students must have permission of instructor: The role of metaphor in structuring our everyday thought, a conceptual system, and world view. Topics include cross-cultural similarities, literary metaphor, sound symbolism, and related theoretical issues in philosophy, linguistics, psychology and anthropology. (F) & 186. Upper Division Seminar. (2-3) Course may be repeated for credit. Prerequisites: Core courses (100, 110, 115, 120, 130). Seminar-style class for juniors and seniors. (F) Staff

188. Directed Group 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) 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) Staff

200. Graduate Proseminar in Linguistics I. (3) Two 1 1/2-hour meetings per week. Prerequisites: Graduate standing. Required of graduate students during first year in program. A close reading of selected works in the structuralist tradition. (F) Ohala

201. Graduate Proseminar in Linguistics II. (3) Two 1 1/2-hour meetings per week. Prerequisites: 115 and 120A. An investigation of selected problems in the field of generative linguistics. (SP) Zimmer

210. 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 they bear on the analysis of selected problems in phonological description and analysis.

212. Language and Music. (3) Course may be repeated for credit. Two 1-hour meetings per week. Prerequisites: 115 and 200. An investigation of selected problems in the realm of language and music.

215. Advanced Morphology. (3) Course may be repeated for credit. Two 1 1/2-hour meetings per week. Prerequisites: 115 and 200. Examination of complex morphological systems. Issues in the theory of word morphology. (SP) Zmmer

216. Word Formation. (3) Two 1 1/2-hour meetings per week. Prerequisites: 115 and 120A. An investigation of selected problems in derivation and compounding and their relevance to grammatical theory.

220. Syntax and Semantics I. (3) Course may be repeated for credit. Two 1 1/2-hour meetings per week. Prerequisites: Graduating standing. Contemporary issues in syntax and semantics. (F) & 221. Syntax and Semantics II. (3) Course may be repeated for credit. Two 1 1/2-hour meetings per week. Prerequisites: Contemporary issues in syntax and semantics. Continuation of 220. (SP) Mchomto

230. Historical Linguistics. (2) Two 1-hour lectures per week. Prerequisite: Consent of instructor. The scholarly tradition of historical and comparative linguistics. Methods of reconstruction. (SP) Holland

231. Historical Semantics. (2) Two 1-hour lectures per week. Prerequisites: 200. Synchronic variation and diachronic change in the realm of meaning.

235. History of Linguistics. (3) Course may be repeated for credit. Two 1-hour lectures per week. Prerequisites: 200. This course covers, grosso modo, the century and a half between 1775 and 1925, through concentration on a limited number of distinguished personalities whose writings are, at least in part, of continued relevance today: Bopp, Rask, Humboldt, Schleicher, Whitney, Breay, Saussure, and Jespersen. (F) Holland

236. Major Schools of Structural Linguistics. (3) Two 1-hour meetings per week. Prerequisites: 200. The linguistic theories of Saussure, the Prague School, Bloomfield, and American structuralism.

240. Field Methods I. (3) Credit and grade to be awarded upon completion of the sequence. Two 2-hour sessions per week. Prerequisites: 210, 221, and 115. Training in elicitation and analysis of linguistic data in a simulated field setting. The same language is used throughout the year. (F) 241. Field Methods II. (3) Credit and grade to be awarded upon completion of the sequence. Two 2-hour sessions per week. Prerequisites: 240. Training in elicitation and analysis of linguistic data in a simulated field setting. The same language is used throughout the year. Continuation of 240. (SP) Hinton, Matsolf

244. Micro-Computational Text Analysis. (3) Two 1-hour lectures per week. Prerequisites: 210 or equivalent. This course is designed to teach the skills and theory required for analysis of linguistic textual materials with the aid of a microcomputer. Students will be trained in the use of a number of specialized programs to handle linguistic fonts, multilingual interface text processing, and concordance and index generation for text analysis. Conceptual models of text and data structures, linguistic architecture, and structural mapping provide a unified framework for understanding the process of getting from text to analysis on a microcomputer. (F) Whistler

270. Structure of a Particular Language. (3) Course may be repeated for credit. Two 1-hour meetings per week. Prerequisites: 210, 221. An in-depth study of the language structure of a particular language. The language investigated changes from year to year. (F) M. Matsolf, McChomto; (SP) Zimmer
271. Linguistics of Southeast Asia. (3) Course may be repeated for credit. Two 1 1/2-hour meetings per week. Prerequisites: 230. Introduction to the major language families of mainland Southeast Asia (Mon-Khmer, Tai, Hmong-Mien, Tibeto-Burman) with special emphasis on areal typological features.

272. Tibeto-Burman Linguistics. (3) Two 1 1/2-hour lectures per week. Prerequisites: 230. An examination of the phonological, grammatical, and semantic characteristics of the various sub-groups of Tibeto-Burman: Lolo-Burmese, Karen, Kachin, Kanuru, and Himalayish. Reconstruction of Tibeto-Burman. (SP) Matsusoff

273. Theoretical Topics in Chinese Linguistics. (3) Course may be repeated for credit. Two 1 1/2-hour lectures per week. Prerequisites: Consent of Instructor. The emphasis in this course will be theoretical topics in linguistics as elucidated by material from Chinese.

275. Survey of American Indian Languages. (3) Course may be repeated for credit. Two 1 1/2-hour lectures per week. Prerequisites: 210 and 230. Reading and discussion of classic works on American Indian languages, and detailed examination of one North American language family. (SP) Hinton

280. Topics in Linguistic Theory. (3) Course may be repeated for credit. Seminars or special lecture courses. Staff

290. Syntax. (3) Prerequisites: Consent of Instructor. The emphasis in this course will be theoretical topics in linguistics as elucidated by material from Chinese.

290B. Semantics. (3) Prerequisites: Consent of Instructor.

290C. Morphology. (3) Prerequisites: Consent of Instructor.

290D. Pragmatics. (3) Prerequisites: Consent of Instructor.

290E. Phonology. (3) Prerequisites: Consent of Instructor.

290F. Diachronic Linguistics. (3) Prerequisites: Consent of Instructor.

290G. Language Variation. (3) Prerequisites: Consent of instructor.

290H. Linguistic Reconstruction. (3) Prerequisites: Consent of Instructor.

290I. Typology and Language Universals. (3) Prerequisites: Consent of instructor.

290J. Lexicology. (3) Prerequisites: Consent of Instructor.

290K. Etymology. (3) Prerequisites: Consent of Instructor.

290L. Special Linguistic Topics. (3) Prerequisites: Consent of instructor.

298. Special Group Study. (2-8) Course may be repeated for credit. To be arranged. Prerequisites: One full year of graduate study at Berkeley or consent of graduate adviser. (F,SP)

Staff

299. Special Individual Study. (2-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. To be arranged. (F,SP) Staff

601. Individual Study for Master’s Students. (1-4) Course may be repeated for credit. Units may not be used for either unit or residency requirements for a master’s degree. Must be taken on a satisfactory/unsatisfactory basis. To be arranged. Individual study for the comprehensive or language requirements in consultation with the field adviser. (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. To be arranged. Prerequisites: One full year of graduate work at Berkeley or consent of graduate adviser. 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 residency requirements for the doctoral degree. (F,SP) Staff

Professional Courses

301. Teaching Practice and Instruction. (2-4) Must be taken on a satisfactory/unsatisfactory basis. To be arranged. Course may be repeated for credit, but credit for the instructional portion is to be given only once for each individual course taught by a graduate student instructor. For graduate students currently serving as graduate student instructors in the department’s undergraduate courses, two units of credit are given for the teaching experience each time a student serving as graduate student instructor enrolls in this course; two more units are given for teaching instruction, thus taking the form of weekly consultations with graduate instructors and their graduate student instructor. (F,SP)

302. Analysis of Linguistic Problem Sets. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour session per week. Prerequisites: 110, 120 and 115 or 122 or consent of instructor. Analysis and construction of data sets in phonology, syntax, semantics, and historical/comparative linguistics, with respect to their usefulness in teaching beginning linguistics. (F,SP)

Interdepartmental Studies Courses

Graduate Courses

IDS 236. Cognitive Science Research Discussion. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1 1/2-hour meeting per week. Prerequisites: Student must be the Cognitive Science R.A. for one of the professors associated with the Cognitive Science Program. The students will interact with the cognitive science-relevant research that they are carrying on as R.A.s with the aim of broadening both their experience and the scope of the research. The group, in addition, will discuss relevant selected readings. (F,SP) Staff

IDS 237A-237B. Cognitive Science Seminar. (1;1) Course may be repeated for credit. Must be taken on a pass/no pass or satisfactory/unsatisfactory basis. One 1 1/2-hour lecture and one 1 1/2-hour discussion per week. Prerequisites: Consent of Instructor. Weekly presentations by local and visiting researchers on a range of topics in cognitive science, with ensuing discussion. Sponsoring departments: ECES, Linguistics, Philosophy, and Psychology. (F,SP) Staff

Logic and the Methodology of Science

(College of Letters and Science)

Group Office: 731 Evans Hall, 642-2065
Chair: Ralph McKenzie, Ph.D.
Professors:
Ernest W. Adams, Ph.D. (Philosophy). Philosophy of science, philosophical logic.
Manuel Blum, Ph.D. (Electrical Engineering and Computer Sciences). Recursive functions, computational complexity.
William Craig, Ph.D. (Philosophy). Foundations of logic, algebraic logic.
Alan D. Costa, Ph.D. (Philosophy). Ancient Greek philosophy, logical semantics.
Donald Davidson, Ph.D. (Philosophy). Philosophy of language, theory of action, philosophy of mind.
Leo A. Harrington, Ph.D. (Mathematics). Recursion theory, model theory, set theory.
Paul Key (Linguistics). Semantics, pragmatics, syntax, and semantics.

Graduate Adviser: Charles Chihara, Ph.D.

The Group in Logic and the Methodology of Science offers an interdisciplinary program of study and research leading to the Ph.D. degree. Although the Department of Mathematics and the Department of Philosophy each offers a Ph.D. degree toward which a student may write a dissertation in logic, the interdisciplinary program is designed for students with a broad interest in logic and the methodology of science who wish to explore the subject in both its mathematical and philosophical aspects. Methodology of science is here understood to mean metascience, the study of the methods of the sciences by logical and mathematical means. The program 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 permitted 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 for one of the professors as Graduate Adviser. Students will interchange on the cognitive science-related reading list, entitled the "Reading List". Students who plan to be R.A.'s for one of the professors as Graduate Adviser are expected to attend all course meetings.

Other Departments with Related Programs

Mathematics and Philosophy.

J. Frits Staal, Ph.D. (Philosophy, South and Southeast Asian Studies). Linguistics, philosophy of language.

Revised 1989-90 2
On leave, spring 3
On leave, fall 4
Recipient of Distinguished Teaching Award
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 expanding applications. The program demands creativity and the ability to solve problems and communicate effectively.

Course topics include computer-aided manufacturing, 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 4 units must be in English composition (cannot be taken pass/fail) and 3 units must be taken in upper division courses. A minimum of 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, 28, 465; 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 or Industrial Engineering and Operations Research 180; Statistics 134. Electives may include 2 courses from each of the following two groups: Group I: ME 110, 122, 128, 130, 133, 134, 135; Group II: Industrial Engineering 115, 131, 140, 162, 164, 170. If 162 is elected, Industrial Engineering 160 should be substituted for Engineering 102.

Mass Communications
(College of Letters and Science)

Group Major Office: Undergraduate Interdisciplinary Studies (Division of Undergraduate Studies), 301 Campbell Hall, 642-2628

Faculty Advisory Committee: Todd Gitlin, Head Advisor (Sociology); Bertrand Augst (Comparative Literature); Jack Citrin (Political Science); W. Russell Ellis (Architecture); Dr. Donald Hansen (Education); Karl Jackson (Political Science); Thomas Leonard (Journalism); Leo Lowenthal (Sociology); John G. Myers (Business Administration); Percy Tannenbaum (Public Policy); Harold Wilenski (Political Science); Raymond Wofinger (Political Science).

Group Major in Mass Communications

The group major in mass communications is administered by Undergraduate Interdisciplinary Studies. 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 7B, 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 102; Mass Communications 103.
B. One of the following methods courses:
- Anthropology 190A; Political Science 5; Political Science 132A; Political Science 132B; Psychology 101; Psychology 102; Sociology 5; Sociology 105.
C. Five courses (totaling at least 18 units) from the following list: Anthropology 144, Anthropology 149, Anthropology 158B, Anthropology 165, Anthropology 166, Business Administration 160, Business Administration 165, English 173, English 176, Journalism 140, Journalism 141, Journalism 163, Journalism 165, Journalism 165, Linguistics 150, Mass Communications 127A or 127B, Political Science 161, Political Science 162, Political Science 164A, Political Science 164B, Political Science 168A, Political Science 168B, Psychology 123, Psychology 124, Psychology 160, Psychology 162, Psychology 168, Public Policy 163, Public Policy 169, Public Policy 176, Sociology 110, Sociology 140, Sociology 150, Sociology 156, 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, a student must have attained at least a 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 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. Discussion of the functions, and control of mass communication institutions in the United States, and to media content and effects. (F) Hansen

Upper Division Courses

101. The Structure of Mass Communications. (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 or permission of the instructor. Introduction to the 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 contracts, 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 in 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. Discussion 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. (SP) Miner

197B. Social Issues in Publishing. (4) One 3-hour seminar and 10 to 12 hours of field laboratory per week. 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 manuals; whiteness; western publishing; publishing profession versus the book industry; first amendment/publishers' rights and responsibilities. Field placements include: reference agencies; bookstores; critical reviews; publishers. (F) Miner

198. Directed Group Study for Advanced Undergraduate. (1-4) Course may be repeated for credit. Must be taken on a pass/fail basis. Prerequisites: Regulations set by College of Letters and Science. Students 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 Undergraduate. (1-4) Course may be repeated for credit. Must be taken on a pass/fail 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 G.W. Cook, Ph.D. (Donald H. Maughn Professor in Mineral Engineering) University of Wisconsin: Mining science and technology
- Joseph A. Pask, Ph.D. (Emeritus)
- Paul A. Witherspoon, Ph.D. (Emeritus)
- Marshal F. Merriam, Ph.D. Carnegie Institute of Technology.
- T.N. Narasimham, 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 uses particularly in advanced applications such as solid-state electronics, atomic energy, and aerospace. 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 selection of courses in ceramic engineering, extractive metallurgy, or physical metallurgy.

**Ceramic Engineering.** The ceramic engineer studies the physical and chemical properties of the raw materials and products of the ceramic industry and fundamentals of ceramic processing. Ceramics are inorganic nonmetals which are produced, either in their pure form or in combination, for use in high-temperature environments. Such materials include rocket nozzles, electrical insulators, precision molds for metallurgical processing and utilizing metals and alloys. The field has two major areas of specialization.

**Electronic Materials.** This group of materials is defined by its applications. Semiconductors, metals, and ceramics are used today to form highly complex systems, such as integrated electronic circuits, optoelectronic devices, and magnetic and optical mass storage media. In intimate contact, the various materials, with precisely controlled properties, perform numerous functions, including the acquisition, processing, transmission, storage, and display of information. Electronic materials research confines the fundamental principles of solid state physics and chemistry, and of electronic and chemical engineering, and of materials science.

**Metallurgy.** Metallurgy is the science and art of processing and utilizing metals and alloys. The field has two major areas of specialization.

**Extrative Metallurgy.** Studies of the scientific and engineering principles utilized in recovering metals from their ores and in refining them to the desired purity. The subject includes mineral processing as well as smelting, leaching, electrochemical methods of extracting and refining metals, and crushing of minerals, 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 properties of materials for advanced applications is a broad field within which primary emphasis can be directed toward fundamental understanding, 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 extraction and processing of raw materials upon which the whole fabric of modern civilization depends. This most fundamental of all branches of engineering encompasses exploration for geological zones of mineral enrichment, the evaluation and economic mining of those minerals, and the processes required to convert them into salable commodities. The four-year undergraduate program leading to the B.S. degree provides a foundation of knowledge and a professional background 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 build upon the background in the basic sciences, applied to more advanced mineral and metallurgical subjects, in that sufficient technical electives to allow further inquiry into the various branches of the profession. Seniors will be offered a choice of studies in mineral exploration, mineral processing, mining in the underground, or mineral processing/extrative metallurgy.

**Materials Science and Engineering**

Students in all programs in materials science and engineering complete a total of 120 units, including 18 units in humanities and social studies.

**Lower Division.** Required: Mathematics 1A-1B, 50A-50B; Chemistry 1A-1B; Physics 7A-7B; 7C.

**Upper Division.** Required: Materials Science and Engineering 100, 101, 102, 103, 104, 111, 112, 113, 130, elective from the 120 series.** Math elective,** and 27 units of electives.

**Graduate Study in Materials Science and Engineering**

Qualified holders 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, optical spectrospecies, electron paramagnetic resonance, electrical transport, micro-probe X-ray emission spectroscopy and nuclear magnetic resonance, precision calorimetry and cryogenic and high temperature mechanical testing are used for fundamental characterization of materials. Research topics include study of the mechanical, chemical, thermal, magnetic, and magnetic properties of ceramics, metals and semiconductors 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 metallurgical, mineral engineering, materials science, chemical engineering, or chemistry would be ideal candidates for this program of interest. A number of introductory and advanced level courses on the processes involved in processing ores into useful materials and processing of mineral fuels are taught. Research courses and theses are assigned, which eventually result in the production or use, to high-temperature environments. Such materials include rocket nozzles, electrical insulators, precision molds for metallurgical processing and utilizing metals and alloys. The field has two major areas of specialization.

**Extrative Metallurgy.** Studies of the scientific and engineering principles utilized in recovering metals from their ores and in refining them to the desired purity. The subject includes mineral processing as well as smelting, leaching, electrochemical methods of extracting and refining metals, and crushing of minerals, 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 properties of materials for advanced applications is a broad field within which primary emphasis can be directed toward fundamental understanding, 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 extraction and processing of raw materials upon which the whole fabric of modern civilization depends. This most fundamental of all branches of engineering encompasses exploration for geological zones of mineral enrichment, the evaluation and economic mining of those minerals, and the processes required to convert them into salable commodities. The four-year undergraduate program leading to the B.S. degree provides a foundation of knowledge and a professional background 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 build upon the background in the basic sciences, applied to more advanced mineral and metallurgical subjects, in that sufficient technical electives to allow further inquiry into the various branches of the profession. Seniors will be offered a choice of studies in mineral exploration, mineral processing, mining in the underground, or mineral processing/extrative metallurgy.

**Materials Science and Engineering**

Students in all programs in materials science and engineering complete a total of 120 units, including 18 units in humanities and social studies.

**Lower Division.** Required: Mathematics 1A-1B, 50A-50B; Chemistry 1A-1B; Physics 7A-7B; 7C.

**Upper Division.** Required: Materials Science and Engineering 100, 101, 102, 103, 104, 111, 112, 113, 130, elective from the 120 series.** Math elective,** and 27 units of electives.

**Mineral Engineering Program**

Students in the Mineral Engineering Program must complete a total of 120 units, including 18 units in humanities and social studies.

**Lower Division.** Required: Mathematics 1A-1B, 50A-50B; Chemistry 1A-1B; Physics 7A-7B; 7C.

**Upper Division.** Required: Mineral Engineering 101, 105, 106, 120, 150, 160, 162, 190, 191, 192, Mechanical Engineering 104, 105, Civil Engineering 100, 187 and 43 units of electives.

1 The program includes 43 units of elective courses, including the College requirement of 18 units in humanities and social studies and 18 units in technical electives. Courses selected to satisfy the technical elective requirement are chosen within the student's individual educational objectives. A minimum of three courses, selected in agreement with the undergraduate adviser, should constitute an integrated program in the major fields of physics, chemistry, or engineering. The College of Engineering requires a total of 18 units of approved humanities and social studies courses, of which 6 units must be upper division; a minimum of two courses in a single department, at least one course in upper division. Three units must be Earned Composition for a letter grade.

2 One upper division math course and one course in the Mat. 120 series are required. Course selection is based on individual interests. Additional math and 120 series courses may be taken to fulfill the 25 unit technical elective requirement.

3 The program includes 54 units of elective courses, 36 of which must be taken in specific technical areas. Electives should be selected to satisfy the college requirement of 18 units in humanities and social studies (see Undergraduate Study) and to meet individual educational objectives.
Graduate Study in Mining Engineering

The graduate courses in Mining Engineering encompass advanced studies of mining methods for both coal and non-coal mines. Specialist courses are offered in a number of areas. Mineral economics and the financial position of the U.S. within the world trade as well as the financial control of a mining enterprise. Courses in rock mechanics utilize continuum mechanics to study the design and stability of mining excavations. Laws of comminution are applied to drilling, underground mining, and blasting in courses on rock fragmentation. Mine environmental engineering includes the mechanics and thermodynamics of mine ventilation systems in addition to problems of mine gases, dust, heat, mine disasters and surface environmental impact. Fluid flow through porous media and geothermal systems are studied through analytical and numerical methods in the courses in geohydrology.

Graduate Study in Engineering Geoscience

This program is directed toward graduate education and research in applied geophysics. The course of study leads to the M.S., Ph.D., and D.Eng. degrees and is designed for students with undergraduate degrees in geology, engineering geology, physics or mathematics. An M.S. program is available for persons currently in industry or government who wish to undertake graduate work in the geosciences. The program currently stresses study in mineral and oil exploration, engineering seismology, and applications of geophysical techniques in geological engineering and mapping, ocean engineering, and groundwater hydrology.

Through the cooperation of the Department of Geology and Geophysics, students are encouraged to take courses in that department to complete requirements for the major in Engineering Geoscience.

Materials Science and Engineering

Upper Division Courses

100. Field Trips. (1) One 4-hour field trip per week. Prerequisites: Junior standing in materials science or consent of instructor. Visits to factories and industrial laboratories or companies in ceramic, metallurgical, or electronic products, with emphasis on understanding the materials aspects. Lectures by engineers and managers from materials industries. Written trip reports. (SP) Merriman


102. Bonding, Crystallography, and Crystal Defects. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: E 45. Bonding in solids; classification of metals, semiconductors, and insulators; crystals; point, line, and planar defects in crystals; examples of crystallographic and defect analysis in ceramics and metals; relationship to physical and mechanical properties. (F) Gronsell

103. Phase Transformations and Kinetics. (3) Three 1-hour lectures per week. Prerequisites: 101 and 102. The nature, mechanisms and kinetics of phase transformations and microstructural changes in the solid state. Atomic and electronic theories of phase transformations; the nucleation and growth of new matrix or precipitate phases. Martensitic transformations, spinodal decomposition. The use of phase transformations to control microstructure. (SP)

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, electron, and X-ray methods for bulk and surface analysis. Measurement of mechanical and physical properties. Project laboratory focusing on mechanical, chemical, electrical, and optical properties of materials, and materials characterization. Field trips. (F) Staff

111. Electrical and Magnetic Properties of Materials. (3) Two 1-hour lectures and one hour of discussion per week. Prerequisites: Physics 7A-7B-7C or Physics 7A-7B and consent of instructor. Understanding of electrical and magnetic properties of metals, semiconductors, and insulators on the basis of physical principles. Control of the properties by processing. Materials for lasers and optical devices. 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 climb, dislocation reactions and hardening, role of defects and microscopic aspects of fracture, fatigue, and environmentally-influenced failure using fracture mechanics. Analysis of engineering failures. (F) Ritchie

120. Materials Production. (3) Two 1-hour lectures per week. Significance of materials. Occurrence of raw materials. Scientific and engineering principles related 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 to establish microstructures which impart desired 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 power-fluid suspensions, forming methods, drying, sintering and grain growth. Relation of processing steps to microstructure development. (F) Glasser

124. Glass and Ceramic Materials (3). Three hours of lecture per week. Prerequisites: 101 and E 45. Introduction to noncrystalline ceramics, conditions for glass formation, atomic structure of glasses, phase separation mechanisms. Mechanical properties of glass, strengthening mechanisms. Controlled crystallization of glasses, preparation of crystalline ceramics. Mechanical behavior of ceramic materials relevant to structural applications. Ceramics for optical, magnetic, and electronic applications with emphasis on microstructure-property relationships. (F) Glasser

130. Materials Engineering. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 111, 112, and Engineering 45. Case study courses concerned with materials development, materials selection, and failure analysis; examples relate to mechanical properties, electrical properties, and corrosion. (SP) Staff

148. Petroleum Engineering I. (3) Formerly Mech.Eng. 148. Three hours of lecture per week. Prerequisites: Senior standing in engineering. Development of oil and gas producing properties to maximize recovery; well drilling mechanics, subsurface evaluation, subsurface flow behavior. (F) Staff

198. Directed Group Studies for Advanced Undergraduates. (1-4) Must be taken on a passed/not passed 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 in consultation with a departmental advisor or individual conferences. Prerequisites: Consent of Instructor and major advisor. Supervised independent study. Please see pages 87 and 88 of this catalog for description and prerequisites. (F,SP) Staff

Graduate Courses

201A-201B. Thermodynamics and Phase Transformations in Solids. (4) Four hours of lecture per week. Prerequisites: 101, 102 or equivalent. 201A is a prerequisite for 201B. The laws of thermodynamics and the 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 relations. 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, lines, planes. Bravais lattices, direct and reciprocal lattices, and space groups; atomic structure; bonding in molecules; bonding in solids; ionic (Pauling rules), covalent, metallic bonding; structure of elements, compounds, glasses, ceramics, and polymers. (SP) Thompson


204. Theory of Electron Microscopy and X-Ray Diffraction. (3) Two 1-hour lectures per week. Prerequisites: 102, 103 or equivalent. Basic principles of techniques used in the characterization of engineering materials by electron microscopy, diffraction, and spectroscopy; 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 defects. 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. Property properties of solid state materials are determined by defects. This course covers the theory 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

210. Materials Chemistry. (3) New course. Course may be repeated for credit. Three hours of lecture per week. Prerequisites: MSE 101 or equivalent. Thermodynamics and kinetics of solid state reactions; stabilities of inorganic solids and alloys; effects of surfaces, interfaces, temperature, and temperature gradients on compositions and properties. (SP) Staff

212. Deformation, Fracture and Fatigue. (4) Prerequisites: 113 or equivalent. Four hours of lecture per week. Mechanics of elastic and inelastic (including rate dependent) constitutive behavior. Macro- and microstructural aspects of failure by fatigue, creep, fatigue, and environmentally-influenced failure. Fracture mechanics, fracture statistics of brittle materials. (SP) Ritchie

213. Environmental Effects on Materials Properties and Behavior. (3) Two 1-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; hydronium embrittlement; liquid metal embrittlement; corrosion fatigue; testing methods. (SP) Staff
221. Metals Processing. (3) Three hours of lecture per week. Prerequisites: MSE 217. Treatment of crystal defects and fracture mechanisms in the processing of metals and the perspective that these involve the manipulation of phase transformations and defects interactions to establish desirable combinations of ductility, strength, and toughness. Study of deformation mechanisms, surface characteristics, and mechanical properties. Use of computer simulation, surface finishing, and precipitation and defect type and distribution. (SP) Staff

222. Powder Processing and Sintering. (3) Three hours of lecture per week. Prerequisites: MSE 101 or equivalent. Introduction to powder processing, synthesis, and densification mechanisms, microstructural evolution, relationships to forming operations, grain boundary migration, and growth. (F) Davis

223. Semiconductor Materials. (3) Three hours of lecture per week. Prerequisites: Physics 7C or consent of instructor. Semiconductors, 1D effects, quantum confinement and crystal growth techniques. Doping, radiation damage, and annealing. Semiconductor interactions and reactions. Interaction between defects and impurities during processing of devices. Theory of electronic and optical methods for analysis of semiconductors. (F) Haller

231. Advanced Electron Microscopy. (3) Three hours of lecture per week. Prerequisites: 204 or consent of instructor. Microscopy, imaging techniques and electron microscopy of materials, including high voltage systems, microprocessor control, contrast transfer functions, optical diffractometer methods, STEM, reflection electron microscopy, atomic resolution, microtomes, and computer methods for image simulation and reconstruction. (SP) Gronsky


241. Electron Microscopy Laboratory. (2) Six hours of laboratory per week. Prerequisites: 204 (may be taken concurrently). Basic techniques and operations of transmission, and scanning, electron microscopy; x-ray microanalysis, energy loss spectroscopy; specimen preparation, examination of data; individual projects in materials science. (SP) Staff

242. Electrical, Optical, and Ion Beam Techniques. (2) Six hours of laboratory per week. Prerequisites: 204 or equivalent. Advanced electrical, magnetic, and optical characteristics of materials including Hall effect, capacitance, voltage methods, electron paramagnetic resonance, conductivity and photoconductivity, and optical absorption 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 in single and mixed atmosphere and functions and effects of oxides and sulfides 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

290E. Electromagnetic Methods in Applied Geophysics. (2) Lecture—2 hour laboratory per week. Prerequisites: Physics 110A-110B, and 232 or equivalent. Methods for numerical solutions of the electromagnetic diffusion equation in conducting media. Specifically, the course includes finite-difference, finite-element, and integral equation algorithms for time and frequency domain solutions in 2 and 3 dimensions. Assignments include computer exercises. (F) Staff

290M. Special Problems in Materials Science. (3) Three hours of lecture per week. Prerequisites: 214A-218 or consent of instructor. Selected topics in the thermodynamic, kinetic or phase transformation behavior of metallic materials. Topics will generally be selected based on student interest in MSE 214A-218. The course provides an opportunity to explore subjects of particular interest in depth. (F) Staff

298. Group Studies, Seminars, or Group Research. (1-12) Course may be repeated for credit. Grading on a satisfactory/unsatisfactory basis. Advanced study in various subjects through special seminar topics on 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. Prerequisites: Graduate standing in engineering. Individual investigation of advanced materials science problems. (F,SP) Staff

601. Individual Study for Master's Students. (1-8) Units may not be used to meet either residence or 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 comprehensive or language requirements in consultation with the field adviser. (F,SP) Staff

602. Individual Study for Doctoral Students. (1-12) 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: 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. (and other doctorate degrees). (F,SP) Staff

Mineral Engineering

101. Mining Methods and Material Handling. (3) Formerly Mini Eng. 100. Students who have taken Mini Eng. 100 may not receive credit for 101. Two 1½-hour lectures per week. Prerequisites: Upper division standing in engineering. 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 that are involved in the selection of an optimum mining method are discussed. (F) Staff


116. Introduction to Fluid Flow in Rocks. (2) Two 1-hour lectures per week. Prerequisites: Mathematics 50B and Physics 5C. Principles governing the movement and storage of fluids in rocks and sediments. Methods of measuring fluid flow problems and applications to typical problems in hydrogeology and engineering. (F) Staff

120. Subsurface Ventilation Engineering. (3) Two 1½-hour lectures per week. Prerequisites: Upper division standing. Principles of large-scale underground ventilation systems. 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 installation of large fans. Ventilation designs for mines and deep nuclear waste repositories. Students will undertake some project work and prepare a report for a computer-based ventilation planning project. (F) Staff

145. Petroleum Engineering. (3) Formerly ME 145. Three hours of lecture per week. Prerequisites: Senior standing in engineering. Techniques and applications of physical and chemical processes. Laboratory measurement of mechanical, hydraulic, electrical, thermal and chemical properties of rocks. (SP) Becker, Cook, Doyle

150. Environmental Properties of Rocks. (3) One 2-hour lecture and three hours of laboratory per week. Prerequisites: Upper division standing in engineering or science. Study of the behavior and properties of rocks, ores and fluids, and their relation to geotechnical work, geophysical exploration, mining and mineral processing. Laboratory measurement of mechanical, hydraulic, electrical, thermal and chemical properties of rocks. (SP) Becker, Cook, Doyle

160. Mineral Processing. (3) Three 1-hour lectures per week. Prerequisites: Upper division standing. Introduction to operations and processes employed to treat metals and to extract metals from low-grade ores. Methods for separating minerals in ores and processing mineral substances are discussed from a unit operation and unit process point of view. (F) Staff

162. Mineral and Metallurgical Process Engineering. (2) Students who have taken Mini Eng. 168 may not receive credit for 162. Two 1-hour lectures per week. Prerequisites: 160. Material and energy balances. Process design and analysis by computer simulation and development of coal, mineral and metallurgical process flow sheets. Principles employed in the selection of unit operations. Cost estimation and alternative process evaluation. (SP) Staff

164. Mineral and Particulate Processing. (3) Two 1½-hour lectures per week. Prerequisites: Upper division standing. Principles of physical processing of mineral and other particulate systems. Particle characterization, particle size and particle-fluid interactions. Understanding and model particulate systems. Techniques for size reduction, mineral separation by gravity magnetic and flotation methods, thickening and filtration, and agglomeration. (SP) Staff

210. 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 techniques. (F,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 academic year. Prerequisites: MSE 101 or equivalent. Thermodynamics and kinetics of solid state reactions; stabilities of inorganic solids and alloys; effects of surfaces, interfaces, temperature, and temperature gradients on compositions and properties. (SP) Staff

200. Mining of Bedded Deposits. (2) Two 1-hour lectures per week. Prerequisites: 100 or consent of instructor. Methods for mining bedded deposits, including coal, oil shale, salt. Underground mining techniques including longwall and room and pillar layouts. Surface mining practices including strip mining. Principles of

*Not offered 1989-90
1On leave, spring
2On leave, fall
3Recipient of Distinguished Teaching Award
4Recalled to active service
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 1½-hour lectures per week. Prerequisites: Mathematics 200 or equivalent. Physical processes governing transient saturated-unsaturated flow and contaminant transport in rock and soil systems. Physically based numerical models (finite differences, integrated finite differences, finite elements) of such systems. Outline of essential aspects of numerical methods and solution of practical problems using available computer programs. (F) Narasimham


206. Advanced Mine Planning. (2) One 2-hour lecture per week. Prerequisites: 108 or consent of instructor. Techniques used in mine planning using a case study. Computer methods including the application of geostatistics and financial calculations involved in a determination of the feasibility of a mining venture. (SP) Hood

210. Advanced Rock Mechanics. (3) Three 1-hour lectures per week. Prerequisites: 110 or CE 118 or CE 119. Rock mechanics is applied to the design of underground openings and open pit mines. Design methods and support requirements for rock arches, tunnels, and shafts are developed, including the use of fills. Special attention is paid to the questions of stability and safety. (SP) Cook

212. Rock Breaking—Principles and Practice. (3) Two 1½-hour lectures per week. Prerequisites: 110, CE 118, CE 120, or equivalent. Rocks and rock-like materials are important to many operations in mining, civil, and petroleum engineering, mineral processing, and other engineering activities. Stable and unstable deformation and fracture behavior of rock materials is studied with emphasis on the theoretical and practical aspects of the phenomena in practice is examined. Offered odd-numbered years. (SP) Morrison


230. Potential Field Methods in Applied Geophysics. (3) Three 1-hour lectures per week. Prerequisites: Graduate standing. One 1-hour discussion per week. Prerequisites: Graduate standing. The physical basis of gravity and magnetic surveying. Reduction of gravity and magnetic data. Theoretical anomalies of common rock types. Detection of parameters of disturbing bodies; spectral analysis; design of filters for derivatives, continuation, and fields reduced to the pole. (SP) Morrison

232. Electromagnetic Methods in Applied Geophysics. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: Graduate standing. Electromagnetic propagation in the earth's crust and ground. Theory and the design and interpretation of electromagnetic surveys in mineral prospecting and geological mapping. Plane wave and finite source fields above and within layered earth models; fields scattered from inhomogeneities in dissipationless half spaces. (F) Becker

233. Geophysical Applications of Electronic Induction. (2) New course. One 2-hour lecture per week. Prerequisites: Consent of instructor. Broad coverage of the geological and geotechnical applications of ground and airborne electromagnetic induction methods of geophysical exploration. Theoretical and laboratory models of exploration targets. Instrumentation. Exploration methods and procedures. Data interpretation. Illustrative examples drawn from surveys related to problems in petroleum engineering, geohydrology, coastal engineering and mineral and petroleum exploration. (SP) Fuerstenau

234. Electrical Methods in Applied Geophysics. (3) Two 1½-hour lectures and one hour of discussion per week. Prerequisites: Completion of course 233. Current flow in isotropic, layered, and inhomogeneous earth models with emphasis on the design and interpretation of field measurement systems. Mechanisms of electromagnetic processes in the Earth, mineralization, induced polarization, and electrochemical effects including self-potential. (SP) Staff

236. Seismic Methods in Applied Geophysics. (3) Two 1½-hour lectures and one hour of discussion per week. Prerequisites: An introductory course in seismology; upper division mathematics. The theoretical principles and experimental techniques used in contemporary seismic exploration, including surface wave, refraction and reflection methods. The use of explosive and non-explosive sources in reflection profiling is treated, as well as the processing methods used to elucidate geological structure from the seismic data. (F) Staff

238. Electronic Instrumentation. (3) One 2-hour lecture and one 3-hour laboratory per week. Prerequisites: Consent of instructor. Analog and digital techniques for processing and recording signals from geophysical transducers. Laboratory experiments involve analog filters, analog to digital converters and elementary digital logic. (SP) Becker


242. Numerical Methods in Materials Science and Mineral Engineering. (2) One 2-hour lectures and one 1-hour discussion per week. Prerequisites: Consent of instructor. The application of numerical techniques to problems in the design of materials and mineral engineering. Brief review of standard numerical procedures. Use of these procedures is then illustrated by applying them to current research problems in physical and extractive metallurgy, ceramics, mineral processing, and engineering geoscience. (F) Evans

244. Inverse Theory. (2) Two 1-hour lectures and one hour of discussion per week. Prerequisites: Consent of instructor. Direct versus iterative inversion of geophysical data. Gafland-Levitan, Marchenko, and Wildhet theories. Resolution in inverting data, and their application via Coen's theory to the direct inversion of geophysical data exploration. The Backus and Gilbert resolving power theory will be discussed with emphasis on the tradeoff between resolution and certainty. (F) Coen

260. Surface Properties of Materials. (3) Two 1½-hour lectures per week. Thermodynamics of surfaces and phase boundaries, surface tension of solids and liquids, surface activity of materials, surface and contact angles, electrochemical double layers at interfaces, theory and applications. (F) Fuerstenau

261. Applied Colloidal Phenomena. (2) One 2-hour lecture per week. The characterization of colloidal materials and the physical chemistry of colloidal systems. Primary emphasis on the interaction of colloidal particles, particularly in aqueous environments; flocculation, coagulation, and dispersion phenomena, selective flocculation. Offered even-numbered years. (SP) Fuerstenau

262. Surface Chemistry of Flotation. (2) One 2-hour lecture per week. Application of surfactant and colloid chemistry to the separation of minerals by flotation; selective absorption of surfactants; natural flotation; flotation of fine particulates, precipitates, oil droplets. Offered odd-numbered years. (SP) Fuerstenau

265. Modeling of Particulate Rate Processes. (3) Two 1½-hour lectures per week. Prerequisites: Consent of instructor. Principles of rate process modeling. Introduction to particulate systems in mineral, metallurgical, ceramic, and chemical industries. Application of these models to particulate systems: transport through reactors, development of population balance models and analysis of rate processes involving particulate size changes, solid-liquid and solid-solid separation. Recent research in particulate systems: transport through reactors, development of population balance models and analysis of rate processes involving particulate size changes, solid-liquid and solid-solid separation. Recent research in particulate systems: transport through reactors, development of population balance models and analysis of rate processes involving particulate size changes, solid-liquid and solid-solid separation. Recent research in particulate systems. (SP) Sastry

266. Mineral Process Simulation. (2) One 2-hour lecture per week. Prerequisites: 265. Principles of process simulation, model validation and parameter estimation in mineral and metallurgical systems; process analysis by computer simulation; detailed description of size reduction, size enlargement, size separation and hydro-metallurgical processes. (SP) Sastry

267. Mineral Process Dynamics and Control. (2) One 2-hour lecture per week. Prerequisites: 266. Principles of dynamics and control of mineral and metallurgical processes; analysis by computer simulation; the development and application of these methods to mineral and pyrometallurgical processes. (SP) Sastry

270. Advanced Hydrometallurgy. (3) Three one-hour lectures per week. Principles of hydrometallurgical processing of minerals and ores. Emphasis on thermodynamics, kinetics, and mechanisms of hydrometallurgical reactions. Analysis of methods for the recovery of metals from leach liquors. (SP, even years) Doyle

271. Electrochemical Techniques in Process Metallurgy. (2) 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

275. 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 extraction metallurgy, mineral processing, and materials processing. (SP) Staff

276. Advanced Extractive Metallurgy. (2) One 2-hour lecture per week. Analysis of the major unit operations of extractive metallurgy. Emphasis on the description of the manner in which each unit operation is governed by materials rate phenomena. (SP) Evans

280A. Advanced Topics in Subsurface Fluid Flow. (3) Course may be repeated once for credit. Three 1½-hour lectures per week. Prerequisites: Consent of instructor. Selected topics in mass and energy transport in rock masses. Recent research in topics such as: non-isothermal flows of multi-phase, multi-component fluids in geothermal systems, chemical transport in groundwater, hydrology of fractured rocks, and coupled thermo-chemical-mechanical effects on hydrology of rock masses. (SP) Staff

280E. Electromagnetic Methods in Applied Geophysics. (3) New course. One 2-hour lecture per week. Prerequisites: Physics 110A-110B, Mineral Eng. 232 or equivalent. Methods for numerical solutions of the electromagnetic diffusion equation in conducting media. Specifically, the course includes finite-difference, finite-volume and finite-element methods used to solve the electromagnetic equations in three dimensions and three to three dimensions. Assignments include computer exercises.

290M. Special Problems in Materials Science. (3) Three hours of lecture per week. Prerequisites: 2014A-2014B. Consent of instructor. Selected topics in the thermodynamics, kinetics, chemical, physical, and economic aspects of solid materials. Topics will generally be selected based on student interest in Mat. Sci. 2014-2015. The course provides an opportunity to explore subjects of particular interest in greater depth. (SP)
Mathematics

(College of Letters and Science)

Department Office: 970 Evans Hall, 642-6550

Professors:
John W. Addison, Jr., Ph.D. University of Wisconsin. Logic, model theory, nonstandard analysis.
Robert M. Anderson, Ph.D. Yale University. Mathematical economics, non-standard analysis.
William B. Arveson, Ph.D. University of California at Los Angeles. Functional analysis, operator algebras.
George M. Bergman, Ph.D. Harvard University. Rings, universal algebra, counterexamples.
David H. Blackwell, Ph.D. University of Illinois, Urbana, Champaign. Game theory, probability, statistics.
John B. Wagoner, Ph.D. Princeton University. Differential geometry, Riemannian geometry, complex manifolds.
Harold M. Karp, Ph.D. Harvard University. Algorithms and computational complexity.
Robin C. Kirby, Ph.D. University of Chicago. Topology of manifolds.
Michael J. Klaas, Ph.D. University of California at Los Angeles. Programming languages, semantics.
Shojiro Koyabashi, Ph.D. University of Washington. Riemannian and complex manifolds.
Tak-Tsuen Lam, Ph.D. University of Illinois at Urbana-Champaign. Algebraic geometry, number theory.
Lucien M. Le Cam, Ph.D. University of California at Berkeley. Theory of statistical decision functions.
R. Sherman Lehman, Ph.D. Stanford University. Number theory, numerical analysis.
Hendrik W. Lenstra, Jr., Ph.D. University of Amsterdam. Number theory.

Associate Professors:
Andrew P. Ogg, Ph.D. Harvard University. Number theory, elliptic curves.
Arthur E. Ogus, Ph.D. Harvard University. Algebraic geometry.

Student Programs

The department offers undergraduate students a choice of two programs leading to the A.B. degree: the major in mathematics and the major in applied mathematics. Each in mathematics gives students the opportunity to obtain a strong, well-rounded mathematical background suitable for graduate study as well as for professional careers in science, industry, or education. Students contemplating the major are required to choose a minor in applied mathematics, computer science, economics, or history, which provides a perspective on their mathematical training. Students interested in the applications of mathematics may find the major program in applied mathematics particularly desirable, as it is not limited to one area of study. The requirements for both majors are summarized below. More detailed information is given in the Undergraduate Announcement, available from the undergraduate advisor in 968 Evans Hall.

Undergraduate Programs

Major in Mathematics.
(a) Courses 104, 110, 113, 114, and 115; (b) One course from each of the following three subject areas: (1) Computing (100, 112A/B); (2) Geometry (141); (3) Logic and foundations (125A, 135); (c) At least eight upper division courses in mathematics.

Major in Applied Mathematics.
(a) 104, 110, 113, 126A, and 126B; (b) Three additional upper division courses, approved by a major adviser, which make a coherent cluster in some applied area such as: actuarial science, biology, chemical engineering, computer science, decision theory, economics, fluid mechanics, geophysics, mathematical physics, 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 enrolled in the 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 3.3 in all courses taken at the University; (b) complete a course 195 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.

Adjunct Professor:
Paul Concus, Ph.D. Harvard University. Fluid dynamics, numerical analysis.

Affiliated Associate Professor:
Alan H. Schoenfeld (Education), Ph.D. Stanford University. Psychology of problem solving.

Visiting Faculty:
Joseph Cao, Ph.D. University of Minnesota. Group theory, number theory.
Pei-Chen Chen, Ph.D. State University of New York, Buffalo. Geometry, topology.

Visiting Assistant Professors:
Robert A. Palais, Ph.D. University of California at Berkeley. Mathematical physics, quantum mechanics.
Biban Velickovic, Ph.D. University of Wisconsin. Combinatorial set theory, theory of computability.

Associate Professor:
Tsit-Yuen Lam, Ph.D. University of California, Berkeley. Mathematics, numerical analysis.

Full Professor:
John B. Wagoner, Ph.D. Princeton University. Topology, group theory.

On leave, spring, fall

On leave, fall, winter

On leave, spring

Recipient of Distinguished Teaching Award
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 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. Detailed information concerning admission, graduate student fellowships and stipends, and departmental requirements is given in the Graduate Advising Office of the Department of Mathematics, which is available upon request 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 semester offerings, instructors, textbooks, course and seminar content, teaching and grading methods, and schedules are posted outside 910 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, 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. (2-3) No credit will be given to students who take Math P after completing any other course in the department with the exception of Math P 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 UC/CSU math diagnostic test. Consult the Math Diagnostic Web page. (Fall only) Staff

Mathematics for Liberal Arts Students. (3) Three hours of lecture per week. Concepts of modern mathematics for students with no technical background. (Fall only) Staff

Mathematical Problem Solving. (3) Three hours of lecture per week. Emphasis on theory and challenging problems; the material is rearranged in a more logical order. Recommended for students who enjoy mathematics. (Fall only) Staff

Supplementary Work in Lower Division Mathematics. (1-3) Course may be repeated for credit. Meetings are arranged by the instructor. Prerequisites: Some units in a lower division mathematics class. Students with partial credit for lower division mathematics courses may, with consent of instructor, complete the credit under this heading. (Fall only) Staff

Math 50A. Sophomore Mathematics. (4) Three 1-hour lectures and two 1-hour sections per week. Prerequisites: 1B or 2A or 3. Ordinary differential equations. Basic linear algebra. Introduction to partial differential equations. Fourier series. (Fall only) Staff

Math 50B. Sophomore Mathematics. (4) Three 1-hour lectures and two 1-hour sections per week. Prerequisites: 50A. Multivariable calculus: gradient, divergence and curl, multiple integrals; Green’s, Stokes’s, and Gauss’s Theorems. Applications of linear algebra to multivariable calculus. Eigenvalue problems. (Fall only) Staff

Honors Sophomore Mathematics. (4-5) Three 1-hour lectures and two 1-hour sections per week. Prerequisites: Same as 50A-50B. This is the honors class corresponding to 50A-50B in emphasis on theory and challenging problems; the material is rearranged in a more logical order. Recommended for students who enjoy mathematics. (Fall only) Staff

Introduction to Linear Algebra. (3) Three hours of lecture/workshop per week. Prerequisites: Math 50A-50B. Matrix algebra, simultaneous linear equations, vector spaces, linear transformations, determinants, eigenvalues. (Fall only) Staff

Discrete Mathematics. (4) Two hours of lecture and two hours of section per week. Prerequisites: Math 1A-1B or 16A-16B. This is a more theoretical and proof-oriented course than Math 51. (Fall only) Staff

Mathematical Problem Solving. (3) Three hours of lecture/workshop per week. Prerequisites: One semester of calculus or consent of instructor. An introduction to problem-solving techniques in mathematics, including induction, working backwards, specialization and generalization, contradiction, and decomposing and recombining. An experimental course with a large percentage of in-class problem solving, with a wide range of mathematical domains, including geometry number theory, probability, logic, and set theory. (Fall only) Staff

Computational Mathematics. (4) Formerly 115M and 116. Course may be repeated for credit if approved by the mathematics advisor. Two hours of lecture and two 1-hour sections per week. Prerequisites: Math 1A or 16A. Staff

IDS 103. Introduction to Mathematical Economics. (See IDS courses at end of mathematics course listings.) Staff

IDS 104. Introductory and Intermediate Analysis. (4) Three 1-hour lectures per week. Prerequisites: 28 or 50B. This course requires at least 12 hours per week of effort and preparation. A review of single variable calculus; the topology of R^n; metric spaces; uniform convergence; Frechet derivative and chain rules; implicit function
improper integrals. Gamma functions. Parallel to 104 and 181A-181B.

121A-121B. Mathematical Tools for the Physical Sciences. (4;4) Three hours of lecture per week. Prerequisites: 28 or 30B. Introduces students to the techniques of applied mathematics. Topics include vector calculus, Fourier series, finite-dimensional linear systems. Infinite-dimensional linear systems, orthogonal expansions, special functions, partial differential equations arising in mathematical physics. Students who are not planning to take more advanced mathematics courses may be permitted to enroll with the consent of the instructor. (121A: FSP; 121B: SP)

123. Ordinary Differential Equations. (4) Three hours of lecture per week. Prerequisites: 110 or consent of instructor. One of a three-quarter sequence. Classification of second-order equations, existence of solutions and the method of instruction to be used will be announced at the beginning of each semester that such courses are offered. Staff.

140. Mathematical Logic. (4;4) Three hours of lecture per week. Prerequisites: 28 or 30B. Functions of a complex variable, continuity, differentiability, and complex integration. Quadratic forms and Rayleigh's principle. Jordan canonical form, applications. Linear functionals. (F,SP)

H110. Linear Algebra. (4) New course. No credit following 110 or 113B. Three hours of lecture per week. Prerequisites: 51 or 50B. Honors section covering more advanced topics in linear algebra, including linear operators, bilinear and quadratic forms, and finite dimensional spaces. (SP) Staff.

113. Introduction to Abstract Algebra. (Formerly 113A) Three 1-hour lectures per week. Prerequisites: Math 50A-50B. Sets and relations. The integers, congruences and the Fundamental Theorem of Arithmetic. Groups and factor groups. Commutative rings, ideals, quotient fields. Theory of polynomials. Euclidean algorithm and unique factorizations. The Fundamental Theorem of Algebra. Fields and field extensions. This course requires at least 12 hours per week of effort, including time spent in class and in outside reading and preparation. (F,SP)

H113. Introduction to Abstract Algebra. (Formerly H113A) Three 1-hour lectures per week. Prerequisites: Same as Math 112. Honors version of 113. This course requires at least 12 hours per week of effort including time spent in class and in outside reading and preparation. (F)

114. Second Course in Abstract Algebra. (4) 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 some of the topics in a Sylow Theorems and their applications to group theory; classical groups; abelian groups and modules over a principal ideal domain; algebraic field extensions; splitting fields; 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. (SP)

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, quadratic fields, asymptotic distributions, additive problems. (F) Staff.

H117. Mathematical Proof Seminar. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. Recommended for exceptional students with strong mathematical background and interest. Problems calling for mathematical inclination and motivation. Emphasis is on rigor, depth, and hard problems. Staff.

Graduate Courses


205. Theory of Functions of a Complex Variable. (4) Three hours of lecture per week. Prerequisites: 185. Normal families. Riemann mapping theorem. Picard's theorem and related theorems. Multiple-valued analytic functions and Riemann surfaces. Further topics selected by the instructor may include harmonic functions, elementary functions, analytic and algebraic functions, boundary behavior of analytic functions and HP spaces, the Riemann zeta function, prime number theory. (F)


209. Operator Algebras. (4) Three 1-hour lectures per week. Prerequisites: 206 Elementary C^*-algebra theory. Course Focus with group representations. Basic von Neumann algebras, algebras, normal states, traces. Further topics may include basic K-theory of C^*-algebras, applications to physics such as the Stone-Von Neumann theorem, automorphism groups, C^*-dynamical systems. (F)


211. Mathematical Theory of Fluid Mechanics. (4) Three hours of lecture per week. Development of the fundamental equations describing the behavior of fluids. Continuum hypothesis followed by the treatment of special topics selected to exhibit different physical situations, analytical techniques, and approximate methods of solutions. (F)

212. Several Complex Variables. (4) Three hours of lectures per week. Prerequisites: 204A-204B or 202A-202B or their equivalents. Power series developments, domains of holomorphy, Hartogs' phenomenon, pseudoconvexity and plurisubharmonicity. The remainder of the course may treat either sheaf cohomology and Stein manifolds, or the theory of analytic subvarieties and spaces. (SP)

213A-213B. Mathematical Economics. (See IDS courses at end of Mathematics course listings.)


215A-215B. Algebraic Topology. (4,4) Three hours of lecture per week. Prerequisites: 215A: 113 and point-set topology (e.g. 202A); 215B: 215A, 214 recommended (may be taken concurrently). Fundamental group and covering spaces, simplicial and singular homology theory with applications, cohomology homology, duality theorem. Homotopy theory, fibrations, relations between homotopy and homology, obstruction theory, and topics from spectral sequences, cohomology operations, and characteristic classes. Sequence begins Fall. (F)

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: 120B, 121B, or both 104 and 185. Ordinary and partial differential equations of mathematical physics arising in engineering and physical science. Solution techniques and direct numerical computation. (SP)


221. Advanced Matrix Computations. (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, polynomial equations, and minimization of functions. (F)

222A-222B. Partial Differential Equations. (4,4) Three hours of lecture per week. Prerequisites: 105 or 202B; 165. The theory of initial value and boundary value problems for hyperbolic, parabolic, and elliptic partial differential equations in Euclidean space, in the plane, and in nonlinear equations. More general types of equations and systems of equations. Sequence begins fall. (F,SP)

224A-224B. Mathematical Methods for the Physical Sciences. (4,4) Three hours of lecture per week. Prerequisites: 110, 104 and 185, or 120A-120B or 121A-121B. Fourier's theorem and transforation, Laplace transforms. Partial differential equations. Green's function. Operator theory, with applications to one-parameter unitary groups, eigenfunction expansions, perturbation theory. Sequence begins fall. (F)


226A. Abstract Machines and Languages. (4) Three hours of lecture per week. Prerequisites: 135: 114 or 113 and 110. Finite state automata, regular sets, Turing machines, recursive functions, decision problems. Context-free languages, pushdown automata, ambiguities, special families of languages, power series in noncommuting variables. (F)

226B. Semigroups and Machines. (4) Three hours of lecture per week. Prerequisites: 226A or consent of instructor. Semigroups, wreath products, prime decompostion theorem, application to finite state machines, algebraic theory of complexity. (F)

227A-227B. Theory of Recursive Functions. (4,4) Three hours of lecture per week. Prerequisites: 225B. Recursive and recursively enumerable sets of natural numbers, characterization, significance, and applications. Relativization, degrees of unsolvability. The recursion theorem. Constructive ordinals, the hyperarithmetical and analytical hierarchies. Recursive objects of higher type. Sequence begins fall. (F,SP)

228A-228B. Numerical Solution of Differential Equations. (4,4) Three 1-hour lectures per week. Prerequisites: 228A-228B. Ordinary differential equations, elementary methods, including Runge-Kutta and predictor-corrector methods: stability theory, Richardson extrapolation, boundary value problems, variational methods, singular perturbations. Partial differential equations: stability, accuracy, and convergence, Von Neumann's condition, finite difference solution of hyperbolic equations, boundary value problems, hyperbolic partial differential equations; solution of elliptic equations. The solution of ordinary differential equations will be discussed in 228A. Sequence begins fall. (F,SP)

229. Theory of Models. (4) Three hours of lectures per week. Prerequisites: 228B. Syntactical characterization of classes closed under algebraic operations. Ultraproducts and ultrametrics, saturated models. Methods for establishing decidability and completeness. Model theory of various languages richer than first-order. (F)


236. Metamathematics of Set Theory. (4) Three hours of lecture per week. Prerequisites: 225A and 225B. Various set theories: comparison of strength transfasi and cardinal models, finite axiomatizability and consistency of axioms of choice, continuum hypothesis, etc. The measure problem and axioms of strong infinity. (F)

240. Riemannian Geometry. (4) Three hours of lectures 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)

241. Complex Manifolds. (4) Three hours of lectures per week. Prerequisites: 214 and 215A. Riemann surfaces, analytic and algebraic functions, divisors and sheaves, and the Dolbeault theorem on Riemann surfaces, the classical Riemann-Roch theorem, theorem
of Abel-Jacobi. Complex manifolds. Kharkov metrics. Summary of Hodge theory, groups of line bundles, additional topics such as Kodaira's vanishing theorem, Lefschetz hyperplane theorem. (SP)

265A-265B. General Theory of Algebraic Structures. (4)(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 and substructures of free objects presented by generators and relations, ultraproducts, direct limits. Applications of general results to groups, rings, lattices, etc. Course may emphasize study of congruence- and subalgebra-lattices, or certain other algebraic systems.

254A: (F); 254B: not offered 1989-90.

250A. Groups, Rings, and Fields. (4) Three hours of lecture per week. Prerequisites: 114 or consent of instructor. Group theory, including the Jordan-Hölder theorem and the Sylow theorems. Basic theory of rings 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. (F) Staff

250B. Multilinear Algebra and Further Topics. (4) Three 1-hour lectures per week. Prerequisites: 250A. Tensor products, exterior and alternating algebras, with application to linear transformations. Commutative ideal theory, localization. Elementary specialization and valuation theory. Related topics in algebra. (SP) Staff

251. Ring Theory. (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 and substructures of free objects presented by generators and relations, ultraproducts, direct limits. Applications of general results to groups, rings, lattices, etc. Course may emphasize study of congruence- and subalgebra-lattices, or certain other algebraic systems. (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, homomorphisms and tensor products of modules, functors and derived functors, homological dimension of rings and modules. (SP)

254A-254B. Number Theory. (4)(4) Three hours of lecture per week. Prerequisites: 250A. Axiomatic set theory, gauge theory, and nonstandard analysis. Coherence of the natural numbers. (SP) Staff

255A-255B. Foundations of Geometry. (4)(4) Three hours of lecture per week. Prerequisites: 250E. Axiomatic set theory, gauge theory, and nonstandard analysis. Coherence of the natural numbers. (SP) Staff

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 differentiability in algebraic geometry. Cohomology of coherent sheaves and their homology. Riemann-Roch theorem and selected applications. (SP) Staff

257. Group Theory. (4) Three hours of lecture per week. Prerequisites: 250A. Topics such as generators and relations, finite discrete groups, groups of Lie type, permutation groups, character theory, solvable groups, simple groups, transfer and cohomological methods. (SP) Staff

258. Classical Harmonic Analysis. (4) Three hours of lecture per week. Prerequisites: 250A. Basic knowledge of real, complex, and linear analysis. Basic properties of Fourier series, convergence and summability, conjugate functions, Hardy spaces, boundary behavior of analytic and harmonic functions. Additional topics at the discretion of the instructor. (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. (SP) Staff

260. Abstract Harmonic Analysis. (4) Three hours lecture per week. Prerequisites: 250A. Topological groups, Haar measure, Pontryagin duality, and structure theory of locally compact abelian groups, Peter-Weyl theorem for compact groups. Further topics may include finer study of harmonic analysis on Lie groups, or else head in the direction of group representations for noncommutative locally compact groups.

261A-261B. Lie Groups. (4) Three hours of lecture per week. Prerequisites: 214. Lie groups and Lie algebras, fundamental theorems of Lie, general structure theory; compact Lie groups; classification theory and representation theory of semi-simple Lie algebras and Lie groups, further topics such as symmetric spaces, Lie transformation groups, etc., if time permits. In view of its simplicity and wide range of applications, it is preferable to cover compact Lie groups and their representations in 261A. Sequence begins fall. Staff

265. Differential Topology. (4) Three hours of lectures 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) Staff

266. 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. (F) Staff

267. 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) Staff

268. 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) Staff

269. 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 permission. Intended for candidates for the Ph.D. degree. (F,SP) Staff

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 practice teaching, alternatives to standard classroom methods, guided group and self-analysis of videotapes, reciprocal classroom visitations, and an individual project. (F,SP) Staff

310. 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 satisfactory/unsatisfactory basis. (F,SP) Staff

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 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. A background in economics is required. Sponsoring departments: mathematics and economics. (SP) Staff

Graduate Courses

IDS 213A-213B. Mathematical Economics. (3,3) May be taken on a passed/not passed basis. Students who have received credit for Economics 207A-207B may

On leave, spring

On leave, fall

Recalled to active service

Recipient of Distinguished Teaching Award
Mechanical Engineering (College of Engineering)

Department Office: 6189 Etcheverry Hall, 642-1338
Chair: Clayton D. Mote, Jr., Ph.D.

Professors:
- David M. Auslander, S.C. Massachusetts Institute of Technology. Continuum mechanics
- Evelyn T. Austin, Ph.D. University of Utah. Fluid dynamics
- William H. Somerton, Ph.D. University of Southern California. Material science and engineering
- Robert Bogy, Ph.D. Brown University. Fluid mechanics
- Stanley A. Berger, Ph.D. Brown University. Fluid mechanics
- Paul B. Stewart, Ph.D. University of California at Berkeley. Fluid dynamics
- Yasuno Takahashi, Ph.D. (Emeritus) University of Tokyo. Fluid mechanics
- Herman Hash-El, Ph.D. State University of New York at Stony Brook. Fluid mechanics
- Erich G. Thomsen, Ph.D. (Emeritus) University of California at Berkeley. Fluid mechanics

Associate Professors:
- Alice M. Aggion, Ph.D. Stanford University. Fluid dynamics
- Balugopal S. Rajagopalan, Ph.D. University of California at Berkeley. Fluid mechanics
- T. Y. Pho, Ph.D. University of California at Berkeley. Fluid mechanics

Other Departments and Groups with Related Programs

Biomaterials
- Karl J. Hedrick, Ph.D. Stanford University. Control systems, robotics

Electrical Engineering and Computer Sciences
- Ralph Greif, Ph.D. Harvard University. Thermal radiation, phase change

Logic and the Methodology of Science
- Shiro Kobayashi, Ph.D. University of California at Berkeley. Rarefied gas flows, gas dynamics

Science and Mathematics Education
- George Leitmann, Ph.D. University of California at Berkeley. Dynamics, biomechanics

Statistics
- E. Paul DeGarmo, M.S. (Emeritus) University of California at Berkeley. Dynamics, biomechanics

Curriculum for the Bachelor's Degree

A total of 120 units is required, including:

Lower Division.
- Mathematics 1A-1B, 50A-50B: Chemistry 1A; Physics 7A-7B-7C; Engineering 7, 28, 36, 45: 17 units of electives.

Upper Division.
- Mechanical Engineering 102A-102B, 104, 105, 106, 120A-120B, 106: Electrical Engineering and Computer Sciences 100; Civil Engineering 130; 27 units of electives.

Mechanical Engineering Options.
- Each group consists of courses that are not required to be taken within the standard allowance. (For requirements, see footnotes.) The electives need not be from any single group.

Applied Mechanics. Engineering 117, 118; Mechanical Engineering 133, 134, 161, 162, 163, 170, 173, 175, 185, 262; Mathematics 104. Mr. Johnson

Automatic Controls. Engineering 118; Mechanical Engineering 130, 133, 134, 135; Electrical Engineering and Computer Sciences 120, 126; Chemical Engineering 162. Mr. Tomizuka

Biomechanical Engineering. Biology 1A, 150; Engineering 153, 290A; Electrical Engineering and Computer Sciences 145A, 145B, 145L, 145M, 146, 148; Mechanical Engineering 110, 130, 134, 151, 173, 213; Anatomy 101, Physiology 1, 100A, 109; Interdepartmental Studies 111. Mr. Rubinsky

Combustion. Engineering 117, 160, 162; Mechanical Engineering 110, 140, Mineral Engineering 148, 149; Physics 132. Mr. Fernandez-Pello

Environmental Engineering. Engineering 155, 150, 160, 161; Mechanical Engineering 110, 140, 142, 151, 173, 254; Civil Engineering 140; Nuclear Engineering 162, 163, 164, 165, 166, 167, 174, 178, 180; Mechanical Engineering 105, 106, 120A-120B.

Fluid Mechanics and Aeronautics. Engineering 117; Mechanical Engineering 133, 134, 135, 151, 161, 162, 163, 175, 185; Civil Engineering 131; Physics 132; Astronomy 297A. Mr. Corcos

General Mechanical Engineering. Engineering 117; Mechanical Engineering 133, 134, 151, 185. Mr. Bogy

Heat and Mass Transfer. Engineering 117; Mechanical Engineering 140, 142, 151, 263. Mr. Humphrey

Materials Processing and Manufacturing Management. Engineering 102, 120; Mechanical Engineering 101, 122, 128, 133, 134, 135, 151; Industrial Engineering 185, 186; Operations Research 115, 140, 180; Business Administration 111, 150, 155. Mr. Dornfeld

Mechanical Engineering Design. Mechanical Engineering 101, 110, 122, 128, 130, 133, 134, 135. Mr. Steidel

Naval Architecture. Naval Architecture 151, 152A-152B, 153, 155; Civil Engineering 120, 131; Mechanical Engineering 133, 161, 162, 175; Mathematics 120A-120B. Mr. Webster

Nuclear Engineering. Nuclear Engineering 101, 104A or 1943, 120, 150, 151; Mechanical Engineering 134, 135, 151, 161, 173; Physics 137A-137B; Mathematics 120A-120B.


*Electives total of 44 units includes (a) 18 units of humanities and social studies of which at least one must be taken from a single department; (b) 3 units must be chosen from a list of upper division engineering courses; (c) 6 units must be chosen from a list of upper division engineering courses.
Civil Engineering 170; Mineral Engineering 116, 148; Chemistry 1B, Mr. Uddell

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 specialties. Master of Science and Ph.D. degrees are the terminal degrees for the scientific emphasis, and Master of Engineering and D.Eng. degrees for the professional one. Specialization is offered in the following areas: (1) bioengineering, (2) controls, (3) design, (4) dynamics and dynamical systems, (5) environmental engineering, (6) fluid mechanics, (7) heat and mass transfer, (8) manufacturing, (9) mechanics of deformable media, (10) petroleum engineering, (11) thermodynamics, (12) water resources, environmental influences, residual stress effects. Environmental influences, residual stress effects. Information on various aspects of graduate study are available from departmental brochures and from the Announcements of the College of Engineering.

Lower Division Courses

92. Introduction to Mechanical Engineering. (1) Must be taken on a passed/not passed 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)

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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, process consideration, 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 and evaluation of tool technologies. (F,SP)

102A. Mechanical Behavior and Processing of Materials. (3) Three hours of lecture per week. Prerequisites: Engineering 45 and Engineering 28; Civil 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)

102B. Mechanical Behavior and Processing of Materials. (3) Three hours of lecture per week. Prerequisites: Engineering 28, Civil 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)

103. Fluid Mechanics. (3) Three hours of lecture and three hours of laboratory per week. Prerequisites: 107A, Engineering 45. Experimental investigation and analysis of engineering phenomena and systems. Experimental design, measurement systems, data processing, and data reduction. Modeling of measurement and experimental systems. Technical communication skills. (F,SP)

107B. Mechanical Engineering Laboratory. (4) Seven hours of laboratory per week. Prerequisites: 107A. Experimental investigation and analysis of engineering phenomena and systems pertinent to mechanical engineers. Design and planning of experiments. Analysis of data and reporting of experimental results. (F,SP)

109. Heat Transfer. (3) Three hours of lecture per week. Prerequisites: 105 and 106. Conective, convective, and radiative transport of thermal energy, boiling and condensation heat transfer, heat exchangers. (F,SP)

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)

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 material forming and fluid flow and methods of study of microscopic and macroscopic characteristics of flow in conduits, lubrication systems, pumps, turbines, and compressors will be described, and analyzed by application of concepts of potential flow, lamina flow, and turbulence. (F)

128. Computer-Aided Mechanical Design. (3) Three hours of lecture per week. Prerequisites: 102B, Engineering 28, Civil Engineering 130, and Mathematics 50B, or consent of instructor. Introduction to interactive computer programs and their use in mechanical design. Applications of computer-aided numerical methods for the synthesis of cams and linkages. Balancing of linkages, rotors, and multicylinder engines. Gear trains and mechanical systems. (F)


131. Mechanical Vibrations. (3) Three hours of lecture per week. Prerequisites: 104. An introduction to the theory of mechanical vibrations including topics of harmonic motion, resonance, transient and random excitation, applications of Fourier analysis and convolution to vibration problems. Mechanical systems and control. (F)

134. Automatic Control Systems. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: Mathematics 50B; Physics 5C; Computer Science 1. Mathematical formulation of real-time passive, linear and nonlinear dynamic systems; state equations and system stability; linear control systems—PID control; control system design in the frequency and time domains; discrete time and computer control of systems. (F)

135. Design of Microprocessor-Based Mechanical Systems. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: Computer Science 7. This course provides preparation for the conceptual design and prototyping of mechanical systems that use microprocessors to control machine activities, 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, thermal components and a variety of instruments. (F)

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 and temperature, processes, pollutant formation. Application to engines, energy production, and fire safety. (F)

142. Thermal Environmental Control. (3) Three hours of lecture per week. Prerequisites: 105, 106, and 109 (may be taken concurrently). Systems and processes of ventilation and control of environments for human habitation and other applications. Specific topics include refrigerant component and system analysis, cryogenic systems, absorption refrigeration, psychrometrics, human comfort criteria, air-conditioning, solar radiation effects, and heat transmission in buildings. The course emphasizes the use of computer simulation as a tool for analysis of thermal systems. (SP)

149. Petroleum Engineering II. (3) Three hours of lecture per week. Prerequisites: Senior standing in engineering. Production of oil and gas will be described, and analyzed by application of concepts of potential flow, lamina flow, and turbulence. (SP)

151. Advanced Heat Transfer. (3) Three hours of lecture per week. Prerequisites: 105, 106 and 109. Basic principles of heat transfer and their application. Subject areas include steady-state and transient system analyses for conduction, free and forced convection, boiling, condensation, and thermal radiation. (SP)

161. Applied Fluid Mechanics. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 105, 106, and 109. Characteristic of flow in conduits, lubrication systems, pumps, turbines, and compressors will be described, and analyzed by application of concepts of potential flow, lamina flow, and turbulence. (SP)

162. Elementary Hydrodynamics. (3) Three hours of lecture per week. Prerequisites: Math 50A, 50B; Eng 111 recommended. This course provides an introduction to classical hydrodynamics aimed at senior undergraduate engineering majors. 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, hydrofoil boundaries, boundary layer airflow, flow over aerofoils, and wakes of sports cars. Viscous effects are discussed briefly. (F)

163. Engineering Aerodynamics. (3) Three hours of lecture per week. Prerequisites: 105. Introduction to the lift, drag, and moment of two-dimensional airfoils, three-dimensional wings, and the complete airplane. Calculations of the performance and stability of airplanes in subsonic flight. (SP)

170. Engineering Mechanics III. (3) May not receive credit if you have taken ME 104 fall 1983 through spring 1985 or ME 104B during quarter system. Two hours of lecture and one hour of discussion per week. Prerequisites: 104 as offered beginning fall 1985. Newtonian Dynamics of a particle or systems of particles and rigid bodies in three-dimensional motions. (SP)


175. Intermediate Dynamics. (3) Three hours of lecture per week. Prerequisites: 104. Lagrangian Mechanics. Theory of constraints, virtual displacement and velocities, coordinates and conjugate coordinates; Lagrange's principle and Lagrange's equations of motion; first integrals; engineering applications to constrained motion of particles and rigid bodies, oscillations, gyrodyamics, vibrations, and problems of stability of flight

185. Introduction to Continuum Mechanics. (3) Three hours of lecture per week. Prerequisites: Physics 5A[7A]; Mathematics 50B. Kinematics of deformation, 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)

*Not offered 1989-90
On leave, spring
Recalled to active service
Recipient of Distinguished Teaching Award
207. Experimental Methods in Mechanical Engineering. (3) Four and one-half hours of meeting per week: either 1 1/2 hours of lecture and 3 hours of laboratory or 3 hours of lecture and 1 1/2 hours of laboratory per week. Prerequisites: Graduate standing. Principles of physical measurements; instrumentation response and characteristics. Measurement techniques in fluid mechanics, heat transfer, combustion, and solid mechanics. Experimental design and experience in the use of contemporary measurement systems. Term project.

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. Topics include design, analysis, especially application of modern control theory, of complex biological systems; dynamical engineering evaluation of anatomical-physiological elements. Experimental methods applied to biomedical problems in the laboratory, with utilized biengineering transducers and on-line digital computers. Digital simulation to interpret experimental data and to elucidate design features of these living systems. (F) Staff

213. Physiological Fluid Mechanics. (2) Two hours of lecture per week. Prerequisites: 106 or equivalent; 265A or consent of instructor. Investigation of fluid mechanical aspects of various systems, including circulatory, pulmonary, and renal system. Motion in the large and small blood vessels, and peristaltic and peristaltic flow. Analysis of prosthetic devices. Tabot

220. Case Studies in Mechanical Engineering. (2) One 2-hour lecture/discussion per week. Prerequisites: One graduate semester. Studies of selected problems that illustrate various methods of the design process in advanced mechanical engineering systems.

221. Machine Tool Design and Control. (2) Two hours of lecture per week. Fundamental aspects of machine tool and control systems, optimization of machining process, machine tool dynamics, and computer-aided control. (S, SP) Domínguez

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 method of characteristics, the bounding method, and the general approximations method. Numerical analysis of plastic deformation. (SP) Kobayashi

222A. Metal Forming and the Finite-Element Method. (2) New course. Two hours of lecture per week. Prerequisites: Graduate standing; seniors with strong background in solid mechanics. Applications of the finite-element method to metals of metal forming processes. General description of metal forming processes, theory of plasticity and viscoplasticity, variational formulation of the problem and the finite-element discretization, and use of forging, rolling, extrusion and drawing, and sheet metal forming. (F) 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 elastic, plastic, and creep deformation, under steady 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) Udey

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 engineering point of view. The topics covered will include: linear elastic fracture mechanics, crack propagation in fatigue, transition temperature approaches, static fracture of brittle solids, fracture of composites, and ductile fracture. (SP) Finnin

226. Computer-Aided, Optimal Mechanical Design. (3) New course. Three hours of lecture per week. Prerequisites: Graduate standing and the equivalent of both ME 102B and ME 128. The optimal mechanical design of mechanical systems and components. A variety of optimization techniques will be developed, applied to mechanical design, and implemented on the computer. (F) Pisano

230. Real-Time Applications of Mini and Micro Computers. Three hours of lecture per week. Prerequisites: Graduate standing in engineering or consent of instructor for advanced undergraduates. Mini and micro computers, operating in real time, have become ubiquitous components in engineering systems. The purpose of this course is to build competence in the engineering use of such systems through lectures stressing small computer structure, programming, and output/in operation, and through laboratory work with mini and micro computer systems. (F) Austerlitz

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 displacement constraints. (SP) Staff

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 dynamic systems. Controllability, observability, and stability. Model reduction. Analysis of single and multi-variable feedback control systems in transform and time domain. State observer. Feed-forward/predictor control. Application to engineering systems. (F) Tomizuka

233. Advanced Control Systems. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 222. Limit cycles and nonlinear systems. Lyapunov stability and Popov hyperstability, and their application to the design of model reference adaptive systems (MRAS). Statistical treatment of dynamic systems and their applications. Frequency domain design. Deterministic and stochastic optimal control. Self-tuning regulators. Applications to engineering systems. (SP) Tomizuka

235. Switching Control and Computer Interfacing. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: Control systems utilizing switching elements. Electronic and microprocessor devices for sequential logic. Applications to control of mechanical systems and control computer interfacing. (SP) Austerlitz

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. Estimation and evaluation of oil and gas reserves. Profitability analysis, optimization of expenditures. (SP) Russo

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; rock behavior, under confining stress and pore pressure; thermal stresses, thermal-chemical behavior; hydraulic fracturing; wellbore stability. (F) Marcus


251. Heat Conduction. (3) Three hours of lecture per week. Prerequisites: 151; Engineering 230A. 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, 265A. Engineering 230A. The transport of heat in fluids in motion; free and forced 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, liquids and solids; the calculation of radiant energy transfer. (F) Tien


255. Thermodynamics II. (3) Three hours of lecture per week. Prerequisites: 254. Equilibrium and non-equilibrium processes in high temperature gases applied to chemically reacting systems, energy transfer, transport processes, laser physics, and spectroscopy of flames and other gas systems.


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, and solidification. (SP) Carey

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. Offered even-numbered years. (F)

261. Compressible Fluid Flow. (3) Three hours of lecture per week. Prerequisites: Graduate standing. Inviscid compressible flow. Steady one-dimensional, unsteady one-dimensional, and two-dimensional flows. Prandtl-Meyer flow and oblique shocks. Linearized supersonic and slender body theory. Similarity. (SP) Marcus

262. Theory of Fluid Sheets and Fluid Jets. (3) Three hours of lecture per week. Prerequisites: 185 and 265A. Conservation equations 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. (F) Humphrey


265A. Viscous Flow. (3) Three hours of lecture per week. Prerequisites: 106 or equivalent. For fluid mechanics majors: 185 (may be taken concurrently). Kinematics and dynamics of viscous fluids. Flows with nearly constant viscosity and density, Vorticity Biot-Savart law. Dimensional analysis and similarity. Exact solutions. Thin layers; lubrication; laminar boundary layers. External creeping flows. Porous media. (SP) Sherman


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 determining the paths of particles and trajectories of aerospace vehicles, economics, and biological systems. Leitmann.

273. Oscillations in Linear Systems. (3) Three hours of lecture per week. Prerequisites: 104 and 133. Response of discrete and continuous dynamical systems, damped and undamped, to harmonic and general time-dependent loading. Convolution integrals and Fourier and Laplace Transform methods. Lagrange's equations; eigensolutions; orthogonality; generalized coordinates; noncanonical and degenerate systems; Rayleigh quotient. (F) Hsu.

274. Random Oscillations of Mechanical Systems. (3) Three hours of lecture per week. Prerequisites: 104 and 133. Random variables and random processes. Stationary, nonstationary, and ergodic processes. Analysis of linear and nonlinear, discrete and continuous, me-

276. 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, KAM theory. (SP) Mote.

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-excited oscillations, limit cycle, and domains of attraction. (SP)

279. Continuous Dynamic Systems Analysis. (3) Three hours of lecture per week. Prerequisites: Second year graduate standing. Exposition of techniques of discretization in continuous dynamic systems which precedes numerical analysis of initial value, eigenvalue, and boundary value problems. Methods discussed include variational, weighted residual, finite element, least squares, and others. Errors in discretization. (SP) Rubinsky.

280. Introduction to the Finite Element Method. (3) Three hours of lecture per week. Course develops foundations of the finite element method for applications to solid and fluid mechanics, dynamics, heat transfer, and field problems. Variational and weighted residual methods are developed. Emphasis on the formulation of elements, element state equations, and on applications. Computation is required at a minimum level. (SP) Mote.


282. Theory of Elasticity. (3) Three hours of lecture per week. Prerequisites: 185. A general development of thermodynamics of deformable media, entropy production, and 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) Naghd.


289. Theory of Shells. (3) Three hours of lecture per week. Prerequisites: 185 and 281. A direct formulation of a general theory of shells and plates based on the concept of Coarea (or Directed) surfaces. Nonlinear constitutive equations for finitely deformed elastic shells. Linear theory and a special nonlinear theory with small strain accompanied by large or moderately large rotation. Applications. (SP) Naghd.

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. (SP) Agogino.

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 oriented (or directed) media, nonlinear theory of diffusion, theory of electrical and magnetic condensation, elasticity and viscoelasticity theories which bear on 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 strategy, two-person games, cooperative games. Applications to engineering, economics, bargaining, coalition avoidance, etc. (SP) Horowitz.

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 151 or ChemEng 171; or consent of instructor. Introduction to the fundamental aspects of heat, mass and momentum transport between immiscible phases and between components of a particulate system. Practical use of conservation laws, constitutive equations, and analysis of chemical and physical-chemical relations. Analysis of systems involving erosion/corrosion, chemical reaction, non-Newtonian flow, interfacial phenomena, and turbulence. (SP) Humphrey.

290E. Thermal Analysis and Control of Electronic Systems. (3) New course. Three hours of lecture per week. Prerequisites: ME 151 or equivalent. An introduction to cooling technology for electronic systems, future needs and trends for electronic cooling, analysis and control of various cooling techniques and their associated thermal management strategies. (SP) Agogino.

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 flow simulation. Application to contemporary problems involving 1-, 2-, and 3-dimensional geometries and flows of gas mixtures will be discussed. (SP)


290M. Expert Systems in Mechanical Engineering. (3) Three hours of lecture per week. Prerequisites: 107A, 102B or equivalent. Introduction to artificial intelligence and expert systems in mechanical engineering. Fundamentals of analytical design, probability theory, failure analysis, risk assessment, and Bayesian and logical inference. Applications to expert systems in probabilistic mechanical engineering design. Development and implementation of automated inference diagrams to codify expert knowledge and to evaluate optimal design decision. (SP) Agogino.

290N. Optimal Dynamical Design. (3) Three hours of lecture per week. Prerequisites: Graduate standing and the consent of the Director of Graduate Studies. This course will cover the fundamentals of designing mechanical systems for optimal dynamic performance. The systems to be optimized are both discrete and continuous in nature, and the independent variables include parameters of system dimensions, mass, stiffness, and various mechanisms of damping. (SP) Agogino.

290P. Design Theory and Methodology. (3) New course. Three hours of lecture per week. Prerequisites: Graduate standing. 129 and 102B or equivalent. This course will cover fundamental studies of mechanical systems design from the perspective of advances from all of the engineering disciplines. Design is the process by which products, processes and systems are created to perform desired functions. (SP) Agogino.

290Q. Dynamic Control of Robotic Manipulators. (3) Three hours of lecture per week for the first five weeks; one hour of lecture per week for the remaining 10 weeks; four hours of laboratory per week for 15 weeks. Prerequisites: 290, 225, or consent of instructor. Dynamic and kinematic analysis of robotic manipulators. Sensors (position, velocity, force and vision). Actuators and power transmission lines. Direct drive and indirect drive. Point-to-point control. Trajectory generation. Phased following. Industrial practice in servo control. Applications of optimal linear and nonlinear control, preview control, non-linear control, and direct/indirect adaptive controls. Force control and compliance control. Feedback and feedforward and utilization of dynamic controls in flexible manufacturing environment. (F) Auslander.

290R. Automatic Control Laboratory. (2) One hour of lecture and three hours of laboratory per week. Prerequisites: ME 134. Applications of dynamic system models and control systems theory to mechanical, electrical, electro-mechanical, industrial, and other systems. Investigations include computer simulation and analog and digital feedback control. (F) Auslander.

290G. Group Studies, Seminars, or Group Research. (1-10 units) Prerequisites: Graduate standing. Open to graduate students for credit on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing. Advanced studies in various subjects through special seminars on topics to be selected each term.
year. Informal group studies of special problems, group participation in comprehensive design problems, or group research on complex problems for analysis and experimentation. (F,SP)

**299. Individual Study or Research.** (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour of seminar per week. Prerequisites: Graduate standing in engineering, physics, or mathematics. Variations on advanced problems in mechanical engineering. (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. 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) in their fields of specialization. (F,SP)

**Professional Courses**

**301. Teaching of Mechanical Engineering at the University Level.** (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One hour of seminar per week (for 1 unit). Weekly seminars and discussions on effective teaching methods. Evaluation of teaching strategies, theory of learning, and alternative approaches. Use of media resources. Student evaluation. Laboratory instruction. Curricula in mechanical engineering. Practice teaching. This course is to be teaching assistants of mechanical engineering. (F,SP)

**Medieval Studies** (College of Letters and Science)

Chair: (To be announced)

Graduate Adviser: (To be announced)

Medieval studies are currently undertaken in a joint degree program designed to preserve the established 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 this extra achievement is the Ph.D. with a joint-degree degree. 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 seminar work in two outside departments or programs, chosen in consultation with the departmental committee of faculty members organized through the Center for Middle Eastern Studies. Students should apply for admission to the individual department in which they would do their major work.

There is no undergraduate major. Students whose interests lie in the medieval period should consider the possibility of setting up an individual major (for requirements see the Announcements 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, Rhetoric, 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. One-hour lectures per week. Taught by the Distinguished Visiting Professor for the current year on a topic related to his or her specialty. (F,SP) Sauerlander and Science, 201 Campbell Hall, University of California at Berkeley; Berkeley, CA 94720.

**Concordance of Courses:** On the following page is a list of courses formerly offered by the Department of Microbiology and Immunology, followed by their new names, numbers, and titles in the new departments. For a list of the courses offered by the new departments, followed by their former names, numbers, and titles, consult staff in one of the new departments. At press time for this catalog, some course information was still not available. If you have not found a course listed with its new name, number, and title, consult staff in one of the new departments for up-to-date information.

**Microbiology and Immunology** (College of Letters and Science)

As a result of the reorganization of the biological sciences on the Berkeley campus, the faculty and programs of Department of Microbiology and Immunology will become part of the new Department of Integrative Biology. The faculty and programs concerned with microbiology will join the Division of Biochemistry and Molecular Biology, and those concerned with immunology will join the Division of Immunology. An outline of the full scope of the biological sciences reorganization and its implications, see page 89.

**Undergraduate Programs:** Beginning fall semester 1989, students will no longer be accepted into the former undergraduate major in microbiology and immunology in the College of Letters and Science. Students who declared the microbiology and immunology major before fall semester 1989 may continue in the program, provided they complete all degree requirements by fall semester 1993. Such students should contact the major adviser or undergraduate assistant in the appropriate department of the new department.

**Graduate Program:** For fall semester 1989, new students have been admitted to the existing graduate program in microbiology and immunology. Graduate programs for the new biological sciences departments are currently under review, and it is anticipated that the new graduate programs will receive final approval during fall semester 1989. All new and continuing graduate students will be notified when these programs are approved. At that time, students will have the option of continuing in the program to which they were admitted or requesting transfer to a new graduate program. For details of the new graduate programs in microbiology and immunology, students should contact the graduate adviser in the Division of Biochemistry and Molecular Biology (for microbiology) or the Division of Immunology (for immunology) who will familiarize them with the languages, culture, and history of the region, its basic geographic, demographic, and ethnographic character, and with the course of recent political, economic, social, and cultural change. The program in microbiology and immunology is seen as an opportunity for qualified students to prepare for careers in the biological sciences.

**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 ethnicity 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 seminar course: 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 geography and ethnography of the Middle East, its history and cultures, and current political, economic, and social development.
## Concordance List for Microbiology and Immunology

<table>
<thead>
<tr>
<th>Old No.</th>
<th>Course Title</th>
<th>Equivalent New Course, If Any</th>
</tr>
</thead>
<tbody>
<tr>
<td>002</td>
<td>Enology—The Microbiology and Biochemistry of Winemaking</td>
<td>MCellBi 014 Enology—The Microbiology and Biochemistry of Winemaking</td>
</tr>
<tr>
<td>006</td>
<td>Immunity and Defense</td>
<td>MCellBi 051 Immunity and Defense</td>
</tr>
<tr>
<td>008</td>
<td>Cancer and Immunology</td>
<td>MCellBi 052 Cancer and Immunology</td>
</tr>
<tr>
<td>010</td>
<td>The Microscopic World</td>
<td>MCellBi 012 The Microscopic World</td>
</tr>
<tr>
<td>100</td>
<td>Introduction to Microbiology</td>
<td>MCellBi 112 General Microbiology</td>
</tr>
<tr>
<td>100L</td>
<td>Microbiology Laboratory</td>
<td>MCellBi 112L Microbiology Laboratory</td>
</tr>
<tr>
<td>101</td>
<td>Molecular Genetics of Microbial Cells</td>
<td>MCellBi 112 General Microbiology</td>
</tr>
<tr>
<td>101L</td>
<td>Experimental Problems in Microbial Genetics</td>
<td>MCellBi 112L Microbiology Laboratory</td>
</tr>
<tr>
<td>103</td>
<td>Introductory Immunology</td>
<td>MCellBi 150 Molecular Immunology</td>
</tr>
<tr>
<td>103L</td>
<td>Experimental Problems in Immunology</td>
<td>MCellBi 150L Immunology Laboratory</td>
</tr>
<tr>
<td>104</td>
<td>Industrial Microbiology</td>
<td>MCellBi 113 Applied Microbiology and Biochemistry</td>
</tr>
<tr>
<td>202A</td>
<td>Advanced Immunology</td>
<td>MCellBi 250 Advanced Immunology</td>
</tr>
<tr>
<td>202L</td>
<td>Immunology Laboratory</td>
<td>MCellBi 250L Advanced Immunology Laboratory</td>
</tr>
<tr>
<td>206L</td>
<td>Molecular Immunogenetics Laboratory</td>
<td></td>
</tr>
<tr>
<td>212</td>
<td>Seminar in Current Research</td>
<td></td>
</tr>
<tr>
<td>214</td>
<td>Introduction to Research</td>
<td></td>
</tr>
<tr>
<td>216</td>
<td>Seminar in Tumor Immunology</td>
<td></td>
</tr>
<tr>
<td>220</td>
<td>Current Research in Microbiology</td>
<td></td>
</tr>
<tr>
<td>222</td>
<td>Cyanobacterial Physiology and Biochemistry</td>
<td>MCellBi 219W Cyanobacterial Physiology and Biochemistry</td>
</tr>
<tr>
<td>225</td>
<td>Transposable Genetic Elements</td>
<td></td>
</tr>
<tr>
<td>230</td>
<td>Regulation of the Immune Response</td>
<td>MCellBi 253 Regulation of the Immune Response</td>
</tr>
<tr>
<td>231</td>
<td>Immunobiology of the T Lymphocyte</td>
<td>MCellBi 252 Immunobiology of the T Lymphocyte</td>
</tr>
<tr>
<td>233</td>
<td>Molecular Biology of Cancer</td>
<td>MCellBi 254 Molecular Biology of Cancer</td>
</tr>
<tr>
<td>270</td>
<td>Research Seminar</td>
<td>MCellBi 291 Introduction to Research</td>
</tr>
<tr>
<td>280</td>
<td>Research</td>
<td></td>
</tr>
</tbody>
</table>

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 particular 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 adviser 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 requirement. 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**


**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, or comparative perspective on 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

**Honor 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 195). 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**

- Approaches to the Middle East from Selected Disciplines Seminar. (2) One 2-hour seminar per week. Prerequisites: Near Eastern Studies 10. A weekly seminar of guest speakers, each reviewing approaches to the Middle East from disciplines such as anthropology, women’s studies, philology, religious studies, etc. The seminar introduces students to the work of several major Berkeley Middle East-related faculty and others. (SP)

*Not offered 1989-90
*On leave, spring
*On leave, fall
*Recipient of Distinguished Teaching Award
Upper Division Courses

190. Senior 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 presentation and preparation of a senior thesis pertaining to the student's individual area of concentration within the Middle Eastern studies major. (F,SP) Staff

H185. 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, NES 10, MES 190, and 3.3 GPA in all work and the major. 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

189. Directed Group Study for Upper Division Students. (1-4) Course may be repeated for credit. One to four hours of seminar per week depending upon unit credit in the particular semester. Seminar for the group study of selected Middle Eastern-related topics not covered by regularly scheduled courses. A written proposal must be approved by a faculty member. (F,SP) Staff

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Individual conferences. For students wishing to pursue an interest not represented in the curriculum by developing an independent program of study and research supervised by a faculty member. A written proposal must be approved by a Middle Eastern Studies faculty adviser. A paper is required. (F,SP) Staff

Military Affairs

Lower Division Courses

1. American Military Experience: Revolution to Vietnam. (3) Two 1-hour lectures and 1-hour discussion per week. Examines four general themes in the military history of the United States: the growth and development of the armed forces, the institution of civil-military relations, the elaboration and refinement of military technology, and the changes in military strategy. (F) Goertemiller

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 relationships between the military institution and the individual, the government, and the society. Investigates the need for national defense and studies the cause of war. (SP)

3. Defense Leadership and Management. (2) One 1-hour lecture per week. An analytical study of management schools, principles, and philosophies as a basis for developing effective leadership. Emphasis on behavioral science applications within the military organizational structure. Review of literature pertaining to power and authority, responsibility, motivation, communication, decision making, role theory, and professional ethics. (F,SP)

20. Evolution of European Warfare. (2) One 2-hour lecture per week. Historical survey and analysis of the causes and nature of wars of 500 B.C. through the France of 1789-1815. Theme of the course is "the Man on Horseback." Historians and authors employed include Herodotus, Thucydides, Plutarch, Caesar, Villehardouin, and Napoleon.

Upper Division Courses

120. The Evolution of American Warfare: 1607-1990. (3) Two 1-hour lectures or one 3-hour lecture per week. Historical analysis of American theory of warfare from colonial period to the Vietnam War. Emphasis on development of a global military strategy, the impact of social forces in the United States, and the changes in military strategy. (F) Goertemiller

121. The Evolution of American Warfare: 1900-1980. (3) Two 1-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. Development of the global strategy of the United States, the role of the Army in world power and the impact of American military influence on the world. (F)

124. War in Literature. (3) Three 1-hour lectures per week. Interdisciplinary exploration of novels and narratives of war as artifacts of our popular culture reflecting American attitudes toward war as both an institution and a personal experience. Traces four themes in particular: war as a rite of passage, the submergence of the individual in modern mass society, the military as a subculture within American society, and America's role as a style of self-defined nation. (F)

140. The North Atlantic Treaty Organization (NATO). (2) Two 1-hour lectures per week. Prerequisites: Upper division standing and consent of instructor. Theory and history of alliances; NATO's political and military structure; operating methods; military forces and strategy; Soviet response to NATO; and strategic and political options, will be examined. (SP) Goertemiller

145A-145B. National Security Forces in Contemporary American Society. (3,3) Two 1-hour seminars per week. Prerequisites: Upper division standing and consent of instructor. Conceptually examines the Armed Forces as an integral element of American Society. Examines contemporary issues in civil-military relations and the unique environmental influence in which U.S. Defense Policy is formulated and implemented. (F,SP)

154. The History of Littoral Warfare. (3) Two 1-hour lectures per week. An analysis of the theory, origins, historical evolution, and impact of man's attempts to project seapower ashore. Research on such 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. Contrasts on the paradigm 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 target country, and the cause of the coup d'etat. (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 Soviet and selected other military systems, as they relate to the socio-political organizations of their respective countries. Special emphasis on discussions of development of their decision making and command structures and the relationship of the military with their domestic and international environment. (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 conference to be arranged. Prerequisites: Upper division standing and consent of the instructor. Supervised independent study and research for undergraduate students who desire to pursue topics of their own selection. (F,SP)
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 active student discussion. In addition, there is a weekly one and one-half hour leadership laboratory 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 of the first-year professional officer course in Aerospace Studies or Military Affairs. The normal sequence for the four-year program is as follows: MA1, AS1, AS2, 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

1. The U.S. Air Force and National Security. (1) One 1/2-hour lecture/discussion per week. Introductory survey of the U.S. Air Force. Explores evolutionary factors affecting 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 commands are examined individually. (SP)

2. The Growth and Development of Air Power. (1) One 1/2-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 figures on the growth and development of air power. (F)

Upper Division Courses

135A-135B. Aerospace Management and Leadership. (3) Two 1/2-hour preseminar meetings per week. Prerequisites: Upper division standing and consent of instructor. A study of contemporary management practices. Includes organizational behavior, functions and theories of management, systematic decision-making, the communication process, case analysis, leadership theories, managerial ethics, personnel administration, and the organizational environment. (F,SP)

Professional Courses

442. Light Aircraft Operation. (2) One 1/2-hour lectures per week. Prerequisites: Consent of instructor. Preparation for qualification as Federally Licensed Private Pilot. Study of federal aviation regulations, basic meteorology for pilots, navigation by dead reckoning and piloting, radio and radio navigation, elementary aerodynamics and aircraft structures. (F,SP)

Military Science (Army ROTC)

Department Office: 73 Harmon Gymnasium, 642-3374

The Army Officer Education Program offers a variety of credit 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 courses.

1. The basic course is designed for students who are unsure of their interest in the military, and it incurs 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 non-for profit 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. Ranger, airborne, air assault, and northern 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 program 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 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. (F,SP)

2A-2B. U.S. Army and National Security. (1) 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. (F,SP)

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. (F,SP)

Military Officers' Education Program (ROTC) / 275

Upper Division Courses

100. Army Management and Leadership. (2) May be taken on a passed/not passed basis. One 2-hour lecture per week. Prerequisites: Upper division standing and consent of instructor. A practical interdisciplinary approach to contemporary civilian and army management. Military leadership is examined with an emphasis on increasing the student's professional effectiveness on an individual, group, and organizational basis. Topics include interpersonal and organizational communication, problem-solving and decision making. (SP) West

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 relation to land navigation. Conceptual linkage to basic military tactics. Topics include map coordinate systems, scale and distance relationships, intersections, and sector identification and pattern operations, and the use of resource planning techniques. (F) West

Naval Science (Navy ROTC)

Department Office: 25 Callaghan Hall, 642-3552

The Department of Naval Science offers several programs of instruction 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 first two years as part of their overall academic load: One term of a foreign language, the basic engineering course in the Naval Architecture Department, three Navy tourism courses (NS 401) and two academic courses listed under Military Affairs covering the Military in American Society (MA 1) and the American Military Experience (MA 2); and Naval Ships' Systems (NS 401). Scholarships are available to students 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 or their equivalent during the junior and senior years:

(a) Organizational Behavior (BA 150); (b) for Navy-Option students, Navigation (NS 150), or for Marine-Option students, a two-course sequence in the Evolution of Warfare (MA 120 and MA 121) and the History of Littoral Warfare (MA 154). National Security Strategy (PS 218); or (c) except those in the Colleges of Engineering and Chemistry, for whom it is highly recommended.

Students are also required to attend weekly professional development laboratories. These two-hour sessions offer the student the opportunity to gain a working knowledge of the role in the management and direction of the midshipman battalion and provide time for the midshipman to explore professional topics. Student midshipmen participate in four-to-six week summer training cruises throughout the world. At sea they apply theoretical aspects of their education and training to the real world environment of a Navy ship.

Currently, there are four programs available:

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, 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 or 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 after their junior year. 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 junior year in the four-year college program.) Scholarships may be offered to highly qualified college program students.

3. NROTC Two-Year Scholarship Program: Nation-wide competition open to academically and physically qualified men and women who will be entering their junior year (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 commission are anticipated. Waivers to age 27 are possible in rare circumstances, however, are possible for prior service. Candidates for the two-year scholarship attend a six-week summer training period at the Naval Science Institute in Newport, Rhode Island, during the summer prior to their junior year. Graduates of the Naval Science Institute will receive full payment of tuition, fees, books, and $100 per month during the last two years of college. The 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. Applications are accepted on a rolling basis.

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 27½ at the time of graduation, with the same active duty waiver 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 receive uniforms, Naval Science books, and $100 per month stipend in their last two years in college. One summer training cruise is required. The six-week summer training cruise is required. Upon completion, the student receives a commission in the Naval or Marine Corps Reserve with a three-year active duty obligation. Application deadline is November 1. Application deadline is November 1. 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 mission and organization of the U.S. Navy and to the concepts of sea power. Instruction emphasizes the mission and organization, 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 paths. The course also covers naval customs and courtesies, 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. (2) Two hours of lecture/discussion per week. Prerequisites: Consent of instructor. Traces the U.S. historical evolution of sea power, its concepts, theories and applications. Emphasizes the role of the U.S. Navy in today's changing world, changing technology, and naval leadership on the evolving concept of sea power. Relates historical developments to current trends. Examines briefly U.S. merchant ships 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 and celestial navigation and piloting techniques. A study of coordinate systems, including the celestial coordinate system, systems for plotting and publication, position fixing, dead reckoning, nautical astronomy, the theory 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, precise ship positioning, use of aids to navigation, meteorology, and electronic navigation. (SP)

Professional Courses

400A through 400H. Naval Laboratory. (0) Grading on a passed/not passed basis only. Section corresponds to the student's standing within the university. Freshmen, 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. Emphasis is placed on professional training not of an academic nature. The laboratory is intended for topics such as drill and ceremonies, physical fitness and swimming test, cruise preparation, crew evaluation, sail training, safety awareness, preparation for commissioning, personal finances, insurance, and applied exercises in naval ship systems, navigation, naval operations, national 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. (FSP)

401. Naval Ship's Systems. (3) Three hours of lecture per week. An introduction to the physical theory or acoustic and electromagnetic wave generation and propagation; the design and use of electronic, electromagnetic, 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, directing, and controlling as related 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 officer responsibilities in naval administration. The course covers counseling methods, military justice administration, naval human resources management, directives and correspondence, naval personnel administration, material management and maintenance, and supply systems. This capstone course in the NROTC curriculum builds on and integrates the professional competencies developed in prior course work and professional training. (SP)

Molecular and Cell Biology

(College of Letters and Science)

Department Office: 596 Life Sciences Annex
Chair: Gunther S. Stent, Ph.D.
Division Offices:
- Biochemistry and Molecular Biology: Genetics and Plant Biology Building
- Biophysics and Cell Physiology: 103 Donner Laboratory 
- Developmental and Cell Biology: 298 Life Sciences Annex

Genetics: Genetics and Plant Biology Building
- Immunology: 298 Life Sciences Annex
- Neurobiology: 298 Life Sciences Annex

Graduate Affairs: Genetics and Plant Biology Building

Professors:
- James Allison, Ph.D. University of Texas. Molecular immunology
- Erez Brain, Ph.D. University of California at Berkeley. Radiation biology, carcinogenesis
- Bruce N. Ames, Ph.D. California Institute of Technology. Molecular biology, biochemistry, carcinogenesis
- Giovanni Ferro-Luzzi Albonico, Ph.D. Cell Biology, University of Rome. Bacterial molecular biology, membranes
- Clint E. Bailey, Ph.D. University of Wisconsin. Carbohydrates, lipids, cell walls
- Alan J. Beaudry, Ph.D. Johns Hopkins. Physics of energy transduction, auditory biology
- David R. Bentley, Ph.D. University of Michigan. Developmental neurobiology
- Elizabeth Blackburn, Ph.D. University of Cambridge. Molecular biology, chemoprevention
- Phyllis B. Blair, Ph.D. University of California at Berkeley. Immunology, virology, cancer research
- Michael R. Blatch, Ph.D. University of California at Berkeley. Eukaryotic gene expression
- Hans J. Bremermann, Ph.D. University of Muenster. Theoretical biology, modeling
- Beth Burnside, Ph.D. University of Texas. Austin. Cell biology of photoreceptors
- Richard Calendar, Ph.D. Stanford University. Molecular genetics of viruses
- W. Zachere Cande, Ph.D. Stanford University. Cell and developmental biology
- Charles A. Cantor, Ph.D. University of California at Berkeley. Genomic structure
- Michael J. Chamberlin, Ph.D. Stanford University. Nucleic acids, gene expression
- Alvin J. Clark, Ph.D. Harvard University. Microbial genetics
- R. David Cole, Ph.D. University of California at Berkeley. Protein chemistry, chromatin, microtubules
- Nicholas R. Cozzarelli, Ph.D. Harvard Medical School. DNA replication and recombination
- Peter H. Duesberg, Ph.D. University of Frankfurt. Genetic stability and carcinogenesis
- Harrison Eochs, Ph.D. University of Wisconsin. Molecular genetics
- Seymour Fogel, Ph.D. University of Missouri. Recombinant DNA in yeast
- John G. Forte, Ph.D. University of Pennsylvania. Membrane proteins, transport of nutrients
- Walter Gehring, M.D. University of Pennsylvania. Neurophysiology, neuropharmacology, nuclear brain dynamics
- James W. Fristrom, Ph.D. University of California at Berkeley. Drosophila developmental genetics, hormones
- John Gottschalk, Ph.D. University of California at Berkeley. Developmental biology
- Robert R. Glaesar, Ph.D. University of California at Berkeley. Membrane proteins, structural biology
- Donald A. Glaesar, Ph.D. California Institute of Technology. Psychophysics of vision, biotechnology
- Alexander N. Glazer, Ph.D. University of Utah. Macromolecular complexes, polysaccharide systems
- Corey Goodman, Ph.D. University of California at Berkeley. Developmental neurobiology, molecular genetics
- Jack F. Kirsh, Ph.D. Rockefeller University. Enzymology, site-directed mutagenesis
- Daniel E. Kohland, Jr., Ph.D. University of Chicago. Molecular biology, neurobiology, enzyneology
- Marian E. Koshland, Ph.D. University of Chicago. Molecular immunology
- Harold Lecar, Ph.D. Columbia University. Neural biology, excitatory membranes
- Terrance Leighton, Ph.D. University of British Columbia. Microscopy, molecular and developmental genetics
- Stuart M. Linn, Ph.D. Stanford University. Enzymes of DNA metabolism
- Robert R. Macey, Ph.D. University of Chicago. Membrane transport
- Terry M. Machen, Ph.D. University of California at Los Angeles. Epithelial transport, cellular and membrane physiology
- W. Steven Martin, Ph.D. University of Cambridge. Cell biology and tumor virology
- Howard L. Mel, Ph.D. University of California at Berkeley. Cell membrane biophysics, thermodynamics
- Robert I. Nicholls, M.D. University of California at Los Angeles. Cellular immunology, immunoregulatory mediators
- Robert K. Mottier, Ph.D. University of California at Berkeley. Yeast genetics, DNA repair
Reorganization of Biological Sciences at Berkeley

In 1989 the biological sciences at Berkeley underwent a complete revision to reflect advances in modern biology. All prerequisite courses for the Molecular and Cell Biology courses followed by former departments, and its implications appears on page 89.

Total units: 66 (biochemistry and molecular biology) or 62 (genetics, or molecular, or microbiology).

Plan II. Cell Physiology: Timiras; Cell and Developmental Biology: Firestone; Neurobiology: Free- man, Winer.

Graduate adviser: Elizabeth Blackburn (Head).

New Program

The teaching and research activities of the Department of Molecular and Cell Biology concern the molecular structures and processes of cellular life and their roles in the function, reproduction, and development of living organisms. This agenda covers a broad range of specialized disciplines, such as biochemistry, biophysics, molecular biology, genetics, cell physiology, cell anatomy, immunology, and neurobiology. The types of living organisms from which the data and skills drawn for the course list and its working materials are as diverse as its disciplinary specializations, ranging from viruses and microbes through plants, roundworms, annelids, arthropods, and mollusks to fish, amphibia, and mammals. The faculty of the department is organized into six divisions, called Biochemistry and Molecular Biology, Bio- physics and Cell Physiology, Cell and Developmental Biology, Genetics, Immunology, and Neurobiology. Each division is responsible for the course list and plan of the undergraduate major program covering its disciplinary specialty. The departmental graduate program is administered by the interdivisional Gradute Affairs Committee.

The Major

At press time, the undergraduate major had been approved by the Executive Committee of the College of Letters and Science. The program must still receive systemwide approval. Consult the department office for up-to-date information.

The undergraduate major in molecular and cell biology replaces the previously offered majors in biochemistry; biological sciences (Plan A, Option 1); biological medical physics option (Plan A.B.); biochemistry and B.S.); microbiology and immunology (Plan I); molecular biology; neurobiology; physiology; and zoology.

Plan I. (Emphasis (Biochemistry and Molecular Biology Emphasis: Genes; Emphasis 3: Immunology; Emphasis 4: Microbiology)

Lower Division. Chemistry 1A-1B (8); Biology 1A-1B (8); Mathematics 1A-1B (8); Physics 8A-8B (8); (emphasis in Biochemistry and Molecular Biology) Chemistry 3 (3), Chemistry 112A-112B recommended instead of Chemistry 8A-8B. Lower division units: 42.

Total Units: 66.

Upper Division. Physical Chemistry (3); MCB 100 (4), MCB 110 (4); MCB 140 (4); (emphasis in Biochemistry and Molecular Biology) MCB 162 (3), MCB 163 (3), MCB 164 (3), MCB 110L (5) and one additional upper division MCB course, or (emphasis in Genetics) MCB 140L (4) and one additional upper division MCB course, or (emphasis in Immunology) MCB 160 (3), MCB 160L (3), MCB 160L (3) and one additional course chosen from MCB 162 (3), MCB 162 (3), MCB 164 (3), and MCB 165 (3).

Upper division units: 23.

Total Units: 69.

Plan II. (Emphasis 1: Cell and Developmental Biology; Emphasis 2: Cell and Developmental Biology; Emphasis 3: Neurobiology)

Lower Division. Chemistry 1A-1B (8); Biology 1A-1B (8); Mathematics 1A-1B (8); Physics 8A-8B (8); (emphasis in Biochemistry and Molecular Biology) MCB 162 (3), MCB 163 (3), MCB 164 (3), MCB 110L (5) and one additional upper division MCB course, or (emphasis in Genetics) MCB 140L (4) and one additional upper division MCB course, or (emphasis in Immunology) MCB 160 (3), MCB 160L (3) and one additional course chosen from MCB 162 (3), MCB 162 (3), MCB 164 (3), and MCB 165 (3).

Upper division units: 23-25.

Total Units: 65-64.

Plan III. (Emphasis in Biophysics)

Lower Division. Chemistry 1A-1B (8); Biology 1A-1B (8); Mathematics 1A-1B (8); Mathematics 50A-50B (8); Physics 7A-7B-C7 (12); Chemistry 8A-8B (7); Chemistry 14 (3). Lower division units: 50.

Upper Division. MCB 102 (4); MCB 122 (4); MCB 122L (4); and two upper division MCB courses; or one of the following physics course sequences: 110A-110B (8), 105-112 (6), or 117A-117B (6). Upper division units: 20.

Total Units: 70.

Honor Program. No later than the beginning of their senior year, students may enroll in the honors program, for which consent of their major adviser and a grade-point average of 3.3 or higher in courses satisfying the requirements of any plan of the major and in all courses taken at the University is required. Certain graduate courses in molecular and cell biology will be open to honors students on approval of the instructor and the major adviser. To complete the honors program and to graduate with honors, students must complete at least 2 units of course H196 and one unit of course H190 and write a superior thesis based on research.

Graduate Program

For fall semester 1989, new students have been admitted into the existing graduate program in the biological sciences. For up-to-date information, consult the graduate programs department as many of the biological sciences departments are currently under
102. Survey of the Principles of Biochemistry and Molecular Biology. (4) Formerly Biochemistry 102. Three 1-hour lectures and one hour of section meeting per week. Partial credit (2 units) will be given to students who have completed Biochemistry 100A or 100. No credit after taking both 100 and 110. Prerequisites: Biology 1A; Chemistry 8B. Recommended: A course in physical chemistry. A comprehensive survey of the fundamental principles of molecular biology, the molecular properties of intermediaries, the structure and function of biological macromolecules, the logic of metabolic pathways (both degradative and biosynthetic), and the molecular basis of genetics and gene expression. (F,SP) Staff

102L. Biochemistry Laboratory. (4) Formerly Biochemistry 102L. Two 1-hour lectures and two 3-hour laboratories per week. Prerequisites: Chemistry 5; 102 (preferably completed but may be taken concurrently). Experimental approach to the study of the properties of biological materials, the action of enzymes, and the use of specific techniques for laboratory work in biochemistry. Planned to accompany lectures in 102. (F,SP) Balou, Neillands

110. General Biochemistry and Molecular Biology. (4) Formerly Biochemistry 100B and Molecular Biology 100A-100B. Three 1-hour lectures and one 1-hour section meeting per week. Prerequisites: 100 (may not be taken concurrently). Molecular Biology of prokaryotic and eukaryotic cells, the structure and function of DNA, replication, transcription, translation. Structure of genes and chromosomes. Regulation of gene expression. (F,SP) Calendar, Linn, Martin, Schekman, Tjian

110L. General Biochemistry and Molecular Biology Laboratory. (4) Formerly Biochemistry 100L and Molecular Biology Laboratory 101. Three 1-hour lectures and three 3-hour laboratories per week. Prerequisites: 110 (may be taken concurrently); Chemistry 5. Experimental techniques of biochemistry and molecular biology, designed to accompany the lectures in 100 and 110. (F,SP) Staff

112. General Microbiology. (4) Formerly Microbiology and Immunology 100 and 101. Three 1-hour lectures and one 1-hour section meeting per week. Prerequisites: Biology 1A; 102. 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) Kustu, Leighton

112L. General Microbiology Laboratory. (4) Formerly Microbiology and Immunology 100L and 101L. One 1-hour lecture and two 4-hour laboratories per week. Prerequisites: 112 (may be taken concurrently); Chemistry 5. Experimental work designed to accompany course 112, which acquaints the student with the isolation of bacteria from natural habitats, methods of culture, microscopic observation, the structural and physiological features of microbial cells, and their molecular genetics. (F) (SP) Staff

113. Applied Microbiology and Biochemistry. (3) Formerly Microbiology and Immunology 104. Two 1-hour lectures per week. Prerequisites: 112. 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; and production of antioxidants. (SP) Nikaido

114. Introduction to Comparative Virology. (3) Formerly Molecular Biology 120 and Biology 120. Three 1-hour lectures per week. Prerequisites: Chemistry 8A-8B and Biology 1A-1B. Consideration of viruses as infectious agents, including virology (vectors and invertebrates). Comparison of biochemical and genetic characteristics, and modes of replication. (SP) Morris, Volkman

117. Topics in Biochemistry and Molecular Biology. (1-3) Formerly Biochemistry 185 and Molecular Biology 185. Topic to be announced on a passed/not passed basis. One, two, or three hours of lecture per week. Prerequisites: Consent of instructor. Topics of current and general interest in some specialized domain of molecular and cell biology.

Graduate Courses

200. Advanced Biochemistry and Molecular Biology. (3) Formerly Molecular Biology 200A-200B. Two 1½-hour lectures and one hour of discussion per week. Prerequisites: 110 or equivalent. General course for graduate students. Recent advances in the study of structural, functional, and genetic characteristics of prokaryotic cells and eukaryotic cells and their viruses, macromolecular synthesis, regulation of gene expression, chromosome organization, and cell differentiation. (F,SP) Czaarrell, Echols, Botchan

201A-201B. Advanced Biochemistry and Molecular Biology Laboratory Methods. (2;2) Formerly Biochemistry 201A-201B. Three 1-hour lectures and three 3-hour laboratories per week. Prerequisites: 110 or equivalent. Lecturing and experimental work on a passed/not passed basis. One, two, or three hours of lecture per week. Each section runs for five weeks.

201A. Enzyme Purification. (SP) Rabionowitz

201B. Molecular Genetics. (SP) G. Ames

201C. Recombinant DNA Technology. (SP) Kane

203. Structure and Function of Eukaryotic Cellular Membranes. (2) Formerly Biochemistry 203. Two 1½-hour lectures per week. Prerequisites: 130. The arrangement and biogenesis of eukaryotic membrane lipids, the membrane skeleton, transport proteins, intracellular organelles, and the function of the cell surface in various cell cycle events. (SP) Schekman

205. Biochemistry of Nucleic Acids. (3) Formerly Biochemistry 205. Two 1½-hour lectures and one hour of discussion per week. Prerequisites: 110 or equivalent. The chemistry and biochemistry of nucleic acids and their constituents. (SP) Chamberlin

206. Physical Biochemistry. (3) Formerly Biochemistry 206. Two 1½-hour lectures per week. Prerequisites: Year courses in organic and physical chemistry; 100 recommended. 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

207. Comparative Biochemistry. (1) Formerly Biochemistry 207. One hour lecture per week. Prerequisites: 100. Contributions of comparative biochemistry to knowledge of the molecular basis for organismal diversity, the mechanism of evolution, and the phylogenetic relationships of species. (SP) Wilson

208. Regulation of Gene Expression. (3) Formerly Biochemistry 208. Two 1½-hour lectures and one hour of discussion per week. Prerequisites: 110 or equivalent; 140. Regulation of genes at the biochemical and molecular levels, chromosome structure and replication; transcription, and RNA processing; transformation, transposition; gene regulation in viruses, microorganisms, and higher eukaryotes. (SP) Schekman, Tjian, Echols

213. Structure and Function of the Prokaryotic Cell. (2) Formerly Biochemistry and Immunology 207. Two 1-hour lectures per week. Prerequisites: 100 or 112, or equivalent. A synthesis of structural and biochemical knowledge about the principal components of prokaryotic cells, with emphasis on membranes. (SP) Glazer; (SP) Nikaido

215. Molecular Biology of Animal Viruses. (2) Formerly Molecular Biology 220. Two 1½-hour lectures per week. Prerequisites: 100 or 112, or equivalent. Structure, reproduction, mutations, and host-cell interactions (including pathogenesis) of animal viruses. Bochtler, Duong

217A-217B-217C. Selected Topics in Biochemistry and Molecular Biology. (1;1;1) Formerly Biochemistry 294A-294B-294C. Course may be repeated for credit. Three 1-hour lectures per week for five weeks. Prerequisites: Graduate standing. Recent advances in the field may be repeated each year. 217A, 217B, 217C are three sections of five weeks each. The sections are taught in tandem and may be taken individually.

218A-218G. Research Review in Biochemistry and Molecular Biology. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis.
basis. One 2-hour seminar per week. Prerequisites: Consent of Instructor. Review of current literature and discussion of original research. (F,SP) 2

218A. Viral Diseases. Formerly Molecular Biology 232. Initiation of DNA replication, the regulation of transcription at the initiation and termination stages, DNA packaging, interference with viruses, malignancy, and the heat shock response. Echols, Calendar

218B. Molecular and Developmental Genetics of Bacillus subtilis. (2) New course. Molecular genetic regulation of transcription, translation, and developmental gene expression in bacteria. Taub

218C. Malignant Transformation. (2) New course. Malignant transformation by retroviruses and the role of protein phosphorylation in growth regulation. Martin

218D. DNA Structure and Function. (2) Formerly Molecular Biology 202. DNA structure and function. Cozzarelli, Harland

218E. Viruses as Models for Eukaryotic Gene Expression and Replication. (2) Formerly Molecular Biology 208. Recent developments in eukaryotic viral and cellular regulation. New concepts in transcription and RNA replication, with particular emphasis upon virus-cell interactions. Botchan

218F. Large DNA Molecules. (2) New course. Methods for manipulating chromosome-sized DNA molecules for the solution of problems of biological interest. Oshino

218G. Mycobacterial Development. (2) New course. Review of current literature and discussion of original research. (F,SP) Zusman

219A-219W. Research Review in Biochemistry and Molecular Biology. (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. Review of current literature and discussion of original research. (F,SP)

219A. Carbohydrate Research. Formerly Biochemistry 231.


219D. DNA Enzymology. (2) Formerly Biochemistry 240. Enzymology of DNA repair, replication, restriction, recombination, and methylation. Lin

219E. Regulation of Gene Transcription. (2) Formerly Biochemistry 242. The mechanism of regulation of gene function, primarily at the level of genetic transcription. Chamberlin

219F. Eukaryotic Gene Expression. Formerly Biochemistry 244. Protein-DNA interactions and the control of gene expression in eukaryotes. Tijan

219G. Mutagen detection. (2) Formerly Biochemistry 246. Mutagens and carcinogens. A. Ames


219J. Evolution and Speciation. Molecular aspects of evolution and speciation. (2) Formerly Biochemistry 249. Wilson

219K. Microbial Protein Synthesis and Regulation of One-Carbon Metabolism. Formerly Biochemistry 251. Rabinozit

219M. Regulatory Substances in Bacteria. (2) Formerly Biochemistry 254. Bacterial regulation. A. Ames

219N. Chemoattractant, (2) Formerly Biochemistry 255. Chemical basis of chemotaxis of bacteria as a model sensory system. Koshland

219P. Secretion and Cell Membrane Assembly. (2) Formerly Biochemistry 256. Cell surface growth with emphasis on the unicellular eukaryote S. cerevisiae. Schekman

219R. Transport Across Cell Membranes. (2) Formerly Biochemistry 258. Special emphasis on transport of amino acids and proteins across cell membranes. G. Ames

219T. Peptide Hormone Biosynthesis and Eukaryotic Cell Division. (2) Formerly Biochemistry 259. Synthesis and processing of peptide hormone precursors, biochemical basis of cellular growth control, and molecular mechanisms of cell type-specific gene expression, with emphasis on the yeast Saccharomyces cerevisiae. Thorer

219U. Microbial iron metabolism. (2) Formerly Biochemistry 252. Microbial iron metabolism. Noland

219W. CyanoBacterial Physiology and Biochemistry. (2) Formerly Molecular Biology 222. The physiology, cell structure, biochemistry, and molecular biology of the cyanobacteria (blue-green algae). Glazer

Division of Biophysics and Cell Physiology
Head: W. Geoffrey Owen

Lower Division Courses

21. The Physics of Life. (2) New course. Three hours of lecture/discussion per week. A seminar-style survey of topics in physical biology which include: quantification of dynamic processes in biological systems, the role of noise in cellular decision making, and the role of noise in perception. (F)

22. Origin and Early Evolution of Life. (2) Formerly Biophysics 12. 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; origins and early evolution of life; search for life beyond Earth. (SP) Bremermann, Jukes

Upper Division Courses

120. Cell Physiology. (4) Formerly Physiology 100 and 101. Three 1-hour lectures and one hour of discussion per week. Prerequisites: 102, Biology 1A-1B, Physics 8A-8B, Physical Chemistry. A discussion of the cellular basis of organ function. Exclusivity, motility and transport and their importance in the cardiovascular, renal, respiratory, gastrointestinal, and nervous systems. (SP) Forte

120L. Cell Physiology Laboratory. (4) Formerly Physiology 100L and Physiology 101L. Two 1-hour lectures, two 3-hour laboratories per week. Prerequisites: 120 (should be taken concurrently). Basic laboratory techniques in cellular and organ physiology. (SP) Macey

122. Biophysics. (4) Formerly Biophysics 101 and 102. Three 1-hour lectures and one hour of discussion per week. Prerequisites: Biology 1A, Physics 7A-7B, 7C, Chemistry 14, and Mathematics 50A-50B. Biophysical determination of macromolecular structure; nuclear magnetic resonance, neutron diffraction, optical and X-ray diffraction, and spectroscopy. Crystalline in solution and biological membranes, the function of ion channels and ensembles of channels. Sensory transduction. Cellular networks as computational devices, information processing and transfer. (F) Bialek, Lecar

122L. Biophysical Laboratory. (4) Formerly Biophysics 111. Two 1-hour lectures and two 3-hour laboratories per week. Prerequisites: 122 may be taken concurrently. Advanced laboratory in biophysics emphasizing the application of physical and mathematical methods to problems in quantitative biology. Experiments are drawn from a wide range of biophysical phenomena. (F,SP) Bearden


125A-125H. Topics in Biophysics and Cell Physiology. At least one course per semester will be offered from the following list.

125B. Computer Simulations in Physiology and Biophysics. (3) Formerly Physiology 130. One 1-hour lecture and two 3-hour labs per week. Prerequisites: 120 or 122 or consent of instructor: Computer workshop. Class sessions on programming and reading assignments; present special topics in physiology and biophysics which are particularly suitable for study by computer simulations. Students will be provided with microcomputers to set up standard simulations on their own original problems. (SP) Macey

125C. Physics of the Sensory Systems. (3) New course. Three hours of lecture/discussion per week. Prerequisites: 122 or 160 or consent of instructor. Characterization of noise in physical and biological systems; analysis and response to small signals. Discrimination of sound and noise in sensory perception; vision, hearing and thermoreception. Anatomical structures that maximize signal collection; transduction, amplification, and filtering in the receptor cell; post-synaptic aspects of signal/noise discrimination applied to higher sensory and perceptual functions. (F) Blaikew

125D. Radiation Biophysics. (3) Formerly Biophysics 131. Three hours of lecture per week. Prerequisites: 102, Physics 85, Biology 1A, Math 1A-1B. Physical concepts of ionizing and nonionizing radiation; application of radiation to biological investigation and to medical diagnosis and treatment. The effects of radiation on molecules, cells, whole organisms, and populations. (SP) Okey

125E. Physiology of Human Development. (3) Formerly Physiology 152. Three hours of lecture per week. Prerequisites: Biology 1A-1B. The developing human body from prenatal life to maturity; fertilization; embryology; growth and development; functional maturation in infant, child, and adolescent; neuroendocrine control of puberty; factors influencing growth and development. (F) Timiras

125F. Physiology of the Aging Process. (3) Formerly Physiology 153. Students who have received credit for MCB 125F may not receive credit for MCB 125F. Three 1-hour lectures and one 2-hour lab per week. Prerequisites: Biology 1A-1B. The aging human body; structural and functional changes at organistic, cellular, subcellular, and molecular levels. Comparative, epidemiological and environmental aspects. Theories of aging and perspectives on aging modification and life extension. (F) Timiras

125G. Physiology of the Aging Process. (3) Formerly Physiology 153L. Students who have received credit for MCB 125F may not receive credit for MCB 125G. Three 1-hour lectures and one 2-hour lab per week. Prerequisites: Biology 1A-1B. The aging human body; structural and functional changes at organistic, cellular, subcellular, and molecular levels. Comparative, epidemiological and environmental aspects. Theories of aging and perspectives on aging modification and life extension. (SP) Timiras

Graduate Courses

220A-220E. Advanced Topics in Biophysics and Cell Physiology. At least one course will be offered each semester from the following list.

220A. Structural Biology. (3) Two 1½-hour lectures per week. Prerequisites: 102 and 122. Mathematics 50A-
208; or consent of instructor. Introduction to current research in structural biology. Emphasis on the use of advanced physical methods in the elucidation of protein, nucleic acid, and membrane structure.

Glaeser, Bialek, Nelson

220B. Membrane and Lipoprotein Structure and Dynamics. (3) Formerly Biophysics 201. Two 1/2-hour lecture/discussions per week. Prerequisites: 122, upper division courses, or consent of instructor. Characterization of cell membranes and lipoproteins by physical methods. Examples to be studied include myelin, erythrocyte, thalidomide and purple membranes. Analytical methods include electron microscopy, diffusion and magnetic resonance, fluorescence and photo bleaching recovery, electrical noise measurements and single channel recording, statistical mechanics and molecular dynamics.

Glaeser

220C. Mathematical Models and Methods in Biology. (3) Formerly Biophysics 221. Three hours of lecture per week. Prerequisites: Biology 1A, Mathematics 50A-50B, or consent of instructor. The art of mathematical modeling. Selected examples from population dynamics, epidemiology, physiology, and neurobiology. (F) Wiesman

220E. Free Radicals and Oxygen Toxicity in Biology. (2) Formerly Physiology 217. Two hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. Chemistry of free radicals and activated species; generation of radicals and singlet oxygen in vivo and in vitro; detection methods and biological defense mechanisms. Oxidative damage; benefits and liabilities of oxygen toxicity to cells. (SP) Packer

229A-229P. Research Review in Biophysics and Cell Physiology. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour laboratory per week. Prerequisites: Consent of instructor. Review of current literature and discussion of original research. (F,SP)

229A. Ion Channels and Membrane Excitability. (2) New course. Seminar course in the biophysics of membrane transport phenomena and the membrane transduction processes underlying excitation in the nervous system. We will discuss topics in the biophysics of ion channels—such as single-channel fluctuations, theories of channel gating, ion selectivity, and transport via pore structures, as well as selected topics in the modeling of neural excitation such as nonlinear mechanics of electrical excitation, neural oscillations, models of synaptic integration, and stochastic properties of neural firing.

Alper

229B. Radiation Biophysics. (2) New course. Effects at the molecular and cellular level of ionizing radiation exposures. Use of in vivo or in vitro detection methods and biological defense mechanisms of cell killing and cell transformation, the molecular target or targets of ionizing radiation, and the mechanisms of repair, recovery and restitution of cellular proliferation. (Fall)

Glaeser

229C. Physical Optics and Crystallography. (2) Formerly Biophysics 240. A combinatorial presentation of didactic presentations and informal discussions of methods and theory in physical optics and diffraction, as applied to crystallography of biological macromolecules. Emphasis on new developments, with the development of suitable background.

Glaeser

229D. Structural Biophysics. (2) Structural biology with emphasis on proteins and nucleic acids, cell membranes, cytoskeletal and motile systems.

Glaeser

229E. Auditory Transduction. (2) New course. Structure and function of hair cells including stereociliary mechanics, transduction processes, and electrophysiology. (Open to graduate students and senior undergraduates.)(Spring)

Owen

229F. Retinal Signal Processing. (2) New course. This course will survey recent research into the mechanisms of phototransduction, signal transfer, and signal processing in the vertebrate retina.

Macey

229G. Membranes and Transport. (2) Formerly Physiology 213. Erythrocyte membrane transport. (SP)

Macey

229H. Cell Physiology. (2) Formerly Physiology 212. One 2-hour discussion per week. Cellular structure and function.

Forte

229J. Mechanisms of DNA Repair. (2) New course. The various molecular processes by which damaged DNA is repaired in prokaryotic and eukaryotic organisms will be reviewed.

Mortimer

229K. Atherosclerosis. (2) New course. Several areas to be covered include cellular, molecular, and genetic aspects of atherogenesis. The format will consist of participation in research workshops, seminars, and journal club. A term paper focusing on a specific topic area will be required. (Spring) Nichols

229M. Cell Membrane Bioenergetics. (2) New course. This course will concentrate on redox electron transport mechanisms of membrane electron transport systems, biological oxidations which cause an active oxygen cascade, and new developments and techniques to studying the assembly/growth/organization of redox components into membranes.

Packr

229N. Development and Aging. (2) Formerly Physiology 282. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour seminar per week. Prerequisites: Consent of instructor. 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. (F,SP) Timiras

229P. Mathematical Biophysics. (2) New course. This course will be a seminar in mathematical biophysics, emphasizing, mathematical complexity theory, genetic algorithms, theory of the evolutionary significance of sex, host-pathogen population dynamics, and models of the immune response. All these subjects are related (often closely) at the level of mathematical description. The seminar is intended to follow important developments in any of these and related areas. Bremann

Division of Cell and Developmental Biology

Head: Fred H. Wilt

Lower Division Courses

Biology 1A. General Biology. (4) Three 1-hour lectures, one 3-hour laboratory per week. Prerequisites: Chemistry 1A-1B, or Chemistry 1A with a grade of B or better and current enrollment in Chemistry 1B; Chemistry 8A recommended concurrently. General introduction to cell structure and function, molecular and organism genetics, development and environmental control and function. Intended for students majoring in the biological sciences, but open to all qualified students. Students must take both Biology 1A and 1B to complete the sequence. (Fall, Winter, Spring, Summer, (SP)

Glaeser

31. The Biology of Human Potential. (3) Formerly Zoology 13. Three 1-hour lectures and one hour of discussion per week. Prerequisites: One year high school or college chemistry. Biological basis for outstanding human performance; evolutionary, physiological, and genetic determinants of selected human functions. (SP)

Srebnik

31A-135J. Topics in Cell and Developmental Biology. At least three courses per year will be offered from the following list.

135A. Molecular Endocrinology. (3) Formerly Physiology 142. Three 1-hour lectures per week. Prerequisites: Biology 1A-1B; strongly recommended an introductory course in human anatomy. Hormone synthesis, metabolism, and transport in endocrine systems as well as presentation and evaluation of research in these areas conducted by seminar participants. (SP) Firestone

135B. Cell Motility. (3) Formerly Biology 139. Three 1-hour lecture demonstrations per week. Prerequisites: Course in cell biology or biochemistry or consent of instructor. Mechanisms in cell movement and contractility in plant and animal cells. Mechanisms of muscle contraction, flagellar yeast, and less well-characterized phenomena such as cytokinesis and cytokinetics and cell shape determination. (SP) Steinhardt

135C. Regulation in Cells and Cell Systems. (3) Formerly Zoology 114. Three hours of lecture and one hour of laboratory per week. Prerequisites: Formerly Physiology 130. Introduction to the regulation of cell metabolism, with special emphasis on the relationships of the cell surfaces to control of intracellular activities. A comparative approach is used in uncovering regulatory mechanisms of fertilization, lym- phocyte activation, cell cycles, hormonal stimulations, cell secretion, cell-cell interactions, and cell-cell communication. (SP) Bremermann

135D. Cellular Aspects of Development. (3) Formerly Zoology 112. Two 1-hour lectures per week. Prerequisites: 130 or 131; 160 recommended. An examination of the cellular problems of cell and developmental biology, including methods of biochemical analysis of cells, analysis of hormone and receptor interactions, optical microscopy, tissue culture, microinjection and microsurary embryos, developmental anatomy. (SP) Weisblat

280 / Molecular and Cell Biology
Molecular and Cell Biology / 281

Principles and practice of classical and modern genetic analysis as applied to eukaryotic organisms, including yeast, nematodes, Drosophila, mice and humans; sequence analysis of mutations; gene mapping; suppressor analysis; chromosome structure; control of gene expression; and developmental genetics. (F) 

242A-242B. Advanced Topics in Genetics. (2,2) New course. Two 1 1/2-hour lectures and one hour section per week. Prerequisites: Graduate standing with 110 and 140 or equivalent; or consent of instructor. Advanced-level coverage of current research problems in genetics. The topics covered vary from year to year. (SP) 

243. Neurogenetics. (2) New course. Two 1 1/2-hour lectures and one hour section per week. Prerequisites: Graduate standing with 110 and 140, or consent of instructor. Translational and molecular genetic approaches to understanding development and function to the nervous system. (SP) 

244. Developmental Genetics. (2) New course. Two 1 1/2-hour lectures and one 1 1/2-hour section per week. Prerequisites: Graduate standing or consent of instructor. Introduction to the principles and experimental methods of mammalian genetics. Major topics to be covered are genome organization and expression, genome evolution, and methods of genetic analysis in mammals. (SP) 

249A-249H. Research Review in Genetics. (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. Review of current literature and discussion of original research. (F,SP) 


249B. Mammalian Molecular Genetics. (2) New course. Mammalian gene regulation. 

249C. Telomere Function and Ciliate Molecular Genetics. (2) New course. Telomere structure, synthesis, and function, developmentally regulated genomic organization, and the use of ciliates to study these topics. (F) 

249D. Mechanisms of Genetic Regulation in Yeast. (2) Formerly Biochemistry 257. Genes, gene products, and molecular mechanisms that control cell types in the unicellular eukaryotic Saccharomyces cerevisiae. 

249E. Molecular Genetics of Drosophila. (2) Formerly Biochemistry 244. Gene regulation and developmental neurobiology. 


249G. Developmental Genetics of Drosophila. (2) Formerly Molecular Biology 236. Experimental approaches to Drosophila embryogenesis, ranging from classical embryology and classical genetics to molecular biology and biochemistry. 

249H. Gene Expression in Drosophila. (2) Formerly Molecular Biology 234. Presentation and discussion of current research on gene regulation in Drosophila and other eukaryotes.
Division of Immunology

Head: James P. Allison

Lower Division Courses

51. Immunity and Defense. (2) Formerly Microbiology and Immunology 101. Three 1-hour lectures and one 1-hour discussion per week. Prerequisites: None. Offered fall, winter, and spring terms. Required of all students in the program. Intended for students not majoring in the biological sciences. (F, W, S) Allison

252. Immunobiology of the T Lymphocyte. (3) For graduate students in immunology. Prerequisites: Immunology 202A and Molecular Biology 232, or consent of instructor. One 2-hour lecture/discussion per week. Prerequisites: graduate standing or consent of instructor. Topics in current research on the biology of T lymphocytes, with emphasis on understanding the interactions between T cells and other cells of the immune system. Offered even-numbered years. (F) Allison

254. Molecular Biology of Cancer. (2) Formerly Microbiology and Immunology 232. Course may be repeated for credit. One 2-hour lecture/discussion per week. Prerequisites: 250 or consent of instructor. Regulation of the immune response involves a complex series of interactions between thymus-derived lymphocytes, B lymphocytes, and macrophages. Some of these interactions lead to cell-cell contact, while others involve soluble secreted products. This course will cover various aspects of these cellular interactions, including the role of lymphokines and of gene products of the major histocompatibility complex in the generation and regulation of immune responses. Offered even-numbered years. (F) Allison

Upper Division Courses

150. Molecular Immunology. (4) Formerly Microbiology and Immunology 103. Three 1-hour lectures and one 1-hour discussion per week. Prerequisites: 150 or 152 (may be taken concurrently); Chemistry 5 recommended; and consent of instructor. Experimental work 1) introduces students to basic molecular and cellular methods employed in immunological research. Illustrates principles presented in courses 150 and 152. (SP) Good, Mithal, Sakash, Shastri

250L. Advanced Immunology Laboratory. (4-6) Formerly Microbiology and Immunology 202L. Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 150 or 152 (may be taken concurrently); Chemistry 5 recommended; and consent of instructor. Experimental work 1) introduces students to basic molecular and cellular methods employed in immunological research. Illustrates principles presented in courses 150 and 152. (SP) Good, Mithal, Sakash, Shastri

Graduate Courses

250. Advanced Immunology. (3) Formerly Microbiology and Immunology 201A. Two 1-hour lectures and one 3-hour lecture per week. Prerequisites: 100, 110, 140, 150 or consent of instructor. The immune response; antibodies; antigens; cellular and humoral immunity; antigen-antibody reactions; antibody molecules; immunoglobulin genes, both structural and regulatory; lymphocyte differentiation; cellular interactions; and mechanisms of immunity and tolerance. Offered fall, winter, and spring terms. (F, W, S) Good, Mithal, Sakash, Shastri

250L. Advanced Immunology Laboratory. (4-6) Formerly Microbiology and Immunology 202L. Two 1-hour lectures and one 3-hour laboratory per week. Prerequisites: 100, 110, 140, 150 or consent of instructor. Students with specialized needs may take portions of the course on a modular basis. Topics in current research on the biology of lymphocytes, with emphasis on understanding the interactions between T cells and other cells of the immune system. Offered fall, winter, and spring terms. (F, W, S) Good, Mithal, Sakash, Shastri

252. Immunobiology of the T Lymphocyte. (3) Formerly Microbiology and Immunology 231. Course may be repeated for credit. Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 250 or consent of instructor. Developmental, cellular, and molecular biological aspects of the thymus-derived lymphocytes and their differentiation, proliferation, and function. Examination of antigene repertoire and antigen recognition. Designed primarily for graduate students in immunology and genetics. Offered odd-numbered years. (SP) Allison

253. Regulation of the Immune Response. (2) Formerly Microbiology and Immunology 230. Course may be repeated for credit. One 2-hour lecture/discussion per week. Prerequisites: 250 or consent of instructor. Regulation of the immune response involves a complex series of interactions between thymus-derived lymphocytes, B lymphocytes, and macrophages. Some of these interactions lead to cell-cell contact, while others involve soluble secreted products. This course will cover various aspects of these cellular interactions, including the role of lymphokines and of gene products of the major histocompatibility complex in the generation and regulation of immune responses. Offered even-numbered years. (F) Allison

254. Molecular Biology of Cancer. (2) Formerly Microbiology and Immunology 232. Course may be repeated for credit. One 2-hour lecture/discussion 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 genes and transforming proteins, the role of host factors and chemicals in carcinogenesis, and cellular oncogenes. Offered odd-numbered years. (SP) Allison, Martin

255. Mechanisms of Eukaryotic Gene Expression: The Immune System as Model System. (3) Formerly Microbiology and Immunology 233. Course may be repeated for credit. One 2-hour lecture/discussion per week. Prerequisites: 250 or consent of instructor. One of the major unresolved problems in molecular biology is the regulation of eukaryotic gene expression. This course will use genes involved in the immune response as model systems to tackle the problem. The genes encoding B cell immunoglobulin proteins and T cell antigen receptors will be analyzed to illustrate the regulatory mechanisms that have been defined and the questions that remain to be answered. The course is designed for advanced graduate students not only in immunology but also in general eukaryotic molecular biology. Offered even-numbered years. (SP) M. Koshland, Sakash, Shastri

256. Current Research in Immunology. (1) New course. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-hour seminar with discussion per week. Prerequisites: Graduate standing in MCB or consent of instructor. Presentations by graduate students and others of topics selected from the current research literature. Attendance required of graduate students in Immunology during five of the six semesters of residence. (F) Shastri

259A-259C. Research Review in Immunology. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two hours of seminar per week. Prerequisites: Consent of instructor. Review of current literature and discussion of original research. (F,SP)

259A. Differentiation of T Lymphocytes. (2) New course. Molecular and biological analysis of T cell differentiation, with particular emphasis on the T cell antigen receptor and related structures. (SP) Allison

259B. Specificity of T Lymphocytes. (2) New course. Molecular basis of antigen recognition function of T lymphocytes. (SP) Shastri

259C. Regulation of Genes Involved in the Immune Response. (2) New course. Molecular biology of immunoglobulin genes, T cell antigen receptor genes, MHC genes, and genes of lymphokines and their receptors. (SP) Sakash

Division of Neurobiology

Head: Gerald Westheimer

Lower Division Courses

61. From Neuron to Brain. (3) Formerly Physiology 256. Must be taken on a passed/not passed basis. Two 1-hour lectures and one 1-hour discussion per week. An introduction to the function, structure, origin, and malfunction of the brain and nervous system, in particular in the human. Intended for students not majoring in the biological sciences. (SP) Freeman

Upper Division Courses

160. Neurobiology. (4) Formerly IDS 111, Zoology 121. Three 1-hour lectures and one 1-hour laboratory per week. Prerequisites: 102 or 100, Biology 1A, Physics 8A-8B. An introductory course designed to provide a general understanding of current knowledge of the nervous system, as well as an insight into the experimental approaches used to study the nervous system. (SP) Miller, Westheimer, Goodman

160L, Neurobiology Laboratory. (2) Former course. One 4-hour laboratory per week. Prerequisites: 102 or 100, Biology 1A, Physics 8A-8B. Electrophysiological, psychophysical, and neuroanatomical experiments and demonstrations designed to illustrate the properties of nerve cells and their ensembles. (SP) Zuckor

162. Developmental Neurobiology. (3) Formerly IDS 113 and Anatomy 154. Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 160. A survey of 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. (F) Bentley, Breadlove, Stent

163. Neuroanatomy. (3) Formerly IDS 112 and Anatomy 110. One 1-hour lecture and one 3-hour laboratory per week. Prerequisites: Biology 1A-1B; consent of instructor. Development, structure (gross and microscopic) and functional relationships of the mammalian nervous system. (F) Zuckor

164. Sensory and Integrative Neurobiology. (3) Formerly Physiology 256. Two 1-hour lectures per week. Prerequisites: 100, 160. Transduction, coding, and information processing in sensory systems. Correlation of neural activity from neurophysiology, psychophysics, and perception. (SP) Winer

165. Molecular Neurobiology and Neurochemistry. (3) Formerly Physiology 256. Two 1-hour lectures per week. Prerequisites: 102 or 110; 160. The molecular and biochemical aspects of the structure and function of the nervous system. (F) Winer

Graduate Courses

260. Advanced Cellular Neurobiology. (3) Formerly IDS 200A. Two 1-hour lectures per week. Prerequisites: 160. Physical-chemical basis of membrane potentials, electronic, action potentials, generation and propagation, synaptic transmission, sensory structures, function, and volume conductor potentials. (F) Lecar, Lewis, Owen, Zuckor

260L. Advanced Neurobiology Laboratory. (3) Formerly IDS 200L. Two 6-hour laboratories and one 3-hour demonstration per week. Prerequisites: 260 (may be taken concurrently). Intended to provide the graduate and advanced undergraduate student with a working knowledge of current anatomical, physiological, and biophysical techniques in neurobiology through demonstrations, exercises, and individual research projects. Topics include synaptic transmission, excitable membranes, sensory reception, and circuits of neurons generating behavior. (F) Miller, Winer, Zuckor

262, Integrative Neurobiology. (3) Formerly IDS 200B. Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 260. Integrative approach to the research questions central to the understanding of the organization of nervous systems, and of the behavior mediated by these systems. When appropriate these lectures will be illustrated with examples drawn from both the vertebrate and invertebrate literature. Circuit, network, or system analogs and analysis will be emphasized where these approaches lend clarity. Sensory-motor integration is discussed in small systems or neurons to more complex ensembles, including mammalian cortex and cerebellum. (SP) Miller, Winer, Zuckor

282 / Molecular and Cell Biology
Molecular and Physiological Plant Biology

(Office of Natural Resources, Interdepartmental Graduate Groups)

Professors:
Bob B. Buchanan, Ph.D. (Molecular Plant Biology)
William Z. Candé, Ph.D. (Botany)
Michael Freeling, Ph.D. (Genetics)
Alexander Glazer, Ph.D. (Microbiology and Immunology)
Joseph G. Hancock, Jr., Ph.D. (Plant Pathology)
Richard Malkin, Ph.D. (Molecular Plant Biology)
Melvin Calvin, Ph.D., Sc.D., LL.D. (Emeritus)
Louis Jacobson, Ph.D. (Emeritus)
Daniel I. Arnon, Ph.D. (Emeritus)

Associate Professors:
Lewis Feldman, Ph.D. (Botany)
Brian J. Staskawicz, Ph.D. (Plant Pathology)
Daniel I. Arnon, Ph.D. (Emeritus)
John W. Taylor, Ph.D. (Botany)

Assistant Professors:
Robert L. Fischer, Ph.D. (Molecular Plant Biology)

Lecturers:
Alex Quintanilha, Ph.D. (Physiology/Anatomy)

Graduate Adviser: Richard Malkin.

The Graduate Group in Molecular and Physiological Plant Biology was formed to permit students to obtain degrees in molecular biology and plant physiology. The graduate program is directed by an interdisciplinary 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 M.S. and Ph.D. degrees is offered.

The program emphasizes fundamental training in the plant sciences. The student chooses one of three academic options, each concentrating on a specified aspect of plant science: plant physiology, molecular plant biology, and physiological plant biology.
## Concordance List for Molecular and Cell Biology

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<th>New No.</th>
<th>Course Title</th>
<th>Equivalent Old Course, If Any</th>
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<tr>
<td>001A</td>
<td>Biology 1A</td>
<td>Biology 001A General Biology</td>
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<tr>
<td>011</td>
<td>Chemistry of Life</td>
<td>Biochem 010 Of Molecules and Man: A View for the Layman</td>
</tr>
<tr>
<td>012</td>
<td>The Microscopic World</td>
<td>Microbiol 010 The Microscopic World</td>
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<td>013</td>
<td>Introduction to Molecular Biology</td>
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<td>014</td>
<td>Enology—The Microbiology and Biochemistry of Winemaking</td>
<td>Microbiol 002 Enology—The Microbiology and Biochemistry of Winemaking</td>
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<tr>
<td>021</td>
<td>The Physics of Life</td>
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<td>Microbiol 101 General Molecular Biology Laboratory</td>
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<td>Microbiol 101 General Molecular Biology Laboratory</td>
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<td>601</td>
<td>Individual Study for Master's Students</td>
<td>IDS 493 Physiological Instrumentation</td>
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<tr>
<td>602</td>
<td>Individual Study for Doctoral Students</td>
<td></td>
</tr>
</tbody>
</table>

### Ecology

Each option is designed to allow students maximum flexibility in achieving their professional objectives. Applicants should have prior preparation in the basic physical and biological sciences, although deficiencies can be removed during the early stages of graduate study.

### Molecular Biology

**College of Letters and Science**

As a result of the reorganization of the biological sciences on the Berkeley campus, the faculty and programs of Department of Molecular Biology will become parts of four divisions (Biochemistry and Molecular Biology; Cell and Developmental Biology; Genetics; and Neurobiology) in the new Department of Molecular and Cell Biology, effective fall 1989. For an explanation of the full scope of the biological sciences reorganization and its implications, see page 89.

**Undergraduate Programs:** Beginning fall semester 1989, students will no longer be accepted into the former undergraduate major in molecular biology. Students interested in molecular biology should consider one of the plans in the new major. The new Department of Molecular and Cell Biology and should contact the major adviser or undergraduate assistant of the appropriate division for information. The names and locations of these advisers can be obtained by writing to Ms. Patricia Power, Staff Assistant to the Dean, College of Letters and Science, 201 Campbell Hall, University of California at Berkeley; Berkeley, CA 94720. Continuing students who declared the molecular biology major before fall 1989 may continue in the program, provided they complete all degree requirements and graduate before fall semester 1989. Students should contact the major adviser or graduate assistant in the Division of Biochemistry and Molecular Biology of the new department. Beginning fall semester 1993, all students will be expected to complete an undergraduate major current at the time of their application for the degree.

**Graduate Program:** For fall semester 1989, new students have been admitted to the existing graduate program in molecular biology. Graduate programs for the new biological sciences departments are currently under review, and it is anticipated that the new graduate programs will receive final approval during fall semester 1989. All new and continuing graduate students will be notified when these programs are approved. At that time, students will have the option of continuing in the program to which they were admitted or requesting transfer to a related new program. For details of existing graduate programs in molecular biology, students should contact the graduate adviser in the Division of Biochemistry and Molecular Biology of the new Department of Molecular and Cell Biology. Students interested in molecular biology who wish to apply for admission after fall 1989 and who require further information should contact the graduate adviser in the division of the new department to which they wish to apply. The names and locations of these advisers can be obtained by writing to Ms. Patricia Power, Staff Assistant to the Dean, College of Letters and Science, 201 Campbell Hall, University of California at Berkeley; Berkeley, CA 94720.

### Concordance of Courses:

For a list of the courses offered by the new departments, followed by their former names, numbers, and titles, consult lists in this catalog under the headings "Integrative Biology," "Molecular and Cell Biology," or "Plant Biology." At press time for this catalog, some course information was still not available. If you have questions, or if you do not find a course listed with its new name, number, and title, consult staff in one of the new departments for up-to-date information.

### Molecular Plant Biology

**College of Natural Resources**

Division Office: 305 Hilgard Hall, 642-3864
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 Malcom, Ph.D. University of California at Berkeley. Biochemistry, biogenetics, photosynthesis
Anastasia M. Mills, Ph.D. Florida State University. Biophysical enzymology, photosynthesis
Peter C. Quail, Ph.D. University of Sydney. Plant molecular biology, plant biochemistry
Angela L. Amon, Ph.D. Doctor of Philosophy University of California at Berkeley. Photosynthesis and nitrogen fixation

Associate Professor:
Patricia C. Zambryski, Ph.D. University of Colorado. Boulder. Plant molecular biology, genetics

Assistant Professor:
Robert L. Fischer, Ph.D. University of California at Berkeley. Plant molecular biology

Assistant Professor:
Robert L. Fischer, Ph.D. University of California at Berkeley. Plant molecular biology
Concordance List for Molecular Biology

Old No.  Course Title                      Equivalent New Course, If Any

010  Introduction to Molecular Biology     MCellBi 013  Introduction to Molecular Biology
100A  General Molecular Biology            MCellBi 110  General Biochemistry and Molecular Biology
100B  General Molecular Biology            MCellBi 110  General Biochemistry and Molecular Biology
101  Molecular Biology Laboratory         MCellBi 110L General Biochemistry and Molecular Biology Laboratory

120  Molecular Virology                    MCellBi 114  Introduction to Comparative Virology
200A  Advanced Molecular Biology           MCellBi 200  Advanced Biochemistry and Molecular Biology
200B  Advanced Molecular Biology           MCellBi 200  Advanced Biochemistry and Molecular Biology
202  Research Review in DNA Structure and Function MCellBi 218D DNA Structure and Function
208  Viruses as Models for Eukaryote Gene Expression and Replication MCellBi 218E  Viruses as Models for Eukaryote Gene Expression and Replication

210  Special Topics in Molecular Biology   MCellBi 291  Introduction to Research
211  Introduction to Research in Molecular Biology MCellBi 239A Animal Cells and Viruses
217  Research Reviews in Animal Cells and Viruses MCellBi 215  Molecular Biology of Animal Viruses
220  Molecular Biology of Animal Viruses    MCellBi 218A  Bacterial Viruses
232  Seminar on Bacterial Viruses           MCellBi 249H Gene Expression in Drosophila
234  Seminar on Gene Expression in Drosophila MCellBi 218G Developmental Genetics of Drosophila
236  Seminar in Developmental Genetics of Drosophila MCellBi 249F  Bacterial Genetics
251  Research Review in Bacterial Genetics  MCellBi 291  Introduction to Research

270  Research Seminar

Adjunct Assistant Professor:
Michael E. Fromm, Ph.D. Stanford University. Plant molecular biology
Athanasios Theologis, Ph.D. University of California at Los Angeles. Plant molecular biology, plant biochemistry

Major Adviser: Anastasios Melis, 313 Hilgard Hall.

Division of Molecular Plant Biology

As a result of the reorganization of the biological sciences on the Berkeley campus, the faculty and programs of the Division of Molecular Plant Biology will become part of the new Department of Plant Biology. The new department will include faculty from Genetics, Plant and Soil Biology, and Botany. For an explanation of the full scope of the biological sciences reorganization and its implications, see page 88. For a list of old Molecular Plant Biology courses followed by the equivalent new course numbers and titles, see the following page.

Beginning fall semester 1989, students will no longer be accepted in the undergraduate major offered in the Division of Molecular Plant Biology. Students who have already declared the major, however, may continue in the program. For detailed information, consult the Student Affairs Office at 106 Giannini Hall, telephone 642-0542.

For up-to-date information on the graduate program, graduate students should consult the graduate adviser or the graduate assistant or the Student Affairs Office at 106 Giannini Hall, telephone 642-0542.

Undergraduate Program

The study of plants at the molecular level is a newly emerging scientific discipline that includes biochemical, biophysical, and molecular biological approaches to the characterization of basic plant processes such as photosynthesis and nitrogen fixation. This program has been developed with the objective of training students to be capable of entering new biotechnology enterprises related to improvement of plant yields through alterations of basic plant processes. In addition, it serves to prepare students for advanced education in fields related to the above-described discipline, such as plant biochemistry, plant molecular biology, or molecular aspects of plant pathology.

Molecular plant biology students initially study basic physics, mathematics, chemistry, and biology as prerequisites for more advanced work. Course work in computer sciences is strongly recommended. Advanced upper division courses dealing with plant biochemistry, plant molecular biology, and laboratory procedures in these areas form the central core of the program. Additional advanced courses from related disciplines, such as genetics, botany, and biochemistry, serve to expand the program and are individually selected to suit particular areas of interest. An attempt is made to provide senior students with an opportunity to spend approximately six months in the research laboratory of an individual professor in order to obtain actual research experience of an individually developed project.

Bonnie C. Wade, Ph.D. University of California. Ethnomusicology, South and East Asia
David Wessel, Ph.D. Stanford University. Computer music, music perception
David Wilson, Ph.D. University of Iowa. Composition, 20th-century, Afro-American music
Joann M. Curnow (Emeritus) Edgar H. Sparks, Ph.D. (Emeritus)

Associate Professors:
John Roberts (Acting), Ph.D. University of California at Berkeley. Handel, 19th-century opera
Richard Taruskin, Ph.D. Columbia University. Renaissance period, Russian music
John Thoe, Ph.D. Harvard University. Composition, 19th-century music

Assistant Professors:
Benjamin Brinner, Ph.D. University of California at Berkeley. Ethnomusicology, Indonesian music
John But, Ph.D. Cambridge University. Organ, J.S. Bach

Senior Lecturers:
Elizabeth Davidson, M.A. University of California. Music, theory
M. Scott Smith, A.B. University of California. Music, theory

Visiting Ernest Bloch Professor:
Laszlo Somfai, Ph.D. Budapest Academy. Bartok, Haydn University Carillonist:
Ronald M. Barnes, M.A.
Visiting Faculty:
Virginia Boker (Violin) Lawrence Ferrara, M.M. (Guitar)
William Bell, M.A. (Piano) Rodney Gehrke, M.A. (Organ)
Anne Crowden (Viola da gamba) Detlev Olshausen, A.B. (Viola)
Christy Dana, M.M. (Pianist) Janet Guggenheim, M.A. (Piano)
Lawrence Ferrara, M.M. (Guitar) Paul Hale, B.S. (Violin)
Evelyn Hemmings Chambers, Chair in Music

Music
(College of Letters and Science)

Department Office: 104 Morrison Hall, 642-2678
Chair: Philip Brett, Ph.D.

Professors:
Philip Brett, Ph.D. Cambridge University, Chorus, English Renaissance, Britten
Richard L. Crocker, 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 Feliciano, Ph.D. University of Iowa. Composition, contemporary music, acoustics
Daniel Heurtz, Ph.D. Harvard University, Classical period, French Renaissance
Andrew W. Imbrie, M.A. University of California. (Jerry and Evelyn Hemmings Chambers Chair in Music)
Joseph Kerman, Ph.D. Princeton University. Criticism, 18th- and 19th-century music
Anthony Newcomb, Ph.D. Princeton University, Italian madrigal, 19th-century music
Michael Senturia, A.B. Harvard University, Orchestral conducting, Schenkerian analysis

*Not offered 1989-90
1On leave, spring, fall
2On leave, fall
3On leave, spring
4Recalled to active service
5Recipient of Distinguished Teaching Award
Concordance List for Molecular Plant Biology

<table>
<thead>
<tr>
<th>Old No.</th>
<th>Course Title</th>
<th>Equivalent New Course, If Any</th>
</tr>
</thead>
<tbody>
<tr>
<td>117</td>
<td>Photobiology</td>
<td>Plant BI 100B Physiology and Biochemical Plant Biology</td>
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<tr>
<td>120</td>
<td>Plant Biochemistry</td>
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<tr>
<td>125</td>
<td>Plant Biochemistry Laboratory</td>
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<tr>
<td>175</td>
<td>Molecular Plant Biology Laboratory</td>
<td>Plant BI 222 Photosynthesis</td>
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<tr>
<td>222</td>
<td>Photosynthesis</td>
<td></td>
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<tr>
<td>250</td>
<td>Seminar in Molecular Plant Biology</td>
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<tr>
<td>260</td>
<td>Seminar in Cell and Molecular Plant Biology</td>
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<tr>
<td>288</td>
<td>Current Topics in Plant Molecular Biology</td>
<td>Plant BI 211 Advanced Topics in Plant Molecular Biology</td>
</tr>
</tbody>
</table>

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 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 I, 70A-70B. (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 acceptable for this major.

Honors Program. Adviser: Mr. Heartz. Qualified students majoring in music are invited to consult the adviser 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 advisers.

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 120s and 130s (including IDS 136). With the instructor's approval, courses numbered between 151 and 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 (harmony, 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.

Group I

Courses open to all students in the University.

Theory

Lower Division Courses

- (20A-20B) Basic Musicianship. (2.2) Three class hours per week. Fundamentals of music, including notation, sight singing, ear training, and beginning linear analysis. For general students. (F,SP)
- 25A-25B. Introduction to Music Theory. (4,4) Three hours of lecture per week. Prerequisites: 20A or consent of instructor. A writing course based on traditional harmony. Beginning linear and vertical analysis. For general students. Emphasis on written exercises. (F,SP)

Upper Division Courses

115. Introduction to Psychoacoustics. (4) New course. Three hours of lecture per week. Prerequisites: 27 or consent of instructor. A review of the sensory, perceptual and cognitive foundations of listening, performing, and composing. Topics include relations among various acoustical and perceptual characterizations of sound; perceptions of pitch, time, timbre, consonance and dissonance, and auditory space; auditory source identification, auditory stream segregation, perceptual grouping mechanisms; perceptual principles for orchestration. (SP) Wessel

History and Literature

27. Introduction to Music. (4) Two 1-hour lectures, one 1-hour listening section, and one 1-hour discussion section per week. Devoted to the development of listening skills, and a survey of major forms and types of Western art music. The fall semester will also include musical examples drawn from various other cultures. (F,SP) Wade, But
Upper Division Courses

Studies of the music and music genres of important composers, for the general student who has had an introductory music course. Emphasis on required listening assignments with supplementary readings and term papers or projects.

*127. History of Western Music. (4) Two 1-hour lectures, one 1-hour demonstration class, and one 1-hour discussion section per week. Prerequisites: 27 or consent of instructor. The evolution of styles of Western music from 1600 to the present.

128A. Opera. (4) Three hours of lecture per week. Prerequisites: 27 or consent of instructor. A study of musical and dramatic aspects of opera. Lectures on selected operas will be supplemented by assigned recordings and films or videotapes of notable performances. (SP) Kerman

128B. Beethoven. (4) Three hours of lecture and one 1-hour listening section per week. Prerequisites: 27 or consent of instructor. Emphasis on the symphonies.

128C. Contemporary Music. (4) Three hours of lecture and one 1-hour listening section per week. Prerequisites: 27 or consent of instructor. Twentieth-century music, from Stravinsky to the present.

128D. J.S. Bach. (4) Three hours of lecture and one 1-hour listening section per week. Prerequisites: 27 or consent of instructor.

128E. Mozart and Haydn. (4) Three hours of lecture and one 1-hour listening section per week. Prerequisites: 27 or consent of instructor.

128F. Music of Johannes Brahms. (4) Three hours of lecture and one 1-hour listening section per week. Prerequisites: 27 or consent of instructor.

128G. 19th- and 20th-Century Symphonic Literature. (4) Three hours of lecture and one hour of listening section per week. Prerequisites: Consent of instructor. A study of the development of the 19th-century piano concerto.

128H. The Piano Concerto. (4) 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.

128I. Russian Music. (4) Three hours of lecture and one hour of listening section per week. Prerequisites: Consent of instructor. Survey of Russian music including Prokofiev, Berg, 18th-19th-century folk music sources, and art music into the 20th century.

128J. Music from the Middle Ages to the High Renaissance. (4) Three hours of lecture and one hour of listening section per week. Prerequisites: Consent of instructor. A study of a selected repertoire from the 14th to the 17th centuries.

128K. Music and Poetry in Medieval and Renaissance England. (4) Three hours of lecture and one hour of listening section per week. The relationship between words and music in song and drama from the early 13th through the early 17th centuries. Included will be works by Chaucer, the medieval carol, music in the mystery plays, early Tudor court songs, music and the Reformation, madrigals, Shakespeare, etc.

128L. Bach and Handel. (4) Three hours of lecture and one hour of listening section per week. Prerequisites: 27 or consent of instructor. A study of the two leading German composers of the early 18th century whose careers contrast sharply. The course will draw on the instructor's recent European productions of several Handel operas. (SP 1990 only) (F) Curtis

128M. Wagner. (4) New course. Three hours of lecture per week. Prerequisites: Consent of instructor. The interaction of music and drama in representative scenes from Wagner's operas from The Flying Dutchman through The Twilight of the Gods. Readings from Baudelaire to Adorno will illuminate Wagner's influence on 19th- and 20th-century culture. (F) Newcomb

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 culture studied. No previous musical experience is required.

Lower Division Courses

*30. Issues of Ethnicity from a Musical Perspective. (4) New course. Three hours of lecture plus field work lab per week. Freshman seminar. Focus on issues of ethnicity raised in musicology, ranging from compartmentalization vs. synthesis of traditions, music as an identity marker, elite vs. non-elite valuation, and cultural preservation. The course will include a field research component focused on the realization of ethnicities, in order to relate theory to the lives of California ethnic groups.

Upper Division Courses

130A. Afro-American Music. (4) Three hours of lecture and one hour of discussion 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.

130B. Afro-American Music. (4) Three hours of lecture and one hour of discussion per week. Historical and analytical study of Afro-American music in the 20th century. Emphasis on the evolution of jazz and various forms of popular and religious music. (SP) Wilson

132. Music of the Middle East. (4) New course. Three hours of lecture per week. Music of the Middle East, including folk, art, popular and religious music of the Pan-Islamic and Isreali traditions. (F) Brinner

133A. Music of the Southeast Asia Tradition. (4) Three hours of lecture and one hour of laboratory discussion per week. Survey of the Southeast Asian music tradition from its West African origins to the various forms at the end of the 19th century.

133B. Music of India. (4) Three hours of lecture and one hour of laboratory discussion per week. Includes the classical music traditions of both North and South India (Hindustani and Karnataka music). Emphasis on class listening.

134. Music of the East Asia Tradition. (4) Three hours of lecture and one hour of laboratory per week. Surveys the musics of Indonesia, Thailand, Cambodia, Laos, Malaysia, and the Philippines—cultures which share instrument types but have developed distinctive musical styles.

134B. Music of Japan. (4) Three hours of lecture and one hour of laboratory per week. Traditional classical music of Japan: Shinto ritual music, the imperial court orchestra, music and dance, biwa and shakuhachi forms, chamber music for shamisen and koto, theatrical genres of kabuki and bunraku. Reading in music and pertinent Japanese literature in translation.

138. Music of Hispanic America. (3) Three 1-hour lectures and one laboratory per week. Survey of folk and popular musical traditions of Mexico and Central America, the Caribbean, the Andean and Patine 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, indicated in the Schedule of Classes. 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) Widyanoto

141. University Symphony Orchestra. (2) Course may be repeated for credit. Course may be taken for credit or audited. 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 audited. Course may be repeated for credit. Two 2-hour rehearsals per week. Prerequisites: audition.

Group II

Courses primarily for students whose major subject is music.

Note: Musicianship (A-B-C-D, Harmony (1A-1B-2A-2B), and Elementary Piano (40SA-40SB-40SC-40SD) 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) Three 1-hour meetings per week. Prerequisites: Majors only; A is prerequisite to B. Ear training, sight singing, and dictation. (F,SP) Sequence begins (F). Dana, Davidson, Swackhamer

C-D. Musicianship. (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, Swackhamer

1A-1B. Harmony, (4) Four 3-hour classes per week. Prerequisites: 1A is prerequisite to 1B. Diatonic harmony, chord manipulation, and analytical studies. Emphasis will be on written exercises. (F,SP) Sequence begins (F).

2A-2B. Harmony, (4) Three 3-hour classes per week. Prerequisites: 1B A review of diatonic, chromatic, and early 20th-century harmony. Emphasis will be on written exercises. (F,SP) Sequence begins (F).

70A-70B. History of Western Music I, (4) Three 3-hour classes per week. Prerequisites: 1B or permission of instructor. A study of the development of Western music from ca. 1700-1760. (F) Kerman

70A. A study of music from 1750-1850. For a continuation, see 70A-70B. (SP) Newcomb

Upper Division Courses

150. Instrumental and Vocal Instruction. (1) Course may be repeated for credit. Two 1-hour rehearsals 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, Senturia in charge

3On leave, spring
4Recalled to active service
5Recipient of Distinguished Teaching Award

144. University Choruses. (2) Course may be repeated for credit. Two 1-hour rehearsals and one section of credit 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. (FSP) 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) Staff

147. Contemporary Chamber 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) Ladtzekpo

149. Collegium Musicum. (2) Course may be repeated for credit. Two 2-hour rehearsals per week. Study of vocal and Baroque music for voices and instruments. (F,SP) Crocker, Curtis
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. (F,SP) Dugger

152. Advanced Musicianship. (2) Course may be repeated once 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, answers, countersubjects, expositions, episodes, and stretti leading to the writing of complete fugues. Regular written assignments required. (F) Thow

154A-154B. Counterpoint. (4;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 inventions, canons, and fugue expositions. (SP) Thow

155A-155B. Composition. (4;4) Three class hours per week. Prerequisite: 151. A study of formal problems using 20th-century compositional materials. (F,SP) Thow

156. Studies in Musical Analysis. (4) Three class hours per week. Prerequisites: 2B. The study of various analysis techniques and their application to important works of music. (F)

157. Orchestration. (4) Three class hours per week. Prerequisites: 2B and 154B. A study of the techniques of 18th-, 19th-, and 20th-century orchestrations. Analysis of scores and assignments in scoring for selected instrumental combinations. (F)

158. Musical Applications of Computers and Related Technologies. (4) New course. Three hours of lecture per week. Prerequisites: Music D and 2B or consent of instructor. Basic concepts and techniques of computer-based musical research, composition, and performance. Topics include essentials of digital audio signal processing, musical acoustics and psychoacoustics, digital signal analysis and synthesis, musical databases, exploitation of MIDI, computer programming for music, computer-aided music analysis, printing and composition. Works from the computer music repertoire will be examined, as well as the impact of methods from the information sciences on research in musicology, music theory and ethnomusicology. (F) Wessel

161. Instrumental Conducting. (4) Course may be repeated for credit in spring 1990 only. Two 2-hour class meetings 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) Santurini

162. Choral Conducting. (4) Two 2-hour classes per week. Prerequisites: 2B, 152, and consent of instructor. A study of choral literature in various styles and periods, with emphasis on conducting techniques and score reading.

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 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: 170A-170B or consent of instructor. 170A is a study of music from the Middle Ages to ca. 1700 and 170B, music from ca. 1850 to the present. (F,SP) Taruskin

171A. The Performance of Medieval and Renaissance Music. (4) Three class hours per week. Prerequisites: 170A and 157B 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. (F,SP) Taruskin

171B. Monteverdi. (4) Three hours of lecture per week. Prerequisites: 170A and 70B or consent of instructor. (F) Heartz

171C. The Performance of Baroque Music. (4) Three hours of lecture per week. Prerequisites: 170B 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. (F,SP) Taruskin

171D. J.S. Bach. (4) Three hours of lecture per week. Prerequisites: 170B and 70B, or consent of instructor. (F) Heartz

172A. Mozart. (4) Three hours of lecture per week. Prerequisites: 170B and 70B, or consent of instructor. (F,SP) Heartz

172B. Beethoven. (4) Three hours of lecture per week. Prerequisites: 170B and 70B, or consent of instructor. (F,SP) Heartz

172C. Schubert. (4) Three hours of lecture per week. Prerequisites: 170B and 70B, or consent of instructor. (F,SP) Heartz

173A. The Symphony. (4) Three hours of lecture per week. Prerequisites: 170B and 70B, or consent of instructor. A study of the development of the symphony as a form. (F,SP) Heartz

173B. Art Song of the 19th Century. (4) Three hours of lecture per week. Prerequisites: 170B and 70B, or consent of instructor. A study of the art song with emphasis upon the music of Schubert and Schumann. (F,SP) Heartz

173C. Wagner's Ring of the Nibelung. (4) Three hours of lecture per week. Prerequisites: 170B and 70B, or consent of instructor. A study of the four operas of Wagner's Ring cycle. (SP) Heartz

173D. Schubert to Brahms. (4) Three hours of lecture per week. Prerequisites: 170B and 70B, or consent of instructor. A study of the history of music from the Middle Ages to ca. 1700. (SP) Heartz

174A. Debussy and Mahler. (4) Three hours of lecture per week. Prerequisites: 170B and 70B, or consent of instructor. A study of the art song with emphasis upon the music of Debussy and Mahler. (F,SP) Heartz

174B. Studies in 20th-Century Music. (4) Three hours of lecture per week. Prerequisites: 170B and 70B, or consent of instructor. A study of representative compositions from each major development of music in the 20th century. (F,SP) Heartz

174C. Stravinsky. (4) New course. Three hours of lecture per week. Prerequisites: 170B and 70B, or consent of instructor. (F) Wilson

174F. Studies in Afro-American Music. (4) Three hours of lecture per week. Prerequisites: 170B and 1308, or consent of instructor. A study of the history of African-American music and its development. Unique aspects of the musical organization, improvisational techniques, and value system will be explored. (SP) Wilson

174G. The History of the Organ. (4) Three hours of lecture per week. Prerequisites: 170B and 70B, or consent of instructor. A study of the organ with emphasis on the development of national organ style. The development of unique instruments in the Music Department's collection will be studied in detail. (F,SP) Wilson

Honors and Special Studies Courses

Upper Division Courses

191H. Honors Course. (2-4) Course may be repeated for credit. Prerequisites: Consent of instructor, student's adviser; and honors program adviser. Attendance at seminar offered during the fall semester and completion of a thesis, or, in exceptional cases, supervised independent study projects. Students 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) Heartz

198. Group Special Study for Advanced Undergraduates. (2-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Not to serve in lieu of regular courses of instruction. (F,SP) Brett

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Not to serve in lieu of regular courses of instruction. Enrollment is restricted by regulations listed on pages 87 and 88 of this catalog. (F,SP) Brett

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 form. (F) Newcomb, Roberts

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 machine skills necessary to operate the analog equipment in the electronic music studio; practical application of musical and acoustic theories to the electronic equipment; compositional assignments. (F,SP) Ganzo

202. Seminar in Contemporary Music. (4) Course may be repeated for credit. Three class hours per week. Studies in 20th-century music. (F) Somfaili; (SP) Taruskin, Thow

203. Seminar in Composition. (4) Course may be repeated for credit. Three class hours per week. Prerequisites: Limited to advanced students of composition. A study of relevant problems and compositional techniques of contemporary music. Original compositions required of students. Group discussion and criticism. (F,SP) Peticono

204. Studies in Musical Analysis. (4) Three class hours per week. Prerequisites: 170B. A study of analytical principles to a group of compositions and the intensive study of at least one major work. (F)

205. Organology. (4) Three hours of lecture per week. Prerequisites: 170B and 70B, or consent of instructor. A study of musical instruments from diverse perspectives including physical characteristics, classification systems, symbolism, iconography, and performance technique. (F,SP) Newcomb

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) Crocker

210B. Medieval Polyphony. (4) Newcomb

210C. The Sixteenth Century. (4) Newcomb

210D. The Seventeenth Century. (4) (F) Heartz

210E. The Eighteenth Century. (4) Newcomb

210F. The Nineteenth Century. (4) Newcomb

210G. The Twentieth Century. (4) Crocker

*211. Musical Paleography. (4) Three class hours per week. Course in the study of musical documents, especially from European Middle Ages and Renaissance, with emphasis on systems of notation. (SP) Crocker
**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.

**217. 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.

**222. 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. (SP)

**219. Seminar: Jazz. (4)** Course may be repeated for credit. Three class hours per week. A highly specialized study of jazz music. 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. Textual editoring and musical notation: problems associated with making modern editions of music in older notational systems. Consideration of multiple sources including facsimile edition and critical edition, different editions of printed scores, 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. Prerequisite: Consent of instructor. A study of transcriptions developed for different musical traditions. Equal emphasis on practical transcription experience.

**280. Colloquium. (1-4)** Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. About five meetings per semester. Open to qualified students for research, or creative work, on a particular topic. Not to be used in lieu of regular courses of instruction. (F,SP)

**289. Group Special Studies. (2-8)** Course may be repeated for credit. Meetings to be arranged according to units taken. Prerequisite: Consent of instructor. Preparation of comprehensive examination. A highly specialized study in Baroque music. The topic will change each time the course is offered.

**289. Group Special Studies in Russian Music. (2-8)** Course may be repeated for credit. Meetings to be arranged according to units taken. Prerequisite: Consent of instructor. Preparation of comprehensive examination in Russian music. The topic will change each time the course is offered. (F,SP)

**601. Individual Study for Master's Students. (1-8)** Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Students must be qualified. A highly specialized study in Baroque music. The topic will change each time the course is offered. (F,SP)

**300. Professional Preparation for Graduate Student Instructors in Music. (2-4)** Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Preparation for teaching and the teaching of undergraduate courses in music. (F,SP) Staff

**405A-405B. Elementary Piano. (1;1)** Must be taken in sequence. Must be taken in sequence. Staff

**410A-410B. Vocal Technique. (1;1)** One class hour per week. Staff

**101. University Requirements, (a) Completion of 120 units, at least 38 of which must be in upper division courses; (b) Maintenance of at least a 2.0 grade-point average; (c) Completion of senior residence, Subject A, and American History and Institutions requirements.**

**102. Major Requirements. (a) 60: 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.**

**201. Interdepartmental Studies Courses**

**101A-101B. Vocal Technique. (1;1)** One class hour per week. Staff

**105A-105B. Elementary Piano. (1;1)** Staff

**203. Topics in Asian Music. (4)** Course may be repeated for credit. Three class hours per week. A highly specialized course in ethnomusicology, dealing with problems in research in music of Asian cultures. The topics will change each time the course is offered. (SP)

**204. Journalism and musical notation: problems in music notation and associated writing systems.**

**205. Group Special Studies. (2-8)** Course may be repeated for credit. Meetings to be arranged according to units taken. Prerequisite: Consent of instructor. Preparation of comprehensive examination in Russian music. The topic will change each time the course is offered. (F,SP)

**206. Group Special Studies in Russian Music. (2-8)** Course may be repeated for credit. Meetings to be arranged according to units taken. Prerequisite: Consent of instructor. Preparation of comprehensive examination in Russian music. The topic will change each time the course is offered. (F,SP)

**207. 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.

**208. 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. (SP)

**209. Seminar: Jazz. (4)** Course may be repeated for credit. Three class hours per week. A highly specialized study of jazz music. The topic will change each time the course is offered.

**210. 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.

**211. 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.

**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.

**217. 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.

**222. 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. (SP)

**225. Introduction to Modern Music Theory. (4)** Three class hours per week. Prerequisite: 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 problems in research in music of Asian cultures. The topics will change each time the course is offered. (SP)

**239A. Issues and Theories in Ethnomusicology I. (4)** Three class hours per week. An introduction to the ideas, methods, theories, and work of historians, philosophers, musicologists, and other humanists in the field of ethnomusicology.

**239B. Issues and Theories in Ethnomusicology II. (4)** Three class hours per week. An introduction to the ideas, methods, theories, and work of anthropologists, sociologists, folklorists, linguists, and other social scientists in the field of ethnomusicology.

**230. Topics in Asian Music. (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)

**231. 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)

**238A. Ethnomusicology Methods: Field Research. (4)** Formerly 238B. Course may be repeated for credit. Three class hours per week. Prerequisites: Consent of instructor. Ethnomusicology: a practical approach to field research in music. The topic will change each time the course is offered. (F,SP)

**238B. Ethnomusicology Methods: Transcription. (4)** Three class hours per week. Prerequisites: 235A-235B. A study of transcription systems developed for different
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 3-credit honors project (H195) 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. One 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. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Satisfaction of Subject A requirement. Expository composition directed to the needs of Native American students. Writing requirement shall be set at a norm of 8000 to 10000 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. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 1A; Satisfaction of Subject A requirement. Continued emphasis on development of proficiency in expository composition with incorporation into Native American literary traditions. Writing requirement shall be set at a norm of 8000 to 10000 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

1C. Native American Studies Reading and Composition. (4) Three hours of lecture, one hour of discussion, and a half hour of discussion 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 traditional themes and presentations as a basis for expression. (F,SP) Biestman, Wilson

152. 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 traditional themes and presentations as a basis for expression. (F) Allen

171A. History of Native Americans in North America. (3) Three hours of lecture per week. History of the origins of native people in North America, discussion of the diversity of Native American cultures and commonality of value systems of those cultures; consideration of the impact of European contact to 1776. (F,SP) 71B

171B. 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 1777 to the present. (SP,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 choices, and cultural integrity through theoretical and historical phases from the colonial period to the present. (F) Faustett

102. Survival 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) Faustett

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 and policies of individual states and localities on Native American economic development of the effect of federal legislation, BIA regulations, and corporate interests on tribal economic life. Consideration of alternative strategies of development. (SP) Black

110. Introduction to Research Problems of Native American Communities. (3) Three hours of lecture per week. Prerequisites: 71A, 71B, 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 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 topical 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 or consent of instructor. A study of the philosophical aspects of Native American world views, with emphasis on systems of knowledge, explanations of natural phenomena, and relations of human beings to nature through ritual and ceremonial observances. (SP) Kidwell

152. Native American Literature. (3) Three hours of lecture per week. Prerequisites: 1A, 71B, or consent of instructor. A study of Native American poetry from ethnocultural 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 poets. (SP) Allen

154. Mythic Tribal Literature. (3) Three hours of lecture per week. Prerequisites: 50. Chronicles and commentaries on published texts and the problems of tribal literature in translation. The cult of cultic verbal artifacts in contrast to the verbal act of showing dreams and telling mythic tales. Perusal of historic speeches, trickster narratives, oratological and prophecy tales. Staff

155. Native American Medicine. (3) Three hours of seminar per week. Prerequisites: 71A, Anthropology 3, or consent of instructor. Theories of health and illness, and curing practices, including herbal medicines, ceremonies, and physical techniques, among Native American groups in North and South America. (SP,SP) Wilson

158. Native Americans and the Cinema. (3) Three hours of lecture per week. Prerequisites: 50, or consent of instructor. This course will analyze the sociological, psychological, and literary aspects of Hollywood moviemakers' stereotypes of the American Indian through the history of film. The format will include representative Indian films, lectures, and guest speakers from the movie industry. (SP) Wilson

159. Native American Women. (3) Three hours of lecture per week. Prerequisites: 71A or 71B, or 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 Euroamerican peoples and the alteration of sex role definitions will be examined. (SP) Allen

173. History of Indians of the Northeast Woodlands. (3) Three hours of lecture per week. Prerequisites: 71B or consent of instructor. Indian groups and cultures from the eastern seaboard to the Mississippi River between the Gulf Coast and southern Canada; precontact ecological adaptations, languages, and cultures, and historical consequences of European colonization. (SP) Kidwell

175. History of Native Americans in California. (3) Three hours of lecture per week. Prerequisites: 71A, 71B, or consent of instructor. History of the Native American tribes of California with emphasis on sites and people, migration, states, wars, and relationships with the United States government. Attention will be given to the background and evolution of acculturation up to the present day. (SP) Black

176. History of Native Americans in the Southwest. (3) Three hours of lecture per week. Prerequisites: 71A, 71B, or consent of instructor. An analytical historical analysis of the Native American Nations of the southwestern United States. (F) Black, 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 1970s. It will stress differences evidenced by the tribes as they met the challenges of ecological, economic, and historical forces. (F) Black

182. Native American Music. (3) Three hours of lecture per week. Focuses on the range and variety of musical forms and styles and the relationship of each to other aspects of human activity, belief, and world view. In particular, the relationship of music and ceremonial activities will be emphasized. The course will include discussions, recordings, and direct contact with musical performance and musicians. Black

190. Seminar on Advanced Topics in Native American Studies. (3) Course may be repeated for credit. Prerequisites: Consent of instructor. A survey of the traditional settlement patterns, native house building technologies, and religious architecture of the major tribal areas of North America. Students will learn to "read" Indian homes and community systems in order to gain deeper understanding of the relationships between material culture, mythology, and socio-economic history. (SP) Staff

H195. Native American Studies Honors Course. (3) Course may be repeated for credit. To be arranged. Prerequisites: Student must have junior standing; a 3.5 GPA overall; a 3.5 GPA in major; and have been admitted to the honors program by the faculty advisor. The course will entail individual study and completion of an honors research project under the direction of a faculty committee. The project should have originated from a regularly scheduled course in the department. (F,SP) Staff

197. Field Work in the Native American Community. (1-3) Course may be repeated for credit if the project varies. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor and upper division standing preferred. Individual conferences to be arranged. Supervised experiences relevant to specific aspects of the Native American community in off-campus settings. Regular individual meetings with faculty sponsor and 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 passed/not passed basis. Prerequisites: Consent of instructor and upper division standing preferred. Individual conferences to be arranged. Group discussion, research, and reporting on topics by students. (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 passed/not passed basis. Prerequisites: Upper division standing and consent of instructor. Individual conferences to be arranged. The individual student, with consent and guidance of an instructor, researches an interest not covered in the courses offered in the program. (F,SP) Coordinator
Naval Architecture and Offshore Engineering
(College of Engineering)

Department Office: 202 Naval Architecture Building, 642-5464
Chair will be announced

Professors:
Robert G. Bea, M.S. Offshore and coastal structures, ocean and coastal engineering
Alaa E. Mansour, Ph.D. Ship and ocean structures
J. Randolph Pauling, Jr., D.Eng. Floating structures, complex systems and computer applications
William C. Webster, Ph.D. Ship hydrodynamics, system analysis
Ronald W. Yeung, Ph.D. Ship and offshore hydrodynamics, numerical fluid mechanics

John V. Weisen, Ph.D.(Emeritus)
Henry A. Schade, Dr.Ing., Dr.Ing.Eh. (Emeritus)

Undergraduate Program
A total of 120 units is required. 18 units of humanities and social studies; 6 units must be upper division; at least two courses from a single department.

Required Lower Division Courses. Mathematics 1A-1B, 50A-50B; Chemistry 1A; Physics 7A-7B-7C; Engineering 7, 28, 35, 45; Naval Architecture 10, (recommended); Statistics 25; and 13 units of electives including at least 12 units of humanities and social studies.

Required Upper Division Courses. Mechanical Engineering 104, 105, 106, 107A, 133; Civil Engineering 130, 167; Naval Architecture 151, 152A-152B, 153, 154, 155; Electrical Engineering and Computer Sciences 100; plus electives which must include 6 units of upper division humanities and social studies.

Graduate study is offered in the areas of ship structures and ship hydrodynamics, leading to both the master's and doctoral degrees. The graduate student normally must take Naval Architecture and Offshore Engineering 240A-240B and 241A-241B. Other courses are chosen according to the student's background and objectives. With sufficient undergraduate preparation, a student may earn a master's degree in two semesters of study. Further details in graduate programs (including the program in ocean engineering) are available from the department upon request.

Lower Division Courses
10. Ship Systems. (3) Two 1½-hour lectures per week. Prerequisites: Mathematics 1A or Mathematics 16A.

152A. Ship Dynamics. (3) Two 1½-hour lectures per week. Prerequisites: 151 (may be taken concurrently). Mechanical Engineering 106: Dimensional analysis and fundamentals of fluid mechanics. Estimates of resistance from model tests and tabulated data. Theories of propeller action and performance of open-water propellers. Interaction between propeller and ship. Selection of optimum propeller characteristics. Laboratory experiment for determination of stillwater resistance of a ship.

152B. Ship Dynamics. (3) Two 1½-hour lectures and four hours of lab per week. Prerequisites: 152A. Elementary wave-water theory. Rigidity-body dynamics of ships and offshore platforms. Motions and loads in a seaway. Statistical description of seaways and resulting loads. Laboratory experiments of motion behavior in the ship model tank. Prediction of steering and maneuvering characteristics. (F) Pauling

153. 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.

154. Ship Structures. (3) Two 1½-hour lectures per week. Prerequisites: 151, CE 130. Introduction to the specialized features of ship structures and their design. Structural loads, hull girder and hull components analysis, laterally loaded girders and cross-stiffened plates, plate buckling, and possible failure to be designed against, use of theory and classification society rules in combination in the design process. (F) Webster

155. Ship Design. (4) Two 1-hour lectures and twog 3-hour labs per week. Prerequisites: 154, 152A. Preliminary design of a ship in the student's choice, including weight and size estimates, preparation of a lines drawing, and a preliminary structural design. (SP) Staff

189. Directed 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 satisfactory/unsatisfactory basis. To be arranged. Prerequisites: Consent of instructor.

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 and major adviser. Supervised independent study. See pages 87 and 88 of this catalog for description and prerequisites.

Graduate Courses
240A-240B. Theory of Ship Structures. (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 hull-strength, modes of failure, reliability concepts and design considerations. (F,SP) Staff

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, lift-drag-force theory. Theory of motion of floating bodies or ships in calm water and waves. (F,SP) Yeung, Webster

243. Advanced Methods in Free-Surface Flows. (3) May be taken on a satisfactory/unsatisfactory basis. Two 1½-hour lectures and two hours of lab per week. Prerequisites: Consent of instructor. Geometry of ship's form, conditions of static equilibrium, and stability of floating and submerged bodies. Effect of damage, subdivision, treeboard, launching of ships, stability, and upending of offshore platforms. Laboratory exercises in ship hydrostatics. An overview of numerical analysis used in naval architecture. Execution of large programming systems. (F,SP) Pauling

Near Eastern Studies
(College of Letters and Science)

Department Office: 609 Evans Hall, 642-3577

Professors:
Hamid Algar, Ph.D. Cambridge University. Islamic and Iranian studies
Robert A. Alter, Ph.D. Harvard University. Hebrew literature, modern and biblical
Guilty Azapay, Ph.D. University of California at Berkeley. Near Eastern art, Persian studies
Ariel A. Bloch, Ph.D. Münster University. Semitics, Arabic, Hebrew, Yiddish, poetics, stylistics
William M. Brinner, Ph.D. University of California at Berkeley. Islamic institutions: Arabic/Judeo-Arabic.
J. Hempel, Ph.D. University of Leiden. Mesopotamian cultures, Sumerian
Anton van der Klaar, Ph.D. University of Pennsylvania. Assyriology: Akkadian, Mesopotamian culture, literature, Near Eastern archaeology
T. Monroe, Ph.D. Harvard University. Classical, Roman, Greek, Near Eastern archaeology
Alessandro Ruggiero, Ph.D. University of Leiden. Hebrew studies, liturgy
David B. Sironen, M.A. Cambridge University. Near Eastern archaeology
Mounah A. Khorai, Ph.D. (Emeritus) Harvard University. Israeli and modern Arabic literature

Associate Professor:
Martin Schwartz, Ph.D. University of California at Berkeley. Old/Middle Iranian, Indo-European, Zoroastrianism, Iranian studies

Assistant Professors:
Cathleen A. Keller, Ph.D. University of California at Berkeley. Arabic, Arabic language, Near Eastern, Hebrew
Chana Kronfeld, Ph.D. University of California at Berkeley. Hebrew, Yiddish, poetics, stylistics

*Not offered 1989-90
*On leave, spring, fall
*On leave, fall

Near Eastern Studies / 29$
Consult the undergraduate adviser for planning or another lower division anthropology course. The 24 upper division units are to be selected from Near Eastern Studies 10, 15, 16, 17, 18, 20, 25; Anthropology 2, 120A-120B and 123A-123B. Each student should take courses offered by the department. The following upper division units must be taken from: Near Eastern Studies 101A-101B, 103, 104, 106A-106B, 118A-118B, 121A-121B, 122A-122B, 123A-123B, 124A-124B; Anthropology 134, 135. While it is not required, the department does recommend some background in French, German, and/or Arabic.

Honors Program. With the consent of the undergraduate adviser, a student with an overall grade-point average of 3.5 or higher and a grade-point average of 3.51 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 Minor

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 at least one semester 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 201A-201B; five upper division courses: Arabic 100A; a two-semester literature course (in Arabic); two-semester courses in Arabic culture/history.

The Minor in Arabic, Option B. Required courses: Seven upper-division courses: five one-semester courses in Arabic culture/history and 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 206-207A; 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 culture/history (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, 104A-104B; 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 culture/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 same degrees are also offered in the following fields of Near Eastern Studies: archaeology, art history, cuneiform, Biblical and Judaic studies, Old Iranian studies, comparative Semitics, Egyptology, 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 are relevant to their disciplines and fields of study. University of California Berkeley graduate students with the approval of their 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. In addition to the requirements outlined for the plan adopted, students must pass a reading examination in an ancient or modern language (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: Other programs of the department. This plan requires at least 24 units of course work, including work in one major and one secondary near Eastern language. Two scholarly papers written independently or in connection with course work will also be required. Written comprehensive examination in the major field is required. Students must be able to read and write in a modern or a classical language. This program requires proficiency in two ancient languages.

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. courses; (2) reading examinations in French and German proficiency in a European or other modern language, the student's field of emphasis may be substituted on approval of the graduate adviser; (3) proficiency in one or two ancient languages, as required for the student's field of study. (4) Language majors, proficiency will be tested through the written preliminary examinations, which will cover at least two Near Eastern languages. For Egyptian archaeology, Near Eastern studies and archaeology majors, proficiency will be tested through the written preliminary examinations, which will cover at least one Near Eastern language. Archaeology/Art History students (except those in Egyptian archaeology who have not completed a minimum of two years of course work in an ancient or modern Near Eastern language must take proficiency exams in an ancient or modern Near Eastern language before taking the preliminary examinations); (4) fieldwork (for art history and archaeology majors); (5) written preliminary examination in the student's major; (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

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, and 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.

Visiting Associate Professor:

David J. Blaie, Ph.D. University of California at Los Angeles. Modern Jewish history and philosophy

Lecturers:

Rutie Adler, M.A. University of California at Berkeley. Linguistics, Hebrew linguistics, English as a second language

Daniel A. Foxvog, Ph.D. University of California at Berkeley. Sumerian language, literature, religion

John L. Hayes, Ph.D. University of California at Los Angeles. Comparative Semitics, Arabic linguistics,

Hasan Javadi, Ph.D. Cambridge University. Persian literature, history, comparative literature

David B. Lakin, B.A. University of California at Berkeley. Ancient Egyptian language, literature

J. David Ogden, M.A. University of California at Berkeley. Modern Iranian history, Persian language and literature

Marble R. Smith, Ph.D. University of California at Berkeley. Arabic linguistics, modern Arabic

Grace M. Smith, Ph.D. University of California at Berkeley. Semitic languages, linguistics

Instruction in the Department of Near Eastern Studies is concerned with the languages and civilizations of the ancient, medieval, and modern Near East. The department offers specialized training in archaeology, art history, Assyriology, Egyptology, littitlology, Iranian studies, Judaic and Islamic studies, Turkish, Hebrew, Arabic, and Persian. For students in other disciplines, the department provides a wide variety of courses in such outer fields as linguistics, history, political science, comparative literature, folklore, and anthropology. Lecture courses offered by the department present a comprehensive basic survey of the history of civilization of their region on past and present Near Eastern civilizations. Many of the courses taught in the department are restricted to a small number of students and thus afford an opportunity for close interaction with the instructing staff.

For a description of interdisciplinary graduate programs in which the department participates, please see the Special Programs section.

Cooperative arrangements between the University and the nearby Graduate Theological Union enable students in the department to use the extensive library resources, seminars, and workshops of the Graduate Theological Union 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: Prerequisites: the elementary courses in the language, or their equivalents. Students with little or no background are recommended that these be taken beginning in the freshman year.

2. In Assyriology and Hittitology, Old Iranian Studies, and Egyptology: A basic reading knowledge of German is recommended. The major requires from 16 to 24 upper division-unit courses, depending upon the language undertaken, plus 6 upper division lecture units.

B. The Major in Ancient Near Eastern Archaeology and Art History

1. Mesopotamian Archaeology. This option requires at least 30 semester units that include 6 lower 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 120A, 120B, 121A, 121B, 122A, 122B. 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 2. Additionally, students must take 8 upper division units from the following list: Near Eastern Studies 101A-101B, 103, 104, 106A-106B, 121A-121B, 122A-122B, 123A-123B, 124A-124B; Anthropology 134, 135. While it is not required, the department does recommend some background in French, German, and/or Arabic.

Honors Program. With the consent of the undergraduate adviser, a student with an overall grade-point average of 3.5 or higher and a grade-point average of 3.51 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.
Near Eastern Studies
Courses listed under Near Eastern Studies are taught in English. Courses listed under language headings are language courses and assume proficiency in that language.

The Schedule of Classes issued prior to each semester, and listings posted at the department office, provide further detailed information about the 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, Iran, and Israel.
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 museum study per week. A survey of Egyptology as a historical discipline and its relations to the social and political institutions of the times.
19. The Sumerians. (3) Three hours of lecture per week. Lectures on the cultural achievements and historical facts of the earliest Mesopotamian people.
20. History and Culture of Ancient Western Asia. (4) 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 Legends 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.
30. 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.
32. Hebrew Literature in Translation. (3) Three hours of lecture per week. Readings from all periods and genres of Hebrew literature.
33. Topics in Near Eastern Studies. (3) One 3-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.
34. Hebrew Bible in Translation. (4) Three hours of lecture and one hour of discussion per week. Readings from the Hebrew Bible in English translation.
40. Introduction to Islam. (3) Three 1-hour lectures per week. Comprehensive introduction to doctrines, rites, and institutions of Islam.
42. 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 section per week. Prerequisites: NES 101A or equivalent or consent of instructor. 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 hours of lecture per week and one hour of museum section per week. Prerequisites: NES 102A or equivalent or consent of instructor. A survey of the archaeological materials available for the reconstruction of Egyptian culture and society.
103. Religion of Ancient Egypt. (3) Prerequisites: 18 or consent of instructor. Three hours of lecture per week. A survey of the religious beliefs of the ancient Egyptians, based upon the written sources.
104. Selected Topics in Mesopotamian History. (3) Course may be repeated for credit. Three 1-hour lectures per week. The history of Mesopotamian states and culture from 3000 BC to the Persian conquest.
105A-105B. Ancient Mesopotamian Documents and Literature. (3;3) Three hours of lecture per week. A representative survey of original third-first millennium cuneiform texts in translation.
106A. 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 through the end of the pharaonic period. Discussion sections will focus on Egyptian material in the Lowie Museum collection. NES 106A will cover the period from predynastic times through the end of the First Intermediate Period (ca. 5000-2000 BC).
106B. Art and Architecture of Ancient Egypt. (4) New course. Three 1-hour lectures and one hour of section per week. Prerequisites: NES 18, NES 106A, or consent of instructor. Stylistic and iconographic study of Egyptian art and architecture from predynastic times through the end of the pharaonic period. Discussion sections will focus on Egyptian material in the Lowie Museum collection. NES 106B will consider the period from the end of the First Intermediate Period (ca. 2000 BC—1st century AD).
107. Ancient Egyptian Literature and Documents. (3) Students who have taken NES 174A may not receive credit for 107. Three hours of lecture per week. Prerequisites: 18 or consent of instructor. Historical and thematic survey of the major genres of ancient Egyptian texts from the Old Kingdom through the Graeco-Roman Period (ca. 2500 BC—first century AD). Special attention will be paid to the social relevance and stylistic 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 Ancient 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 periods in Cyprus, Jordan, Israel, and Syria. The time period covered will be Ceramic/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 1-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 analysis of the impact of Hellenism on Judaism through a detailed study of various apocryphal and pseudopigraphic Alexandrian writings. Special attention will be given to Wisdom Tradition and the philosophical works of Philo Judaeus and their relationship 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 piety, institutions, thought, and literature.
134. Talmud and Midrash in Translation. (3) Three 1-hour lectures per week. Reading in translation and discussion of selections of Talmudic Midrashic literature, their history 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).
137. Modern and Contemporary Jewish Thought. (3) Three 1-hour lectures per week. An analysis of modern Jewish movements and ideas. Topics include Zionism, Hasidism, The Enlightenment, Jewish religious movements in America, Zionism, Buber, Rosenweig, 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.
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.

Not offered 1989-90
On leave, spring
On leave, fall
Recipient of Distinguished Teaching Award
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.

160. Religions of Ancient Iran. (3) Three 1-hour lectures per week. Principally devoted to Zoroastranism and Manicheanism but with some attention to Indic-Iranian origins of Iranian religion for the history of Hellenistic Gnosticism, Judaism, and Islam.

161. 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.

162A-162B. 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 lecture 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 passed/not passed basis. Prerequisites: Limited to senior honors candidates. Directed study centering 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. Prerequisites: Consent of instructor. Seminar 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. May not be used for unit or residence requirements for the doctoral degree.

Upper Division Courses

201A-201B. Elementary Standard Arabic. (5;5) Formerly Arabic 2A-2B. Five 1-hour recitations per week. A presentation of literary Arabic, leading to the reading of a variety of classical and modern texts.

217A-17B. Readings in Current Arabic Newspapers. (2;2) Course may be repeated for credit. Must be taken on a passed/not passed basis. Two hours of lecture and recitation per week. Prerequisites: Arabic 1B or 2B. 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.

201A-201B. Intermediate Arabic. (5;5) Five 1-hour recitation sessions per week. Prerequisites: 1A-1B or 2A-2B. Sequence begins fall.

Literary Arabic Usage. (3) Three hours of lecture per week. Prerequisites: 100A, or consent of instructor. Discussion of the grammar, syntax, semantics, and stylistics of Arabic, as reflected in literary texts.

100B. Classical Arabic Grammar and Syntax. (3) Three hours of lecture per week. Prerequisites: 100A, or consent of instructor. Discussion of the grammar, syntax, semantics, and stylistics of Arabic, as reflected in literary texts. Literacy texts (see syllabus), organized throughout the semester in increasing degree of 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;3) 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: 204-208. 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: 204-208. 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: 204-208. 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: 204-208. 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: 204-208. 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: 204A-204B. 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 majors 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-Abbasid 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. Instruc- tion 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 87 and 88 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 relation- ship to literary Arabic and other Semitic languages.

205. Classical Arabic Poetry. (3) Course may be re-peated for credit. Three hours of class per week. Prerequisites: 105. Intensive study of classical poetry.

206. Classical Arabic Prose. (3) Course may be re-peated for credit. Three hours of class per week. Prerequisites: 105. Intensive study of classical prose.

207. Arabic Historical Texts. (3) Course may be re-peated 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 additional credit when texts vary. Three hours of class per week. Prerequisites: Three years of Arabic. Selected readings in Arabic from the Qur'an in 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 palaeography, grammar, and varieties of Judeo-Arabic style from 9th-13th centuries. Readings will vary.

211A-211B. Hispano-Arabic Literature. (3,3) Credit and grade to be awarded upon completion of sequence. 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 class meeting per week. Prerequisites: 192. 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.

258. Seminar. (1-4) Course may be repeated for credit. Variable. For students of instructor. Special topics in Arabic. Topics vary and are announced at the beginning of each semester.

Cuneiform

Upper Division Courses

200A-200B. Egyptian Akkadian. (4,4) Two 11/2-hour meetings per week. Prerequisites: Background in German and French recommended. Introduction to cu-neiform script and grammar, reading of selected cuneiform texts. Sequence begins fall. This course will be offered in alternate years starting 1989-90.

*101A-101B. Intermediate Akkadian. (3,3) 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. This course will be offered in alternate years starting 1990-91.

102A-102B. Elementary Sumerian. (4,4) Three 1-hour meetings per week. Prerequisites: Three years of another Semitic language or equivalent. A comparative approach to the Sumerian dialects; their relationship to literary Arabic and other Semitic languages.

103A-103B. Intermediate Sumerian. (3,3) One 3-hour meeting per week. Prerequisites: 102A-102B, background in German and French recommended. Reading of texts selected for clarity of script, simplicity of vocabulary, and historical and cultural significance.

105A-105B. Elementary Hittite. (4,4) Two 11/2-hour meetings per week. Prerequisites: Background in German and French recommended. Introduction to Cuneiform Hittite language and grammar with reading of selected historical and religious texts. Sequence begins fall.

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. In-struction 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 87 and 88 of this catalog.

Graduate Courses

200A-200B. Readings in Coptic. (3,3) Course may be repeated for credit. Three hours of class per week. Prerequisites: 102A-102B. Reading texts of a particular genre or period: Coptic Gnostic literature, the New Test-ament in Coptic texts, Shenute and other native Coptic authors.

201A-201B. Later Stages of Egyptian. (3,3) Three hours of class per week. Prerequisites: 101A-101B and 102A-102B. Introduction to late Egyptian and Demotic.

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.

210A-201B. Intermediate Egyptian. (3,3) Three hours of class per week. Prerequisites: 201A-201B and Consent of instructor. Special topics in Egyptian. Topics vary and are announced at the beginning of each semester.

Hebrew

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.

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.

211A-211B. Hebrew Conversation. (2,2) Two 1-hour meetings per week. Prerequisites: 201A or equivalent. Conversation and discussions on contemporary texts selected from Israeli newspaper articles. Course is con- ducted on two levels: intermediate and advanced, si-multaneously.

20A-20B. Intermediate Hebrew. (5,5) Five 1-hour meetings per week. Prerequisites: 1A-1B.

*102A-102B. Readings in the Qur'an. (3,3) Course may be repeated for credit. Three hours of class per week. Prerequisites: 101A-101B. Reading of selected texts in Arabic. Sequence begins fall. This course will be offered in alternate years starting 1990-91.

*105A-105B. Elementary Hittite. (4,4) Two 11/2-hour meetings per week. Prerequisites: Background in German and French recommended. Introduction to Hittite language and grammar with reading of selected historical and religious texts. Sequence begins fall.

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. In- struction 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 87 and 88 of this catalog.

Graduate Courses

200A-200B. Readings in Coptic. (3,3) Course may be repeated for credit. Three hours of class per week. Prerequisites: 102A-102B. Reading texts of a particular genre or period: Coptic Gnostic literature, the New Testament in Coptic texts, Shenute and other native Coptic authors.

201A-201B. Later Stages of Egyptian. (3,3) Three hours of class per week. Prerequisites: 101A-101B and 102A-102B. Introduction to late Egyptian and Demotic.

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.

210A-201B. Intermediate Egyptian. (3,3) Three hours of class per week. Prerequisites: 201A-201B and 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 recitation sessions and one hour of laboratory per week.


1A-1B. Hebrew Conversation. (2,2) Two 1-hour meetings per week. Prerequisites: 20A or equivalent. Conversation and discussions on 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.
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: 2A-2B or 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: 2A-20B. Study of literature, exegesis, halakhic (legal), poetic, apocalyptic, messianic, or historical texts.

103A-103B. Modern Hebrew Texts. (3;3) Course may be repeated for credit with consent of instructor when material varies. Three 1-hour lectures per week. Prerequisites: 20A-102A. Two fundamental texts from week to week. An introduction to the study of selected topics in Hebrew literature from the European Enlightenment to contemporary Israel 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, syntax, semantics, morphology, history of the language, fixed expressions, discourse analysis, contrastive features of Hebrew and English in the context of contemporary linguistic theories.

106. Introduction to Bibliography of Jewish Studies. (2) Three 1-hour meetings 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 to 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: 2A-20B or equivalent. Syntax, semantics, pronunciation and styles of Modern Hebrew, from the literary language to slang, as reflected in representative texts.

111. Intermediate Biblical Texts. (3) Course may be repeated for credit. Three hours of class per week. Prerequisites: Hebrew 101A-101B or equivalent. A systematic study of the prophets beginning with Isaiah.

115. 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.

128. 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.

150A-150B. Teaching Hebrew in College. (3;3) Must be taken on a passed/not passed basis. Variable. Enrollment is restricted by regulations listed on pages 87 and 88 of this catalog.

Graduate Courses

200A-200B. Advanced Persian. (3;3) Course may be repeated for credit. Three hours of class per week. Prerequisites: 101A-201A or equivalent (Hebrew 100A-100B or equivalent) or consent of instructor. Three 1-hour meetings per week. Prerequisites: Consent of instructor; background in German and French recommended, but not required. Texts from the Vendidad and the Yashts; Achaemenid inscriptions.

201A-201B. Persian Historical Texts. (3;3) Course may be repeated for credit. Three hours of class per week. Prerequisites: 101A-201B or equivalent. Systematic readings in the classics of Persian literature, from the tenth to the eighteenth centuries.

108A-108B. Old Persian. (3;3) Course may be repeated for credit. Three hours of class per week. Prerequisites: 101A-102A or equivalent. Texts from the Persian Empire. Sequence begins fall.

109A-109B. Middle Persian. (3;3) Course may be repeated for credit. Three 1-hour meetings per week. Prerequisites: Persian 100A-100B or equivalent; background in German or French recommended, but not required. Manichaean Middle Persian texts, with an introduction to Pahlavi.

111A-111B. Old Iranian. (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 Yashts; Achaemenid inscriptions.

Graduate Courses

201A-201B. Iranian Philology. (3;3) Course may be repeated for credit when subject matter varies. Three hours of class per week. Prerequisites: 101A-201B or equivalent. Selected readings in classical Persian prose and poetry, with an introduction to Pahlavi.

Semiotics

Upper Division Courses

100A-100B. Aramaic. (3;3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Hebrew 100A-100B. Biblical and Ancient Aramaic, including study of the Aramaic parts of Daniel and Ezra and the inscriptions and papyri from Syria, Egypt, Mesopotamia, and the Persian Empire. Sequence begins fall.

201A-201B. Aramaic Texts. (3;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.
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. Prerequisites: Limited to senior honors candidates. Directed study centered upon preparation of an honors thesis.

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 87 and 88 of this catalog.

Graduate Courses

200A-200B. Studies in Comparative Semantics. (3;3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Variable. Prerequisites: 12 upper division units in Semantics or consent of instructor; 200A is prerequisite to B. Comparative Semitic phonetics, morphology, and lexicography with the wider context of Afro-Asiatic 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: 205A or Aramaic (100A-100B) or equivalent; 205A is prerequisite to B. Ugaritic 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: 101A-101B or Aramaic (100A-100B) or equivalent; 205A is prerequisite to B. The Phoenician, Punic, Moabite, and early Aramaic inscriptions, with reference to palaepigraphy, dialectology, and literary style. Sequence begins fall.

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 2-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 eastern area which eventually became 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.

Graduate Program in Neurobiology

Office: 135A Life Sciences Annex, 642-3525

Professors:

David R. Bentin, Ph.D.

Beth Burns, Ph.D.

*On leave, spring

†Recipient of Distinguished Teaching Award

This program is administered by the Graduate Group in Neurobiology and offers graduate education leading to the Ph.D. degree in neurobiology. Applicants should have a bachelor's degree in science and should have satisfied the requirements for the undergraduate major in molecular and cell biology (emphasis in neurobiology), by course work or by independent study.

Advancement to candidacy for the Ph.D. degree is dependent upon successful passage of the qualifying examination. All candidates must acquire teaching experience equivalent to a minimum of one semester of half-time teaching as a graduate student instructor. Inquires concerning admission, financial aid, and degree requirements may be addressed to the group chair, Frank S. Werbin, Department of Molecular and Cell Biology.

Detailed information on new undergraduate and graduate programs and courses in neurobiology can be found in this catalog under the headings "Integrative Biology," "Molecular and Cell Biology," and "Physiological Optics." Undergraduates should consult a major adviser or undergraduate assistant. Graduate students should consult the graduate adviser or graduate assistant in either the Division of Neurobiology of the Department of Molecular and Cell Biology or the Graduate Group in Neurobiology.

Concordance of Courses

On the following page is a list of neurobiology courses formerly offered under the rubric of Interdepartmental Studies (IDS), followed by their new names, numbers, and titles in the new departments. For a list of courses offered by the new departments, followed by the former course number, names, and titles, consult lists in this catalog under the headings "Integrative Biology," "Molecular and Cell Biology," or "Plant Biology." At press time for this catalog, some course information was still not available. If you have questions, or if you do not find a former course listed with its new name, number, and title, consult staff in one of the new departments for up-to-date information.
## Nuclear Engineering (College of Engineering)

**Department Office:** 4153 Etchells Hall, 642-5010  
Chair: T. Kenneth Fowler, Ph.D.  
Professors:  
Paul L. Chamber, Ph.D., University of California. Numerical analysis and computational methods  
T. Kenneth Fowler, Ph.D. University of Wisconsin at Madison. Applied plasma physics and fusion  
Lawrence L. Grossman, Ph.D. University of California. Reactor physics  
Selig N. Kaplan, Ph.D. University of California. Nuclear instrumentation  
Donald R. Olander, Sc.D. Massachusetts Institute of Technology. Nuclear materials  
Thomas H. Pigford, Sc.D. Massachusetts Institute of Technology. Nuclear safety, waste management  
Stanley G. Prussin, Ph.D. University of Michigan. Nuclear/radio chemistry and its applications  
Virgil E. Schrock, M.S., M.E. University of California at Berkeley. Reactor thermal hydraulics, safety  
Lawrence Ruby, Ph.D. (Emeritus)  
Associate Professor:  
Edward C. Morse, Ph.D. University of Illinois. Applied plasma physics  
Professor:  
Robert V. Pyle, Ph.D. (In Residence) (Emeritus)  
Lecturers:  
TeK H. Lim, Ph.D.  
Keith I. Thomasen, Ph.D.  
Roger W. Wallace, Ph.D.  
Nuclear engineering is concerned with the applications of nuclear processes, including the design, analysis, and operation of nuclear reactors and their nuclear fuel cycles. The techniques taught in the nuclear engineering courses are applicable to both nuclear fission reactors and to the development of nuclear fusion as an energy source. The nuclear engineering courses deal with the physical principles of nuclear reactions, the interaction of nuclear radiation with matter, the behavior of neutrons in reactor media, the thermal and hydrodynamic principles of heat extraction, the properties of nuclear materials, and operations and processes in nuclear fuel cycles, 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 may major in nuclear engineering or jointly 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 of engineering. 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; Engineering 7, 45; Electrical Engineering and Computer Science 100, Introduction to Electronics (may also be satisfied by EECS 40 plus EECS 43). Electives.¹

- **Upper Division.** Required: Engineering 117, Mechanical Engineering 105; Nuclear Engineering 101, 104A-104B, 120, 150, 160, 161; Electives.¹

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, Thermodynamics. Kinetics of nuclear reactions and radioactive decay, fission, fusion, and reactions of the energy neutrons; properties of the fission products and the actinides; nuclear models and transition probabilities; interaction of radiation with matter. (F) Kaplan

104A-104B. Nuclear Engineering Laboratory. (3-4) 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, research reactor operations, reactor neutronics, reactor material experiments, thermodynamics, and fusion plasmas. Analysis of data and formal report writing are emphasized. (F,SP) Olander

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 thermodynamics. Thermodynamics of nuclear materials, especially uranium dioxide; crystal structure, point defects and diffusion in solids; cavities in solids; pores and gas bubbles; grain boundaries. Fuel fabrication; thermal gradient effects; irradiation effects; densification, fission product swelling and release. (F) Olander

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 ores, milling, feed material preparation; fuel element fabrication; uranium enrichment by gaseous diffusion and by the gas centrifuge; ideal cascades and enrichment costs; fuel reprocessing by solvent extraction; radioactive waste management. (SP)

150. Introduction to Nuclear Reactor Theory. (4) Two 1½-hour lectures and one hour of discussion per week. Prerequisites: 101; Mathematics 50B. Neutron interactions, nuclear fission, and chain reaction systematics in thermal and fast nuclear reactors. Diffusion and slowing down of neutrons. Criticality calculations. Nuclear reactor dynamics and reactivity feedback. Fuel cycles and fuel management. Production of radionuclides in nuclear reactors. (F,SP) Olander

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)


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, shielding-design concept. (SP) Kaplan, Prussin

167. Reliability and Risk Assessment in Nuclear Systems. (3) Three hours 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 Economics and Design. (3) Three hours lecture per week. Prerequisites: 150 and a junior-level thermodynamics course. The course will place strong emphasis on engineering economics. Operating principles of various reactor concepts. Designs of thermal power cycles tailored to these reactors. Economics of nuclear plants addressing costs of construction, operation, fuel cycle and decommissioning. (F) Fowler

180. Introduction to Controlled Fusion. (3) Three hours 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

198. Group Study for Advanced Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Various. Prerequisites: Upper division standing. Group studies of selected topics. (F,SP) Staff

199. Supervised Independent Study. (1-4) Course may be repeated for credit for a maximum of 4 units per semester. Must be taken on a passed/not passed basis. Individual conferences. Prerequisites: Consent of instructor and major adviser. Supervised independent study. Please see pages 87 and 88 of this catalog for description and prerequisites. (F,SP) Staff

¹Electives 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 of upper division NE courses. student.
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 helium embrittlement; mechanical analysis of structures under irradiation; sputtering and hydrogen recycling in fusion reactors. (SP) Kaplan

221. Corrosion in Nuclear Power Systems. (3) Two 1½-hour lectures per week. Prerequisites: 120 and 117 recommended or consent of instructor. Structural metals in nuclear power plants; properties and fabrication of Zircaloy; aqueous 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

222. Process Technology in the Nuclear Fuel Cycle. (4) Four hours of lecture per week. Prerequisites: Upper division mathematics. Analysis of the principles of the ex-reactor operations of the nuclear fuel cycle, including alternative fuel cycles, recovery and separation of uranium and other special feed materials, isotopes, and applications of process technology for reprocessing, control of radioactive effluents, radioactive waste management, waste isolation. (F) Pigford

225. Nuclear Fuel Cycles. (3) Three hours of lecture per week. Prerequisites: 101, 150; Engineering 117 recommended. Fission characteristics; neutron chain reactions, neutron transport and diffusion theory; reactor kinetics, reactor operation, reactor safety, fast and thermal spectrum calculations, inhomogeneous reactor design, effects of poisons and fuel depletion. (SP) Grossman

255. Numerical Methods of Reactor Analysis. (3) Three hours of lecture per week. Prerequisites: 250; Mathematics 120A-120B. Numerical methods for the solution of reactor systems, radiation sources, reactor kinetics and reactor safety problems, reactor parameter variations 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: 150; Fluid dynamics and heat transfer; thermal and hydraulic analysis of nuclear reactors; two-phase flow and boiling; compressible flow; stress analysis; energy conversion methods. (F,SP) Grossman

265. Design Analysis of Nuclear Reactors. (3) Three hours of lecture per week. Prerequisites: 150 and 161. Principles and techniques of design 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 licensing; release of radioactive fission products 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 flows and applications in nuclear power and propulsion systems. Emphasis on analysis of the single and two-component gas liquid systems. Aspects of gas-solid and liquid-solid systems are also treated. (SP) Schrock


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. Processes of fusion reactor design. Engineering principles of support technology for fusion systems. (SP) Morse, Fowler

290A. Economics of Uranium Enrichment and Deuterium Production. (4) Two 2-hour lectures per week. Prerequisites: Upper division course in thermodynamics. Engineering economics as they apply to nuclear facilities. Processes of making engineering decisions will be demonstrated using cash flow, discounted cash flow and present worth methods. Various nuclear power reactor concepts, other major components of nuclear power plants and their engineering aspects will be covered. Uranium and heavy water enrichment concepts will be analyzed and their engineering economics assessed. (F) Riet

295. Nuclear Engineering Colloquium. (0) Course may be repeated. Must be taken on a satisfactory/unsatisfactory basis. One 1½-hour lecture per week. A series of weekly lectures by experts from industry and faculty. These presentations will deal with current issues in a wide variety of research and technology areas of nuclear engineering and energy development. Master's degree students are required to register for two semesters. Doctoral students required to enroll until admitted to candidacy. (SP, F)

298. Group Studies, Seminars, Group Research. (1-8) Course may be repeated for credit. Sections 1-10: satisfactory/unsatisfactory grading; sections 11-15: letter grading. One to eight hours of lecture per week. Prerequisites: AP. Graduate course in thermodynamics. Advanced study in 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 the process 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. Investigation of advanced nuclear engineering problems. (F,SP)

301. 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 adviser. May not be used for unit or residence requirements for the doctoral degree. (F,SP) Staff

302. 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 field adviser may 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)

303. Professional Courses

304. Graduate Student Instructor Training. (1-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One meeting weekly with a faculty member to discuss some 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) Staff

Interdepartmental Studies Courses

Upper Division Courses

IDS 145. Chemical Methods in Nuclear Technology. (3) One 1½-hour lecture and one 4½-hour laboratory per week. Prerequisites: Nuclear Engineering 101 or Chemistry 143. Experimental illustrations of the interrelationship between chemical and nuclear science 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) Hoffman

Nutrition

(College of Natural Resources, Interdepartmental Graduate Groups)

Office: 146 Morgan Hall, 642-2879
Chair: Sharon E. Fleming, Ph.D.

Professors:
Bruce N. Ames, Ph.D. (Biochemistry)
Leonard F. Bejebine, Ph.D. (Nutritional Sciences)
Doris Howes Calloway, Ph.D. (Nutritional Sciences)
Kameshwar K. Kanungo, Ph.D. (Nutritional Sciences)
John G. Forte, Ph.D. (Physiology/Anatomy)
Jane R. King, Ph.D. (Nutritional Sciences)
Norman Krechmer, M.D., Ph.D. (Nutritional Sciences)
Sheldon Margen, M.D., (Public Health, SAHS)
John S. Nealands, Ph.D. (Biochemistry)
Alexander V. Nichols, Ph.D. (Biophysics and Medical Physics)

Lecturers:
Leslie Packer, Ph.D. (Physiology/Anatomy)
D.L. Pricer, Ph.D. (Public Health, SAHS)
George Sensabaugh, Ph.D. (Public Health, BEHS)
Barry Shane, Ph.D. (Public Health, SAHS)
Herbert H. Sobelman, Ph.D. (Physiology/Anatomy)
Poila Timiras, Ph.D. (Physiology/Anatomy)
Fernando Vitiel, M.D., Ph.D. (Nutritional Sciences)

Graduate Study is supervised by an interdepartmental group representing the various departments at Berkeley interested in nutrition: Nutritional Sciences, Biochemistry, Physiology/Anatomy, Public Health, Agricultural and Resource Economics. 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 in one 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, animal, and plant nutrition, including molecular biology, biochemistry, physiology, nutrition, toxicology, food science, medical nutrition, and other related fields. A wide range of opportunities for research is available in the areas of nutrition, biochemistry, physiology, and toxicology. The program is designed to provide students with a strong background in the fundamental principles of nutrition and to prepare them for careers in research, teaching, and professional fields.
Comparative, and cellular nutrition. Fields of emphasis include chemical, biochemical, and genetic aspects of nutrition; experimental nutrition; human nutrition; international nutrition; physiological phenomena; and therapeutic nutrition.

Nutritional Sciences

(Complementary Readings)

Department Office: 119 Morgan Hall, 642-6490
Chairs: Jane C. King, Ph.D.

Professors: Leonard F. Beldjanes, Ph.D., University of California at Los Angeles. Food toxicology, chemical carcinogenicity. Doris Howes, University of Chicago, Human nutrition and function.

Kenneth J. Carpenter, Ph.D., University of Cambridge. Protein and vitamin nutrition; history of nutritional ideas.

Nerman Ketchmer, M.D., Ph.D., University of Minnesota. Diabetes, hypertensive growth, and nutritional assessment.

Barry Shane, Ph.D., University of London. Regulation of vitamin metabolism.


Mary Ann Williams, Ph.D., University of California at Berkeley. Upper gastrointestinal fatty acids

George W. Briggs, Ph.D. (Emeritus), Thomas H. Harley, Ph.D., (Emeritus), Angela C. Little, Ph.D., (Emerita), E.L. Robert Stone, Ph.D., (Emeritus)

Associate Professors: Nancy K. Amy, Ph.D., University of Virginia. Regulation of trace element metabolism.

George W. Chang, Ph.D., University of California at Berkeley. Nutrition and resistance to infection

Bertha B. de Lumen, Ph.D., University of California at Davis. Food chemistry, molecular biology of legumes as food sources.

Sharon E. Fleming, Ph.D., University of Saskatchewan. Food digestibility, gastrointestinal function.

Susan M. Davis, University of California at Berkeley. Nutritional bioavailability; vitamin metabolism.

Assistants Professors:

Greene Mas, A. M., Ph.D., University of California at Davis. Gastrointestinal peptides and nutriment stimulation.

Maurice Helleman, M.D., Ph.D., University of Massachusetts Institute of Technology. Hepatic metabolism, nutrition, and inflammation.

Visiting Professors:

George A. Wey, Ph.D., Oxford University. The influence of vitamin A on carcinogenesis.

Lecturers:

Pat Booth, M.S., R.D.

Linda Chandy, M.S., R.D.

Marcia H. Martin, Ph.D.

Joanne J. Hsu, M.A., R.D.

Suzanne Murphy, Ph.D.

Jona Richardson, M.S.

Nelle Tiu, M.S., R.D.

Judith Tumtum, Ph.D.

Directors:

Clinical Dietetics Program:

Mary Anne Burkman, M.P.H., R.D.

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 an emphasis in nutrition, biochemistry, and physiological study of nutrition, 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 biological or chemical sciences or enter professional programs in the health sciences. Through careful selection of electives, a nutrition 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 the B.S. degree 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 clinical study 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 natural and social sciences with 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 science, 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, nutrition 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 Office, 146 Morgan Hall, 642-2679.

Lower Division Courses

10. Introduction to Human Nutrition. (Students will receive no credit for 10 after taking 100. Two hours of lecture and one hour of 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 on health. Emphasis on issues of current interest and on worldwide problems of food and nutrition. Students are required to keep their own diet, calculate its composition and evaluate it. (F,SP) Ketchmer, Carpenter.

100. Introduction to Food Science. (5) Three 1½-hour lectures per week. Prerequisites: Molecular and Cell Biology 32 and 102 (may be taken concurrently). Human nutrient requirements throughout the life cycle, nutritional balances, assessment of nutritional status, nutrient functional properties. (F) King, Bence.

104. Human Food Practices. (2) Two hours of lecture and one hour of discussion per week. Prerequisites: 10 recommended. Historical, geo-ecological, biological, cultural, socio-economic, political and personal determinants of human diets. Community food and nutrition programs and programs. Food safety and consumer protection. Contributions to the pursuit of multidisciplinary degrees in nutrition policy and planning. (SP) Viteri.

105. Introduction to Food Science. (3) Three 1-hour lectures per week. Prerequisites: Molecular and Cell Biology 102 or consent of instructor. Evaluation of the chemical, biochemical, and physiological properties of foods and the changes which occur during preparation, processing and storage. Evaluation of the quality criteria for foods and the criteria for standards and legal requirements. (F) de Lumen, Fleming.

106L. Introductory Food Science Laboratory. (2) One hour of lecture and one hour of laboratory 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) de Lumen, Fleming.

108. Food Chemistry Laboratory. (4) One hour of lecture and three hours of laboratory per week. Prerequisites: 106, Molecular and Cell Biology 102L, and a course in statistics. Principles, methods, and techniques for quantitative analysis of food components by physical, chemical and biological assays.

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 practices in evaluating the safety of foods, food components, additives, and contaminants. Selective toxicity, detoxification, mechanisms, basic concepts, and techniques of safety evaluation, and interpretation of biochemical data. (SP) de Lumen.

113. Food Microbiology and Technology. (3) Three hours of lecture per week. Prerequisites: Recommended: A course in microbiology or bacteriology, a course in food science or food chemistry. Characteristics and actions of microorganisms involved in foodborne illness, food spoilage, and food fermentations. Selection of foods and the criteria for standards and legal requirements. (SP) Chang.

135. Food Systems Organization and Management. (2) Three hours of lecture/lab per week. Prerequisites: 113 (may be taken concurrently). Principles and practices in evaluating the safety of foods, food components, additives, and contaminants. Selective toxicity, detoxification, mechanisms, basic concepts, and techniques of safety evaluation, and interpretation of biochemical data. (SP) de Lumen.

150. Experimental Nutrition. (4) Three 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.

161. Therapeutic Nutrition. (4) Four hours of lecture and one hour of discussion per week. Prerequisites: 106; 161L required. Dietetic methods of therapeutic treatment and evaluation of various human conditions and diseases. (SP) Staff.

165. Research Dietetics. (1) One 1-hour lecture/discussion per week. Prerequisites: 102. 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) Burkman.

170. Experimental Nutrition Laboratory. (4) One hour of lecture, one hour of discussion and two 3-hour laboratories per week. Prerequisites: 100, Molecular Cell Biology 102L, and a course in statistics. Basic principles and techniques used in human and animal nutrition research. Students design, execute, and analyze experiments. (F) Amy.

180. Introduction to Clinical Dietetics. (1) Must be taken on a pass/no pass basis. One 1-hour seminar per week, two 1-hour laboratory sessions per week, one 1-hour seminar per week. Prerequisites: 2.5 GPA in required major courses and consent of instructor. Minimum of 24 hours of clinical field work per semester; includes planning, analysis, and performance of practical assignments. Primarily for students interested in careers in clinical dietetics. Introduction to practice of dietetics in hospital and specialized settings. In addition, attendance at weekly clinical dietetic seminar is required. (F) Burkman.
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 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 modified diets; emphasis on obesity, Endocrine, cardiovascular. (SP) \[Chandhoke\]

182. Clinical Nutrition II. (4) One 2-hour lecture/discussion, one 8-hour clinical experience per week. Prerequisites: 181, 181, maintenance of 2.5 GPA in required major courses, and consent of instructor. Individual counseling and group teaching methods; assessment for students in clinical dietetics. Methods of nutrition care, planning, and evaluation for patients requiring modified diets. Assessment of therapeutic diets and formulated foods; emphasis on trauma, renal, hepatic, and gastrointestinal disorders. (F) \[Heilierstein, Booth\] \[Chandhoke\]

182L. Clinical Nutrition Laboratory. (1) New course. One 3-hour laboratory per week. Prerequisites: 182 (may be taken concurrently), 181, 181, maintenance of 2.5 GPA in required major courses, and consent of instructor. Laboratory emphasis on principles and laboratory techniques used in the clinical evaluation of patient status; discussion of meaning of such values in patient treatment. (F) \[Heilierstein\]

185. Introduction to Research in Nutritional Sciences. (1) Consent of instructor; 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) \[Staff\]

197. Field Study in Food and Nutritional Sciences. (1-3) Course may be repeated for credit. Must be taken on a pass/not passed basis. Approaches one 8-hour field study per week per unit. Supervised experience in off-campus organizations relevant to specific aspects of foods and nutritional sciences. 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 pass/not passed basis. Approximately three hours of laboratory per week per unit. Prerequisites: Consent of instructor. Study of special topics in food science or nutrition that are not covered in depth in required courses. (F,SP) \[Tummler, de Lumen\]

199. Supervised Independent Study and Research. (1-3) Course may be repeated for credit. Must be taken on a pass/not passed basis. Approximately three hours of laboratory per week per unit. Prerequisites: Consent of instructor. Enrollment is restricted by regulations listed on pages 87 and 88 of this catalog. (F,SP) \[Staff\]

Graduate Courses

200. Advanced Human Nutrition. (4) Three 1½-hour review lectures and one 2-hour advanced lecture per week. Prerequisites: \[11, Molecular and Cell Biology 32 and 102\]. Intended primarily for first semester graduate students in nutrition. Review of nutrient metabolism and function, human nutrient requirements, nutritional balance and needs assessment. Evaluation of research data relevant to controversial nutrient requirements. Evaluation of research methodologies relevant to nutritional assessment. (F) \[Shane\]

201A. Molecular and Cellular Nutrition. (2) New course. Two hours of lecture/discussion per week. Prerequisites: \[Molecular and Cell Biology 100 or consent of instructor\]. Mechanisms by which nutrients modulate metabolic and developmental processes at the molecular and cellular level with emphasis on experimental systems for studying nutrient control of gene expression. (SP) \[Staff\]

201B. Metabolism and Human Nutrition. (2) New course. Two hours of lecture/discussion per week. Prerequisites: \[200 or consent of instructor\]. Formulation of research diets for experimental animals or humans; metabolism and human nutrition; analysis of recent research publications. (SP) \[King\]

201C. Functional Consequences of Nutritional Status. (2) New course. Two hours of lecture/discussion per week. Prerequisites: 200 or consent of instructor. Critical review of the knowledge and methodologies for investigating the long-term functional status of individuals and populations. Policy implications and research needs will be discussed. (SP) \[Viteri\]

202. 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 malnutrition. (F) \[Chandhoke\]

203. Vitamin and Mineral Metabolism. (2) Two hours of lecture and one hour of discussion per week. Prerequisites: 150. Advanced vitamin and mineral nutrition; emphasis on function, homeostatic control, and dietary need. (F) \[Amy\]

205. Protein and Energy Metabolism. (2) Two hours of lecture and one hour of discussion per week. Prerequisites: 100. Methodology for study of protein and energy nutrition. Factors influencing protein and energy utilization and metabolism. (SP) \[Carpenter\]

211. Research Methods in Nutritional Sciences. (2) One hour of lecture/discussion per week; two hours of discussion/demonstration per week. Prerequisites: 200, Molecular and Cell Biology 102L, and a course in statistics. Design and statistical analysis of nutrition research; modern computer instrumentation; techniques in nutrition; research laboratories. (F) \[Staff\]

213. Special Topics in Food Microbiology. (2) Course may be repeated for credit. One 2-hour lecture/seminar per week. Prerequisites: Consent of instructor; Critical review and discussion of current 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 intestinal microflora, or genetic engineering. (F) \[Chang\]

260. Topics in Human Nutrition. (2) Two hours of lecture per week. Prerequisites: 200. Analysis of current research and development of areas of interest and controversy in human nutrition. (F) \[Shane\]

261. Topics in Clinical Nutrition. (2) Two hours of lecture per week. Prerequisites: 200 and 161 or consent of instructor. 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) \[Staff\]

262. Nutrition and Human Reproduction. (1) One 2-hour lecture for first hour and one 2-hour discussion for second hour. Prerequisites: 200. Nutritional needs for fertility, pregnancy and lactation; malnutrition and reproduction performance. Assessment of nutritional status in pregnant and lactating women. (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: \[Graduate standing\]. Advanced study of topics in nutritional sciences. More than one section may be taken simultaneously. (F,SP) \[Staff\]

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: \[Graduate standing\]. Presen- tations by graduate students of research proposals and results of their research. Participation in discussion and evaluation of others' presentations is required. (F,SP) \[Staff\]

298. Directed Group Studies. (1-4) Course may be repeated for credit. One hour of lecture/discussion per week per unit. Prerequisites: \[Graduate standing and consent of instructor\]. Special study in various fields of nutritional sciences. Topics will vary depending on interests of qualified graduate students and availability of staff. (F,SP)

*Not offered 1989-90
*On leave, spring
*Fall
*On leave, fall

299. Experience in Nutrition and Food 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 a grade of 'B' or better in major 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 competency. Supervised practice of dietetics in a hospital setting with progressively greater responsibility to entry level practitioner competency. Preparation, presentation, and evaluation of nutrition education unit to specified audience. (F,SP) \[Bjeldanes\]

401. Dietetic Counseling. (2) Must be taken on a passed/not passed basis. Prerequisites: 182 (may be taken concurrently) and a grade of 'B' or better in major courses and consent of instructor. Minimum of 200 hours of clinical field work; one hour of counseling per week. Planning, discussion, and evaluation sessions as needed. Additional effort may be required to achieve competency. Supervised practice of dietetics in a hospital setting with progressively greater responsibility to entry level practitioner competency. Concurrent full days of clinical experience in specialized care wards. (SP) \[Booth\]

408. Field Study in Clinical Specialties. (2) 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: \[2.5 GPA in required major courses; consent of instructor\]. 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) \[Burman\]

490. Clinical Dietetics Seminar. (1) Course may be repeated for credit up to four units. Two hours of lecture, field trip, and/or clinical presentation per week. Prerequisites: \[2.5 GPA in required major courses and consent of instructor\]. Seminars and discussions on professional roles and responsibilities of dietitians; clinical case presentations by professionals and students; special topics in clinical dietetics. (F,SP) \[Burman\]

492A. Advanced Field Studies in Food Service Management. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. One hour of discussion per unit; one hour discussion per week. 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 food service management settings. Students will gain practical experiences...
preparation, personnel supervision, budget, safety and sanitation. (F,SP) Burkm

492B. Advanced Field Studies in Nutrition Education. (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 community dietetics setting. The 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 intervention interactions. (F,SP) Burkm

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 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, or private practice setting. The students will gain practical experience in the techniques, problems and implications of human metabolism research including ethics, experimental and diet design, quality control and subject intervention interactions. (F,SP) Burkm

492D. 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 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 scheme, etc. (F,SP) Burkm

487. 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 clinical field work per semester per unit; one hour discussion per week; includes planning, discussion, and evaluation sessions as needed. Additional effort may be required to achieve desired competency. Supervised practice of dietetics in specialized clinical settings. (F,SP) Burkm

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 1/2-hour lecture and one 2/3-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 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) Must be taken on a satisfactory/unsatisfactory basis. Three hours of seminar per week. Prerequisites: Gradu ate 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 food 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 Re source Economics, Nutritional Sciences, Social and Administrative Health Sciences (School of Public Health). (SP) Lane, Robinson, Vlteri, Saby

Optometry (School of Optometry)

Office: 350 Minor Hall, 642-3414

Professors:

Anthony J. Adams, O.D., Ph.D. Color vision; assessment of retinal function

Jan L. Bailey, O.D., M.S. Low vision; clinical optics; clinical assessment of visual performance

Swetha Cohn, Ph.D. Psychophysics of vision; visual neurophysiology; low dose effects of ocular toxic agents

Russell L. DeVries, Ph.D. Visual neurophysiology; color vision; spatial vision

Jay M. Enoch, O.D., Ph.D. Retinal receptor optics and function; quantitative layer-by-layer perimeter; visual correction of infants and the elderly

Ralph D. Freeman, O.D., Ph.D. Neurophysiology and psychophysics of development and plasticity

Stanley A. Klein, Ph.D. Spatial vision; psychophysical methods and vision test design; nonlinear analysis of visual processes

Robert R. Mandell, O.D., Ph.D. Structure, growth, and physiology of the cornea; contact lenses

Clyne S. Martin, O.D., Ph.D. Visual neurophysiology; development and plasticity, visual-evoked potentials

Sheldon S. Miller, Ph.D. Membranes: transport and biochemistry

Kenneth A. Potes, O.D., M.S. Corneal physiology; 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 pupil; bioengineering of movement and computer vision

Richard C. Van Sluyters, O.D., Ph.D. Visual development; neuropsychology; visual-motor interaction

Irving Felt, Ph.D. (Emeritus) Material and energy transport in the eye: contact lens technology related to physiology of the eye

Mercedes W. Morgan, O.D., Ph.D. (Emeritus) Ocular optics and binocular vision

Associate Professors:

Martin S. Banks, Ph.D. Infant vision; visual development and spatial vision

Karen DeValois, O.D. Psychophysics and electrophysiology of color vision and spatial vision

Assistant Professors:

Gunilla Haegerstrom-Porfy, Ph.D. Clinical psychophysics and basic aspects of human color vision; binocular vision

Jack R. Hobson, B.S. (Emeritus)

Senior Lecturers:

Darryl M. Carter, O.D., Ph.D. Ocular pathology; clinical optometry

Terry Long, O.D. Ocular pathology

Michael G. Harris, O.D., J.D., M.S. Contact lenses and corneal physiology

Lecturers:

John D. Grisham, O.D., M.S.

Kermit K. Koe, O.D., M.Opt. (Emeritus)

Clinical Professors:

Karen L. Walker-Brandreth, O.D.

Thomas M. Willett, O.D., M.S.

Barry C. Winston, O.D.

Assistant Clinical Professors:

Clark M. Abramson, O.D.

Everett Al, M.D.

Stephanie N. Baba, O.D.

Daniel A. Baggett, O.D.

Charles H. Baker, O.D.

Richard W. Baker, O.D.

Frank G. Blaslavsky, O.D., M.S.

Bruce H. Bern, M.D.

Roy Black, O.D.

Christina Brischer, O.D.

Dennis Burger, O.D.

Mathew K. Chan, O.D.

Stephen R. Chun, O.D.

David R. Demannini, M.D.

Edward A. Denza, O.D.

Bernard J. Dolan, O.D., M.S.

Charles Drucker, M.D.

Steven Ellis, O.D.

Weylin G. Eng, O.D.

Bernard E. Falsb, M.D.

Mark A. Fujiwara, O.D.

Ronald Furukawa, O.D.

Michael A. Glazeks, O.D.

Gregory L. Goodrich, O.D.

Howard J. Goodrich, O.D.

Patsy L. Harvey, O.D., M.P.H.

James A. Heni, O.D.

Camran X. Hunt, O.D.

Stephen J. Ingman, O.D.

Douglas H. Kay, O.D.

Roderick J. Keener, O.D.

Nicholas G. Kerry, O.D.

Curtis W. Kerrick, O.D.

Jeffrey Ko, O.D.

George K. Lee, O.D.

Stephen L. Laster, O.D.

Gary L. Liberman, O.D., Ph.D.

Willbur W. Liville, O.D.

Richard F. Lundy, M.D., M.A.

Kenneth C. Low, M.D.

Joseph H. Maino, O.D.

Mark R. Mandell, M.D., Ph.D.

Rachel M. McBride, O.D.

Bruce C. Meloche, O.D.

Robert W. Metzler, O.D.

Rosemary H. Miller, O.D.

Alan T. Nakashita, O.D.

Gary A. Osias, O.D.

Steven D. Parsons, O.D.

Robert Z. Quinlan, M.A.

Jeffrey A. Quinlan, M.D.

Edward J. Revelli, O.D.

Paul R. Roe, O.D.

Michael E. Ross, O.D.

Donald S. Solar, O.D.

Steven H. Schwartz, O.D., Ph.D.

Karen R. Segaloff, M.S., M.Sc.

Jayne L. Silve, O.D.

David C. Simpson, O.D.

Karen R. Spring, O.D.

Rodney Taheran, O.D.

Joseph S. Tardman, M.D., Ph.D.

Lawrence Thai, O.D., M.B.A.

Charlotte Thye, O.D.

Peter S. Visendi, O.D.

Glenna E. Wals, O.D.

James C. Wendt, O.D.

Spencer H. Wheatcott, O.D.

Frank J. Whitaker, O.D.

Diane H. Williams, O.D.

Russell Wonnell, O.D.

David S. Yee, M.D.

Frank Zisman, O.D., Ph.D.

Clinical Instructors:

Linda G. Anzalone, O.D.

Mark Bowman, O.D.

Thomas M. Cahan, O.D.

Stephen J. Dantoine, O.D.

Robert B. Damirato, O.D., M.S.

Steven E. Fein, M.D., O.D.

Teresa A. Fong, O.D.

Teresa A. Goldberg, O.D.

Kim Holliday, O.D.

Ronald J. Janda, O.D.

Duane K. Kanehira, O.D.

Lori A. Landsman, O.D.

Raymond F. Pederson, O.D., M.S.

Joy N. Sarver, O.D., M.A.

Larry A. Sarver, O.D.

Meryn S. Simon, O.D.

Carol L. Slate, O.D.

Margaret M. Stobaczek, O.D.

Kenneth E. Sweeney, O.D.

Ernest H. Takahashi, O.D.

John W. Tierney, O.D.

Richard T. Wacker, O.D.

Allan H. Violini, O.D.

Burton Wondr, O.D.

Senior Lecturers (Part Time):

Thomas H. Jamison, M.D.

Programs

For a description of optometry programs, see page 92.
Optometry

Upper Division Courses

100A. Introduction to Optometry. (2) Must be taken on a passed/not passed basis. Two 1-hour lectures, two hours clinic observation. Prerequisites: 100A. The profession of optometry, its history, and present status. Discussions on the role of the optometrist in health care delivery systems and on clinical optometric practice. Clinic observation. (SP) Ennoch

100B. Introduction to Optometry. (2) Must be taken on a passed/not passed basis. One hour of lecture and two hours clinic observation per week. Prerequisites: 100A. Course description: the practice of optometry. The establishment, management, economics of an optometric practice. Professional organizations and societies; options and methods for delivery of optometric services. (SP) Thal, Hisaka

185B. Practice of Optometry. (1) Must be taken on a passed/not passed basis. One 1-hour lecture per week. Prerequisites: 165A. A course designed to specifically relate those concepts taught in 195A to the seeking of employment or establishment of optometric practice. Topics include: practice management, marketing, public relations, management, personnel 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. (1,1) 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 proposal; fundamentals of scientific inquiry; experimental design and analysis of data. (F,SP) Cohn, Staff

192. Optometry Research Project. (1) Must be taken on a passed/not passed basis. One hour discussion per week. Prerequisites: 190B. Thesis research for optometry students; presentation of research results. (SP) Cohn, Staff

186. Group Studies. (2) Two 1-hour lectures per week. Prerequisites: 453B. Advanced topics in specialty areas. (F,SP) Staff

Graduate Courses

230A-230B. Graduate General Clinical Practice. (2-6-8) Course may be repeated for credit. Four hours of clinical credit per hour. Prerequisites: O.D. degree. General Optometric practice for four hours per week per credit hour, including optometric examination, dispensing, consultation, and subsequent vision care of patients performed independently by graduate student clinicians. More than one clinical specialty may be taken simultaneously. (F,SP) Shedy, Staff

231A-231B. Graduate Specialty Clinics. (2-8-2) Course may be repeated for credit. Four hours of clinical credit per week per unit. Prerequisites: O.D. degree. Clinical examination of patients in designated specialty clinics. More than one clinical specialty may be taken simultaneously. (F,SP) Shedy, Staff

231A-231B. Graduate Clinical Rounds. (1-2-1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Seminar/patient participation in diagnosis and treatment. Prerequisites: O.D. degree. Presentation and discussion of the diagnosis, etiology, prognosis, and treatment of selected clinical cases. (F,SP) Staff

292A-292B. Graduate Optometry Seminar. (1-3-1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Seminar. Prerequisite: Graduate seminars on selected topics in clinical optometry. (F,SP) Staff

298A-298B. Independent or Group Studies. (1-6-1) Course may be repeated for credit. Directed studies. Prerequisites: O.D. degree. Directed studies on a selected topic(s) within optometry. (F,SP) Staff

299A-299B. Graduate Optometry Research. (2-4-2) Course may be repeated for credit. Research. Prerequisites: O.D. degree. Directed research on a selected topic within clinical optometry. (F,SP) 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 one 2-hour lab per week. Prerequisites: 127B. Lectures, seminars, and clinic practice in the techniques and interpretation of critical data. (S)

Not offered 1989-90

On leave, spring

On leave, fall

†Recipient of Distinguished Teaching Award
Physiological Optics

Upper Division Courses

110. Anatomy of the Visual System. (5) Two 1½-hour lectures and one hour of discussion per week. Prerequisites: Anatomy 101-105, or equivalent or consent of instructor. Gross and microscopic anatomy of orbit bones, appendages, fascia, muscles, and blood vessels. Histology of the eye. Neuroanatomy of sensory, motor and autonomic visual pathways. Embryology of the visual system. (F) Van Sluyters

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. Selected topics in physical theory: diffraction, interference, polarization of light, and their applications. (F) Klein

111. Optics. (5) Three 1-hour lectures, one 2-hour laboratory and one hour discussion per week. Prerequisites: 110. The eye as an optical instrument; image-forming properties; the eye as an image receptor; peripheral vision, optical constants, schematic eyes, cardinal points, ametropia, accommodation, retinal image size, blur circles, defraction, aberrations, scatter, and absorption. (SP) Klein

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; metabolism in the lens; properties of the vitreous; physiology of the cornea, sclera, retina, and tear film. (SP) Miller, Stark

129. Ocular Motility. (3) Two 1-hour lectures and one 2-hour lab per week. Prerequisites: 101. Motor mechanics, control, and stimuli in accommodation, pupil and vergence responses; interactions of this triad; zone of single clear binocular vision. Kinematics of ocular rotations, degrees of freedom, false horseriding; Hering's, Listing's and Donder's laws; kinetics of time-optimal sacadic trajectories; vestibular ocular reflex; fixation, reading, and saccade eye movement patterns. (F) Sheedy

131. Vision: Sensitivity. (3) Two 1-hour lectures, one hour of discussion or 1½-hours of lab per week. Anatomy and physiology of human retina and peripheral visual pathways, functional role of retinal neurons, photo transduction, lateral interactions, psychophysical methods, area, time, uncertainty, criterion, and adaptation influences on threshold, applications including acuity perimetry and gross potentials. (F) Cohn

132. Vision: Central Pathways. (2) One hour of lecture or two 1½-hour lab per week. Prerequisites: Vision 1 and 2 or permission of instructor. Anatomy and physiology of central visual pathways from lateral geniculate to visual cortex. Psychophysical functions that are identified with central pathways. Visual acuity and contrast sensitivity. (F) Freeman

133. Vision: Normal and Abnormal Development. (1) One hour of lecture per week. Prerequisites: Vision 1 and 2 or permission of instructor. Normal development of the visual pathways including optics, anatomy, and physiology. Abnormal development induced by various types of visual deprivation. Clinical models. Psychophysical functions of abnormal development. (SP) Freeman

134. Vision: Light and Color. (3) Two 1-hour lectures and one 2-hour lab per week. Prerequisites: Vision 1, 2 and 3 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 color 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, motion and depth cues. (F) Schor

198. Group Studies for Advanced Undergraduates. (1-4) Must be taken on a passed/not passed basis. Supervised group study. Prerequisites: Upper division status and consent of instructor. (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. Supervised independent study. Prerequisites: Upper division status and prior consent of instructor, the student's major adviser and the departmental chair. (F,SP) Staff

Graduate Courses

201A. Seminar in Physiological Optics. (2) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: Consent of instructor. Graduate seminar in physiological optics. (F,SP) Staff

201B. Seminar in Physiological Optics. (2) Course may be repeated for credit. One 2-hour seminar per week. Prerequisites: Consent of instructor. Graduate seminar in physiological optics. (F,SP) Staff

202. Visual Evoked Potentials. (3) Four hours of seminar per week. Prerequisites: Consent of instructor. Graduate standing in physiological optics, or consent of instructor. Bases of visual evoked potentials, including application to visual development and deprivation, objective testing, function anatomy of the visual brain, instrumentation and future developments. Contributions from positron emission tomography. (SP)

204. Optical Image Formation of the Eye. (3) Two 1-hour lectures and two 1½-hour lab per week. Prerequisites: Standing in psychological optics, or consent of instructor. Lectures and laboratory demonstrations. Measurement of optical properties of simple and compound eyes. Image quality and resolution. Optometry Seminar in Physiology of the Eye. (F) Klein, Bailey, Einhorn

205. The Oculomotor System. (3) Two 1-hour lectures and two 2-hour laboratories per week. Prerequisites: Consent of instructor. Lectures and laboratory demonstrations on mechanical, physiological, servoanatomy, and behavioral aspects of pupil, accommodation, and monocular and binocular eye movement responses. (F) Stark

207. Simulation of Visual Systems. (3) Two hours of lecture and 6 hours of laboratory per week. Prerequisites: Graduate standing or permission of instructor. Analysis of eye, instrument optics, biochemiotopic and vegetative a control and systems approach is made available to non-engineers, using computer simulation techniques, and biologist-oriented display programs. (F) Stark

210. Instrumentation and Methodology in Vision Research. (2) Must be taken on a satisfactorystudent basis. One hour of lecture and one hour of laboratory per week. Prerequisites: Graduate standing or permission of instructor. Selected topics from basic concepts in radiometry, photometry, and colorimetry. Optical bench systems, monochromatic and polychromatic methods applied to the optics of mirrors, lenses, and image quality. Video and oscilloscope stimulus generation and calibration. Neurophysiological and biophysical techniques for measurement of eye movements, pupil, accommodative response, and retinal reflexes. Psychophysical methodology, signal detection, computer control of stimuli, data acquisition and processing. Clinical assessment of ocular components; exam. (F) Adams

214A. 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 literature and the more recent information on visual science. Topics will include physical and geometric optics, dioptics of the eye, instrument optics, biocomputational and vegetative physiology of the eye, anatomy of the eye and orbit, eye movements, pupil, accommodation, and photochemistry and receptor physiology. (F) R. DeValois

214B. Visual Sciences B. (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 literature and the more recent information on visual science. Topics will include retinal neuroanatomy and neurophysiology, genetics anatomy and physiology, psychophysical procedures, incremental thresholds and absolute sensitivity, color vision (physiology and psychophysics), spatial vision, visual acuity, spatial frequency analysis, form perception, visual development, temporal aspects of vision (movement and flicker), and binocular vision. (SP) D. DeValois

216. Color Vision. (2) Course may be repeated for credit with consent of instructor. Two 1½-hour lectures per week. Prerequisites: Consent of instruction. Selected topics from color vision mechanisms, specification, and discrimination, psychophysics and neurophysiology of color processing. Color and brightness perception. Stiles two-color increment threshold measures, interaction of color and form, color vision anomalies. (F) D. DeValois

218. Spatial Aspects of Vision. (2) Course may be repeated for credit with consent of instructor. Two hours of lecture per week. Prerequisites: 123A or consent of instructor. Selected topics from color vision mechanisms, specification, and discrimination, psychophysics and neurophysiology of color processing. Color and brightness perception. Stiles two-color increment threshold measures, interaction of color and form, color vision anomalies. (F) R. DeValois

220. Binocular Vision. (2) Course may be repeated for credit with consent of instructor. Two hours of lecture
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: Optometry, Physiology-Anatomy, Public Health, Social Welfare. (F,SP) Timiras, Minkler

IDS 119. Multidisciplinary Studies and Field Experience in Aging. (2) New course. Seven weeks of one-2-hour seminar each week and a total of six hours of field work. Prerequisites: Upper division or graduate student standing and consent of instructor. Study of adults 70 years and older. Students will visit older patients from a local geriatric clinic and confer with clinic staff. One hour of seminar consists of a lecture by a specialist on aging from a local geriatric clinic and a discussion of the interrelationships of aging and of caring for older people. Sponsoring departments: Optometry, Social Welfare, Public Health. (F) Timiras, Arnold

Related Courses in Other Departments

Psychology 210A. Proseminar: Sensory Processing. (3)
Psychology 210D. Proseminar: Perception. (3)

Oriental Languages (College of Letters and Science)

Departmental Office: 104 Durant Hall, 642-3480

Professors:
Haruo Aoki, Ph.D. University of California. Japanese
Cyril Birch, Ph.D. University of London. Vernacular, Modern Chinese literature
John C. Jamieson, Ph.D. University of California. Medieval Chinese literature
Lewis R. Lancaster, M.Th., Ph.D. University of Wisconsin. Buddhism
William H. McCulloch, Ph.D. University of California. Classical Japanese literature
Michael M. Rogers, Ph.D. University of California. Early Chinese literature
Stephen West, Ph.D. University of Michigan. Medieval Chinese literature
Kun Chang, Ph.D. Yale University. Chinese linguistics (Emeritus)
Helen C. McCullough, Ph.D. University of California. Classical Japanese literature (Emeritus)
Edward H. Schafer, Ph.D. University of California. Philology, Medieval Chinese (Agassiz Professor Emeritus)

Associate Professors:
James E. Bosson, Ph.D. University of Washington. Attic and Tibetan languages and literature
Samuel Cheung, Ph.D. University of California. Chinese vernacular literature, linguistics
Francis T. Motsu, Korea
Jung K. Riegel, Ph.D. Stanford University. Early Chinese texts
Michel Strickmann, Ph.D. Ecole Pratique des Hautes Etudes. Buddhism, Tazim, medieval Chinese cultural history

Assistant Professor:
Van C. Gessel, Ph.D. Columbia University. Modern Japanese literature

Professor-in-Residence:
Donald H. Shively, Ph.D. Harvard University. Japanese literature and theater

Lecturer (BOE): Cecilia Chu, M.A.

Senior Lecturer:
Suzumu W. Nakamura, M.A. (Emeritus)

Lecturers:
H. I-hao L. I. B. A.
Sze-yun Liu, B.A.
Kay Richards, M.A.
Liu Shih, B.A.
Clare You, M.A.
Liang Sheng, P.H.D.

Major Advisers: Mr. Birch (Chinese); Mr. Motofuji (Japanese).
Graduate Advisers: Mr. Riegel (Chinese); Mr. Aoki (Japanese)

*Not offered 1989-90
On leave, spring, fall
On leave, fall

The Department of Oriental Languages at Berkeley offers a thorough training in the classical and modern languages and literatures of Eastern Asia. The East Asian Library, which houses one of the largest American collections of materials related to China, Japan, Korea, and Tibet, is located on the Berkeley campus. A student selects one area of emphasis in the undergraduate major program: Chinese, Japanese, or Altai languages. In all cases students proceed with an initial acquaintance of a facility in the spoken language to a reading knowledge of both modern and classical forms. Individual upper division courses stress the philological, linguistic, or literary study of the Asian cultures, and students are encouraged to select courses that will provide them an insight into each of these disciplines. The department also emphasizes the study of a particular East Asian culture in its broader geographical context.

The Major

Emphasis on Chinese

Lower Division. Chinese 1A-1B (5-5); Chinese 10A-10B (5-5); Chinese 2A-2B (4-4); Linguistics 5 (4). Linguistics 5 may be taken on a passed/not passed basis.

Upper Division. Chinese 100A-100B (5-5); 4 units of Chinese linguistics (161, 163, 165); 4 units of modern Chinese (154, 156, 158); 8 units of classical Chinese (chosen from among 140, 145, 148, 150, 151, 153, 155, 157); 4 additional units of departmental courses in Chinese; 4 additional unit of departmental lectures on Chinese subjects.

Total units required: 62.

Emphasis on Japanese

Lower Division. Japanese 1A-1B (5-5); Japanese 10A-10B (5-5); 4 units of modern Chinese (154, 156, 158); 8 units of classical Chinese (140, 145, 148, 150, 151, 153, 155, 157); 4 additional units of departmental courses in Japanese.

Total units required: 58.

Emphasis on Altai 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). Linguistics 5 (4). Linguistics 5 may be taken on a passed/not passed basis.

Upper Division. Altai 144A-144B (3-3), Altai 154A-154B (3-3) and other relevant courses designated by the adviser (e.g., Altai 104A-104B (5-5), Turkish 101A-101B (5-5), and other relevant courses designated by the adviser). 4 additional units of departmental courses in Japanese.

On leave, spring, fall
Recalled to active service
Recipient of Distinguished Teaching Award
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 Aisic 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 and to begin study toward the time they will be expected to 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.

Oriental Languages—General

(Courses in which knowledge of an Oriental language is not required.)

Lower Division Courses

116. The Classics of Chinese Philosophy. (3) Three 1-hour lectures per week. Prerequisites: Consent of instructor. Lectures will be given on the major philosophical systems of ancient China as they are found in pre-Han, Han, Six dynasties, and Tang literature. (SP) Riegel

121A-121B. Development of Buddhism in East and Inner Asia. (3-3) Course may be repeated for credit with consent of instructor. Three 1-hour lectures per week. The introduction of Buddhism from India into Central Asia and China, and its subsequent spread to Korea and Japan. The separate traditions of Mahayana and Theravada Buddhism is included. 121A: (F) Lancaster

122. Buddhism and Contemporary Society in East Asia. (3) Three 1-hour lectures per week. A study of the Buddhist tradition as it is found in contemporary life within a historical context. Students are to read the assigned works, participate in discussions of them, write three papers (for a total of 21 pages) on three different genres of literature, and take a midterm and final. (F) Mosty

133B. Survey of Japanese Literature in Translation. (3) Students who have taken 133A will receive one unit of credit for 133B. Students who have taken 137 will receive no credit for 133B. Three 1-hour lectures per week. A survey history of Japanese literature from 700 to the present. Lectures will cover important literary figures and developments; genres of literature; and critical evaluation of texts. Students will be required to read the assigned texts, participate in discussions of them, write two short papers, and take a midterm and final. (SP) Gessel

134. Seminar in Classical Women Writers of Japan. (4) New course. Three hours of seminar per week. Prerequisites: 133A or consent of instructor. Critical reading in English translation of the chief women writers of Japan up to the 14th century, with attention to their social, intellectual and religious environments. (F,SP) McCullough

Upper Division Courses

H195A-195B. Honors Course. (2-5) Course may be repeated for credit. In-process option permitted for use in first semester of two-semester series. To be arranged. Prerequisites: Senior honors candidates in Oriental Languages. Directed independent study and preparation of senior honors theses. Limited to senior honors candidates in Oriental Languages. (For description of Honors Program, see Intro.) (F,SP) Staff

198. Directed Group Study. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. To be arranged. Prerequisites: Junior standing. Small group meeting in topics not covered by regularly scheduled courses. (F,SP) Staff

199. Supervised Independent Study. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Enrollment is restricted by regulations listed on pages 87 and 88 of this catalog. (F,SP) Staff

Chinese

Instructor approval is required for enrollment in language courses.

Lower Division Courses

1A-1B. Elementary Chinese. (3-5) Five 1-hour meetings plus two hours in language laboratory per week. Prerequisites: 101B. Reading of current poetry and stories. (SP) Tun

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 Tang literature. (F,SP) Riegel, West

5. Read Chinese for Mandarin Speakers. (5) New course. Students who have received credit for Chinese 1A-1B may not receive credit for 5. Five 1-hour meetings plus two 1-hour laboratory per week. An intensive reading course designed for those who speak Mandarin but who do not read or write in Chinese. The course teaches both pinyin and simplified characters, introduces functional vocabulary, and provides a systematic review of grammar. (F,SP) Cheung

10A-10B. Intermediate Chinese. (5-5) Five 1-hour meetings plus one hour in language laboratory per week. Prerequisites: 10A is prerequisite to 10B. (F,SP) Cheung

Upper Division Courses

100A-100B. Advanced Chinese. (5-5) Five 1-hour meetings per week. Prerequisites: 10A. 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) Chu

101. Readings in Modern Chinese. (3) Must be taken on a passed/not passed basis. Three 1-hour meetings per week. Prerequisites: 100B. Reading of current political and similar materials and discussion, in Chinese, of contents. (F-SP) 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 writings on the development of Chinese literature. Conducted in Chinese. (F,SP) Staff

102A. Pre-Han. (3)

102B. Wei-Jin Through Tang. (3)

102C. Song-Yuan. (3)

102D. Ming-Qing. (3)

109. Chinese Bibliography. (3) Three 1-hour lectures per week. Prerequisites: Two upper division courses in Chinese Literature. (SP) Janson

140A-140B. Readings in Chinese Buddhist Texts. (3) Three 1½-hour reading/lecture per week. Prerequisites: One upper division course in Classical Chinese. (F) Lancaster

145. Taotai Texts. (3) Three 1½-hour meetings per week. Prerequisites: 29. Readings in printed and manuscript sources. (F,SP) Staff

146. Documents on the Chinese World Order. (3) Three 1-hour reading/lecture meetings per week. Prerequisites: Two semesters of classical Chinese, including 109. Philosophical analysis of documents pertaining to the Chinese tributary system, ca. B.C. 100-ca. A.D. 1700. The selection of documents is designed to create, in specific historical contexts, the tension between rhetoric and reality, and to contrast the Sinic Zone with the inner Asian Zone. (F,SP) Rogers

150. Ancient Chinese Prose. (3) Three 1½-hour lectures per week. Prerequisites: 2A. Readings in historical, religious, and philosophical texts of the Chou and Han periods from printed and manuscript sources. (F,SP) Riegel

151. Ancient Chinese Poetry. (3) Two 1½-hour lectures per week. Prerequisites: 2A. Readings from the Shih Ching, the political parts of the I Ching, the Chu Tzu, and selections from Han dynasty fu. (SP) Riegel

153A-153B. Readings in Early Medieval Literature. (3) Three 1½-hour meetings per week. Prerequisites: C285, one upper division course, C1 Chinese, Classical Chinese. A different theme or literary form will be studied each semester. (F,SP) Strickmarr

154. Readings in Vernacular Chinese Literature: Pre-Tang. (3) Three 1½-hour reading/lecture meetings per week. Prerequisites: 102C. A critical study of pre-Tang Chinese fiction. (F) Cheung

155. Readings in Later Medieval Poetry. (3) Course may be repeated for credit as topic varies. Three 1-hour reading/lecture meetings per week. Prerequisites: Knowledge of semantics, structural, and some aspects of poems (both shih and tz'u) of the T'ang, Five Dynasties, and Sung periods, to reveal how their interplay makes poetry. (F,SP) Cheung

156. Readings in Vernacular Chinese Literature: Drama. (3) Three 1-hour reading/lecture meetings per week. Prerequisites: 1002B. Readings at fourth year level. (SP) Birch

157. Readings in Late Medieval Prose. (3) Course may be repeated for credit with prior instructor approval. Three one-hour lectures per week. Prerequisites: Chinese 285. Reading of prose texts from the Sung, Ch'in, and Yuan periods. Texts will include court poetry, historical works, funerary inscriptions and epitaphs, scholarly notes (k'ao shih). The selection of documents includes literary and administrative documents including letters, grants and inscriptions, and writings on classical scholarship and thought. (F,SP) Birch

158. Modern Chinese Literature. (3) Three 1-hour reading/lecture meetings per week. Prerequisites: 1002B. Readings in Chinese, but class conducted in English. (F) Birch

161. Structure of the Chinese Language. (3) (F,SP) Staff

161. Structure of the Chinese Language. (3) (F,SP) Staff

161. Structure of the Chinese Language. (3) (F,SP) Staff
163. Cantonese Linguistics. (3) Three 1-hour lectures per week. Prerequisites: 102B and Linguistics 5 or 100. A linguistic analysis of Cantonese with emphasis on its phonological and grammatical differences from Mandarin. Cheung

165. History of the Chinese Language. (3) Two 1½-hour sessions per week. Prerequisites: Linguistics 5 or 100. Writing system, early dictionaries, historical phonology, and classical grammar. (SP) Ting

Japanese

Instructor approval is required for enrollment in language courses.

Lower Division Courses

1A-1B. Elementary Japanese. (5;5) Five 1-hour meetings plus two additional hours in the language laboratory per week. Prerequisites: A is prerequisite to B. (F,SP) Aoki

10A-10B. Intermediate Japanese. (5;5) Five 1-hour meetings plus one hour of laboratory per week. Prerequisites: 1B; A is prerequisite to B. (F,SP) Motofuji

Upper Division Courses

100A-100B. Advanced Japanese. (5;5) Five 1-hour meetings per week. Prerequisites: 10B; A is prerequisite to B. Readings in modern Japanese. Expository writings. Fiction. (F,SP) McCullogh, Staff

101A-101B. Fourth-Year Japanese. (4;4) Three 1-hour meetings per week. No, Kyogen, Joruri, and Kabuki. Prerequisite: 101A. Critical reading of important texts from phonetic transcription into written Tibetan. (F,SP) You, Staff

Korean

Instructor approval is required for enrollment in 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) Shively

10A-10B. Intermediate Korean. (5;5) Five 1-hour meetings per week. Prerequisites: 1B; A is prerequisite to B. (F,SP) W. McCullogh

Upper Division Courses

100A-100B. Advanced Korean. (3;3) Three 1-hour meetings per week. Prerequisites: 10B; A is prerequisite to B. (F,SP) Rogers, Staff

Altai

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 (Khalkha). 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 Khalkha, 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 Cyrllic script and vertical script. (F,SP) Bosson

177A-177B. Manchu. (3:3) Three 1-hour meetings per week. Prerequisites: Junior standing. An introduction to Manchu language; selected prose texts. (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) Staff

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) Staff

164A-164B. Elementary Literary Tibetan. (3:3) Two 1½-hour meetings per week. Introduction to the grammar of standard literary Tibetan; graded readings in Tibetan prose from literary and historical sources. (F,SP) Ting

Graduate Courses

201. Japanese Bibliography. (3) Three 1-hour meetings per week. Prerequisites: Japanese 100A-100B. Japanese reference works for literature and history. (F,SP) Cheung

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) Birch

206. Chinese Vernacular Literature. (3) Course may be repeated for credit with consent of instructor. One 3-hour seminar per week. An introduction to the methods of textual criticism and critical analysis. (F,SP) Strickmann

212. Seminar in Chinese Literary History. (3) One 3-hour seminar per week. Textual and aesthetic criticism. (F,SP) Riegel

215. Tun-Huang Studies: The Manuscript Tradition in Medieval China. (3) One 3-hour seminar per week. Ancient and medieval prose. (F,SP) Strickmann

261. Texts on the Civilization of Medieval China. (3) One 3-hour seminar per week. (F,SP) Strickmann

219. Seminar on the Sources of the Traditional Chinese World Order. (3) One 3-hour meeting per week. Prerequisites: Consent of instructor. Cultural, strategic, and economic factors in the operation of the tributary system of the Chinese empire. (SP) Ting

224. Reading in Altai Texts. (3) Course may be repeated for credit. One 3-hour seminar per week. Ancient and medieval prose. (F,SP) Bosson

229. Seminar in Classical Japanese Texts: Helen Prose. (3) Course may be repeated for credit. One 3-hour seminar per week. Cultural, political, and social factors in the development of the Japanese language. (SP) Ting

233. Seminar in Japanese Linguistics. (3) Course may be repeated for credit. One 3-hour seminar per week. Prerequisites: Japanese 162 or consent of instructor. Topics vary according to the interests of the participants: dialectology, phonology, or syntax and semantics. (SP) Aoki

*Not offered 1989-90

On leave, spring

Recipient of Distinguished Teaching Award
visers can be obtained by writing to Ms. Patricia Power, Staff Assistant to the Dean, College of Letters and Science, 201 Campbell Hall, University of California at Berkeley; Berkeley, CA 94720. Continuing students who declared the paleontology major before their names, numbers, and titles, consult list in this catalog under the headings "In- terdisciplinary Studies," "Molecular and Cell Biology," or "Plant Biology." At press time for this catalog, some courses formerly offered by the Department of Paleontology, followed by their new names, numbers, and titles, may not be used to meet either unit or residence requirements for a Ph.D. degree. (F,SP)

292. Directed Study for Graduate Students (1-8) Course may be repeated for credit. Special tutorial of seminar on selected topics not covered by available courses or seminars. (F,SP)

293. Thesis Preparation and Related Research. (1-8) 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 adviser. (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. Hours to be arranged. Prerequisites: Consent of graduate adviser. 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. (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 adviser, intended to provide an opportunity for qualified students to prepare for various examination required 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) Two 1.5-hour lectures and one hour of discussion section per week. A survey of the history of Chinese philosophy from Confucius to Zhuangzi times through the Ch’ing dynasty. The course is aimed at the development of Chinese ethical theory and the role of language in moral education. Other subjects covered are Chinese aesthetics, political thought, and metaphysics. Riegel, Shun

Paleontology

(College of Letters and Science)

As a result of the reorganization of the biological sciences on the Berkeley campus, the faculty and programs of Department of Paleontology will become part of the new Department of Integrative Biology, effective fall 1989. For an explanation of the full scope of the biological sciences reorganization and its implications, see IDS 186.

Undergraduate Program: Beginning fall semester 1989, students will no longer be accepted into the former undergraduate major in paleontology. Prospective majors interested in paleontology should consider Track 3 (any major with consistent coursework in biology, geology, and genetics) of the major offered by the new Department of Integrative Biology and should contact the major adviser or undergraduate assistant in that department. The names and locations of these advisors can be obtained by writing to Ms. Patricia Power, Staff Assistant to the Dean, College of Letters and Science, 201 Campbell Hall, University of California at Berkeley; Berkeley, CA 94720. Continuing students who declared the paleontology major before fall 1989 may continue in the program, provided they complete all degree requirements and graduate before fall semester 1993. Such students should contact the major adviser or undergraduate assistant of the Department of Integrative Biology. Beginning fall semester 1993, all students will be expected to complete an undergraduate major current at the time of their application for the degree.

Graduate Program: For fall semester 1989, new students have been admitted to the existing graduate program in paleontology. Beginning fall 1989, these students will be expected to enroll in the new Graduate Group in Paleontology. The names and locations of these advisers can be obtained by writing to Ms. Patricia Power, Staff Assistant to the Dean, College of Letters and Science, 201 Campbell Hall, University of California at Berkeley; Berkeley, CA 94720.

Concordance of Courses: On the following page is a list of courses formerly offered by the Department of Paleontology, followed by their new names, numbers, and titles in the new departments. A list of courses offered by the new departments, followed by their former names, numbers, and titles, is provided in the graduate catalog. Students should consult the graduate adviser for information about the new departmental courses. Existing courses will be offered for credit in the new departments through the end of the 1989-90 academic year.

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 graduate study leading to the M.S. and Ph.D. degrees. 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 interrelations. Hosts of primary interest are animals in the animal kingdom. The parasites under consideration have 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, epidemiology, 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 Microbiology and Immunology, and the School of Public Health at the Berkeley campus and the Department of Epidemiology and International Health, the Department of Medicine, and the Department of Pharmaceutical Chemistry on the San Francisco campus.

Peace and Conflict Studies

(Special Studies)

Program Office: T-5 Room 110, 643-6465.
Chair: Sheldon Margen, M.D.

Academic Coordinator: Jerry Sanders, Ph.D.
Affiliated Faculty: Gerald Berreman (Anthropology); Clay Carr (Conservation and Resource Studies); Owen Chamberlain (Physics); Diane Clemens (History); Troy Duster (Sociology); William R. Ellis (Architecture); John Harte (Energy and Resources Group); Paul Heist (Education); Charles Henry (African-American Studies); Percy Hintzen (African-American Studies); John Holdren (Energy and Resources Group); John Hurst, (Education); John Kelly (Mathematics); Angela Little (Nutritional Sciences); Maragrita Melville (Chicano Studies); Carolyn Merchant (Conservation and Resource Studies); Alan S. Miller (Conservation and Resource Studies); Meredith Minkler (Social and Administrative Health Sciences); Carlos Munoz (Chicano Studies); Laura Nader (Anthropology); Michael Nagler (Classics); John B. Neihardt (Molecular and Cell Biology); Frank Newman (Law); Ivo Petk (Fulbright Scholar, Technical University of Prague); Ishaan Reed (English); Arnold Schultz (CfISForesy); Charles Schwartz (Physics); Susan Schwiell (English); Peter Dale Scott (English); Otto J.J.M. Smith (Physics); Ronald Takaki (Ethnic Studies); Pravin Varma (Biological Engineering and Computer Sciences); Richard Walker (Geography); Michael Wau (Geography); Leon Wofsy (Molecular and Cell Biology); David Wood (Entomological Science).

Affiliated faculty serve as course instructors, students advisors, and supervisors of students projects.

The Program

Peace and Conflict Studies is an interdisciplinary undergraduate program designed to provide students
## Concordance List for Paleontology

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<tr>
<th>Old No.</th>
<th>Course Title</th>
<th>Equivalent New Course, If Any</th>
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<tr>
<td>002A</td>
<td>Topics in Paleontology: The Age of Dinosaurs</td>
<td>IntegBi 033 Topics in Paleontology: The Age of Dinosaurs</td>
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<tr>
<td>002B</td>
<td>Topics in Paleontology: Mass Extinctions</td>
<td>IntegBi 081 Topics in Paleontology: Ancient Landscapes</td>
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<td>002C</td>
<td>Topics in Paleontology: Ancient Landscapes</td>
<td>IntegBi 034 Topics in Paleontology: The Age of Mammals</td>
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<td>002D</td>
<td>Topics in Paleontology: Understanding Evolution</td>
<td>IntegBi 16 Vertebrate Adaptation</td>
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<td>002E</td>
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<td>IntegBi 080 Life, Climates and Ecologies of the Past</td>
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<td>002F</td>
<td>Topics in Paleontology: Current Topics</td>
<td>IntegBi 082 Introduction to the Oceans</td>
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<td>002G</td>
<td>Topics in Paleontology: The Antecedents of Man</td>
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<td>002H</td>
<td>Topics in Paleontology: Vertebrate Adaptation</td>
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<td>015</td>
<td>Life, Climates and Ecologies of the Past</td>
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<td>020</td>
<td>Fossils and the Record of Life</td>
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<td>025</td>
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<td>039B</td>
<td>Land Plants—Origins and Rise to Prominence—415 Million Years of Record</td>
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<td>IntegBi 182L Invertebrate Paleontology Laboratory</td>
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<td>112</td>
<td>Paleoeconomy and Functional Morphology</td>
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<td>IntegBi 181L Origin and Evolution of Plants</td>
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<td>IntegBi 183L Vertebrate Paleontology Laboratory</td>
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<td>IntegBi 184L Laboratory on the Vertebrate Skeleton</td>
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<td>224</td>
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<td>225</td>
<td>Paleontology and Evolution of Amphibians, Reptiles and Birds</td>
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<td>247</td>
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<td>250</td>
<td>Seminars in Paleontology</td>
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<td>250A</td>
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<td>250E</td>
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with a comprehensive and integrated approach to the study of peace and conflict. It addresses the critical problems of war, injustice, poverty, and ecological deterioration, and it explores the social, psychological, economic and political dimensions of conflict resolution as well as cultural and religious forces in social change. Peace studies is a humane inquiry in the classical tradition of a liberal arts and sciences education, preparing students for graduate work in peace studies and other disciplines. The program also offers internship opportunities for students who wish to prepare for a career in peace work and related fields of endeavor.

The Major

The degree of Bachelor of Arts will be granted on completion of the following requirements:

I. University Requirements

II. Breadth Requirements: (A) Two courses beyond the subject A level in reading and composition; (B) Proficiency in a language other than English at a level prescribed by the College of Letters and Science; (C) One course involving analytic reasoning; and (D) One course from each of the following fields: (1) the humanities, (2) the natural sciences, (3) the social sciences.

II. Major Requirements: Introductory Courses—PACS 10; PACS 105; Core Courses—One course from each of the following five areas: (1) Social Change and World Order; (2) International Conflict; (3) Political Economy; (4) Ethics and Ideology; and (5) Ecology. Area of Concentration: Six upper division courses focusing on a particular area in Peace and Conflict Studies formulated by students in collaboration with their advisors.

Advanced Courses: Critical Approaches to Peace Studies and Research (PACS 100); Theories and Methods in Peace and Conflict Studies (PACS 101); Internship Program: Peace Work as a Profession (PACS 186/187) and Senior Seminar (PACS 190). Student programs should include at least one course in each of the following categories: cultural, ethnic, and gender diversity as well as class relations.

(The complete version of the PACS major requirements, which includes a listing of acceptable courses meeting the breadth and area of concentration requirements is available from the PACS office.)

Lower Division Courses

10. Introduction to Peace and Conflict Studies. (4) Formerly 100. Two 1½-hour lectures and one 1½-hour discussion section per week. This course will explore the political and social causes of violence and war and the processes that lead to ecological and social integration, justice and peace. The course will be based on guest lectures and readings, with lectures by faculty providing continuity. This course is required for majors, but non-majors are welcome. (F,SP) Sanders

98. Directed Group Study. (1-3) New course. Course may be repeated for credit. Must be taken on a passed/not passed basis. One to four hours of lecture/group study per week. Group discussion, research, and reporting on selected topics. (F,SP)

99. Supervised Independent Study and Research. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Tutorial. Prerequisites: Lower division standing: GPA 3.4 or better; consent of instructor, adviser and departmental chair; usually restricted to PACS majors. Supervised independent study or research on topics relevant to PACS not covered in depth by other courses. A proposal must be formulated in consultation with the faculty mentor who will clearly state the objectives and means of implementation. (F,SP) Staff

Upper Division Courses

100. Critical Approaches to Peace Studies and Research. (3) New course. Two hours of lecture and two hours of discussion per week. Prerequisite: PACS 10. This course will explore the historical development of the field through analysis of the operative assumptions, logic and differing approaches of the seminal schools and thinkers that have shaped the field. Students will become familiar with the body of literature and major debates in peace studies and research. (F) Sanders

101. Theories and Methods in Peace and Conflict Studies. (3) One 3-hour lecture per week. Prerequisite: 100. This is a course in how to think critically about policy research, in which scientific and values structures inevitably become merged. It prepares students to make independent, reasoned decisions regarding the explicit integration of scientific considerations and ethical concerns. (SP) Nagler

105. Integrative Seminar. (1) Course may be repeated for credit. Must be taken on a passed/not passed basis. One 3-hour seminar per week. A weekly seminar designed to help PACS majors identify and emphasize the concepts that unify their diverse course work. A different theme of the PACS curriculum will be focused on each semester. Strongly recommended for all PACS majors each semester. (F,SP) Sanders

119. Special Topics in Peace and Conflict Issues. (3) Course may be repeated for credit as topics varies. Two hours of lecture and two hours of discussion per week. Topics vary from semester to semester. Check with the PACS office for current course offerings. (F,SP) Staff

124. Issues in Global and Domestic Hunger. (3) New course. Two 1½-hour lectures per week. An introduction to the root causes of hunger, global and domestic, and possible solutions. Topics to be examined include: Overview of basic theories explaining causes of hunger; relationships of political and economic structures with hunger; and critical evaluation of current efforts to alleviate hunger. (F) Margen

130. Contemporary Processes in Central America. (3) One 2-hour lecture and one 2-hour discussion per week. A study of the social, political, and economic factors contributing to the current conflicts in Central America. Emphasizing the historical roots of the crisis, the course will attempt to develop a framework for analysis of contemporary processes in the region. (Margen)

135. Special Topics in Regional Conflict. (3) New course. Course may be repeated for credit when topic changes. Two hours of lecture and two hours of discussion per week. Topics vary from semester to semester. The course will offer a critical interdisciplinary study of geopolitical regions and the sources of their conflicts.

161. War and Peace Movements in 20th-Century America. (3) Two 1½-hour lectures per week. An examination of the legacy of anti-war movements which have been an integral component of contemporary U.S. history. The historic roots of these movements, their connections in the impact of anti-war movements, and their impact on shaping U.S. society. (SP) Scott

164. Theories of Nonviolence. (3) Formerly 194. Two 1½-hour lectures per week. Special topics in theories of nonviolence as articulated or inferred in the work of its major practitioners. (SP) Scott

165. Introduction to the Ethics and Value Assumptions of Planning Systems Design. (3) Formerly 175. Two hours of lecture and two hours of discussion per week. Introduction to the considerations of values and ethics in social planning and policy making, e.g., alternative solutions, research, science, policy science, cost-benefit analysis, urban and national planning, world modeling, etc. (F) Churchman

170. Nuclear Safety. (3) One 3-hour lecture per week. Exploration of the primary nuclear safety issues which must be considered in making intelligent choices about energy alternatives for the future. Topics will include ionizing radiation and public health, reactor safety, waste storage, economics of nuclear power, and the link between nuclear power and the nuclear industry and how these contribute to world conflict and world order.

174. Politics of Chemical and Biological Warfare. (3) Three hours of lecture and one hour of discussion per week. More deadly than nuclear weapons? Review of the historical, technical, and institutional origins of current CWB weaponry and policy in the United States. Ethical questions surrounding CWB development, stockpiling, and use will be discussed. (SP) Neillande

186. Internship. (2-4) Must be taken on a passed/not passed basis. 10-20 hours of internship per week. Hours must be approved by the supervisor. (SP) Staff

187. Peace Work as a Profession. (2) Must be taken on a passed/not passed basis. One 3-hour seminar per week. Prerequisites: 100; upper division standing or consent of instructor. PACS 187 must be taken concurrently with PACS 187, Peace Work as a Profession. Field Studies 187 cannot be taken concurrently. Supervised internship in selected community agencies concerned with peace and justice. Placement relevant to student's academic interests and career objectives. Minimum 120 hours per semester work in an agency. Required for PACS majors and normally restricted to them. (SP) Scott

197. Field Studies. (2-4) Must be taken concurrently with PACS 187. Peace Work as a Profession. Field Studies 197 cannot be taken concurrently. Supervised internship in selected community agencies concerned with peace and justice. Placement relevant to student's academic interests and career objectives. Minimum 120 hours per semester work in an agency. Required for PACS majors and normally restricted to them. (SP) Scott
Required for PACS majors and normally restricted to them. (F,SP) Hurst

190. Senior Seminar. (2) One 2-hour seminar per week. Prerequisites: Offered to PACS majors only, to be taken during final year of study. Students prepare a major analytical paper synthesizing their education and present an oral presentation representing their Area of Concentration. (F,SP) Staff

195. Senior Thesis. (3-4) Must be taken on a passed/not passed basis. Three hours of research per unit per week. Prerequisites: Senior standing in PACS. Research paper or suitable research project done under the direct supervision of a faculty sponsor. Subject must be approved by faculty sponsor no later than the semester preceding the semester in which the course is to be taken. (F,SP) Staff

197. Field Studies. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Field work and regular independent meetings with faculty sponsor. Prerequisites: Upper division standing, consent of instructor and PACS chair. Supervised experience relevant to specific aspects of peace and conflict studies in off-campus organizations. Written reports required. (F,SP) Staff

198. Directed Group Study for Upper Division Students. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: 2.0 GPA, upper division standing. Group discussion, research, and reporting on selected topics. Student initiation in choice of subjects is solicited and welcomed. (F,SP) Staff

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 will examine the interaction of technological innovation, strategic planning, and political processes to understand the dynamics of the nuclear arms race. The course will consider how the introduction to the literature; and the history of the subject will be studied critically to help in understanding contemporary conditions and the possibilities of future developments. Sponsoring departments: Peace and Conflict Studies. (F) Schwartz

IDS 191. Public Health and Nuclear War. (2) Formerly PH 291. 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 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) Margen, Leonard

Pest Management (College of Natural Resources)

Department Office: 216 Weiland Hall, 642-6680, and 147 Hilgard Hall, 642-5211

The Departments of Entomology and Plant Pathology are preparing to withdraw the undergraduate major by fall 1990. Call the department numbers listed above for updated information. Professional training in pest management is available in the entomology undergraduate major.

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 be responsible for pest problems which 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.

People educated in pest management have job opportunities in both the private and public sectors—for example, in biotechnology, genetic engineering, chemistry, 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 requires the following persons to be licensed as agricultural pest control advisers: (1) A person who has recommendations concerning any agricultural use; (2) A person who offers himself/herself as an authority on any agriculturale 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.

Petroleum Engineering (College of Engineering)

The petroleum Engineering program is designed to prepare students for careers in the petroleum production industry and related fields. Petroleum engineering deals with the wide array of problems associated with oil and gas 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 providing a strong basic engineering curriculum while maintaining a diversity in elective course offerings. Students will be able to channel their own interests by choosing one of the following three 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, materials science and mineral engineering, and chemical engineering.

Curriculum for the Bachelors 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, 36, 45, 49; Geology 50, 50L; 11 units of electives.

Upper Division. Mechanical Engineering 104, 105, 107A-107B, 109, 149; Civil Engineering 130; Electrical Engineering 100; Chemical Engineering 140; Mineral Engineering 116, 148; Geology 111; 19 units of electives. Electives must include 18 units of upper division and special studies and the balance (12) from one of the 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, 105, and 110 and 4 additional units in mineral or geological engineering or geoscience.

For further details, consult the Announcement of the College of Engineering.

Pharmacy (College of Letters and Science)

Department Office: 314 Moses Hall, 642-2722

Professors:

Ernest W. Adams, Ph.D.
Charles E. Chihara, Ph.D.
Thompson Clarke, Ph.D.
Alexander C. F. Doherty, Ph.D.
William Craig, Ph.D.
Hubert L. Dreyfus, Ph.D.
Paul K. Feyerabend, Ph.D., L.H.D.
Benson Mates, Ph.D.
Wallace I. Matson, Ph.D.
Samuel Scheffler, Ph.D.
John R. Searle, D.Phil.
Hans Sluga, D.Phil.
Frits Staal, Ph.D.
Barry G. Stroud, Ph.D.
Bruce J. Vermazen, Ph.D.
Donald H. Davidson, Ph.D. (Mills Professor, Emeritus)
Kwong-loi Shun, Ph.D.

Assistant Professors:

Janet Broughton, Ph.D.

Mills Professor:

Richard Wolff, 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 addition to the three required upper division courses: 100, 104, and 122. The student must take one upper-division course from the 160-178 series and one course from the 160-184 series and four additional upper division courses (one course numbered 191-199 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.

Honors 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 H194, Senior Colloquium, or (2) a graduate seminar, with 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 completed on a letter-graded 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 per discussion per week. Introduction to ethical and political philosophy. (F) 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) Searle

4. Knowledge and Its Limits. (4) Three hours of lecture and one hour of discussion per week. Introduction to the theory of knowledge. (SP) Stigler

5. Science and Human Understanding. (4) Formerly 281. Three hours of lecture and one hour of discussion per week. Introduction to the philosophy of science. (SP) Lloyd

6. Man, God, and Society in Western Literature. (4) Three hours of lecture and one hour of 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 these questions are themselves self-interpreted.

7. Existentialism in Literature and Film. (4) Three hours of lecture and one hour of discussion per week. Christian, agnostic, and atheistic existentialism as ex-

pressed in the works of Dostoyevsky, Melville, Kafka, Antionioni, Goddard, etc. (SP) Dreyfus

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) Mates, Chiara

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) Chiara

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 one hour of discussion per week. The history of modern philosophy from Descartes through Kant. (SP) Broughton

25A. Ancient Philosophy. (4) Three hours of lecture and one hour of discussion per week. The history of ancient philosophy with special emphasis on the Pre-

socratics, Plato, and Aristotle. (F) Feyerabend

25B. Modern Philosophy. (4) Three hours of lecture and one hour of discussion per week. The history of modern philosophy from Descartes through Kant. (SP) Broughton

39. Freshman Seminar. (3) Three hours of seminar per week. Seminar on a special subject of interest to freshmen. Topics will vary from semester to semester and will be individually announced. Freshman seminars are restricted to 15 students each. (F) Wolff; (SP) Stroud

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 of 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.

Restricted 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 designed to acquaint students with the techniques of philosophical reasoning through a 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) Broughton, Vermazen

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 intuitions. 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 of discussion per week. The fundamental concepts and problems of morality examined through the study of classical and contemporary philosophical theories of ethics. (F) Shun; (SP) Williams

105. Foundations of Ethics. (4) Three hours of lecture per week. Prerequisites: 104 or equivalent. An advanced investigation of fundamental questions of the nature of morality. (F)

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. (F) Shun


110. Aesthetics. (4) Three hours of lecture per week. Major themes in aesthetic thought. Upper division courses in philosophy or consent of instructor. Major in literature or the arts. Visual arts/literature and music. Form, expression, representation style; interpretation and evaluation. (SP) 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. (F) Williams


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.

128. Philosophy of Religion. (4) Three hours of lecture per week. The nature and the validity of religious ideas. (SP) Matson

129. Special Topics in the Philosophy of Science. (4) Three hours of lecture per week. A survey of major topics in logic of science and of other issues coming under the general heading of philosophy of science. (SP) Adams

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?

132. Philosophy of Mind. (4) Three hours of lecture per week. Mind and matter, other minds; the concept of mind, person. (SP) Spurrell

133. Philosophy of Language. (4) Three hours of lecture per week. (F) Searle

135. Theory of Meaning. (4) Three hours of lecture per week. Prerequisites: One course in logic or consent of instructor. Language as social behavior. Language compared to other sign systems. The foundations of semantics, truth, meaning, reference. Issues of logical form in belief sentences, indirect discourse, sentences about causality, events, actions. Relations between thought and language. (SP) Davidson


142. Philosophical Logic. (4) Three hours of lecture per week. Major subject of study will be the logics of various fields of philosophy. Major concepts, results, and techniques of modern logic. Model theoretic treatment of propositional and first-order logic. Basic set theoretic tools. Completeness, computability, incompleteness.


148. Probability and Induction. (4) Three hours of lecture per week. Different approaches to the foundations
of probability; inductive confirmation of scientific theories.

149. Supplementary Work in Upper Division Philosophy. (2.7.3.3) Meetings to be arranged. Prerequisites: Consent of instructor. Special courses 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: the Confucian ethical tradition; classical Chinese philosophy; a comparative study of Confucianism, Taoism and Buddhism. (SP) Shun

150. 19th-Century Philosophy. (4) Three hours of lecture per week.

151. Chinese Philosophy. (4) Formerly 191F. Three hours of lecture per week. Prerequisites: 104 or equivalent. The course studies a particular text by an important figure in contemporary European philosophy, current French and German philosophy. (F) Dreyfus

191. Experimental Courses. (1-6) Course content varies each semester. (F,SP) Staff

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 thesis requirement of the Honors Program. (F,SP)

196. Senior Colloquium. (4) Three hours of seminar per week. A seminar course for honors students in philosophy or equivalent. Emphasis on the writing of papers and discussion of them. (F,SP)

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. Enrolment is restricted by regulations listed on pages 87 and 88 of this catalog. (F,SP)

204. Recent Work in Ethics. (3) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Two hours of seminar per week. A seminar and tutorial, required of and available to the department's graduate students. (F) Williams, Ginsborg

207. Philosophical Problems. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. Directed study on specific topics. (F,SP)

237. Philosophical Problems. (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)

238. Special Topics in Modern Philosophy. (3) Three hours of lecture per week. Prerequisites: Either 183 or 184 or satisfactory equivalent. The course is designed to deal with a variety of topics in modern philosophy. Its contents will vary from occasion to occasion. Possible topics may include: analytic philosophy, semantics, and model theory; modal logic; Peirce; post-structuralism; critical theory; contemporary Chinese philosophy; contemporary American philosophy; and the philosophy of language. (SP) Sluga

239. Modernity: Nietzsche, Weber, Heidegger, and Foucault. (3) Formerly IDS 163. Two 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: the study of particular texts by important figures in contemporary European philosophy, current French, and German philosophy. (F) Dreyfus

240. Recent Work in Philosophy of Language. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. Directed study on specific topics in the philosophy of language. (SP) Ginsborg

241. Recent Work in Theory of Knowledge. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. Directed study on specific topics in the theory of knowledge. (SP)

242. Kierkegaard. (4) Three hours of lecture per week. Prerequisites: One philosophy course. A study of Kierkegaard as theologian, psychologist, and philosopher. Emphasis will be placed on those aspects of his thought which have provided the basis of existential phenomenology. (F) Matson

243. Hegel. (4) Three hours of lecture per week.

246. Nietzsche. (4) Three hours of lecture per week. Prerequisites: Consent of instructor. A study of Nietzsche's thoughts on ethics, politics, and metaphysics. (F) Ginsborg

249. Phenomenology. (4) Three hours of lecture per week. Backgrounds of phenomenology and existentialism. Husserl and Merleau-Ponty. (F) Matson

250. Heidegger. (4) Three hours of lecture and one 1-hour seminar per week. A study of Heidegger's Being and Time. (SP) Dreyfus

251. Directed Studies. (1-4) Course may be repeated for credit. Tutorial. Credit not offered for seminars on a satisfactory/unsatisfactory basis. (F,SP) Staff

252. Seminar. (3) Course may be repeated for credit. Two hours of seminar per week. Seminar and tutorial, required of and available to the department's graduate students. (F,SP)

253. Modernity: Nietzsche, Weber, Heidegger, and Foucault. (3) Formerly IDS 163. Two hours of lecture per week. Thinking about modernity as crisis has produced some of the most important work of our age. In this course we will examine the problematization of modernity by four thinkers: Nietzsche (nihilism and history), Weber (rationalization and 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. (F) Dreyfus, Robinow

254. Seminar. (3) Course may be repeated for credit. Two hours of seminar per week. Seminar and tutorial, required of and available to the department's graduate students. (F,SP) Staff

603. 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. Prerequisites: Appointment as a graduate student assistant. The student will work as teachers under the guidance of a faculty member. They will attend lectures, guide classroom discussion, and participate in a workshop in teaching methods. (F,SP) Staff

Undergraduate Courses

IDS 167. Introduction to Chinese Philosophy. (4) New course. Two 11/2-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, Han Fei, Wang Yang-ming, and Tai Chen. (SP) Code

IDS 236. Cognitive Science Research Discussion. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 11/2-hour lecture per week. Prerequisites: Student must be a cognitive science research assistant for one of the professors associated with the cognitive science program. The students will interchange on the cognitive science-related research that they are carrying on as research assistants with the aim of broadening both their experience and the scope of the research. In addition, will discuss relevant selected readings. This course is required of all cognitive science research assistants. (F,SP) Staff

IDS 237A-237B. Cognitive Science Seminar. (1-1) Course may be repeated for credit. Must be taken on a passed/not passed or satisfactory/unsatisfactory basis. One 11/2-hour lecture and one 11/2-hour discussion per week. Prerequisites: Consent of instructor. Weekly presentations by local and visiting researchers on a range of topics in cognitive science, with ensuing discussion. Sponsoring departments: EECS, Linguistics, Philosophy, and Psychology. (F,SP)

IDS 283. Modernity: Nietzsche, Weber, Heidegger, and Foucault. (3) Formerly IDS 163. Two hours of seminar per week. Prerequisites: Consent of instructor. Thinking about modernity as crisis has produced some of the most important work 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. Sponsoring departments: Anthropology and Philosophy.
Physical Education (College of Letters and Science)

Department Office: 200 Hearst Gymnasium, 642-3288
Chair: Roberta J. Park, Ph.D.

Professors:
George A. Brooks, Ph.D.
Helen M. Eckert, Ph.D.
Roberta J. Park, Ph.D.
Mary E. Parent, M.S., Ph.D. (Emeritus)
Maria N. Petruccelli, M.Ed. (Emeritus)
Sally H. Pocha, M.S., (Emeritus)
Carl L. Nordby, Ph.D. (Emeritus)
G. Lawrence Rand, Ph.D. (Emeritus)
Dorothy J. W. Van Dam, Ph.D. (Emeritus)

Associate Professors:
Brenda J. Bredemeier, Ph.D.
Joseph C. Fink, Ph.D.
Stevan L. Lehman, Ph.D.

Assistant Professor:

Supervisors of Physical Education:
Frances L. Bioland, M.S.
C. Richard Crawford, M.A.
Petra M. Frey, Ph.D.
Harold J. Frey, Ph.D. (Coordinator of Physical Activities at Hearst Gymnasium)
Arvin K. Kyle, Ed.D.
William J. Mecir, M.A.
Kyung Min, M.Ed., Ph.D. (Hon.)
M. K. Nuyen, B.S., Ph.D. (Vice Chair)
Doris White, M.A. (Coordinator of Physical Activities at Hearst Gymnasium)
Frederick B. Holland, M.S.
Maria H. Glass, A.B. (Emeritus)
Charles J. Keeney, A.B. (Emeritus)
Radda E. Miller, M.A. (Emeritus)
Cheryl R. McLaughlin, Ed.D. (Emeritus)

Lecturers:
Linda K. Koehler, Ph.D.
Ronald Larson, M.S.
Agustina U-Jue, M.F.A.
C. Edward McLaughlin, M.D.

Major Advisor: Ms. Bredemeier, Mr. Brooks, Ms. Eckert, Mr. Lehman.

Graduate Advisor: Ms. Park.

Pre-Major Advisor: Ms. Scott.

The Department of Physical Education at Berkeley offers an undergraduate A.B. major and graduate majors leading to the M.A. and Ph.D. degrees. In addition, the department makes available to all students instructional classes in a wide variety of sports, dance, fitness, and gymnastics activities. The department operates an Exercise Stress Testing Laboratory for students of the University community who wish to utilize the service.

The physical education major is concerned with the wholeness of knowledge pertaining to an understanding of human beings as they engage in a wide range of motor activities. Emphasis is placed upon the development of a scientific and scholarly basis for understanding: (a) the physiological status of individuals engaged in physical activity; (b) acquisition, performance, and retention variables in motor activities; and (c) the nature and role of games, sports, and similar activities in human cultures—both contemporary and historical. At Berkeley the physical education major is academic in its orientation and is built upon an organized body of knowledge with a content that is theoretical and scholarly as distinguished from technical and professional.

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 does not offer formal programs in these professional 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 58 to 70 semester units:

Chemistry 1A and at least three of the following: Integrative Biology 131L (formerly Anatomy 106-108L) or equivalent, Elementary Statistics, Physics 8A, Mathematics 16A, Molecular and Cell Biology 32 (formerly Physiology 1-1L) or Integrative Biology 132L, formerly 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, Integrative Biology 132L-132L (formerly Anatomy 109-109L) or equivalent, Molecular and Cell Biology 32 (formerly Physiology 1-1L) or Integrative Biology 132L-132L, formerly Physiology 109-109L) (human physiology with laboratory), and at least one 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; Molecular and Cell Biology 32 (formerly Physiology 1-1L) or equivalent; Molecular and Cell Biology 32 (formerly Physiology 1-1L) or Integrative Biology 132L-132L, formerly Physiology 109-109L) (human physiology with laboratory), and at least one of the following: Elementary Statistics; 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 3.3 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 consistent with the requirements 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.

Preparation for Graduate Study. Students must complete the equivalent of the Berkeley undergraduate major in physical education.

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; (3) Physiological Aspects of Human Performance. Detailed information concerning admission, degree requirements, and graduate student instructor appointments 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, gymnastics, and gymnastic activities. Instruction is planned to develop and improve performance skills, to impart knowledge and concepts relevant to the activity, to establish a sound theoretical basis for entering the particular activities available. All classes are open to men and women for credit. Consult the Schedule of Classes for relevant information.

Departmental Fees. The incidental fee payable by all students at the time of registration entitles students to use various gymnasium, swimming pools, tennis courts, and other athletic fields. Lockers and shower facilities are provided. Some activity classes such as bowling, and martial arts require payment of extra fees.

Locker Room Regulations and Penalties. A penalty fine is imposed if students fail to comply with the following regulations: (A) Failure to clear locker and return lock by specified date; (B) failure to return equipment or clothing on or before the date posted for such return at the end of each semester or at the time of each special session of the University; (C) overnight use of locker in designated areas.

Exercise Stress Testing. As a service to the campus community the Department of Physical Education (in conjunction with the Student Health Service) offers 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 and aerobic capacity. 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 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 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

6. Physical Education Activities. (.5) Two hours of laboratory per week. Instruction in a wide variety of sports, exercise, and conditioning activities is offered 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

7. Physical Education Activities. (.5) Two hours of laboratory per week. Instruction in a wide variety of sports, exercise, and conditioning activities is offered 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.

Physical Education Activities for Majors. (1) Course may be repeated for credit. Four hours of laboratory per week. Sections in sport, exercise, and dance; 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 (respiratory, cardiovascular, muscular, etc.). Specific adaptations of these systems in response to different exercise regimens will be examined. Environmental, nutritional and aging influences on performance will also be discussed. Exercise programs 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) Brooks

39. Healthy, Moral, and Strong: Athleticism in the 19th Century. (3) Three hours of lecture per week. Prerequisites: Limited to freshmen and sophomores. Nineteenth-century American and European views of bodily fitness, exercise, and athletics. The rise of "modem" sport. Medicine, biology, and Victorian notions of health and exercise. Physical education and sport as perceived to moral and physical regeneration and the establishment of a well-ordered society. (F) Scott

50. Emergency First Aid and Sports-Related Injuries. (2) Must be taken on a passed/not passed basis. One 1/2-hour 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 automatic certificate may be issued. (SP) Scott

66. Descriptive Introduction to Physical Education. (2) Two hours of lecture per week. Prerequisites: High school biology or physiology. Overview of physical education's immediate and more lasting effects of physical activity on the human body including: growth and development, factors affecting motor learning, socio-psychological aspects of sport participation, and philosophical and historical considerations of sport (F) Scott

Upper Division Courses

101. Kinesiology and Body Mechanics. (3) Two hours of lecture and one 3-hour laboratory per week. Prerequisites: Demonstrated ability in human anatomy and physiology, and the ability to work in a laboratory setting. Description of the human body focusing on the musculoskeletal system. (F,SP) Scott (Fall, Recalled to active service)

105A. Exercise Physiology. (4) Three hours lecture and one 3-hour lab per week. Prerequisites: A college-level course in human physiology and laboratory experience with laboratory equipment. Basic concepts of cellular biochemistry are covered. (F,SP) Scott

105B. Exercise Physiology. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisites: 105A. Discussions of the effects of exercise on skeletal muscle, exercise and recovery, disease, exercise and temperature, heat, cold, under water, and altitude, nutrition and performance, effects of drugs on performance, blood doping, sex differences and performance. (SP) Scott

107. Sports Medicine. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 105A. Analysis of the causes and situations of injuries in physical activities; strategies in the prevention, recognition, evaluation, management and rehabilitation of sports-related injuries. (SP) Scott

108. Neuro muscular Fatigue. (2) Two hours of lecture per week. Prerequisites: Human physiology or exercise physiology. Analysis of mechanisms of muscle fatigue, oxygen consumption and muscle contraction, and changes occurring during fatigue and recovery. (F) Lehman

110. Motor Control. (3) Two hours of lecture and two hours of laboratory per week. Control of normal human movements, with an emphasis on physiological mechanisms: strength, range of motion, and muscle function of proprioceptors, sensory and motor pathways and areas in the central nervous system, and sensorimotor integration in control of posture, locomotion, and simple volitional movement. (F) 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, 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. Influences of maternal 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 social-psychological constructs as factors which influence physical activity. Personality variables, motivation, presence of others, and competition. (F) Bredenemeier

119. Exercise and Aging. (3) New course. Two hours of lecture and one hour of discussion per week. Prerequisites: Molecular and Cell Biology 32 or equivalent; Psychology 1. Functional capacity changes during aging. Exercise, physical performance, and the aging process. The role of exercise and physical activity in the maintenance of health and fitness for older adults. Psychological, morphological, developmental, psycho-social, and cultural considerations. (SP) Eckert; Koehler

120. Sports in American Society. (2) Two hours of lecture 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. (SP) Bredenemeier

130. History of Physical Education and Sport. (3) Two hours of lecture and one hour of section per week. Prerequisites: History 5, 7B, 17A-17B or 30. History of physical education and sport. Social, cultural, and perin ger scientific aspects. Emphasis on 17th through early 20th centuries. (SP) Scott

131. 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 basis 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. (SP) Bredenemeier

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. (SP) Eickert

135CA. 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. (SP) Eickert

140. Recreation in American Society. (2) One and one-half hours of lecture and one hour of section per week. Prerequisites: Sociology 1 or Anthropology 3. Nature, scope and significance of recreation in the social and economic life of the American people. (SP) Koehler

160. Theory of Dance. (3) Three hours of lecture and three hours of laboratory per week. Prerequisites: 160A and 160B or equivalent. Survey of dance history with emphasis on theory and function in rhythm in dance; theories and principles of technique and composition. (F) Biotland, Li Jue

165. Introduction to the Biomechanical Analysis of Human Movement. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: 160A and 160B or equivalent. 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, prevention of injuries, diet, health, and activity habits. Care of injuries, with special emphasis on taping, therapy, and protective equipment.

H198. 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) Scott

H199. Honors Thesis. (2) Course may be repeated for credit. Individual conferences to be arranged. (F,SP) Scott

H199. 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 related to the student's specialization. (SP) Scott

199. Supervised Independent Study and Research for 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 87 and 88 of this catalog. (F,SP) Scott

200. Seminar in Kinesiology and Body Mechanics. (2) Two hours of seminar 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: 101. Neurophysiological concepts, physical laws and kinesiology. (SP) Scott

205. Seminar in Physiological Bases of Physical Activity. (2) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: 105A. Immediate and long-range adaptations of the body to exercise. Physiological limits and work capacities in relation to age, sex, diet, environmental factors, and nature of activity. (SP) Scott

208. Seminar in Neuromuscular Fatigue. (2) Course may be repeated for credit. Two hours of seminar per week. A critical review of current literature on neuromuscular fatigue, its sites and mechanisms. The core material is physiological; changes in neuromuscular education, exercise, electromyograms, excitation-contraction coupling and metabolism in fatigue. Readings will also include history of the study of fatigue and its operational definition, central versus peripheral literature on neuromuscular fatigue, its sites and mechanisms. The core material is physiological; changes in neuromuscular transmission, electromyograms, excitation-contraction coupling and metabolism in fatigue. Readings will also include history of the study of fatigue and its operational definition.

*Not offered 1989-90

1 On leave, spring, fall
2 On leave, fall

On leave, active service

†Recipient of Distinguished Teaching Award
John Clarke, Ph.D. University of Cambridge, England.
Eugene D. Commins, Ph.D. Columbia University,_ATOMIC
and nuclear physics.
Sumner P. Davis, Ph.D. University of California at Berkeley.
Atomic and molecular physics.
Donald S. Fisher, Ph.D. University of California at Berkeley.
Condensed matter physics.
Frederick Reif, Ph.D. Harvard. Science and mathematics.
Yuen-Ron Shen, Ph.D. Harvard. Solid state, quantum and
relativity physics.
George H. Trilling, Ph.D. California Institute of Technology.
Condensed matter physics.

Charles Kittel, Ph.D. (Emeritus)
Gerson Goldhaber, Ph.D. University of Wisconsin, Ph.D.hc.
Donald A. Glaser, Ph.D. California Institute of Technology.
Carson D. Jeffries, Ph.D. Stanford. Condensed matter
physics.
Steven G. Louie, Ph.D. University of California at Berkeley.

Richard E. Packard, Ph.D. University of Michigan. Low
temperature physics.
Alex Zettl, Ph.D. University of California at Los Angeles.

Marc Davis, Ph.D. Princeton. Astrophysics.
Rainer K. Sachs, Ph.D. (Mathematics) Syracuse University.
Experimental condensed matter physics.
Steven G. Louie, Ph.D. University of California at Berkeley.

Charles L Schwartz, Ph.D. Massachusetts Institute of
Technology. Theoretical physics; militarism.

Graduate Programs
Graduate work leading to the M.A. and Ph.D. degrees is offered in the Department of Physics with emphasis placed on the Ph.D. in addition to applications and requirements for undergraduate students, but admission must submit scores on the graduate record examination in physics. Detailed information concerning admission, graduate student instructor appointments, fellowships, and course requirements is given in a departmental brochure, which is available upon request from the graduate assistant, Department of Physics.

Research is a major part of the Ph.D. program, and the department offers opportunities in a wide variety of experimental and theoretical fields. Campus research includes atomic physics and spectroscopy, laboratory astrophysics, cosmic rays, mass spectrometry, nonlinear optics, solid state physics, low-temperature physics, electronics, magnetic resonance, gaseous electronics, and upper atmosphere physics. At the Lawrence Berkeley Laboratory, extensive opportunities exist for research in elementary particle and nuclear physics, in plasma physics, and on energy and environmental problems.

Space physics, interplanetary studies, solar plasma research, physics of the upper atmosphere, and cosmological problems are pursued both in the Physics Department and in the Space Sciences Laboratory. With special research interests should make inquiry in the department office.

Requirements for the Ph.D. include the following courses:

*Not offered 1989-90
#On leave, spring
##On leave, fall

#On leave

On leave, active service

†Recipient of Distinguished Teaching Award

The Minor
The Department of Physics has adopted a physics minor program. The minor will conform to the College of Letters and Science specifications and will consist of the following course work:

**Prerequisites.** Physics 7A, 7B, 7C (or their equivalent); Math 1A, 1B, 50A, 50B, (or their equivalent). These courses must be taken for a letter grade.

**Minor Requirements.** Physics 103, 104, 105, 106. Three additional upper division physics classes to total 12 units in upper division physics units of upper division courses must be taken for a letter grade (thus Physics 123, 153, H190, 198, 215, 220, 240) and 15 units of lower division courses must be completed at Berkeley. A minimum of three upper division courses must be completed at Berkeley. An upper division course may be applied to the minor applied.

Qualifications for the minor will be required to furnish transcript (official or unofficial) to the undergraduate assistant (in 368 Le Conte Hall) to show work and grade-point average in physics and math. After completing a 368 Le Conte Hall) the students will be directed to a physics minor advisor who will approve the completion of the minor program.

Students may petition for a minor in physics at the time that the requirements are complete until the student graduates from the College of Letters and Science.

For more information regarding this program please contact the undergraduate assistant at 642-0481.

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Requirements for the Ph.D. include the following courses:

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On leave, active service

†Recipient of Distinguished Teaching Award
19 units (five semester courses) of material selected from upper division or graduate courses (not including any compulsory upper division material required for the undergraduate major), of which at least 11 units must be in 200-level courses. Some of the 19 units could include courses in mathematics, biophysics, or astrophysics. Mathematics 224 is recommended. Physics 251, 290, 295, 299, 300, and 602 are excluded from the 19 units considered above. In physics, students majoring in Physics 1A-1B, 8A-8B or equivalent, 63B, and 93 should take the physics courses for which they have completed the necessary prerequisites. Students majoring in any of the physical sciences, or who, Mathematics 50A (may be taken concurrently). Honors sequence coreq. nature, and quantum physics. (F,SP) Staff

8A. Introductory Physics. (4) Students with credit for 7A-7B, 7C, H7A-H7B-H7C are fundamental and are designed to meet the needs of students majoring in any of the physical sciences, or who, Mathematics 50A (may be taken concurrently). Honors sequence coreq. nature, and quantum physics. (F,SP) Staff

Courses 7A-7B-7C, or H7A-H7B-H7C are fundamental and are designed to meet the needs of students majoring in any of the physical sciences, or who, Mathematics 50A (may be taken concurrently). Honors sequence coreq. nature, and quantum physics. (F,SP) Staff

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 1C, 1C with Math 50A, 1D with Math 50B.

*Physics 1A: Mechanics and Simple Harmonic Motion. (F 1988)

*Physics 1B: Wave Motion, Heat, Electrostatics. (SP 1988)

Physics 1C: Electric Currents, Electromagnetism, Geometrical Optics. (F 1989)

Physics 1D: Physical Optics, Relativity and Quantum Physics. (SP 1990)

1A. 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. Credit in Math 1A or 1AS; Math 1B or 1BS (which may be taken concurrently). 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, 1C-1D, or Math 50A-50B (Math 50B may be taken concurrently). Electromagnetic waves, physical optics, quantum mechanics, and atomic physics. (F,SP) Staff

H7A-H7B-H7C. Physics for Scientists and Engineers. (4;4;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 (may be taken concurrently). Honors sequence coreq. corresponding to 7A-7B-7C, but with greater emphasis on theory as opposed to problem solving. Recommended for students who have adequate preparation on the high school level and who are intending to pursue a major in physics. Entrance into H7A is decided on the basis of performance on an examination given during the first few weeks of the semester. Gain the consent of the instructor, and into H7B-H7C on performance in previous courses in a standard sequence. (Sequence begins 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: Mathematics 16A or equivalent. Mechanics, wave motion, electromagnetics and heat. Specific 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 laboratories per semester. Prerequisites: 8A or equivalent. Electromagnetism, optics and modern physics. (F,SP) Staff

10. Descriptive Introduction to Physics. (3) Not open to students who have taken any of 7A-7B-7C, H7A-H7B-H7C, 8A-8B 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 illustrations. (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 dimensions and illustrative lecture demonstrations will be given. Only the basics of high school algebra and geometry will be used. 39. Lower Division Physics Seminar. (1.5) Must be taken on a pass/not pass basis. Two hours of lecture per week. Prerequisites: Enrollment by consent of instructor during the week of pre-enrollment. Consult bulletin boards outside of 366 Le Conte for more information. Enrollment limited to 20 students per section. Physics Seminar course designed for both non-major students and those students considering a major in physics. Topics vary from semester to semester. (F,SP) Staff

49. Supplementary Work in Lower Division Physics. (1-3) Course may be repeated for credit. Meetings to be arranged. Students with partial credit in lower division physics courses may, with consent of instructor, complete the credit under this heading. (F,SP) Staff

Upper Division Courses

105. Analytic Mechanics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 105, 110A-110B (HOB may be taken concurrently). Mechanics and wave motion. (F,SP) Staff

110A-110B. Electromagnetism and Optics. (4;4) Three hours of lecture and one hour of discussion per week. A course emphasizing electromagnetic theory and applications; charges and currents; electric and magnetic fields; dielectric, conducting, and magnetic media; relativity, Maxwell equations, wave propagation in media, radiation and scattering, Fourier optics, interference and diffraction, ray optics and applications. (Sequence begins F,SP) Staff

111. Modern Optics and Advanced Electrical Laboratory. (1-3) Two to six hours per week. Prerequisites: 137A or consent of instructor. The course will begin with a nine-week (eight hours/week) laboratory and lecture (1/2 hours/week) on Basic Semiconductor Circuits (BSC(Sup)) for 2 units, followed by 1 individual experiments which are approximately 0.5 units each. This advanced laboratory for junior and senior students involves some of the significant experiments of atomic, nuclear, class, and condensed state-physics. Individual work is encouraged. (F,SP) Staff

112. Introduction to Statistical and Thermal Physics. (4) Three hours of lecture and one hour of discussion per week. Basic concepts of statistical mechanics, macroscopic basis of thermodynamics and applications to macroscopic systems, condensed states, phase transformations, quantum distributions, elementary kinetic theory of transport processes; fluctuation phenomena. (F,SP) Staff

123. Computational Physics. (2) New course. Must be taken on a pass/not pass basis. Three hours of seminar and three hours of laboratory. Prerequisites: Working knowledge of at least one of the following computer languages: Basic, Fortran. C. Senior standing in Physics major or related discipline and permission of the instructor. Laboratory and seminar on the computations of physical problems by modern computational methods. Students will be presented by each student during the term describing their progress. Working programs and a written report will be submitted at the end of the term. (SP, Strovkin)

124. Introductory Nuclear Physics. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 137A. Tools of nuclear physics, alpha, beta, and gamma decay, nuclear interactions, nuclear structure, brief introduction to particle physics. (SP)

129A-129B. Particle Physics. (4;4) Three hours of lecture and one hour of discussion per week. Prerequisites: 137A-137B (137B may be taken concurrently). Tools of particle and nuclear physics. Properties, classification and interaction of particles including the quark-gluon constituents of hadrons. High energy phenomena analyzed by quantum mechanical methods. 129A will include topics from elementary particle physics in nuclear physics. 129B will develop more quantitative topics such as quark content number determination of resonances, hadron structure functions, introductory electro-weak interactions with Dirac matrices, quark models, and current research. (Sequence begins F)

132. Contemporary Physics. (3) Not open for credit to students who have completed 137A. Three hours of lecture and one hour of discussion per week. Prerequisites: 8A-8B or equivalent or consent of instructor. 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, radiation, fundamental particles and symmetries, superconductivity, soliton states, solid state physics, astrophysics, and cosmology.

137A-137B. Quantum Mechanics. (4) Three hours of lecture and one hour of discussion per week. Introduction to the methods of quantum mechanics with applications to atomic, molecular, solid state, nuclear and elementary particle physics. (Sequence begins F,SP) Staff

139. Special Relativity and General Relativity. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 105, 110A or consent of instructor. 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, radiation, fundamental particles and symmetries, superconductivity, soliton states, solid state physics, astrophysics, and cosmology.

141A-141B. Solid State Physics. (3;3) Three hours of lecture and one hour of discussion per week. Prerequisites: 137A-137B may be taken concurrently. A thorough introductory course in modern solid state physics and practical applications of Einstein's special theory of relativity; spatial and temporal measurement; particle dynamics, electrodynamics, Lorentz invariants. Introduction to general relativity. Selected applications. Designed for advanced undergraduates in physics and astronomy. (SP)

142. Introduction to Plasma Physics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 105, 110A-110B (110B may be taken concurrently). Motion of charged particles in magnetic fields, dynamics of fully ionized plasma from both microscopic and macroscopic point of view, magnetohydrodynamics, small amplitude waves; examples from astrophysics, space sciences and controlled nuclear fusion research. (SP)

150. Introduction to Atmospheric and Space Sciences. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Senior standing in the physical sciences or consent of instructor. Recent measurements and physical theories of processes in...
### Physics Courses

**180. Physics of Energy Conversion and Use.** (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 112 or equivalent, or consent of instructor. Staff

**198. Directed Group Study.** (1-4) Must be taken on a passed/not passed basis. Enrollment is restricted by regulations on pages 87 and 88 of this catalog. Staff

**199. Supervised Independent Study.** (1-3) Must be taken on a passed/not passed basis. Enrollment is restricted by regulations on pages 87 and 88 of this catalog. 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, symmetry, kinematics and dynamics of rotation, canonical variables and transformations, perturbation theory, non-linear dynamics, KAM theory. Staff

**205B. Advanced Dynamics.** (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 105 or equivalent. Continuous systems, dissipative systems. Attractors. Emphasis on recent developments, including turbulence. 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. Staff

**209A. Introduction to Quantum Mechanics.** (5) Three hours of lecture and one hour of discussion per week. Prerequisites: 205A or equivalent. Staff

**210B. Theory of Electricity and Magnetism.** (5) Three hours of lecture and one hour of discussion per week. Prerequisites: 210A. Staff

**211. Equilibrium Statistical Physics.** (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 112 or equivalent. Staff

**212. Nonequilibrium Statistical Physics.** (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 112 and 211A-211B, or equivalents. Staff

**216. Special Topics in Many-Body Physics.** (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 211A-211B or equivalent recommended. Staff

**211A. Quantum Mechanics.** (5) Three hours of lecture and one hour of discussion per week. Prerequisites: 137A-137B or equivalent. Staff

**221A. Quantum Mechanics.** (5) Three hours of lecture and one hour of discussion per week. Prerequisites: Consent of instructor. Staff

**222. Special Topics in Mathematical Physics.** (2-4) Course may be repeated for credit with consent of instructor. Staff

**223. Group Theory and Quantum Mechanics.** (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 211A-211B or equivalent. Staff

**225A-225B. Relativistic Particle Physics.** (5.5) Three hours of lecture and one hour of discussion per week. Prerequisites: 211A-211B or equivalent. Staff

**228. Theory of Weak Interactions.** (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 225A or consent of instructor. 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 or equivalent. Staff

**241. Physics of Energy Conversion and Use.** (3) 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. Staff

**242A-242B. Theoretical Plasma Physics.** (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. Staff

**245. Physics of Ionized Gases.** (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Consent of instructor. Staff

**249. Seminar.** (2) Course may be repeated for credit. 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. Staff

**260. Seminar.** (2) Course may be repeated for credit. Staff

**262. Issues in the Teaching of Physics.** (2) Must be taken on a satisfactory/unsatisfactory basis. Staff

**265. Seminar.** (2) Course may be repeated for credit. Staff

**290. Seminar.** (2) Must be taken on a satisfactory/unsatisfactory basis. Staff

**299C. Experimental Cosmology.** (2) New course. Course may be repeated for credit. Staff

**299D. Research.** (1-12) Course may be repeated for credit. Staff

**299E. Research.** (1-12) Must be taken on a satisfactory/unsatisfactory basis. Staff

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*Not offered 1989-90
*On leave
*Recalled to active service
*Recipient of Distinguished Teaching Award
Physiology-Anatomy (College of Letters and Science)

As a result of the reorganization of the biological sciences on the Berkeley campus, the faculty and programs of the Department of Physiology-Anatomy will become part of the new Department of Integrative Biology and of three divisions (Biophysics and Cell Physiology, Cell and Developmental Biology, and Neurobiology) of the Department of Molecular and Cell Biology, effective fall 1989. For an explanation of the full scope of the biological sciences reorganization and its implications, see page 89.

Undergraduate Programs: Beginning fall semester 1989, students will no longer be accepted into the undergraduate major in Physiology. Students interested in physiology or anatomy should consider one of the majors offered by the new departments and should contact a major adviser or undergraduate assistant in either the Department of Integrative Biology or in the appropriate division listed above of the Department of Molecular and Cell Biology. The names and locations of these advisers can be obtained by writing to the Staff Assistant to the Dean, College of Letters and Sciences, 201 Campbell Hall, University of California at Berkeley; Berkeley, CA 94720. Continuing students who declared the major before fall 1989 may continue in the program, provided they complete all degree requirements and graduate before fall semester 1993. Such students should contact the major adviser or the Student Assistant to the Dean, College of Letters and Sciences, 201 Campbell Hall, University of California at Berkeley; Berkeley, CA 94720. Continuing students who declared the major before fall 1989 may continue in the program, provided they complete all degree requirements and graduate before fall semester 1993. Such students should contact the major adviser or the Student Assistant to the Dean, College of Letters and Sciences, 201 Campbell Hall, University of California at Berkeley; Berkeley, CA 94720. Continuing students who declared the major before fall 1989 may continue in the program, provided they complete all degree requirements and graduate before fall semester 1993. Such students should contact the major adviser or the Student Assistant to the Dean, College of Letters and Sciences, 201 Campbell Hall, University of California at Berkeley; Berkeley, CA 94720.

Graduate Programs: For fall semester 1989, new students have been admitted to the existing graduate programs in physiology and anatomy. Graduate programs for the biological sciences departments are currently under review, and it is anticipated that the new graduate programs will receive final approval during fall semester 1989. All new and continuing graduate students will be notified when these programs are approved. At that time, students will have the option of continuing in the program to which they were admitted or requesting transfer to a related new program. For details of existing graduate programs in physiology and anatomy, graduate students should contact the graduate adviser in the Division of Biophysics and Cell Physiology of the Department of Molecular and Cell Biology. Beginning fall semester 1993, all students are expected to complete an undergraduate major at the time of their application for the degree.

Schwartz

Plant and Soil Biology (College of Natural Resources)

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Schwartz

Plant and Soil Biology (College of Natural Resources)

Department Office: 108 Hilgard Hall, 642-0341
Chair: Lawrence J. Waldron, Ph.D.
Professors:
Harvey E. Doner, Ph.D. University of California at Riverside. Soil moisture: evaporation, plants, microorganisms, soil physics.
Wilford R. Gardner, Ph.D. Iowa State University. Soil physical: conservation, landscape, pedogenesis.
John Harls, Ph.D. University of Wisconsin. Ecosystem modeling, environmental impacts
John G. McColl, Ph.D. University of Washington. Soils: nutrient cycling, forest soils
George Spokas, Ph.D. University of California at Berkeley. Soil physical chemistry
Norman Terry, Ph.D. Nottingham University. Environmental plant pathology
Geoffrey B. Bondman, Ph.D. (Emertus) University of Minnesota. Soil physics
Theodore C. Broyer, B.S. (Emertus) University of California at Berkeley. Plant pathology, mycorrhizae
Paul R. Day, Ph.D. (Emertus) University of California at Berkeley. Soil physics
Louis Jacobson, Ph.D. (Emertus) University of California at Berkeley. Plant physiology, ion transport
Hendrik J. D. Meijer, Ph.D. (H.c.) Utrecht University. Soil plant relationships, land use
Lawrence J. Wilkins, Ph.D. University of California at Davis. Soil physics, soil/plant relationships

Assistant Professors:
Ronald G. Amundson, Ph.D. University of California at Riverside. Pedology
Keith M. Logue, Ph.D. University of British Columbia. Soil and water hydrology

Lecturers:
Rodney J. Arkley, Ph.D. (Emertus) University of California at Berkeley. Soil genesis
Isaac Barshad, Ph.D. (Emertus) University of California at Berkeley. City mineralogy and chemistry
Allan D. J. Utch, Ph.D. University of California at Berkeley. Plant physiology
I. W. Weis, Ph.D. University of California at Berkeley. Plant physiology
D.E. Williams, Ph.D. (Emertus) University of Minnesota. Plant and soil biology

Plant and Soil Biology: a multidisciplinary department with teaching and research directed to the study of the entire plant-soil system. Course offerings of the department support the curricula of two undergraduate majors: plant and soil biology, and soil resource management.

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, and plant physiology. The curriculum in plant and soil biology provides excellent undergraduate preparation for graduate study in soil science and 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 of various soil resource classification, evaluation and inventory.

Courses offered by the Department of Plant and Soil Biology serve students in the College of Natural Resources and across the campus in such diverse but related fields of study as forestry, conservation and resource studies, botany, geology, and geography. A number of our courses are of sufficient general interest to attract students who wish to expand their intellectual horizons by learning something about soils, plants, and their interrelationships which support all terrestrial life.
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<tr>
<th>Old No.</th>
<th>Course Title</th>
<th>Equivalent New Course, If Any</th>
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<tr>
<td>001</td>
<td>Introductory Human Physiology</td>
<td>MCellBi 032 Introduction to the Biology of Human Cells</td>
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<tr>
<td>001L</td>
<td>Introductory Human Physiology Laboratory</td>
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<tr>
<td>010</td>
<td>The Biology of Man</td>
<td>MCellBi 061 From Neuron to Brain</td>
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<td>100</td>
<td>Organ Physiology</td>
<td>MCellBi 120 Cell Physiology</td>
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<td>100L</td>
<td>Organ Physiology Laboratory</td>
<td>MCellBi 120L Cell Physiology Laboratory</td>
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<td>101</td>
<td>Cellular and Neural Physiology</td>
<td>MCellBi 130 Cell Biology</td>
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<td>101L</td>
<td>Cellular and Neural Physiology Laboratory</td>
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<td>MCellBi 130L Analytic Mechanics</td>
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<td>MCellBi 160L Neurobiology Laboratory</td>
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<td>109</td>
<td>Survey of Mammalian Physiology</td>
<td>IntegBi 132 Survey of Mammalian Physiology</td>
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<td>109L</td>
<td>Laboratory of Mammalian Physiology</td>
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<td>139</td>
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**Anatomy**

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<th>Old No.</th>
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<td>110</td>
<td>Mammalian Neuroanatomy</td>
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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, microbiology, and agricultural and environmental chemistry. Areas of specialization include plant nutrition, soil microbiology, chemistry, soil-plant relationships, nutrient cycling, salinity research, forest soils, and pedology.

Lower Division Courses

10. Soils and Their Significance to Society. (3) Three 1-hour lectures per week. Instructor's relationship to soils, their significance to society, and interpretation of soil properties for land-use decisions. (F) Gerster

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 and as a habitat for organisms. Soil management for agriculture and forestry will also be discussed. (F) McColl

101. Development and Classification of Soils. (3) Three hours of lecture per week. Prerequisites: 100 or equivalent, and Chemistry 1A-1B recommended. Development, morphology, and classification of soils as related to geology, environmental factors, and time. Soils as a functioning component of ecosystems. (SP) Amundson

101F. Field Study of Soil Development. (1) Five day-long Saturday field trips to locations in central California. Prerequisites: Completion or concurrent enrollment in 101F. The field study of soil development and morphology related to climate, biota, geology, topography, and time. (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 every even-numbered year. (F) Waldron

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, morphology, and genesis. Field exercises in classifying/mapping soils and preparation of survey reports. Practice in evaluating soils for agriculture, range, forest, and other uses. Extra cost. 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 are emphasized. Characteristics and causes of acid, alkaline, and saline soils. (F,SP) 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 lab 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 fundamental aspects of inorganic nutrients, photosynthesis, and nitrogen metabolism. (SP) Terry

117. The Nutrition of Green Plants Laboratory. (3) One hour of lecture 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. Management of the soil for sustained agricultural production, water quality control, and environmental protection. Soil erosion, fertility enhancement, salinity, and water conservation are the principal topics. (SP) Waldron

162. Soil Resource Evaluation. (3) Three 1-hour lectures per week. Prerequisites: 100 or equivalent, or consent of instructor. Principles of soil survey and mapping in making land-use decisions. Offered every even-numbered year. (F) Gerster

169. Senior Seminar. (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 integrating the natural science, economic, and political aspects of soil resource management or plant and soil biology. (SP) Staff

196. Directed Group Study. (1-3) 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. (F,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. Enrollment is restricted by regulations listed on pages 87 and 88 of this catalog. (F,SP) Staff

Graduate Courses

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) Waldron

211. Advanced Soil Microbiology and Biochemistry. (3) Course may be repeated for credit. Three 1-hour lectures 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. (F) Doner

213. Soil Surface and Colloid Chemistry. (3) New course. Three hours of lecture per week. Prerequisites: 112. Chemistry 130A. Origin and coordination chemistry of soil adsorbents; nature of the soil-liquid interface in soils; solute adsorption mechanisms and theoretical models; soil colloidal phenomena; interparticle forces and chemical factors influencing soil aggregate formation. Offered odd-numbered years. (SP) Sposito

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. (F,SP) Staff

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. (F,SP) Staff

299. 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...
Reorganization of Biological Sciences at Berkeley

In 1989 the biological sciences at Berkeley underwent a complete revision to reflect advances in modern biology. A comprehensive study of the organization, teaching and research activities of more than 10 predecessor departments have been fused and realigned into three new departments, Integrative Biology, Molecular and Cell Biology, and Plant Biology. A full description of the biological sciences reorganization and its implications appears on page 89.

The Plant Biology courses on the following pages are either new or have been drawn from among the predecessor biological sciences departments. A comprehensive list of the courses followed by the former departments, course titles, and course numbers from which they were derived appears on page 329.

The Department of Plant Biology focuses on the study of plants at the cellular and molecular levels. Modern concepts of plant biochemistry, development, genetics, molecular biology, and physiology will be considered in an integrated curriculum at both the undergraduate and graduate levels. Both programs are designed to offer students maximum flexibility in defining their own areas of interest. In addition to departmental resources in the new Genetics and Plant Biology Program, the National Science Foundation Center for Plant Development Biology and the United States Department of Agriculture Plant Gene Expression Center are available for the programs of the department.

Undergraduate Program Proposed for Fall 1989

The undergraduate program in plant biology has been developed as a broadly based program in biology, emphasizing the study of plants at the cellular and molecular levels. Lower division courses are intended to provide a foundation in biological and physical sciences as a preparation for advanced study at the upper division level in specific areas of plant biology and related fields. At the upper division level, the program is structured around a two-semester core course that emphasizes developmental, physiological, and biochemical aspects of plant biology. The core program also includes an intensive laboratory experience in modern techniques in plant biology. Additional courses in specialized areas in plant biology (molecular, physiology, structural anatomy), as well as appropriate courses from other disciplines, are also available at the upper division level.


Upper Division. Required courses in genetics and biochemistry. Plant biology courses including developmental plant biology, biochemical and physiological plant biology, plant structure, diversity and ecology.

Graduate Program Proposed for Fall 1990

The graduate program in plant biology is designed to train students in modern research areas of plant biology. The department has selected the following areas of research: molecular, cellular, genetic, biochemical, developmental, and structural plant biology. The graduate program includes an introductory three-semester core course that covers in a systematic manner the facilities of the molecular biology, genetics, plant biology, plant molecular biology, plant regulatory biology, developmental plant biology, and plant cell biology. Additional special topics courses and seminars in areas of individual faculty expertise will also be available.

Requirements for Admission. Prospective students for the graduate program in plant biology will be expected to demonstrate academic excellence and potential for independent scientific research. Students are expected to have a background in chemistry, physics, mathematics, and biology. An admissions committee composed of the department will review applications and make recommendations to the full department on admissions matters. Recommendations for admission will be based on grades in undergraduate-level undergraduate and graduate courses, letters of recommendation, written statements of academic and professional goals, and other evidence of academic accomplishment. Scores on standardized tests may be considered. Graduate Record Examination, will be required of all applicants.

Lower Division Courses

Biology 11. Introduction to the Science of Living Organisms. (4) Students may not receive credit for this course if they have credit for both Zoology 10 and Botany 10. Three hours of lecture and one 3-hour laboratory per week. Prerequisites: For students not majoring in biology and for non-science majors. Principles of biology organization and function using examples from plant and animal kingdoms. Similar in scope to Biology 1A-1B except that knowledge of physical sciences is neither required nor assumed. (SP)

Grusell, Powell

100A. Molecular, Cellular, and Genetic Aspects of Plant Development. (4) New course. Three 1-hour lectures and one 1-hour discussion per week. Prerequisites: PB 100A, MCB 102 or consent of instructor. A study of physiological and biochemical processes in higher plants, including water relations, ion transport, membrane bioenergetics (photosynthesis and respiration), nitrogen metabolism and hormone physiology. (SP)

Jones, Mills

101. Modern Techniques in Plant Biology. (4) New course. Two hours of lecture and six hours of laboratory per week. Prerequisites: PB 100A and 100B (may be taken concurrently); or consent of instructor. Experimental work in the areas of cellular and molecular biology. Plant molecular biology—techniques of gene transfer to plant cells, isolation and characterization of plant DNA and RNA. Plant developmental biology—immunochemical analysis of developmentally regulated proteins, organogenesis, and embryogenesis. Plant biochemistry—measurement of photochemical reactions, enzyme assays from whole plant tissues and organelles, qualitative and quantitative analysis of plant cell lipids. (SP)

Zambryski

110. Biology of Fungi. (4) Formerly Botany 101. Two 1-hour lectures and two 3-hour laboratories per week. Prerequisites: Biology 10A and 10B, or consent of instructor. General biological insight into the fundamental role of fungi as decomposers, plant cells, or consort of instructor. Experimental work in the areas of cellular and molecular biology. Plant molecular biology—techniques of gene transfer to plant cells, isolation and characterization of plant DNA and RNA. Plant developmental biology—immunochemical analysis of developmentally regulated proteins, organogenesis, and embryogenesis. Plant biochemistry—measurement of photochemical reactions, enzyme assays from whole plant tissues and organelles, qualitative and quantitative analysis of plant cell lipids. (SP)

Zambryski

120. Biology of Algae. (4) Formerly Botany 102. Two 1-hour lectures and one 4-hour laboratory per week plus two or three half-day trips on weekends. Prerequisites: Biology 10A-10B, or consent of instructor. General biological insight into the fundamental role of algae including both phytoplankton and benthos. Emphasis is on morphology, physiology, and systematics. An important component of this course will be the identification of field-collected specimens, techniques for culture, simple experiments on development and reproduction, and economic uses of algae. (SP)

West

Standing Research in plant and soil biology. (FSP)

300. Professional Preparation: Supervised Teaching of Soil Science. (1-4) New course. Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences and participation in teaching activities. Prerequisites: Graduate standing and appointment as a graduate student instructor, or consent of instructor. Teaching methods in soil science at the university level; course content; problem set review and development; guidance of laboratory experiments; course development and evaluation; supervised practice teaching. (FSP)

601. Individual Study for Master's Students. (1-8) 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)

602. Individual Study for Doctoral Students. (1-8) 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 for non-matriculated students to prepare themselves for the examinations required of candidates for the Ph.D. (FSP)

Plant Biology

(College of Natural Resources)

For Information contact Student Affairs, 106 Giannini Hall, 642-0542

Chair: Richard Malkin, Ph.D.

For information contact Student Affairs, 106 Glannini Hall, 642-0542

Michael Freeling, Ph.D. University of Indiana. Plant biology. Plant molecular biology. Developmental genetics, molecular biology, and physiology. Aspects of functional and evolutionary genetics, including gene regulation. (F,SP) Staff

Lewis J. Feldman, Ph.D. Harvard University. Plant biochemistry. (F,SP) Staff

Patricia C. Zambryski, Ph.D. University of Colorado. Plant biology. Plant molecular biology. Developmental genetics, molecular biology, and physiology. Aspects of functional and evolutionary genetics, including gene regulation. (F,SP) Staff

Richard MalKin, Ph.D. University of California at Berkeley. Plant development and gene regulation. (F,SP) Staff

Russell L. Jones, Ph.D. University of Wales. Plant physiology. (F,SP) Staff

Donald R. Kaplan, Ph.D. University of California at Berkeley. Developmental morphology of vascular plants. (F,SP) Staff

Owen H. Miller, Ph.D. University of Iowa. Mycology. (F,SP) Staff

Michael Frielimg, Ph.D. University of Indiana. Plant development and gene regulation. (F,SP) Staff

Russo1 J. Jones, Ph.D. University of Wales. Plant physiology. (F,SP) Staff

Gruisell, Powell

Norman Terry, Ph.D. Nottingham University. Environmental plant physiology. (F,SP) Staff

John A. West, Ph.D. University of Washington. Physiology

Associate Professors:

Lewis J. Feldman, Ph.D. Harvard University. Plant physiological development.

Wilhelm Grusell, Ph.D. University of Bonn. Plant molecular biology. (F,SP) Staff

John W. Taylor, Ph.D. University of California at Davis. Molecular biology.

Zimmay Reine Sung, Ph.D. University of California at Berkeley. Plant somatic cell genetics. (F,SP) Staff

Barbara J. Zambryski, Ph.D. University of Colorado. Plant molecular biology. (F,SP) Staff

Assistant Professor:

Robert H. Old, Ph.D. University of California at Berkeley. Plant molecular biology. (F,SP) Staff

Adjunct Assistant Professors:

Michael Fromm, Ph.D. Stanford University. Plant molecular biology. (F,SP) Staff

Sarah C. Hake, Ph.D. Washington University. Plant molecular biology. (F,SP) Staff

Shelia M. McCormick, Ph.D. University of Missouri. Plant developmental genetics. (F,SP) Staff

Athanasios Theologis, Ph.D. University of California at Los Angeles. Plant molecular biology. (F,SP) Staff

Undergraduate Advisers: A. Melis, Z.R. Sung. (F,SP) Staff

Graduate Advisers: L. Feldman, R. Fischer.
Plant Pathology (College of Natural Resources)

Department Office: 147 Hilgard Hall, 642-5121
Chair: Joseph G. Hancock, Jr., Ph.D.
Professors:
Fields W. Cobb, Jr., Ph.D. Pennsylvania State University. Forest pathology
Joseph G. Hancock, Jr., Ph.D. Cornell University. Fungal ecology, disease and pathogen physiology
Andrew O. Jackson, Ph.D. University of Manitoba. Soil microbiology
Sydney Kustu, Ph.D. University of California, Davis. Fungal ecology, pathogen physiology
Timothy Morris, Ph.D. University of Nebraska. Plant virology, comparative virology
John R. Parmenter, Jr., Ph.D. University of Wisconsin. Forest pathology
Nicholas J. Panopoulos, Ph.D. University of California at Berkeley. Mycology
Robert D. Rastad, Ph.D. University of Washington. Fungal ecology, epidemiology
David E. Schiegl, Ph.D. University of California at Berkeley. Plant pathology, crop virology
A. S. Seifert, Ph.D. University of California at Berkeley. Cell biology
Albert R. Weinhold, Ph.D. University of California at Davis. Fungal ecology, pathogen physiology
Peter A. Arko, Ph.D. (SD)
Lee J. Ashworth, Ph.D. (Emeritus)
Kenneth G. Barriechbol, Ph.D.
Stephen Wilham, Ph.D. (Emeritus).

Associate Professors:
Oenes C. Hutsman, Ph.D. University of California at Davis. Fungal ecology, disease and pathogen physiology
Steven E. Lindow, Ph.D. University of Wisconsin. Bacterial ecology, and physiology
Philip T. Spooner, Ph.D. University of Oregon. Evolutionary biology and population genetics of fungi
Brian J. Staskawicz, Ph.D. University of California at Berkeley. Molecular genetics

Assistant Professors:
Lynn Epstein, Ph.D. Michigan State University. Developmental biology
Mustafa E. S. Gokce, Ph.D. University of Washington. Fungal ecology
Lynn G. Gordon, Ph.D. University of California at Davis. Fungal ecology

Adjunct Professor:
Robert Goodman, Ph.D. Cornell University. Plant genetics, plant molecular biology, plant virology

Adjunct Assistant Professors:
Barbara Rance, Ph.D. Genomic disease resistance
David W, Ow, Ph.D. Plant viral gene expression

Undergraduate Program

The Department of Plant Pathology is proposing to withdraw the undergraduate major by fall 1997. Call the department for up-to-date information. Undergraduates may apply to Bioresources Sciences or Plant Biology for training in plant pathology.

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. The program is designed 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 Bioresources Sciences. For upper division requirements, see the Announcement of the 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 in 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 crops from disease losses. The subject area is extremely broad, covering the response of the plant to the environment and to disease agents, such as bacteria, fungi, nematodes 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. For applied emphasis include biological and integrated disease control; 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.

Upper Division Courses

120. Plant Diseases. (4) Two 1-hour lectures and two 3-hour laboratories per week. Prerequisites: Chemistry 1A-1B. An introductory course in plant diseases. Diseases studied include those 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 phanerogams. Studies in the laboratory with fresh or preserved material augmented in lectures. (F) Raabe

123. Introduction to Microbiology of Natural Resources. (4) Two 1-hour lectures and two 3-hour laboratories per week. Prerequisites: Chemistry 1A-1B. A survey of the groups of microorganisms: bacteria, fungi, protozoa, algae and viruses. The emphasis of the course is on the role of both psychrophilic and xerophilic microbes in the environment, particularly in agriculture. Laboratories are designed to acquaint stu-
### Concordance List for Plant Biology

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<th>New No.</th>
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<th>Equivalent Old Course, If Any</th>
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<td>011</td>
<td>Introduction to the Science of Living Organisms</td>
<td>Biology 011 Introduction to the Science of Living Organisms</td>
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<td>Molecular, Cellular and Genetic Aspects of Plant Development</td>
<td>Genetic 170 Plant Cell And Developmental Genetics</td>
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<td>100B</td>
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<td>Individual Study for Graduate Students</td>
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An advanced research seminar on topics in plant pathology. (F,SP) Jackson

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. (F,SP) Schroth, Hancock, Parmeter

209. Molecular Plant Pathology. (2) Includes former 208. 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. (F,SP) Staskawicz

210. Diagnosis of Plant Disease. (3) One hour of lecture and 3 hours of laboratory per week. Prerequisites: Consent of instructor. Trips to observe and discuss symptoms of disease in nature, approaches to control, cultural practices for major California crops, and controls of crop management on disease development. (F,SP) Schroth

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-200B and consent of instructor. Seminar/discussion by graduate students of current research in the field of plant pathogenic bacteria. (SP) Schroth, Hancock

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: 204A-204B and consent of instructor. Seminar/discussion by graduate students of current research in the field of soil microbiology. (F,SP) Morris, Jackson

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-200B and consent of instructor. A critical analysis of the current literature dealing with molecular basis of plant pathogenesis. (F) Jackson, Panopouios, 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-200B and consent of instructor. Seminar/discussion by graduate students of current research in the field of plant pathogenic bacteria. (SP) Schroth, Hancock, Parmeter

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-200B and consent of instructor. Seminar/discussion by graduate students of current research in the field of forest pathology. (SP) Parmeter, Cobb

217. Field Study in Plant Pathology. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Three hour laboratory/discussion per week. 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) Gordon, Hancock

218. 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) Gordon, Hancock

187. Field Study in Plant Pathology. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Three hour laboratory/discussion per week per unit. To be arranged. Prerequisites: Consent of instructor. Special topics will be offered from time to time. (F,SP) Gordon, Hancock

219. Supervised Independent Study and Research. (1-4) 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) Gordon, Hancock

220A. Advanced Plant Pathology. (4) Two 1½-hour lecture 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 in disease of plant pathogenic fungi including problems in collection, cultivation, and identification of fungal pathogens. (F) Gordon, Hancock, Parmeter

220B. Advanced Plant Pathology. (4) Two 1½-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) Schroth, Morris, Jackson

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

2021. 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

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-200B and consent of instructor. Seminar/discussion by graduate students of current research in the field of plant virology. (F) Morris, Jackson

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-200B and consent of instructor. Seminar/discussion by graduate students of current research in the field of soil microbiology. (F,SP) Morris, Jackson

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-200B and consent of instructor. A critical analysis of the current literature dealing with molecular basis of plant pathogenesis. (F) Jackson, Panopouios, 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-200B and consent of instructor. Seminar/discussion by graduate students of current research in the field of plant pathogenic bacteria. (SP) Schroth, Hancock, Parmeter

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-200B and consent of instructor. Seminar/discussion by graduate students of current research in the field of forest pathology. (SP) Parmeter, Cobb
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. (FSP) Hancock

Political Economy of Industrial Societies

(College of Letters and Science)

Group Major Office, Institute of International Studies, 201 Moses Hall, 642-4466

Major Advisers: Mr. Rosberg and Mr. Maric (Institute of International Studies), Coordinators; Mr. Abrams (History); Mr. Aggarwal (Political Science); Ms. Bonnecan (Sociology); Mr. Cohen (City and Regional Planning); Mr. Epstein (Business Administration); Mr. Feldman (History); Mr. Fishlow (Economics); Mr. Gregor (Political Science); Mr. Hammel (Anthropology); Mr. Janos (Political Sciences); Mr. Landau (Political Science); Mr. Reed (Geography); Mr. Rochlin (Institute for Governmental Studies); Mr. Saragosa (Chicano Studies); Mr. Teece (Business Administration); Ms. Tyson (Economics); Mr. Ward (Economics); Mr. Williams (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 societies. The consequences of 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 assigns first 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 advisor. Within individual study plans, particular emphasis is placed on the institutions and values that have shaped, and sometimes created, the emergence of contemporary events. Students also study the methodology 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 well before reaching the maximum number of units, 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 their second semester at the University 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 FEIS 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 any 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 interdisciplinary interest, independent research, special projects, etc.; b) extracurricular academic activities such as work, internships, participation in student conferences; and c) demonstrated ability to clearly 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 and admissions procedures. At the time this catalog was published, revisions were under consideration.

Advising. In the major, great importance is assigned to advising. The purpose of advising is to give students personal interests the appropriate academic orientation and career goals. When students declare, 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, and History 7B. U.S. History from the Civil War to Present; Political Science 2. Comparative Politics; and Political Science 3, History 20, 21, or Anthropology 190A: optional. Statistics 1A-1B (required only of students taking Economics 101A-101B to satisfy the methodology 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:

Note: Course additions and deletions are frequently made within fields. Consult the program brochure for updated information.

I. Models of the Industrial State: Three One-semester Courses


II. Systems of Interdependence: One-semester course

Politics and Resource Economics 231; Anthropology 148; Biology 150; Business Administration 188; Conservation and Resources Studies 110, 116; Economics 121, 122, 124A, 124B, 125, 128A, 128B, 129C, 137A.

III. Planning and Policy Making: One-semester course

Business Administration 112, 190; City and Regional Planning 110, 112, 127, 250, Economics 123, 136, 152, 155, 156, 171, 172, 173; Geography 110; Mass Communications 103; Political Science 125, 139B, 182, 184, 185, 187A, 167C; 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, 156; Conservation and Resources Studies 110, 116; Economics 121, 125, 131, 137, 174; Geography 125; Legal Studies 145, 180; Political Economy of Natural Resources 141; Population Studies 100; Psychology 180; Sociology 113, 116, 126.

Environmental: Anthropology 148; Biology 150; Conservation and Resources Studies 110, 115, 150, 151, 163, 169; Economics 125, 155, 156; 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 with the approval of a major adviser. Any course not officially approved by the Executive of the College of Letters and Science may be included in the major, e.g., courses in business administration, city and regional planning, conservation and resources 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 or Economics H195A-H195B and/or Sociology 100 (4.4). Honors 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

100. Classical Theories of Political Economy. (4) New course. Three hours of lecture and one hour of discussion per week. One-semester lecture course offered each semester. In-depth analysis of the classical political economy literature, including such authors as Locke, Smith, Marx, Mills, and Weber to Veblen and Polanyi. Strong emphasis is placed on providing appropriate background for understanding the evolution of the literature that has emanated from the various social science disciplines—political science, history, economics, sociology, and anthropology—which forms the basis for modern political economy literature. Course work upon the organization and utilization of political power and the production and distribution of scarce goods and services. Epstein

101. Contemporary Political Economic Theory. (4) New course. Three hours of lecture and one hour of discussion per week. Prerequisites: Upper division standing or consent of instructor. One-semester lecture course offered each semester. This course follows the study of classical political economy of PEIS 100 with an examination of contemporary applications of political economic theory. Abrams

102. Scope and Methods of Research in Political Economy. (4-4) Formerly 100A-100B. Three hours of lecture and one hour of discussion per week. One-semester seminar course offered each semester. Recommended prerequisite for all honors students. Introduction to research strategies for the collection, interpretation, and analysis of data. Course integrates the study of the fundamental theories of social science, with the practical techniques of social science research methods. (FSP) Matic

150. Advanced Study in Political Economy of Industrial Societies. (3) Course may be repeated for credit on topic change. One hour seminar per week. Prerequisites: Consent of instructor. An advanced study in political economy or related social sciences. Advanced multidisciplinary research in current issues of political
Political Science / 331

Political Science (College of Letters and Science)

Department Office: 210 Barrows Hall, 642-6323
Chair: Austin Ranney, Ph.D.

Professors:
Jyothindra Das Gupta, Ph.D.
Giuseppe Di Palma, Ph.D.
Lowell Dittmer, Ph.D.
A. James Drescher, Ph.D.
Ernst B. Haas, Ph.D. (Robson Research Professor of Governance)
Norman Jacobson, Ph.D.
Andrew C. James, Ph.D.
Thomson, Ph.D.
Robert A. Kagan, Ph.D.
Martin Landau, Ph.D.
Gail Lapidos, Ph.D.
Todd P. Levy, Ph.D.
Eugene C. Lee, Ph.D.
William K. Milliner, Ph.D.
Hanna Piltin, Ph.D.
D. Nelson, Ph.D.
Michael P. Rogen, Ph.D.
Carl G. Rosen, Ph.D.
Robert A. Scalapino, Ph.D. (Robson Research Professor of Governance)
Paul Seabury, Ph.D.
Kenneth N. Waltz, Ph.D.
Aaron B. Wilkisvsky, Ph.D.
Herold L. Wilesky, Ph.D.
Raymond E. Wistrich, Ph.D.
John Zysman, Ph.D.
Reinhard Bendix, Ph.D. (Emeritus)
Vitor Jones, Ph.D. (Emeritus)

Albert Lewin, Ph.D. (Emeritus)
Leslie Lipson, Ph.D. (Emeritus)
Herbert McClosky, Ph.D. (Emeritus)

Associate Professors:
Vinton K. Agawali, Ph.D.
George W. Breusler, Ph.D.
Jacob Catin, Ph.D.
David Collier, Ph.D.
Judith E. Gruber, Ph.D.
Karl D. Jackson, Ph.D.
David Leonard, Ph.D.
Robert M. Prist, Ph.D.
J. Merrill Shanks, Ph.D.
Peter W. Sperlich, Ph.D.
D. Paul Thomas, Ph.D.

Assistant Professors:
Steven Webber, Ph.D.

Acting Assistant Professor:
Laura L. Stoker, Ph.D.

Adjunct Professor:
Leo Rose, Ph.D.

The Major

The major in political science at Berkeley consists of a minimum of 12 courses for a total of 48 semester units. The lower division prerequisites are: (1) Political Science 1, 2, 3; and (2) two history courses, one in American history and one in Western European history or Western civilization. The history courses will be selected from the following list: American history: 7A, 7B, 17A, 17B, 121A, 121B, 122, 123, 124A, 124B, 130A, 130B, 131A, or 131B. European history: 4A, 4B, 5, 158A, 158B, 159C, 162A, 164A, 165A, or 165B; OR Undergraduate Interdisciplinary Studies (formerly Special Programs) 4AA, 44B, 44C, 44D, 55A or 55B.

The upper division requirements include seven upper division political science courses from those numbered 101-189. Effective fall 1969, students will be required to complete Political Science 1 and 2 plus two other lower division requirements before declaring the major. At press time for this catalog, the department was contemplating additional changes to the major. Students should consult the undergraduate assistant for up-to-date information.

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 in the students' last semester at Berkeley, and completed at least two upper division political science courses at Berkeley are eligible to apply for the honors program (H190A and H190B or H195A and H195B). Students generally are required to perform independent research or participate in an honors seminar and write a major paper or scholarly thesis. Departmental honors are awarded upon completion of the honors course, and a grade-point average of 3.0 or above in both the major and overall in the students' last semester at Berkeley. Enrollment in the honors courses requires the written approval of a sponsoring faculty member. Interested students should consult the undergraduate advisor for more information or an application.

Further Information.

Pamphlets describing the upper division political science courses and the honors program are available in the Undergraduate Office, 210B Barrows Hall. For specific information on field or area concentrations in political science, consult faculty members.

Graduate Program

Information about admission to the graduate program may be obtained from the departmental graduate office, 210B Barrows Hall.

Undergraduate Courses

Lower Division Courses

1. Introduction to American Politics. (4) Students who have taken Political Science 100 will receive no credit for 1. Three hours of lecture and one or two hours of discussion per week. An introductory analysis of 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 issues that all political systems face. The major and judge is to examine 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 science with an emphasis on quantification and measurement. (F,SP)

4. Introduction to Political Theory. (3) 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 pass/failed basis. Students who have taken quarter course PS 52 may not receive credit for PS 20. Three hours of lecture and one hour discussion/convference per week. Analysis of the execution, development, and formulation of current U.S. national security policy. Fundamental concepts of national interest, 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. Freshman Seminar. (4) May be taken on a pass/failed basis. Three hours of seminar and one hour of conference per week. Prerequisites: Consent of Instructor. Topics, experimental in nature, will vary from year to year. (F,SP)

98. Undergraduate Study of Selected Topics Which Vary Over Time. (1) Must be taken on a pass/failed basis. One hour of lecture per week. The instructor will work with an experienced writing workshop leader at the Student Learning Center, working with small groups of not more than 15 students. Each Political Science 98 section would have as its goal the development of writing competencies through group discussion of structured weekly writing assignments. (F,SP)

Upper Division Courses

100. American Institutions. (3) Students who have taken Political Science 1 will receive no credit for 100. Three hours of lecture per week. Prerequisites: Consent of Instructor. A survey of the operations of government, primarily at the national level. (For nonmajors) (SP)

American Politics

101. Labor, Professions, and Bureaucracy. (4) May be taken on a pass/failed basis. Two 1-hour lectures and one hour of discussion per week. Prerequisites: One lower division course in political science, economics, or sociology. The organization of work and the nature of work relationships in modern society. Special attention to labor force trends in the U.S.; the character of the service sector; structural determinants of occupational choice; the structure, functions, and power of labor unions, business enterprises, and professions; work reform movements and economic democracy. (F,SP)

102. The American Executive. (4) May be taken on a pass/failed basis. Students who have taken quarter course PS 102 may not receive credit for this course. Three hours of lecture and one hour of discussion per week. Analysis of principal institutions, functions, and problems of the presidency and the federal executive branch. Special attention will be given to topics of presidencial leadership, staffing, executive-legislative relations, and policy formation. Comparative reference to executive processes in other political systems. (F,SP)

103. Congress. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 1 or consent of instructor. Nomination and election, constituent re-
latures, the formal and informal structures of both houses, related to the executive branch, policy formation, and lobbying. (F,SP)

104. Political Parties. (4) May be taken on a passed/not passed basis. Students who have taken quarter course PS 104 may not receive credit for this course. Three hours of lecture per week. The institutional environment of American politics takes place. Concept and history of parties in the American political system, their nature and function, origin and development. Party organization and structure. State, national, and local party systems, and their variations. Nominations and elections. One directed research paper will be required. (F,SP)

105. The Politician. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 105 may not receive credit for this course. Three hours of lecture per week. The nature of politics, the education of politicians, the structure of ambition, and the ethical values of social behavior in the political world. Sessions with elected officials and party workers on their vocation. Directed field research. (F,SP)

106. Social Groups and Political Power. (4) Three hours of lecture and one hour of discussion per week. Private power and public policy; the nature and causes, strategy and tactics of group power within the context of the issues facing Business, agriculture, labor, the military, black protest, and other significant lords of power. Implications for democratic a society. (SP)

107A. The Policy Process. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 107A may not receive credit for this course. Three hours of lecture and one or two hours of discussion per week. How policy is made in the United States. How issues are placed on the political agenda, the role of legislatures, executives, courts, bureaucrats, interest groups, and parties in formulating public policies; policy implementation and policy evaluation. (F,SP)

107B. Public Policy Disciplines. (4) May be taken on a passed/not passed basis. Students who have taken 107B may not receive credit for this course. Three hours of lecture and one or two hours of discussion per week. History, principles, and impact of public policy in the United States in areas like education, social welfare, taxation, business regulation, racial discrimination, employment, environment, and consumer protection. Range of topics will vary. (F,SP)

108. Selected Topics in American Politics. (4) May be taken on a passed/not passed basis. Course may be repeated for credit. Three hours of lecture and one hour of discussion per week. For details see departmental announcements. (F,SP)

109. Women and Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 109 may not receive credit for this course. Three hours of lecture and one hour of discussion per week. Analysis of women in politics from a historical as well as theoretical perspective. This course will examine the strategy and tactics of women's political groups and the relationship between various stages of the women's movement and major political events. (F,SP)

110. Cal-in-the-Capital. (4) Formerly 191S. Must be taken on a passed/not passed basis. Students who have taken 191S may not receive credit for 110. Three hours of seminar and one hour of conference per week. Prerequisites: Limited to summer Cal-in-the-Capital interns. 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)

Political Theory

112A. History of Political Theory. (4) May be taken on a passed/not passed basis. Students who have taken 112A may not receive credit for 112A. Three hours of lecture, one hour of discussion, and one hour of conference per week. Prerequisites: 112B, History of Political Thought, including Plato, Aristotle, and St. Augustine. (F,SP)

112B. History of Political Theory. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 112B may not receive credit for 112B. Three hours of lecture, one hour of discussion, and one hour of conference per week. Early modern political thought up to the French Revolution, including Machiavelli, Hobbes, Locke, Rousseau, Burke, Utilitarianism, Marx, 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 Theorists and Their Theories. (4) May be taken on a passed/not passed basis. Three hours of lecture and one hour of discussion 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 115A may not receive credit for 115A-115B. Three hours of lecture and one hour of discussion per week. (F,SP)

A. The development of Marxist theory during Marx's lifetime.
B. The development of Marxist theory after Marx's death.

116. Selected Topics in Political Theory. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 116 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)

117. Political Theory in Nonwestern Societies. (4) Students who have taken quarter course 117 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. International Relations. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 118 may not receive credit for 118. Three hours of lecture and one hour of discussion per week. Comparative foreign policy. (F,SP)

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 120B. 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 120A. Three hours of lecture and one hour of discussion per week. Prerequisites: 120A. Theory of international relations. (F,SP)

121. International Organizations. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 121 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)

122. 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 122 may not receive credit for 123. 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)

123A. War and Politics in History. (4) May be taken on a passed/not passed basis. Students who have completed quarter course 123A may not receive credit for this course. Three hours of lecture and one hour of discussion per week. The nature and causes 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)

123B. Politics and Military Strategy. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 123B 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)

124. Science, Technology and International Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 124 may not receive credit for this course. Three hours of lecture and one hour of discussion per week. Econometric concepts in the study of international political behavior. Political concepts influencing the choice of economic policies. (F,SP)

125. American Foreign Policy. (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, implantation of advanced technologies, resource scarcities, 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 126A-126B. 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 concepts of the American national interest operative since World War I; Wilsonianism, isolationism, the Open Door, the Monroe Doctrine, and the Good Neighbor Policy; continentalism; the role of objective knowledge in the definition and solution of such international conflict issues as environmental degradation, implantation of advanced technologies, resource scarcities, and the type of institutions created to cope with these. (F,SP)

128A-128B. The American Role In Asia. (4,4) May be taken on a passed/not passed basis. Students who have taken quarter courses 128A-128B may not receive credit for these courses. 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)

129A. Soviet Foreign Policy. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 129A may not receive credit for this course. Three hours of lecture and one hour of discussion per week. The role played by the United States in East Asia from the 19th century to the present. Trends in U.S. policy, including evaluation of current policy alternatives in Japan, China, Korea, and Indochina. (F,SP)

129B. Soviet Foreign Policy. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 129B may not receive credit for this course. Three hours of lecture and one hour of discussion per week. The development of foreign policy in the Soviet Union: Foundations of Soviet foreign policy in West and East Europe, Middle East, and Third World. (F,SP)

129C. Communist International Relations. (4) May be taken on a passed/not passed basis. Students who
have taken quarter course 129C may not receive credit for this course. Three hours of lecture and one hour of discussion per week. The political and economic issues that characterize political science inquiry. The processes involved in theory generation in the social sciences; the discovery, communication, confirmation, and articulation of logical, empirical, normative truth claims. Research procedures in political science inquiry. (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 132A-132B. Three hours of lecture and one hour of discussion per week. Prerequisites: 132A is a prerequisite to 132B. Comprehensive 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. Meets basic methodological needs of all political and social 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. Topic to vary with instructor. (F,SP)

Comparative Politics

136A. Theory in Comparative Analysis. (4) May be taken on a passed/not passed basis. 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 macro-political theory. Students will vary with instructor. For details consult 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 140L may not receive credit for 136B. Three hours of lecture and one hour of discussion per week. The comparative method. Application of 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)

137A. Revolutionary Change. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 140J may not receive credit for 137A. Three hours of lecture and one hour of discussion per week. Theories of revolutionary violence, rebellion, and revolution, strategies of revolution, terrorism, sources of revolutionary action. (F,SP)

137B. Revolutionary Movements. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 140L may not receive credit for 137B. 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 and its influence on the rise of modern capitalism, industrial society and the post-industrial age. (F,SP)

137C. Intellectuals in Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 119 may not receive credit for 137C. Three hours of lecture and one hour of discussion per week. Intellectuals as a social group in the process of modernization and revolution. The role of intellectual 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)

138A. Modern Democracy. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 140G may not receive credit for 138A. Three hours of lecture and one hour of discussion per week. The development of the parliament, of equality before the law, the extension of suffrage, the emergence of mass parties and modern political parties. Special emphasis will be placed on the structure of politics as it has changed in the course of democratic development. (F,SP)

138B. The Industrial State. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 140D may not receive credit for 138B. Three hours of lecture and one hour of discussion per week. The evolution of the modern industrial state from its feudal origins. The emergence of the institutions that comprise the political economy of the industrial state, their relations and their impact on political and economic power. Particular attention will be paid to the role of the state in economic life. (F,SP)

138C. Comparison of Party Systems. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 191P may not receive credit for 138C. 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. The historical origins of parties and party systems, the main lines of cleavage in democratic politics, the substance and importance of ideologies, electoral systems and parliamentary arrangements, government coalitions, and the policy consequences of political parties. (F,SP)

138D. Comparative Political Economy. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 140E may not receive credit for 138D. Three hours of lecture and one hour of discussion per week. Prerequisites: 132D, Introduction to Political Economy. Comparative analysis of the political economy of modern societies. (F,SP)

139A. Development Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 140E or 140G may not receive credit for 139A. Three hours of lecture and one hour of discussion per week. Modernization, development, and political systems. Topic will vary with instructor. (F,SP)

139B. Development Politics. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 140A or 140B may not receive credit for 139B. Three hours of lecture and one hour of discussion per week. The structure and evolution of political systems; political leadership, political succession; political culture and politics, the role of experts and intellectuals. (F,SP)

140A. Authoritarian Government. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 140J may not receive credit for 140A. Three hours of lecture and one hour of discussion per week. Authoritarianism in traditional and revolutionary societies. Tensions between personal and institutional power, legitimacy and efficiency, political ends and bureaucratic means. (F,SP)

140B. Comparative Communism. (4) May be taken on a passed/not passed basis. Students who have taken quarter course 140J may not receive credit for 140B. Three hours of lecture and one hour of discussion per week. The formation and evolution of communist elites; organizational patterns; methods of economic modernization; political strategies of divide-and-rule; the role of ideological, economic and ethnic policy; political stability and the future. (F,SP)

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 141A. Three hours of lecture and one hour of discussion per week. Introduction to Soviet political history of the USSR from Lenin through Brezhnev. Emphasis on political elites and the nature of politics that have evolved over time. Law, economics, and society as related to government and politics. (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 141B. Three hours of lecture and one hour of discussion per week. Selected themes in contemporary Soviet internal affairs; the nature of the Brezhnev era; elites and functional groups; political leadership; politics as roles of economic and ethnic policy; political stability and the future. (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 the comparative dimensions of autocracy. (F,SP)

142A-142B. Northeast Asian Politics. (4,4) May be taken on a passed/not passed basis. Students who have taken quarter course 142A or 142B may not receive credit for 142A-142B. Three hours of lecture and one hour of discussion per week. Modernization, development, and political systems. Topic will vary with instructor. (F,SP)

143A-143B. Southeast Asian Politics. (4,4) May be taken on a passed/not passed basis. Students who have taken quarter course 143A or 143B may not receive credit for 143A-143B. Three hours of lecture and one hour of discussion per week. The structure and evolution of political institutions in China, Japan, and Korea. Emphasis upon such topics as nationalism, political modernization, and ideology. (F,SP)

143C. Southeast Asian Politics. (4) Students who have taken quarter course 143D may not receive credit for 143C. Three hours of lecture and one hour of discussion per week. The impact of cultural variables on political behavior. The effect on Southeast Asian politics of foreign influence, religious values, economic change, patron-client relations, and the psychological roots of colonialism. (F,SP)

143D. Policy Problems of Southeast Asia. (4) May be taken on a passed/not passed basis. Students who have...
have taken quarter course 143E may not receive credit for 143D. Three hours of lecture per week. Subject will vary with instructor. (F,SP)

145A-145B. South Asian Politics. (4,4) May be taken on a passed/not passed basis. Students who have taken quarter course 145A or 145B may not receive credit for 145A-145B. Three hours of lecture and one hour of discussion per week. The pursuit of economic development and change in the political systems of contemporary South Asia. (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. Introduction to African politics of sub-Saharan Africa. Focus on the relationship of politics to social and economic change. Emphasis is placed on the basic problems and challenges faced by the post-colonial states of the region, and on alternative strategies for dealing with them. Nation-building, political instability, neo-colonialism, and the roles among the specific topics that are discussed. (F,SP)

146B. 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 per week. In-depth analysis of contemporary African states, focusing on the formation of contemporary state structures and political systems, and the nature of current political processes and problems. Cases are chosen so as to highlight contrasting political processes in contemporary Africa. (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 institutions in the European continent from the Roman and medieval periods to the contemporary political processes and institutions. Basic characteristics of political processes in Latin America, Europe, and other world regions. (F,SP)

147B. Latin American Politics. (4;4) Two 1/2-hour lectures and one hour of discussion per week. Political processes and institutions of Latin American countries. (F,SP)

148A-148B. Latin American Politics. (4;4) Two 1/2-hour lectures and a 1-hour discussion per week. Political processes and institutions of Latin America, including the nature of the political systems in the region. Focus on the evolution of political systems and institutions in Latin America. (F,SP)

149. Selected Topics In Area Studies. (4) Course may be repeated for credit with permission of instructor. Three hours of lecture and one hour of discussion per week. The role of various levels of government. The place of the jury in the judicial and political system. A comparative analysis of decision-making processes. (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 1/2-hour lectures and one hour of discussion per week. The nature of the American legal system: the interaction of judges, lawyers, political officials, bureaucrats, press, and public. (F,SP)

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. (F,SP)

157A-157B. Constitutional Law of the United States. (4,4) Two 1/2-hour lectures and one hour of discussion per week. Fundamental principles of constitutional law. (F,SP)

158. Selected Topics in Public Law and Jurisprudence. (4) Two 1/2-hour lectures and one hour of discussion per week. Leading cases, causes, and consequences of legal decisions. (F,SP)

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, party offices, political violence, and influence on political behavior through examination of theories, findings, and significant studies in the field. (SP)

168A-168B. Seminar In Political Behavior. (4,4) May be taken on a passed/not passed basis. Three hours of lecture and one hour of discussion per week. Extreme belief, protest and violence, ideology socialization, political participation, recruitment to political activity and office. (SP)

171. California Politics. (4) Two 1/2-hour lectures and one hour of discussion per week. An inquiry into the political environment of the state—historical, economic, social, and governmental. Focus on government, parties, interest groups, and the policies resulting from the interaction of environment and institutions. (F)

175A. Urban and Metropolitan Government and Politics. (4) Two 1/2-hour lectures and one hour of discussion per week. An inquiry into the political environment of the state—historical, economic, social, and governmental. Focus on government, parties, interest groups, and the policies resulting from the interaction of environment and institutions. (F)

175B. Urban and Metropolitan Government and Politics. (4) Two 1/2-hour lectures and one hour of discussion per week. Metropolitan regions: 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 1/2-hour lectures and one hour of discussion per week. For details see departmental announcements. (F,SP)

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. (SP)

184A. 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)

186B. Political Psychology and Involvement. (4) Three hours of lecture and one hour of discussion per week. Extreme belief, protest and violence, ideology socialization, political participation, recruitment to political activity and office. (SP)

Sub-National Government and Politics

170. Comparative State Politics. (4) Two 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 government, including political institutions, parties, interest groups, and the determinants of policy outcomes. (SP)

171. California Politics. (4) Two 1/2-hour lectures and one hour of discussion per week. An inquiry into the political environment of the state—historical, economic, social, and governmental. Focus on government, parties, interest groups, and the policies resulting from the interaction of environment and institutions. (F)

175A. Urban and Metropolitan Government and Politics. (4) Two 1/2-hour lectures and one hour of discussion per week. Metropolitan regions: 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 1/2-hour lectures and one hour of discussion per week. For details see departmental announcements. (F,SP)

Public Organization, Administration, and Policy

181. Public Organization and Administration. (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. (F,SP)
Special Studies

H190A-H190B. Honors Seminars. (4-4) Four hours of seminar 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)

H192. Honors Seminar. (4) Three hours of lecture and one hour of conference per week. Honors seminar following, or in conjunction with, a regular lecture course. Open only to students who have taken, or are taking, the prerequisite 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)

Special Research Project. (1-4) Course may be repeated for credit. Regular individual meetings with faculty sponsor. Prerequisites: Consent of faculty sponsor and department chair. Designed to provide independent study of an advanced topic resulting in a substantial research paper. (F,SP)

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 specific aspects of political science in off-campus organizations. Regular individual meetings with faculty sponsor and written reports required. (F,SP)

Directed Group Study for Undergraduates. (1-3) Must be taken on a passed/not passed basis. By arrangement with faculty. Prerequisites: Course must be available either in the sequence or in conjunction with another course. Submission of study proposal by faculty sponsor to the department chair one month in advance of the semester to be offered. Group studies of selected topics which vary from year to year. (F,SP)

Graduate Courses

Specialized Independent Study and Research for Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Hours by arrangement with faculty. Enrollment is restricted by regulations listed on pages 87 and 88 of this catalog. Undergraduate assistant for political science will write on individual basis the required information. (F,SP)

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 development and international relations. The effect of economic development on political change. The effect of labor politics on national politics. (F,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 dependency. (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 interrelations between Communist systems with particular reference to institutional and ideological differences, pressures within 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, propose descriptive criteria, and examine practices of authoritarian systems, undertake comparative assessments, and compare attempts at theory construction dealing with such policies. 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 relations 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 of seminar per week. Analytical 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 passed/not passed basis. Students who have taken other courses in political development may not receive credit for this course. Three hours of seminar per week. Students from other disciplines are welcome. Comparative analysis on the politics of economic development. The theories and practices of economic development as applied in the case of the state and other organizations related to agricultural, industrial, and educational development and their implications for national autonomy, productivity, justice, and human capability. (F,SP)

209A. Comparative Political Economy. (4) Emphasis on three models of modern society—post-industrial, mass, and corporate—as they apply to countries labeled capitalist and socialist, pluralist, and totalitarian. The aim: to evaluate modernization theory and explore differences among developing countries. Special attention to stratification, the welfare state, mass media, role of intellectuals. (F)

209B. Comparative Public Policy. (4) Two hours of seminar and one hour conference per week. Comparing in policy processes between rich countries. Students will compare two or more nations similar in economic level but different in culture and politics to explore (a) the development or effects of the welfare state; (b) divergence in particular public policies (e.g., health, labor, the family, health, safety, the environment, the media); or (c) problems of political legitimacy and the fiscal crisis. (SP)

210. Selected Topics In Comparative Politics. (4) New course. Course may be repeated for credit 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)

Political Theory

213. American Political Theory. (4) Three hours of seminar per week. Prerequisites: 112A or consent of instructor. Basic problems of political theory will be examined in the context of American political development. (F)

214. Themes in Western Political Theory. (4) Course may be repeated for credit. Three hours of seminar per week. Themes to be specified by instructor. (F,SP)

216. Contemporary Theory and Political Science. (4) Three hours of seminar per week. Topics of the course will be varied, and include or in conjunction with, a regular lecture course. 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)

216A-216B. Colloquium in Political Theory. (4-4) Credit and grade to be awarded upon completion of the sequence. Three hours of seminar per week. An intensive examination of the nature 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. Forum for the presentation of original work in political theory. (F,SP)

International Relations

220A. Theories of International Relations. (4) Three hours of seminar per week. Prerequisites: Previous work in international relations. Origin, application, and utility of major concepts featured in the study of international relations. Relations of various strands of political and social theory to international relations. (F)

220B. Theories of International Relations. (4) Three hours of seminar per week. Prerequisites: 220A. The construction of theories in the field of international relations. (SP)

221. International Organization. (4) Three hours of seminar per week. Evolution of international institutions in response to changes in knowledge and international political conditions in fields such as science and technology, health, education, welfare, 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 of seminar per week. Prerequisites: 200 or 200A. Themes
in the theories 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 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)

226A-226B. International Political Economy. (4;4) Three hours of 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 arrangements designed to manage or regulate interstate actions relating to trade, money, resource use, technology, and the physical environment. (F)

227A. International Relations and Foreign Policy. (4) Three hours of seminar per week. Convergence and interaction among national 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 3-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; armament decision-making; arms control; the use of military force; and present and future problems of national security. The main emphasis is on the United States. (SP)

229A. Soviet Foreign Policy. (4) Three hours of seminar per week. Soviet perceptions, priorities, policy toward West and East Europe, Third World, the Sino-Soviet conflict. (F)

229B. Soviet-American Relations. (4) Three hours of seminar per week. The nature of the Cold War, and the factors that facilitated the rise of deterrence; character and causes 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 of 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 of seminar per week. Prerequisites: 130A-130B or Statistics 130A. Introductory course in the analysis of political data. (F,SP)

231B. Quantitative Analysis in Political Research. (4) Three hours of seminar per week. Prerequisites: 231A 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 of 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, hypotheses, research design, 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)

239. 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. The historical roots of Soviet Communism. The strains of industrialization and political development from the revolution through the Stalinist period. Cross reference to other national models of communism and revolutionary change. (F)

241B. Soviet Politics. (4) Three hours of seminar per week. Selected topics of 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 dilemma of liberalization, policy excesses and the character of contemporary Soviet policy-making: ethnic integration, social stratification and political stability. (SP)

241C. East European Politics. (4) Three hours of seminar per week. Prerequisites: 141C 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. (SP)

242. Topics in Middle East Politics. (4) May not receive credit after taking 242A or 242B under quarter system. Three hours of seminar per week. Prerequisites: 142A or 142B or consent of instructor. An advanced seminar designed to encourage the 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. A focus upon domestic and foreign policies of the PRC, developed from reading major recent works. Students will be required to present a seminar paper and to take an active role in class discussions. (F,SP)

243B. Japanese and Korean Domestic—Foreign Policies. (4) One 3-hour discussion per week. An emphasis upon the interaction between domestic and foreign policies of these two Northeast Asian nations. Each week will be devoted to the study of a recent monograph and the exploration of the broader issues raised in that work. A seminar paper and class discussions are required. (F,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)

244C. The Chinese Revolution. (4) Three hours of seminar per week. Advanced research on imperialism and nationalism in China down to the Communists' revolution in 1949. Topics include comparative study of revolutionary elites, the role of external powers, ideologies, and mass mobilization. (F)

244D. State and Economy in Japan. (4) Three hours of seminar per week. Research on the Japanese capitalist development and economic performance. Includes 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 future research 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; crisis states and proto-national states; ethnic states; oppression and restructuration; conflict and class formation; political order and development; modernization and equity; and the conflict and interstate 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 alternative explanations of the "German problem." Why was Germany involved in so much warfare in the transition from oligarchic rule to mass democracy? Why the Nazi revolution? Why Auschwitz? (F,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 dependency and imperialism, internal 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. Consent of instructor. For details see departmental announcement. Topic will vary with instructor. (F,SP)

Public Law and Jurisprudence

252. 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 responses to problems of legality, authority, policy choice, and the organization of enforcement and decision-making processes. Readings include empirical studies, judicial opinions, and 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 role of the jury member on 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. Topic will vary with instructor. (F,SP)

Political Behavior

261. Political Behavior. (4) Three hours of seminar per week. With focus on the study of political processes in political behavior through intensive examination of the theories, findings, proceedings of the most significant studies in the field. (F)
American Government and Politics

271A-271B. American Government. (4)(4) Credit and grade are given on a satisfactory/unsatisfactory basis. Three hours of seminar per week. Overview of the American political system. The system in comparative perspective. Social and demographic foundations of American government and politics. The American system in light of democratic theory. (F)


273. Urban Politics. (4) Three hours of seminar per week. Politics and policy making in American cities. Historical, economic, and social context of cities. Major urban political institutions, other levels of government in urban affairs. (SP)

275. Principles of Policy Analysis. (4) Three hours of seminar per week. Graduate level course. This course helps to make students familiar with the role of science research in policy making. (SP)

276. Federalism and Intergovernmental Relations. (4) Three hours of seminar per week. Class covers traditional and contemporary relations between the American federal system and the states. (SP)

279. Selected Topics in American Government. (4) Course is repeated for credit, subject to instructor's consent. Topics will vary with instructor. (F, SP)

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 character of administrative performance. (SP)

280C. Public Policy and Decision Making. (4) Three hours of seminar per week. The process of public policy formulation, analysis, and programming, and administrative decision-making. (F)

281A-281B. Budgeting. (4)(4) Three hours of seminar per week. Budgeting in diverse contexts—from ancient times, local, state, and national governments, to the private sector. Topics include budgeting theory, strategy, and methodology. (F)

282. Management Information Systems. (4) Three hours of seminar per week. Course deals with the use of information in policy design and implementation. Major issues will be considered in the context of organizational theory and policy analysis. (F, SP)

283. Bureaucratic Politics. (4) Three hours of seminar per week. The role of bureaucracies and bureaucrats in policy making, including consideration of individual incentives, inter-agency relations, bureaucratic-executive relations, bureaucratic-executive relations, and the problem of democratic control. (F)

287. Development Administration. (4) Three hours of seminar per week. The problems of administering complex programs in poor countries. The role of the development administrator and the importance of development policy. (F, SP)

289. Research Topics in Public Organization. (4) Course is repeated for credit, subject to instructor's consent. Content of course will vary with instructor. (F, SP)

Public Organization, Administration, and Policy

290. Dissertation Research. (4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Three hours of seminar per week. Prerequisites: Consent of Instructor. Topics, experimental in nature, will vary from year to year. (F, SP)

291. Experimental Course. (4) Course may be repeated for credit. Presentations by graduate students working on their dissertation. Open only to qualified graduate students advanced to candidacy. (F, SP)

295. Directed Dissertation Research. (4) Three hours of seminar per week. The problems of relating bureaucratic structures to peasant communities, and the relevance of organization theory to non-Western administration. (F)

296. Directed Dissertation Research. (4) Three hours of seminar per week. The problems of administering complex programs in poor countries. The role of the development administrator and the importance of development policy. (F, SP)

299. Independent Study In Preparation for the M.A. Essay. (4-8) 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)

302. 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. Open only to qualified students advanced to candidacy for the Ph.D. degree. (F, SP)

309. Thesis. (3) Open to qualified graduate students advanced to candidacy. Must be taken on a satisfactory/unsatisfactory basis. By arrangement with faculty. (F, SP)

398. Professional Preparation for Graduate Students. (3) Open only to qualified students advanced to candidacy. Must be taken on a satisfactory/unsatisfactory basis. By arrangement with faculty. (F, SP)

Interdepartmental Studies Courses

Related Courses offered 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. Strategic Management in the Public Sector. (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 Public and Nonprofit Management section of this catalog.

Population Studies (College of Letters and Science)

Office: Graduate Group in Demography, 2232 Piedmont Avenue, 842-9800

Advisors: Mr. Hammel, Mr. Wachtler, Mr. Lee.

The Group in Demography offers an undergraduate minor in the subject of population. The minor is open to all interested undergraduates at Berkeley. Please see the “Demography” listing in this catalog for a complete description of the minor. There is no undergraduate minor in population studies. A listing of the faculty and descriptions 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)

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 policy factors. (SP)

Lee


Wachtler

*Variable offerings.*

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Advisors: Mr. Hammel, Mr. Wachtler, Mr. Lee.

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Upper Division Courses

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Lee


Wachtler

*Variable offerings.*
Psychology
College of Letters and Science
Department Office: 3210 Tolman Hall, 642-5292
Chair: Ervin R. Hatter, Ph.D.

Professor:
Jack Block, Ph.D. Stanford University. Personality, personality development
Michael C. Bond, Ph.D. University of California. Behavioral, developmental, cognitive, social development
Kenneth H. Craik, Ph.D. University of California. Personality, social psychology
Russell L. Decolva, Ph.D. University of Michigan. Sensory physiology, color vision
Susan Envin-Tripp, Ph.D. University of Michigan. Psycholinguistics, child development
Karen K. DeValois, Ph.D. Indiana University. Vision, information processing and cognition
Robert W. Levenson, Ph.D. Vanderbilt University. Human psychophysiology
Mark O. P. Johns Hopkins University. Attachment, speech process, ethology
Dan L. Siegal, Ph.D. University of Pennsylvania. Social psychology
Kenneth J. Mendlsohn, Ph.D. University of Michigan. Personality theory and assessment
William M. Meredith, Ph.D. University of Washington. Measurement, test theory
Charlan J. Nemeth, Ph.D. Cornell University, Social psychology
Richard S. Lazarus, Ph.D. University of Pittsburgh. Stress, emotion, coping
Robert E. Postman, Ph.D. Harvard University. Personality development
Karen L. Black, Ph.D. University of California. Social, political behavior
Anne Treisman, D.Phil. University of Oxford. Human attention
John S. Watson, Ph.D. Cornell University, Development in infancy
Karen L. Black, Ph.D. Bowling Green University. Intellectual, educational psychology
Irving Zucker, Ph.D. University of Chicago. Animal biological clocks
Harrison G. Gough, Ph.D. Emeritus University of Michigan, Measurement
Rheem F. Jarell, Ph.D. Emeritus University of California. Statistics, experimental design
Catherine L. Leach, Ph.D. Emeritus University of California. 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
Berndt F. Ritchie, Ph.D. Emeritus
Mary L. Smith, Ph.D. Emeritus
Audrey D. Tuddenham, Ph.D. Emeritus University of California, Differential

Affiliated Professors:
Martin Banks, Ph.D. (Optometry)
Curst D. Harlow, Ph.D. (Education)
Ronnie R. Snowden, Ph.D. (Social Welfare)
Bob Turk, Ph.D. (Education)

Visiting Professor:
Alvin F. Zander, Ph.D. University of Michigan. Small group processes

Psychology represents an extremely broad discipline, ranging from the study of behavior of the simplest of organisms to the behavior of humans that are involved in complicated situations. The major attempts to give basic and well-rounded coverage of most of the main established fields of psychology. The areas covered include social, developmental, biological, comparative, differential, industrial, quantitative, clinical, and cognitive psychology, learning (human and animal), perception, personality, and psycholinguistics.

The fact that psychology is so diverse means, however, that all areas of study cannot be represented within the expertise or primary interest of a single faculty member. Therefore, the emphasis is upon empirical research and the theoretical analysis of fundamental aspects of animal and human behavior. Since students who are interested in any of these areas are exposed to introductory courses with emphases different from those present at Berkeley, prospective majors are strongly urged to examine closely our upper division course offerings to see if they are consonant with their interests and needs.

Counseling psychology, mental retardation, and humanistic psychology, for example, are not covered, and students interested in these fields should consider some other programs at Berkeley or at other campuses, colleges, or universities. For information concerning alternative programs, contact the Student Services Office, 3305 Tolman Hall.

The major serves three purposes: (1) For the liberal arts student, the study of psychology provides an avenue for the development of thought processes and insight into the behavior of others. The objective study of behavior is one of the major themes of intellectual history of the last hundred years. (2) For students preparing for training in such professions as medicine, law, education, and business, psychology provides important basic knowledge and principles. (3) For students planning on graduate work in psychology, the undergraduate major requires a sound foundation in the subject, mastery of the material, and preparation for further training in a variety of areas, the undergraduate program in psychology does not prepare for further training in its own major unit requirement. The primary goal of the major is to ensure that the student becomes aware of the diversity within the discipline and of the interrelationships among the different subareas of psychology. More specifically, the major consists of (1) a set of prerequisites, (2) six one-semester courses distributed over three areas, (3) a one-semester course in statistics and methodology, and (4) additional courses to bring the upper division courses to 28. Most students will begin requirements (2) and (3) in the junior year and will begin the requirement in either or both requirements during the sophomore year is encouraged in order to allow for flexibility in course scheduling in subsequent years. As many of the courses may be used to satisfy the requirements (2) will be more meaningful to students who have completed requirement (3), students should plan to take 101 early in the major.

Students will be admitted to the major upon completion of the prerequisite courses. The Major

Lower Division. Prerequisites may be taken on a N-P basis and must be completed with a "passed" grade or a letter grade of C- or higher. Prerequisite courses and their respective courses and options are listed below.

Psychology: Psychology 1

Biological Science: Two courses from the following: Biology 1A-1B, 11, 15, Integrative Biology 15-15.1, (formerly one course, Botany 10) if taken before or after Integrative Biology 30 (formerly Zoology 10); Molecular and Cell Biology 13 (formerly Molecular Biology 10); Molecular Biology 50 (formerly Physiological Chemistry 1); Molecular and Cell Biology 61 (formerly Physiology 10); Integrative Biology 30 (formerly Zoology 10); Molecular and Cell Biology 31 (formerly Zoology 13), or equivalent. Students should consult the department advisors for changes in these requirements resulting from the reorganization of the biological sciences.

Evolution: Two courses from Anthropology 1, 11, 15, Molecular and Cell Biology 41 (formerly Genetics 10), IDS 16, or, 17.

Social Science: Two courses from among the following: Anthropology 3, 17, Linguistics 5, Sociology 3.

Quantitative: Statistics 2 or Psychology 5. Upper Division.


Note: A few courses are listed as meeting requirements in more than one area. However, if a course is used to satisfy the requirement in one area, it cannot be used for another area.


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.

Note: Courses to be counted toward the completion of the upper division requirements may be taken on a passed or not passed basis except with the explicit approval of the major advisor.

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) a thesis of a high quality based upon independent study with a member of the Psychology Department staff, and marked by satisfactory completion of at least 3 units of course 199 or H198A-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. The number of fully qualified applicants always greatly exceeds the number admitted; therefore, the prospective applicant who has little or no background in psychology is advised to defer application until appropriate undergraduate course work has been completed.

Graduate Training Programs. The graduate program is designed for doctoral students interested in pursuing advanced study and conducting original research in psychology. New admissions are re-
stricted to candidates for the Ph.D. Students are accepted for the fall semester only. Detailed information concerning admission, financial aid, and degree requirements is given in a brochure available from the Admissions Office, Department of Psychology, University of California at Berkeley; Berkeley, CA 94720.

Graduate training is organized around seven major areas of study. Formal graduate training, including the selection and evaluation of students and the development and maintenance of training programs, is the primary responsibility of faculty members in the following areas: biological, clinical, cognitive, developmental, personality, quantitative, and social. The core of each training program is a set of pre- or seminar courses. These courses are designated as "decade" courses (i.e., 200, 210, 220, etc.) and are offered either yearly or every other year. They are intended to provide the core content necessary for a student to become an effective scholar and researcher in the area of specialization. Students are expected to affiliate themselves with one of the area programs and to complete the core sequence for that area. Depending upon the area, additional course requirements might consist of (1) courses on methodology, experimental design, and statistical analysis, (2) courses selected from other areas within or outside of the Psychology Department, (3) advanced courses and seminars in the area of specialization, and (4) independent study and research (299) when programs require a major research or theoretical paper by the end of the second year of graduate study. All students are required to serve at least two semesters as a graduate student instructor in one of the Ph.D. courses. The final requirements of all programs consist of the successful passing of the qualifying examination, taken usually during the third year, and the submission and approval of the dissertation.

General Psychology

Lower Division Courses

1. General Psychology. (3) Two 1-hour lectures and one 1-hour discussion per week. Introduction to the principal areas, problems, and concepts of psychology. (F,SP) Cowlinge, Staff

5. Introduction to Research and Data Analysis in Psychology. (3) Students who have completed a college level course in statistics will not receive credit for Psychology 5. Three 1-hour lectures and one 1-hour discussion per week. Prerequisites: Second-year high school algebra or consent of instructor. Primarily for majors. (SP) C. R. Keppel, Staff

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. (SP) (F,SP) Breedlove

39. Topical Seminars in Psychology. (3) Course may be repeated once for credit but not with the same instructor. Three 1-hour seminar meetings per week. Seminars in various fields of psychology designed to introduce beginning students to basic methods, concepts and issues 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. (SP) (F,SP) Main

45A. Freshman Seminars. (1) Must be taken on a pass/fail/no credit basis. One 2-hour seminar meeting per week. Prerequisites: Open to students in the psychology freshman 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,SP) Staff

*45B. Freshman Seminars. (1) Must be taken on a pass/fail/no credit basis. One 2-hour seminar meeting per week. Prerequisites: Open to students in the psychology freshman 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,SP) Staff

*105A. Test Theory. (3) Prerequisites: 104 recommended. (106C. Psychological Scaling. (3) Prerequisites: 104 or 105 recommended.

106E. Decision Making. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 101. This course focuses on empirical 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; and different empirical vi- rues and norms of decision making. (F) Kaheman

106F. Research Design and Analysis. (3) New course. May be repeated for credit. Three 1-hour lectures per week. Prerequisites: 101 or instructor's approval. An in-depth examination of research design in psychological experiments. A detailed consideration of within-subjects design, with special emphasis on the interpretation between research design and statistical analysis. (SP) Keppel

Biological Psychology

Upper Division Courses

110. Introduction to Biological Psychology. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 1 and biological prerequisites for the major or consent of instructor. Survey of behavioral and biological processes. Topics include sensory and perceptual processes, neural maturation, natural bases of motivation, learning. (F,SP) Leiman, Martinez

111. Sensory Processes: Vision. (3) Two 2-hour lectures per week. Prerequisites: 110 or consent of 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) K. DeVivo

111L. Laboratory in Vision. (2) Two 2-hour laboratories per week. Prerequisites: Concurrent 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) (F,SP) K. DeVivo

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 physiology of the auditory system. (SP) Staff

*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 or consent of instructor. Lectures cover a broad range of topics related to the psychology of the biological clock and the physiology of the auditory system. (SP) Staff

*114. Biological Learning and Neural Plasticity. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 110 or consent of instructor. Lectures cover a broad range of topics related to the psychology of learning, memory, and the physiology of the biological substrates of learning, memory and development. (SP) (F,SP) Rogerus

*115. Introduction to Comparative Psychology. (3) Students who have taken AP psychology may 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 behavioral development, reproduction, aggression, territoriality. (SP) (F,SP) Keppel

116. Hormones and Behavior. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 1

3On leave, spring, fall
4Recalled to active service
5Recipient of Distinguished Teaching Award Psycholog} / 339
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, biorythms and aggressive behavior.

117. Biological Psychology and Problems of Human Dysfunctions. (4) Two 1½-hour lectures and one hour of 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) Consent of instructor, especially regarding a non-repetition of a former topic and with consent of instructor. One 3-hour meeting per week. Prerequisites: Consent of instructor. For a precise schedule of courses check with the Student Services Office each semester. (SP) Zucker

119. Drugs and Behavior. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 110 or consent of instructor. A course surveying the basic principles of psychopharmacology. The major focus of the course is on the relationship between behavior and the physiological actions of drugs. Emphasis will be placed on effects of pharmacological agents on complex mental processes such as attention, motivation, learning, and memory.

120. Introduction to Cognitive Psychology. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: recommended but not required. Principle concepts and research concerning human processing of visual, auditory, and symbolic information; object recognition and classification; perception and comprehension of language; attention; theoretical model and experimental techniques in the study of imagery and other cognitive processes. (SP) Kahnehan, Treisman

121. Animal Cognition. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 1 and 5 or Statistic considerations 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 humans. Special emphasis on comparisons of cognitive approach processes; evolution of cognition. (SP) Riley

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

123. Concepts and Categories. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: Consent of instructor; 101 recommended. Theoretical concepts and empirical 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: Consent of instructor. Introduction to psycholinguistics, emphasizing effects of psychological variables on the learning and use of language, influence of language behavior on psychological processes; special attention to psychological variability of modern linguistic theory and to social psychological aspects of language behavior. (SP) Sobin

125. Second Language Learning and Bilingualism. (3) Two 1½-hour lectures and one 1-hour discussion per week. Prerequisites: Background in linguistics and psychology recommended. Process and structure in second language acquisition and types of language. Processing of linguistic information by bilinguals (perception, recall, translation); structure of bilingual discourse.

126. Perception. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: Consent of instructor. An introduction to principal theoretical constructs and experimental procedures in visual and auditory perception. Topics will include psychophysics, perception of color, space, shape, and motion, pattern recognition, and perceptual attention. (F) Palmer

127A. Human Problem Solving and Thinking. (3) Two 1½-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 1½-hour lectures per week. Prerequisites: 127A and consent of instructor. Survey of theories and research regarding the facilitation 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 implications of findings.

128. Topical Seminars in Cognitive 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 the Student Services Office each semester. (F,SP) Mellers, Rosch

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 one 3-hour laboratory per week. Prerequisites: Consent of instructor. For a precise schedule of offerings check with the Student Services Office each semester.

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 different models of psychological dysfunction, and community approaches to therapeutic and preventive intervention. Thematic focus of the course may change from year to year. See department notices for details. (F) Cowan

131. Minority Mental Health. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 130 or consent of instructor. Overview of concepts and research findings relevant to understanding and contributing to the solution of the mental health problems of ethnic minority communities.

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 a social psychological perspective, with particular concern for ecological, epidemiological and sociological factors. Critical examination of emerging methods of community intervention, including prevention.

133. 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: 130 or consent of instructor. For a precise schedule of offerings, check with the Student Services Office each semester. (F,SP) Levenson, Jones, Weinstein

Developmental Psychology

Upper Division Courses

140. Developmental Psychology. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 1. Survey of theory and research in developmental psychology with emphasis upon changes in behavior throughout the life span, including infancy, childhood, adolescence, and adulthood. (SP) Gopnik

141. Development During Infancy. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 130 or consent of instructor. An introductory course in psychological development, with a specific focus may be adopted for the course. Check with the Student Services Office each semester. (F) Watson

142. Cognitive 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 other domains.

143. Child Language Development. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 130 or consent of instructor. An introductory course in child language acquisition, perceptual, and social development during the first two years of life with emphasis upon methods of observation and experimentation. (F) Langer

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 other domains.

145. Developmental and Biological Processes in Attachment. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 110 or consent of the instructor. This course provides an integrating approach to the topic of human and subhuman attachment. Based on ethological and evolutionary perspectives, it moves through considerations of the effects of separation and loss in non-human primate 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 emphasized.

146. Topical Seminars in Developmental 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 the Student Services Office each semester. (SP)

147. Topical Laboratories in Developmental Psychology. (3) Course may be repeated for credit with a different topic and consent of instructor. Two 3-hour laboratory per week. Prerequisites: Consent of instructor. For a precise schedule of offerings, check with the Student Services Office each semester. (SP)
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 an evaluation of major theories and points of view. (F) Staff

151. Assessment of Personality. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: 150 and consent of instructor. Theoretical and methodological issues in the assessment of personality; observational procedures; the interview; problems of test interpretation and psychodiagnosis; demonstrations and exercises in the methods of personality assessment. (SP) Block, Craik

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 the clinical, field, and laboratory settings dealing with the psychological issues involved in adjustment to life stresses. (F,SP) Block

158. Topical Seminars in Personality. (3) Course may be repeated for credit with a different topic and consent of instructor. One-hour seminar per week. Prerequisites: 150 and consent of instructor. For a precise schedule of offerings check with the Student Services Office each semester. (F,SP) Staff

159. Laboratory in Personality Research. (3) One 2-hour lecture and one 3-hour laboratory per week. Prerequisites: 150 and 151; 151 strongly recommended. Students will design, conduct and write up studies of their own and will participate in the analysis and criticism of the studies of others in the course. (SP) Staff

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. (F) Maslach

161. Interpersonal Processes. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: 160 or consent of instructor. Social psychology theories and research methods in the area of small groups.

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 attitudes and attitude 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 psychology theories and research methods in the area of small groups.

165. Language in Social Interaction. (3) Three 1-hour lectures and one 1-hour discussion per week. Prerequisites: 160 or consent of instructor. Language and social psychology recommended. Variation in linguistic features, register, style, dialect and language in interaction, in relation to social features of participants and situation. Analysis of social functions of language, and strategic use to convey social meaning. (F) Ervin-Tripp

166. Socialization and Personality. (3) Three hours of lecture per week. Prerequisites: 1. Development and change in personality as a result of socialization in the family and in wider social relations from childhood through the middle years. (SP) Staff

168. 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 check with the Student Services Office each semester.

Differential Psychology

Upper Division Courses

171. Psychology of Abilities and Aptitudes. (3) Two 1.5-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 organizations. (F) 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,SP) Staff

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. 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. (SP) Staff

192. Psychology in an International Context. (3) One 2-hour lecture per week. Prerequisites: Psychology major and admission to the cluster program. Examination of the role and status of psychology in other countries, and cultural differences and trends in evolution of psychology. (F) Martinez

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) Staff

Psychology / 341

194. 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 the instructor. Group study of a selected topic or topics in psychology. Enrollment is restricted by regulations listed on pages 87 and 88 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 87 and 88 of this catalog. (F,SP) Staff

Graduate Courses

Graduate standing and the consent of the instructor are prerequisites for all graduate offerings. (Undergraduates may enroll only upon approval of a faculty advisor and consent of the instructor.) Courses beginning each decade are designated as prestigious and are designed to provide the background essential for a student planning to concentrate in that area of specialization. Proseminars are usually sufficient, generally, however, for students from other areas of psychology to obtain breadth of training in complementary areas of study. (Most proseminar courses are self-contained and may be taken separately. For most the seminars are for graduate students only.) (See instructor before enrollment.) Students from other departments must obtain permission to enroll in these courses since they are designed primarily for first and second year graduate students in psychology.

Quantitative Psychology

201A-201B. Cognition and Analysis of Psychological Experiments. (3,3) One 3-hour lecture per week. Design and statistical analysis of psychological experiments are examined from an intuitive and practical point of view. 201A may be taken by itself and considers the most common statistical tools found in psychology. 201B is a continuation of 201A and covers the design and analysis of more complicated experimental designs. (SP) Kappel

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 data analytic course that emphasizes design issues and problems, from pure experimental research to field studies. Techniques of ANOVA and multiple regression/correlation will be presented as analytical models, both lab and research.

208A. Modern Mental Test Theory. (3) Two 1-hour lectures per week. Prerequisites: 206A or Education 206A. Development of latent trait and item response theory by way of standard models such as the normal ogive, logistic, etc. Laslterfield's latent class models will also be discussed as will be special topics in this true theory. Tailored testing will be introduced. Either Education 206B, an equivalent course, or Psychology 208B will be offered in alternate years.

208C. Psychological Scaling. (3) Two 1-hour lectures per week. An introduction to the measurement of psychological value. Emphasis will be placed on psychophysical judgment. Topics will include Weber's Law, Fechner's Law, Thurstone scaling, signal detection theory, debates on the use of category ratings vs. magnitude estimations, the ratio-difference controversy, cross-modality matching, theories of contextual effects.

208F. Mathematical Psychology. (3) Two 1-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.

208G. Introduction to Linear Models. (3) Two 1-hour lectures per week. This course will be primarily concerned with correlation, regression, and related topics (e.g. analysis of covariance, trend functions, factor analysis and analysis of variance, problems in interpretation.) The course will also provide an introduction

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 87 and 88 of this catalog. (F,SP) Staff

Not offered 1989-90

On leave, spring

Recalled to active service

Recipient of Distinguished Teaching Award.
**Psychology**

209. Quantitative Seminar. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-1/2-hour lecture per week. Prerequisites: Graduates standing or consent of instructor. Reports and discussions of original research in the area of quantitative 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 quantitative graduate program. (F,SP) Staff

**Biological Psychology**

210A-210B. Graduate Survey of Biological Psychology. (4) One 2-hour lecture per week for 2 semesters. Prerequisites: Graduate standing or consent of instructor. Reviews and discussions of original research in the field of biological psychology. Both seminars are required for all graduate students in biological psychology. Other graduate students may take either or both seminars 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 behavior, including emphasis on the process of sexual differentiation. Discussions of parental behavior, seasonal reproduction and hormonal involvement in nonreproductive processes, including eating, social behavior, learning and memory. Emphasis on mammals. (F,SP) Martinez

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 circadian reproductive cycles. Discussion of chemical and natural bases for generation and entrainment of biological rhythms. (F,SP) Zucker

217. Drugs and Behavior. (3) One 3-hour lecture per week. Prerequisites: 210A-210B or consent of instructor. This course attempts to explain how drugs influence behavior. Principles of pharmacology, cytology of nerve cells, neurophysiological mechanisms and synaptic functions are emphasized. The anatomy, neurochemistry, and pharmacology of neurotransmitter systems are reviewed. The actions of drugs on psychopathological conditions will be studied. Finally, the course will focus on the effects of drugs on complex behaviors such as motivation, cognition, memory, and memory. Emphasis is on the behavioral basis. (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 biological basis 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 1-1/2-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 include memory structure, concept formation, concept organization, meaning, thought, and cross-cultural comparisons. (F,SP) Staff

220B. Proseminar: Conditioning and Discrimination Learning. (3) One 3-hour lecture per week. Classical and instrumental conditioning and discrimination learning, with emphasis on human and animal literature, but with emphasis on the animal work. (F,SP) Staff

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 materials. (F) Treiman

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 variables in convergent and divergent thinking, computer simulation, and the measurement and training of problem solving effectiveness. (F) Treiman

220E. Proseminar: Perception. (3) One 3-hour lecture per week. Principal theoretical constructs and experimental research in the area of perception. Topics will include psychophysics, perception of color, space, shape, and motion, pattern recognition, and perceptual attention. (F) Treiman

229. Cognitive Seminar. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Taken on a satisfactory/unsatisfactory basis. One 1 1/2-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) Treiman

**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) Treiman

231A. Clinical Psychophysiology. (3) One 3-hour lecture per week. The interaction between psychological and physiological processes, with particular emphasis on the interplay between psychophysiology and clinical psychology. Topics to be covered include structure, function and measurement of the autonomic nervous system; fundamental psychophysiological concepts and models; human emotion; stress; psychophysiological disorders; psychophysiological substrates of personality and psychopathology; social psychophysiology; and applied psychophysiology. (SP) Levenson

231B. Ego Psychology. (3) One 3-hour lecture per week. Examination of theory and research on ego structure and functions within the context of psychoanalytic thought. Both the self-system and executive functions will be studied in the writings of classical psychoanalysts, psychoanalytic ego psychologists, object-relations theorists, and psychoanalytic personality theorists. Emphasis will be placed on ego development, perception-cognition, and fantasy will be examined. (F) Levenson

231C. Assessment of the Child in the Family and School. (3) One 3-hour lecture per week. An introduction to the clinical method of assessing children in the context of their family and school settings. (F) Cowan

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) Levenson

231E. Expectations and the Prevention of School Failure. (3) One 3-hour lecture per week. Examination of the effects of teacher and school 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. (SP) Cowan

233A-233B. Laboratory in Clinical Assessment. (2:2) Credit and grade to be awarded upon completion of the sequence. One 2-hour discussion per week. Prerequisites: First-year status as graduate student in clinical psychology or consent of instructor. The clinical interview and principles of methods of behavioral, objective, and projective clinical assessment. Readings, discussion, and supervised experience in clinical assessment. Required of all clinical students. Credit and grade awarded upon completion of sequence. (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 discussed include traditional psychoanalytic, 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. (SP) Staff

234C. Theories of Community Intervention. (3) One 3-hour lecture per week. Examination of theory and research underlying such 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. (F) Weinstein

235. Clinical Research. (3) One 3-hour lecture per week. Theoretical and methodological issues 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. Consultation, program evaluation, program development, and prevention in community settings. (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. The teaching of supervisory skills for clinical and social intervention. (F,SP) Staff

237E. Clinical Decision Making. (1) Course may be repeated for credit. One 1-1/2-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

239. Clinical Seminar. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1-1/2-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) Weinstein

**Developmental Psychology**

240A. Proseminar: Early Cognitive Development. (3) One 3-hour lecture per week. Broad coverage of theory, methods, and research findings primarily 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 intelligence. (F) Watson

240B. Proseminar: Human Epistemology 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 relations will be emphasized. (F) Watson

*F* indicates fall term; *S* indicates spring term; *SP* indicates summer term.
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 personality development and early social behavior. Classical and contemporary theories will be emphasized (particularly parent-child relationships and peer influences) and relevant research findings reviewed. Research methods and methodological problems will be emphasized.

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 on the progressive construction of logical and physical concepts. Also relevant, development of aspects of symbolization, perception, and learning will be considered.

240E. Proseminar: Language Development. (3) One 3-hour lecture per week. Child language development within the theoretical and methodological framework of psycholinguistics. Review of phonological, grammatical, semantic, and sociolinguistic development, considered in relation to developmental models, with special attention to interaction between linguistic and cognitive development and to the development of language within communicative contexts. (SP) Stobin

249. Developmental Seminar. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1/3-hour meeting per week. Prerequisites: Graduate standing or consent of instructor. Reports and discussions of original research in the area of developmental 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 developmental psychology 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 having an interest in their field. Each week attention is directed to the work of a different faculty member associated with the personality program. Staff

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) issues of dispositionalism; (2) person by environment transactions; (3) observational assessment of persons, and (4) personality systematics; (5) personality development and concepts of structure, and (6) formulations of personality system-social system interrelations. (SP) Mundelsohn

250C. Perspectives in Personality: Stress and Coping Processes. (3) One 3-hour lecture per week. Explores the ways stress and coping processes affect health, functioning and morale as reflected in current models and research. Focuses on human psychological studies of coping and adaptation. Occasionally may deal with theories of affect and its links to cognition. (F) John

250D. Perspectives in Personality: Principles and Pragmatics of Personality Measurement. (3) One 3-hour lecture per week. Identification of personality measurement and assessment, with particular attention to the qualities, attributes, talents and dispositions considered in the everyday evaluations people make of self and others. (SP) John

251A-251B. Personality Assessment. (5.5) Three hours of lecture and three to five hours of laboratory per week. Prerequisites: Ph.D. candidate in personality psychology or consent of instructor. Lectures and laboratory work on personality assessment, including the historical and contemporary development and design of an assessment program, conducting an assessment, and case conferences, preparation of research reports, and methods of data analysis. (F,SP) Craik

259. Personality Seminar. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1/3-hour meeting per week. Prerequisites: Graduate standing and consent of instructor. Reports and discussions of original research in the area of personality 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 personality graduate program. (F,SP) Staff

Social Psychology

260A-260B. Proseminar Course in Social Psychology. (3-3) One 3-hour lecture per week. Extensive coverage of theoretical and research literature. Topics include history and systems, attitudes and attitude change, interpersonal processes, motivation, social interaction, small groups, and organizational behavior. Required course for all students in the social program. (F,SP) Staff

261. Research Methods in Social Psychology. (3) One 3-hour lecture per week. Survey of various research methodologies that have been developed for studying human social behavior, including experiments, quasi-experiments, self-report methods, and content analysis. Required course for all students in the social psychology graduate program.

269. Social Seminar. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1/3-hour meeting per week. Prerequisites: Graduate standing or consent of instructor. Reports and discussion of original research in the area of social psychology. Not all participants need report in any given semester, but all are expected to attend and to enter into the discussions. Required for all students in the social program. (F,SP) Staff

Special Course Offerings

290. Seminars. (2) Course may be repeated for credit. One 2-hour meeting per week. (F,SP) Staff

290A. Measurement. (2)

290B. Biological. (2)

290C. Comparative. (2)

290D. Learning. (2)

290E. Perception. (2)

290F. Thinking. (2)

290G. Language and Communication. (2)

290H. Developmental. (2)

290I. Personality. (2)

290J. Social. (2)

290K. Clinical. (2)

290M. Industrial. (2)

290O. Analysis of Variance Techniques. (2)

290P. Additional Seminars on Special Topics. To be Announced. (2)

290Q. Cognition. (2)

292. Survey of Department of Psychology. (2) Must be taken on a satisfactory/unsatisfactory basis. One 1/2-hour meeting per week. Prerequisites: Graduate standing or 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. (F,SP) Staff

IDS 232A-232B. Understanding Families: Methods in Family Research. (1) Course may be repeated for credit. Two-semester course with grade of in progress the first semester. Two hours of seminar every other week. Prerequisites: Consent of instructor. Course will focus on the relation between theory and method in understanding family structure and function. It will examine historical, cultural, and psychological perspectives on studying couples, parent-child relationships, and family systems as they change over time. Attention is given to processes within the family and to the connections between the family and other social institutions. Methods for understanding the role of the family in both normal and dysfunctional development will be evaluated. (F,SP) Stobin

IDS 236. Cognitive Science Research Discussion. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 1/2-hour meeting per week. Prerequisites: Students must be the cognitive science research assistant (R.A.) for one of the professors associated with the cognitive science program. The students will interchange on the cognitive science-related research that they are carrying on as R.A.'s with the aim of broadening both their experience and the scope of the research. The group, in addition, will discuss relevant selected readings. This course is required of all cognitive science R.A.'s. (F,SP) Staff

IDS 237A-237B. Cognitive Science Seminar. (1-1) Course may be repeated for credit. Must be taken on a passed/not passed or satisfactory/unsatisfactory basis. One 1/2-hour lecture and one 1/2-hour discussion per week. Prerequisites: Consent of instructor. Weekly presentations by local and visiting researchers on a range of topics in cognitive science, with ensuing discussion. Staff
IDS 206. Advanced Seminar in Public and Nonprofit Management. (3) Course may be repeated for credit. One 3-hour lecture and one 2-hour laboratory per week. Lectures and case presentations in neuropsychology. Discussion of problems 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. Recent developments in neuropsychological populations as opportunities for the study of cognitive functioning. Sponsoring departments: Education and Psychology.

Public and Nonprofit Management

Office: School of Library and Information Studies, South Hall, 642-1964
Coordinator: Nancy Van House, 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 clearinghouse 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, Public Policy, Social Welfare, and Regional Planning, Political Science, and Law.

A listing of the related courses is contained in the program's "Graduate Student's Guide to Courses," available from the School of Library and Information Studies, South Hall, University of California at Berkeley; Berkeley, CA 94720, 642-1454.

Graduate Courses

IDS 206. Advanced Seminar in Public and Nonprofit Management. (3) Course may be repeated for credit. Three hours of seminar per week. This seminar is designed for students who wish to explore advanced topics in the field of public and nonprofit management. Major conceptual, theoretical, and methodological issues are discussed in path-breaking articles. Prerequisites: high school biology and chemistry. This interdisciplinary course will single out specific topics in aging and Alzheimer's disease: high school biology and chemistry. This interdisciplinary course will single out specific topics in aging and Alzheimer's disease.


IDS 208. Public Management: Techniques of Management. (3) Two 1 1/2-hour lectures per week. Examination of methods, strategies, and requirements for effective public management in the public and nonprofit sectors. Particular emphasis on budgeting and financial administration. Techniques and considerations in defining missions, influencing behavior of outside organizations, securing and controlling resources, managing staff and operations, managing the political environment, and building organizational capacity.


IDS 210. Public Management: Organizational Understanding for Managers. (3) Two 1 1/2-hour seminar sessions per week. The applications of concepts from organization theory and behavior to enhance managers' understanding of public and nonprofit organizations. The role of manager in complex settings, authority relations and goal formulation, professional and conflict, technologies and organizational structure, problems of implementation, interorganizational relations and political environments. Case studies will be examined.

IDS 211. Public Management: Public Sector Accounting. (3) Three hours of lecture per week. Accounting principles and practices for managers of public and nonprofit organizations. Emphasis is on development of efficient systems which will provide both internal data for managers for analysis of past performance, control of current operations, and future planning, and data for accountability to external parties.

IDS 212. Public Management: Financial Management. (3) Three hours of lecture per week. Theory and practice of financial operations for managers of public and nonprofit organizations. Sources of financing, expenditure evaluation and control, policy issues and special topics.

IDS 214. Strategic Management in the Public Sector. (3) Three hours of seminar per week. Using case materials, students assume the roles of managers trying to solve organizational problems. Cases are drawn from a variety of policy areas. Middle and top management roles are emphasized.

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 required 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 studies management issues surrounding data processing, communications and office automation. Using case studies, it explores managerial strategies in planning, policy and organizational issues in the context of current and future technology. Sponsoring departments: Public and Nonprofit Management Program.

IDS 219. Financing Tools for Public Managers. (3) Three seminar sessions 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 managers. 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 managers. 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 managers.


IDS 221. Technology, Tasks, and Politics. (3) Three hours of seminar per week. The character, role and influence of the manager in public and nonprofit organizations. Analytical and interpersonal aspects. Authority, responsibility and control in policy making and administration. Performance and accountability measures. Coping with the external environment. Ethical dilemmas and current issues.

IDS 222. Introduction to Community Oriented Primary Care. (3) Three hours of lecture and three hours of laboratory. Prerequisites: Graduating 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 with specific examples. Visitors working in this area will present their current research. Students will be asked to work in teams to develop a COPC project proposal.

IDS 224. Preventive Medicine Residency Seminar. (1-4) Course may be repeated for credit. One 1 1/2-hour lecture per week. Prerequisites: Prior or concurrent enrollment in BEHS 100 or consent of instructor. This course will utilize both faculty and guest lecturers to examine the biomedical, psychosocial, and public policy aspects of the current epidemic of Acquired Immuno-Deficiency Syndrome. The virology, immunology, natural history, transmission, and comparisons with other 20th-century epidemics will be presented. Sociological, anthropological, psychological, and ethical issues will be discussed, as well as the legal implications. The response of local, state and federal governments will be reviewed and assessed, as well as the response of the broadcast and print media.

IDS 114A-114B. Advances in Aging: Alzheimer's Disease; Biological and Social Dimensions. (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.

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, 186, 199, 235, 296, 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
K. Environmental Health Sciences
L. Biostatistics
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 83.

Schoolwide Public Health Courses

Graduate Courses

282. Introduction to Community Oriented Primary Care. (3) Three hours of lecture and three hours of laboratory. Prerequisites: Graduating 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 with specific examples. Visitors working in this area will present their current research. Students will be asked to work in teams to develop a COPC project proposal.

288. An Overview of the AIDS Epidemic. (3) Course may be repeated for credit. Two 1 1/2-hour lectures per week. Prerequisites: Prior or concurrent enrollment in BEHS 100 or consent of instructor. This course will utilize both faculty and guest lecturers to examine the biomedical, psychosocial, and public policy aspects of the current epidemic of Acquired Immuno-Deficiency Syndrome. The virology, immunology, natural history, transmission, and comparisons with other 20th-century epidemics will be presented. Sociological, anthropological, psychological, and ethical issues will be discussed, as well as the legal implications. The response of local, state and federal governments will be reviewed and assessed, as well as the response of the broadcast and print media.

294. Preventive Medicine Residency Seminar. (1-4) Course may be repeated for credit. One 1 1/2-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 academic concepts in relation to practical issues in public health and professional practice in preventive medicine.

S. Forensic Science

Interschool Departmental Courses

IDS 114A-114B. Advances in Aging: Alzheimer's Disease; Biological and Social Dimensions. (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.

IDS 114A-114B. Advances in Aging: Alzheimer's Disease; Biological and Social Dimensions. (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.
Programs

For a description of programs in public policy, see page 84.

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 occupational policies, racial or gender inequalities 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. Contact Freshman Seminars Coordinator to register. (SP) Sinder

Note: Students interested in Public Policy 6 must talk to instructor prior to course registration.

10. Contemporary Policy Issues and Controversies. (3) One hour of lecture and 1 1/2 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 1/2-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 the 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 1/2-hours 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, and to ascertain how decisions are reached. This course is open to all students, and is not limited to majors. (SP) Curtis

*161. Policy on Inner-City Poverty and Unemployment. (3) Two 1 1/2-hours per week. Examines problems of inner-city poverty and unemployment by reviewing key perspectives 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 mix of local experiences and national perspectives, will be presented. (SP) Curtis

*162. Women's Rights and Public Policy, (3) Two 1 1/2-hours per week. This course will analyze key issues raised by the contemporary feminist movement and their impact on national and state policies. Policy areas to be covered include civil liberties and economic equity. (SP) Curtis

163. Strategies in Using Governmental Process. (3) Two 1 1/2-hours lectures per week. Examines the political and legal requirements and limits of a predominant reliance on different parts of the governmental process—executive, legislative, judicial, bureaucratic, media or special interest groups—in trying to influence current social-economic policy problems. Policy conflicts in such areas as warfare, abortion, childcare, two-tier wages, comparable worth, minimum wage, Iranage, and confirmation of Supreme Court justices will be examined. (SP) Curtis

164. Impact of Government Policies and Programs on Poor Children and Families. (3) Two 1 1/2-hours 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 1/2-hours per week. Deals with gender equity since suffrage. Examines correlations between compulsory conditions in the U.S. and the social institutions 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. (SP) Weinberg

166. Science and Technology Policy: Values in Conflict. (3) Three 1-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 several countries will be examined, as well as specific issues including nuclear technologies, the computer revolution, and biotechnology.

168. Political Communications and Public Policy. (3) Two 1 1/2-hours lectures per week. Prerequisites: Open to upper division undergraduate students with consent of instructors. Explores the interdependent relationships between the media and policy from two perspectives: the efforts of public officials to get their policies and policy messages across and the efforts of the media to interpret what government press relations offices, 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 both the primary reading and the focus of the major written assignment.

169. Contemporary Issues in the American Political Economy. (3) Two 1 1/2-hours per week. Prerequisites: Econ 1 or equivalent. Examines several major economic issues of the late 1970s and early 1980s: microeconomics; 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. The course will emphasize a non-technical understanding of the economic issues involved, as well as the historical and political background of these problems.

171. Educational Governance and Policymaking. (3) Two 1 1/2-hours lectures/discussion per week. Examines how educational policy gets made and who becomes involved in the enterprise. Case studies of such critical matters as education vouchers, desegregation, teacher collective bargaining and financing public schools are discussed. These case studies illustrate the elements of policy-making including interest group involvement, political economy, and collective action. (SP) Curtis

173. Acquired Immune Deficiency Syndrome (AIDS) and Public Policy. (3) Formerly 258. Three hours per week of seminar. Prerequisites: Upper division standing and consent of instructor. AIDS poses important and pressing challenges for formulating public policy. This course will focus on such topics as: Have policy responses been influenced by the fact that most victims belong to socially disadvantaged groups? What local initiative is most equitable and effective? What local public policies regarding education, public reaction, and administration of the AIDS antibodies test are most promising? How should

On leave, spring
Recalled to active service
Recipient of Distinguished Teaching Award
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. A critical review of differing schools of policy making with respect to various issues, e.g., consumer protection, energy and resources, mental health and safety regulation. (SP) Barchard

175. Making Legislative Policy. (3) One 3-hour lecture per week. Practical factors influencing governmental action in Sacramento. Effect of constituents, lobbyists, the media, the Administration, local government, and labor and management on legislation. Diverse policy topics include selected environmental and social issues, the current tax revolt and the budget process.

176. Current Issues in Public Policy Analysis. (3) Two 1.5-hour lectures per week. Prerequisites: Economics 1 or equivalent. A critical review of differing schools of policy making with respect to various issues, e.g., consumer protection, energy and resources, mental health and safety regulation. (SP) Barchard

177. Quantitative Approaches to Policy Analysis. (3) Two 1.5-hour lectures per week. Introduces students to various methods used in examining policy issues and discusses which methods are best suited for policy making. (3) Two 1.5-hour lectures per week. Prerequisites: Math 1A & 1B or equivalent, or consent of instructor. This course will cover (1) biotechnology: history and description of the industry, patent law, and patent races (the economics literature), regulation, ethical issues; (2) consider the role of analysis and the economic literature on whether market forces can be trusted to ensure efficient quality and safety, American regulation of product safety, and relevant liability law; and (3) consider the role of new waste: recent proposals to solve this problem, as well as the extent of the problem. (F) Scottcher

178. Public Policy-Making Issues in California: Applying Concepts. (3) One 3-hour lecture per week. This course examines public policy-making in California by applying concepts such as advocacy vs. analysis; incrementalist vs. pluralist decision making; leadership, and centralization/decentralization of structures in top areas of education, health, physical infrastructure and toxics. Budgetary, administrative, legislative and judicial aspects of policy-making are reviewed and assessed.

181. Energy Policy. (3) Two 1.5-hour lectures per week. Introduction to the economic analysis for America's energy problem, especially policy choices affecting energy demand and conservation, energy supply and exploitation of finite resources and environmental damages from energy production and use. Solar subsides, building and appliance efficiency standards, the strategic petroleum reserve, accelerated development of western coal, and other policies will be examined. (SP) Barchard

182. Political Skill in the Making of Public Policy. (3) Two 1.5-hour lectures per week. Strategic considerations in managing problems of policy design and advocacy. Special attention to countering the efforts of opponents, and to issues of timing. Analysis of these problems in the context of American legislative and bureaucratic structures. Focuses on professional and citizen activist roles.

183. Developing, Implementing, and Evaluating Social Policies and Programs. (3) Two 1.5-hour lectures per week. 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 political and bureaucratic environment of such policy advice. Advisers are facing an exponential growth in demands and challenges. How do political, economic, and institutional factors shape current approaches to environmental regulation? It introduces students to political, economic and administrative theories of regulation. Case studies of regulatory decisions permit students to apply theories to specific environmental problems, including air pollution, solid waste disposal, pesticide regulation, and power plants.

184. The Economics of Public Problem Solving. (3) Two 1-hour lectures and one hour of discussion per week. Prerequisites: Economics 100A or 101A or equivalent. Prerequisites: Economics 100A or 101A or equivalent. This course provides an overview of the economic applications of microeconomic theory as required for an understanding of 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) Friedman

185. An Introduction to the Politics of Policy Advising. (3) Two 1.5-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 political and bureaucratic environment of such policy advice. Advisers are facing an exponential growth in demands and challenges. How do political, economic, and institutional factors shape current approaches to environmental regulation? It introduces students to political, economic and administrative theories of regulation. Case studies of regulatory decisions permit students to apply theories to specific environmental problems, including air pollution, solid waste disposal, pesticide regulation, and power plants.

186. Equal Opportunity, Affirmative Action, and Public Policy. (3) Two 1.5-hour lectures per week. Examines the conflicts of 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 courts and of the political process in determining such policies will also be considered.

187. Legal Institutions and Public Policy. (3) Two 1.5-hour lectures per week. Legal institutions and public policy are increasingly resolved by the judiciary. Does judicial policy-making differ from policy making as carried out elsewhere in government? How has the involvement of the courts in issues of public policy changed the character of the judiciary? Are current issues intertwined law and policy to be discussed: abortion, preferred admissions and exclusionary zoning.

188. Policy Issues in Urban and Industrial America. (3) New course. Two 1.5-hour lectures. Prerequisites: Math 1A-1B or equivalent. This course is designed to provide an introduction to the major policy issues in urban and industrial America. The course will cover: (1) the role of government in the economy; (2) the role of government in public policy; (3) the effect of government on the economy; (4) the role of government in economic development; (5) the role of government in education; (6) the role of government in health care; (7) the role of government in the environment; (8) the role of government in the arts; and (9) the role of government in social welfare. (F) Scottcher

190. Directed Group Study. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor. Group study of a selected topic or topics in Public Policy. Meetings to be arranged.

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed 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 by regulations listed on pages 87 and 88 of this catalog. Staff

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) Credit and grade to be awarded upon completion of one of the sequence. Two 2-hour lectures/discussions per week for five weeks. Prerequisites: Open only to students in the Graduate School of Public Policy. This introductory course will integrate various social science disciplines and apply these perspectives to problems of public policy. Throughout the academic term, students will be in a better position to assess the likely effectiveness of their advising. (F) Scottcher

205. Political and Organizational Environment of Policy Analysis. (3) One 2-hour seminar and one hour of conference per week. Prerequisites: Business Administration 101B or Economics 200A or equivalent, and consent of instructor. Research seminar to develop public policy analyses based on microeconomic theory of organizations, including collective demand mechanisms, behavioral theory of regulatory agencies and bureaucracies, and productivity in the public sector. (F) Friedman

220. Law and Public Policy. (4) Two 2-hour lectures/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 draftsmanship are developed. Relationships among law-making agencies and between public policy and the courts are explored through case-centered studies. (F) Train, Friedman

230A-230B. 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 will examine public policy and political organizations involved in developing new policies, choosing among alternative courses of action, gaining acceptance, ensuring implementation, and coping with unanticipated consequences. Materials will include case studies, theoretical, empirical, and interpretive works from several disciplines. (F,SP) Ahern, McDuffie

240A-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 quantitative techniques and models of public policy analysis: computer modeling and simulation, linear programming, and optimization, decision theory, and statistical and econometric analysis of policy-relevant data. The student develops a facility in displaying the policy relevance of numbers through an analysis of case studies and statistical data sets. (F,SP) McGuire, Quigley

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 applying political and organizational factors to the analysis of public policy. Attention is given, especially in 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. (SP) Friedman

251. Microeconomic Organization and Public Policy Analysis. (3) One 2-hour seminar and one hour of conference per week. Examination of the political environment surrounding policy advising and the application of analytical information to policy making. By exploring the interactions of clients and advisors, engineers, planners, policy analysts, and other professionals, we will be in a better position to assess the likely effectiveness of their advising. (F) Scottcher

*253. Methods of Policy Evaluation. (3) One 3-hour seminar per week. Prerequisites: Consent of instructor. This course covers several different methods of evaluating public programs and policies. It will cover the descriptive issues of whether programs have their intended effects; including both process evaluations and impact evaluation, concentrating on different evaluation methodologies. The second part of the course will consider normative approaches, especially cost-benefit analysis as the core course will also examine the political influence of evaluation results.

254. Organizational Analysis and Public Policy. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. This course examines the structure and organization of public policy and as influences upon the definition of policy problems. A variety of theoretical perspectives and case studies are explored. Specific consideration is devoted to organizational effectiveness and problems of organizational design and reorganization.
255. Advanced Quantitative Models in Policy Analysis. (3) One 3-hour meeting 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. Students will choose substantive issues for individual research and analysis. (F) McCuir

256. The Public Policy of Economic Stabilization and Growth. (3) One 3-hour session per week. Prerequisites: Consent of instructor. Application of economic modes (supply-sider economics, neo-Keynesian economics, and monetarism) to various policy issues: stimulating economic growth through tax cuts; increasing 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

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 countering them. (F)

258. The Elusive Pursuit of Toxics Management. (3) New Course. One 3-hour seminar per week. This seminar addresses the complicated governmental and public responses to evolving toxics issues, from Love Canal and Bhopal to the present. Case studies illustrate changing conceptual and programmatic models, including the evolution from narrow program-specific approaches to more complicated efforts to construct broad regulatory frameworks: interfering federal, state, and local laws; constructing public-private partnerships to balance conflicting interests; and balancing technical, economic and political factors. (SP)

259. 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 analyzes in depth some important applied aspects such as endogenous prices of other commodities, methods to infer willingness to pay, valuation of life, uncertainty, and the role of discounting. (F)

260. Policy in Higher Education. (3) One 3-hour seminar per week. This seminar will explore the current problems and issues of the public policy areas of education and the role of government. Topics include the history and structure of higher education, its political context, finance, functions and politics. (SP)

261. California Energy and Coastal Protection Policy Analyses. (3) One 3-hour seminar per week. This course explores the role of ideologies, the professions, the decision-making process, and analysis in decisions of the California Public Utilities Commission and Coastal Commission. Participants will familiarize students with the agencies and will use analytical and management techniques involving, for example, costs of nuclear power plants, offshore oil drilling, non-utility electricity generation, and the regulation of natural and telecommunications services.

262. 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 given to the problems and efforts that are being made or might be made by public and private agencies to deal with these problems in the U.S. and abroad.

263. Health Policy in the Public and Private Sectors. (3) One 3-hour session per week. Prerequisites: A course in micro-economic theory or health economics. An examination of the government policy in health and the role of the private sector, particularly the health care industry, insurance, and profit and nonprofit health care institutions, and the adequacy of the supply of health care professionals.

264. Constitutional Law and Limits of Power. (3) New course. Three hours of seminar per week. How can government best enable individuals to achieve their goals? What is the balance of power between the three branches of government (executive, legislative, and judicial) and between federal and state government? What is the relationship of executive power and the fate of bureaucracy, special interests and media? A study of constitutional law and selected problems. Internships in government or nonprofits offered.

265. Environmental Policy and Regulation. (3) One 3-hour seminar per week. Examination of diverse regulatory policies for enhancing environmental quality, from the viewpoint of both environmental economics and effective policy implementation. Special consideration given to public choice issues raised in environmental regulatory processes and the development of adversarial litigation, such as the mediation of environmental disputes. Specific issues, such as air pollution, hazardous waste disposal, and waste facility siting, are considered.

266. 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 cancer-causing chemicals, toxic waste, and recombinant DNA.

267. Law and Social Change. (3) One 3-hour seminar per week. Prerequisites: Limited to graduates or those undertaking a JD or JD/MPA. 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 translating, implementing, and thwarting policy decisions. Specific topics to be covered will change from year to year: e.g., discretion, compliance, and the law and procedures affecting behavior; and the role of individual and collective behavior. What role do norms and moral judgments play? Discussions and papers will link seminal readings to concrete policy issues. (F) McCann

270. Program Tasks and Political Environments in State Licensing Agencies. (3) One 3-hour seminar per week. Prerequisites: Consent of instructor. Government licenses issue licenses for a wide range of activities. This course examines licensing regulation and dynamics that are similar across programs, despite the many disparities of program 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.

271. Moral Issues in Public Policy. (3) One 3-hour seminar per week. Focuses on the social and organizational sources of moral issues and on moral dilemmas arising in the implementation of public policies rather than on logical and philosophical analyses of ethical positions. Problems and illustrations will be drawn from a variety of policy areas and professions.

272. Gender Policy. (3) One 3-hour seminar per week. Prerequisites: Consent of instructor. Enables participants to explore 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, education, contraception, and abortion. Will draw on the experiences of other international societies, including the U.S.S.R. Alternate analytical 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 attention to the concept of self-interest as a basis for social cooperation.

276. Economic Analysis and Public Policy. (1-3) It will be possible for students to take modules of five or ten weeks on selected topics and to receive appropriate course credit. One 3-hour lectures per week. Prerequisites: Economics 252A or consent of instructor. A consideration of selected topics in the economic analysis of urban areas and the relationship of analysis to urban policy. Topics covered may include urban public finance, analysis of housing, transportation, environmental policies, public and private agencies in service delivery, and welfare, etc. This course will be offered in modules providing 1 or 2 units of graduate credit, in addition to the more conventional units. (Quigley)

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 questions. How does one position oneself in relation to the problems being analyzed? How does one choose among the competing kinds of data?—and competing models of individual and collective behavior? What role do normative judgments play? Discussions and papers will link seminal readings to concrete policy issues. (F)

278. Organizational Decline and Cutback Management. (3) One 3-hour meeting per week. An examination of how organizations behave when faced with resource cutbacks. Differences in the response of public and private organizations to the same type of reduction in resources is an important issue. 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 exempt sector, local government, and local municipalities during the fiscal crisis of 1974-76 and the behavior of local governments in California following the passage of Proposition 13.

279. Financial Innovation and Public Policy. (3) One 3-hour seminar per week. Examination of the impact of public policy on the national 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, political pressure and credit rationing funds, and other areas of public intervention in the allocation of capital.

280. Seminar in Energy Policy. (3) One 3-hour seminar per week. Prerequisites: Economics 100A or equivalent and consent of instructor. The nature of energy policy. The theory of economic policy 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. The energy problem in perspective. How can government resolve social problems and reserve power? Examines institutional law and selected problems. Internships in private organizations to fiscal stress will be analyzed. Specific issues, such as air pollution, hazardous waste disposal, and waste facility siting, are considered.

281. The Uses and Abuses of Social Science in Social Policy Making. (3) One 3-hour seminar per week. Examines applications of social science research in social policy making by government through case materials in the field of social policy. Topics include the research and policy making and the dissemination and application of research findings will be emphasized. Examples of relevant case materials (the choice will depend on student interests) are the supported work experiment, the negative income tax experiments, 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. Open to students wishing to pursue special study and research under direction of a member of the staff. (F,SP) Staff

283. Supervised Research Colloquium. (1-9) Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: graduate standing. Open to qualified graduate students, either full-time or part-time with the approval of a member of the staff. Discussion and analysis of dissertation research projects, including conceptual and methodological problems of designing and conducting policy research.

284. Ph.D. Seminar. (2) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 3-hour seminar per week. Prerequisites: Must be third-year or beyond Ph.D. student in Public Policy. Discussion and analysis of dissertation research projects, including conceptual and methodological issues.
problems of designing and conducting public policy re-
search. (F,SP)
Barbach

298. Directed Advanced Study. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Open to graduating students wishing to pursue special study and research under the direction of a member of the staff. (F,SP) Staff

299. Independent Study in Preparation for the Master's Essay. (3) Credit to be awarded upon completion of the Master's essay. Prerequisites: Consent of faculty. By arrangement with faculty. Open only to qualified second-year graduate students working toward the M.P.P. degree. (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 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 re-
requirements for the doctoral degree. (F,SP) Staff Related Courses in the Program in Public and Nonprofit Management

IDS 205. 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. Strategic Management in the Public Sector. (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 Professionalism in Organizations. (3)

For information about these and other courses related to this program, see the section on Public and Nonprofit Management.

Range Management
(College of Natural Resources, Interdepartmental Graduate Groups)

Office: 145 Mulford Hall, 642-3765
Professors:
Herbert G. Baker, Ph.D. (Botany)
David L. Emanuel, Ph.D. (Forestry and Resource Management)
Sally K. Ferris, Ph.D. (Conservation and Resource Studies, Agricultural and Resource Economics, Landscape Architecture)
Robert E. Martin, Ph.D. (Forestry and Resource Management)
Joe R. McRorie, Ph.D. (Forestry and Resource Management)
Date R. McCullough, Ph.D. (Forestry and Resource Management)
James J. Parsons, Ph.D. (Ecology)
Dennis E. Teeguarden, Ph.D. (Forestry and Resource Management)
Halef F. Headley, Ph.D. (Emeritus) (Forestry and Resource Management)
Edward C. Stone, Ph.D. (Emeritus) (Forestry and Resource Management)
Herbert F. Vaux, Ph.D. (Emeritus) (Forestry and Resource Management)
John L. Ziemer, Ph.D. (Emeritus) (Forestry and Resource Management)

Associate Professors:
Reginald H. Barrett, Ph.D. (Forestry and Resource Management)
James W. Bartolome, Ph.D. (Forestry and Resource Management)
Louise F. Portmann, Ph.D. (Forestry and Resource Management)
Jeffrey M. Romm, Ph.D. (Forestry and Resource Management)

Assistant Professor:
Barbara H. Allen, Ph.D. (Forestry and Resource Management)

Graduate Advisor: James W. Bartolome.
This program is administered by an interdepartmental group consisting of faculty members from the Department of Range Management and related departments at the Berkeley campus. The program is designed to enable students with a B.S. degree in range management, forestry, or in related disciplines to obtain advanced work in this field. Graduate study leads to the Master of Science degree and serves students with advanced professional interests as well as those wishing to specialize in a specific aspect of range management, such as grass or brushland ecology, forage in relation to livestock or wildlife management, or rangeland vegetation manipulation. Excellent laboratory and field facilities include several experimental range properties and large acreages of wildland ranges that are easily accessible from Berkeley. The staff is actively involved in both the theoretical and practical research.

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. Strategic Management in the Public Sector. (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 Professionalism in Organizations. (3)

Religious Studies
(College of Letters and Science)

Group Major Office: Undergraduate Interdisciplinary Studies (Division of Undergraduate Studies), 301 Campbell Hall, 642-2628

Advisory Committee: Robert Bellah (Sociology), William Bouwsma (History), William Brinner (Near Eastern Studies), Hubert Dreyfus (Philosophy), Suzanne Elm (History), Linda Hass (South-Southeast Asia Studies), Mark Juengensmeyer (Religious Studies), Anne Kilmer (Near Eastern Studies), Lewis Lancaster (Oriental Languages), William Simmons (Anthropology).

Adjunct Professor:
Mark Juengensmeyer (Coordinator).

Group Major in Religious Studies

The religious studies major provides opportunities for securing a broad background in the religious arts while at the same time allowing for a focus on a thematic concern or a particular religious tradition. It views religion from a global perspective and combines aspects of the humanities and the social sciences.

The major is open to anyone interested in the symbolic and mythic dimensions of world cultures, the ethical aspects of human societies, and existential issues. It is not restricted to those who have a religious background or are pursuing a religious vocation. Members of the major will be challenged to view religion multiculturally and from critical as well as appreciative perspectives.

Graduates in the program have gone on to careers in law, journalism, medicine, international business, counseling, and religious vocations. Others have entered graduate schools in history, sociology, anthropology, international policy, and religious studies.

The program requires both a general understanding of the study of religion as well as a particular emphasis on one specific tradition or thematic concern. The general requirement involves courses that present the methodological approaches to the study of religion such as sociology of religion and psychology of religion and courses that examine thematic issues and cross-cultural phenomena such as myth, ritual, transference, and comparative ethics. The religious traditions that may be included as major fields of emphasis or as supplementary courses include the Jewish, Islamic, Christian, Hindu, and Buddhist traditions, as well as the religious cultures of China, Japan, Africa, and Native American communities.

Most of the courses available for the program are, of course, religious studies courses taught within such departments as history, sociology, and near eastern studies. As a supplement to these courses, the program 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 religious traditions, and the other of which introduces the study of religious phenomena thematically).

A limited number of courses taught at the nearby Graduate Theological Union may be taken by Berkeley students. Berkeley credit will be given for these courses, and the courses will appear on students' Berkeley transcripts. Students are expected to study the history of Christianity, Jewish studies, religious ethics, and other topics. A list of GTU courses approved for cross-registration and a description of the registration procedure may be found in the group major office.

The group major in religious studies is administered through the Division of Undergraduate Studies. Students are referred to that office for study list filing and other administrative matters.

Lower Division Requirement: Religious Studies 90A-90B, Introduction to the Study of Religion (4,4), to be taken before selecting a field of emphasis.

Upper Division Requirement: Two methodological courses from the following: Anthropology 158B (Religion and Anthropology), Philosophy 126 (Philosophy 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 165 (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 religion 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).

Fields of Emphasis: The field may be any cross-cultural theme (such as the study of ritual, myth, or ethics) in which three courses are available, a cultural period (such as the religious interactions of medieval Europe or modern Asia), or the study of a single religious tradition (such as Christianity or Buddhism).

Courses available in religious traditions include the following:


Christianity: Religious Studies 120A, or History 185A, Religious Studies 120B or History 156A, History
Rhetoric
(College of Letters and Science)

Department Office: 2125 Dwinelle Hall, 642-1415

Professors:
Robert L. Belbo, Ph.D. Northwestern University. Proseody, modern poetry.
Seungho B. Chongsuk, Ph.D. University of Michigan. Creative writing, poetry.
Vivian N. Choung, Ph.D. University of California. Poetry, translation.
Mark S. Quinn, Ph.D. Princeton University. Nonfiction prose, historical narrative.
Jane C. Richardson, Ph.D. University of California. Historical narrative.
Janet L. Richmond, Ph.D. University of California. Historical narrative.
Barbara Shapiro, Ph.D. University of California. Early modern rhetoric.
Leo Thomas, Ph.D. Northwestern University. Renaissance literature, humanist rhetoric.
William J. Brandt, Ph.D. Emeritus University of California. Law, philosophy, social theory.
Garth B. Wilson, Ph.D. Emeritus Cornell University. Law, philosophy, social theory.

Associate Professors:
David Cohen, Ph.D. Cambridge University. J.U.D. of California. Law, philosophy, social theory.
Bridget Connolly, Ph.D. University of California. Oral interpretation, oral literature.
Laurent Mayral, Docteur d'Etat en droit, habilitation.
L'Universite de Montpellier I. Classical rhetoric, Roman law.
Daniel F. Melia, Ph.D. Harvard University. Oral literature, Celtic folklore.

Assistant Professors:
Catherine C. Cottrell, Ph.D. University of California. Law, philosophy, social theory.
Frederick Dolan, Ph.D. Princeton University. Political discourse, social and literary theory.

Lecturers:

Major Advisers: Check with department office.
Graduate Adviser: Mr. Dolan.

Rhetoric is the study of 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 the audience; through some form of discourse. Modern rhetoric adapts classical theories of persuasion to all forms of discourse, and is also concerned with the extension and development of rhetorical theory itself.

The aims of the department's undergraduate program is to educate students who are sophistcated 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, and who can acquire relevant 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; fictive discourse; argumentative and expository 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 expose students to 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, 146, 165, 166, 168, 171, 177.

II. Fictive Discourse. These courses examine the ways in which modes such as lyric poetry, the novel, and film achieve their special impact on audiences. Rhetoric 102, 121B, 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, religious, etc.: Rhetoric 110, 130, 131, 150, 152, 153, 154, 155, 157, 158, 160, 161, 167, 170, 172, 173, 175.

Rhetoric 1A-1B (or 10), and 30 are prerequisite to all upper division courses unless otherwise specified. A grade of C- or better in all 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 H190 may be adopted 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.

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 beginning 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 including theory of rhetoric, the departmental honors the student must complete 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). Opportunities are available for M.A. and Ph.D. candidates to serve as graduate student instructors in the department. During each semester in which students are employed as graduate student instructors, they are required to enroll in Rhetoric 300, Problems in Teaching Rhetoric. Individual programs for all graduate students are carefully planned in conference 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: Rhetoric 1A-1B, 10, 30 or 32; Rhetoric 100 and four upper division electives from courses numbered between 101 and 177.

A. Introduction to Language and the Craft of Writing. (3) Three hours lecture per week. Survey of various topics or problems in the study of language. (F,SP)

1H59A-1H59B. Honors Course. (3,3) Independent study. Course may take one or two semesters at 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. (F,SP)

198. Directed Group Study. (1-4) Course may be repeated for credit. Must be taken on a pass/failed basis. Independent study. (F,SP)

199. Supervised Independent Study. (1-4) Course may be repeated for credit. Must be taken on a pass/failed basis. Independent study. (F,SP)

200. The Craft of Writing. (3) Three 1-hour lecture and discussion meetings per week plus individual conferences. Prerequisites: Subject A or examination: Rhetoric 1A-1B, 10, 30 or 32; Rhetoric 100 and four upper division electives from courses numbered between 101 and 177.

205. Contemporary Rhetorical Criticism. Opportunities are available for M.A. and Ph.D. candidates to serve as graduate student instructors in the department. During each semester in which students are employed as graduate student instructors, they are required to enroll in Rhetoric 300, Problems in Teaching Rhetoric. Individual programs for all graduate students are carefully planned in conference with the graduate adviser.

Upper Division Courses

115. Mysticism. (3) Three hours lecture per week. Studies in the literature and piety of various mystical traditions, including readings of scripture, lyrical poetry, spiritual discourse, autobiography, etc. The relationship of several forms of mysticism to their religious traditions will be explored. (SP, Staff)

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 transcendent and historic elements of several early religious concepts; traditions about Jesus; political and religious eschatology; Paul and his interpreters. (F,SP)

120B. Origins of Christianity. (4) Two hours of lecture and two hours of seminar per week. Varies of Early Christianity. Conflicts of interpretation of both Old Testament and Christian message; Marcion; the Gnostics; virginity; martyrdom; radical prophecy; the idea of heresy. (SP)

190. Topics in the Study of Religion. (3) Course may be repeated for credit. Three hours lecture per week. Survey of various topics or problems in the study of religion. (SP, Staff)

H159A-H159B. Honors Course. (3,3) Independent study. Course may take one or two semesters at 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. (F,SP)

198. Directed Group Study. (1-4) Course may be repeated for credit. Must be taken on a pass/failed basis. Independent study. (F,SP)

199. Supervised Independent Study. (1-4) Course may be repeated for credit. Must be taken on a pass/failed basis. Independent study. (F,SP)
of C or higher fulfills the Subject A requirement. Six workload units in computation of study list. (F,SP)

Johnston

18. The Craft of Writing. (4) Three 1-hour lecture and discussion sessions per week plus individual conferences. Prerequisites: 1A or equivalent. Introduction to the various elements of writing: pronunciation, writing practices, grammar, mechanics, composition, and parts of speech. (F,SP)

2. Fundamentals of Public Speaking. (2) Must be taken on a passed/not passed basis. Two 1-hour meetings per week. Practice in the oral presentation of ideas. (F,SP)

10. Principles of Argumentation. (4) Three 1-hour lecture and discussion meetings per week plus individual conferences. 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 arguments on language, and their use in written and spoken text. (F,SP)

1.1. Advanced Argumentative Writing. (4) Three 1-hour meetings per week. Use of oral performance as a critical instrument 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 discussion per week. Examination of the major texts of rhetorical theory in Classical antiquity, with consideration of various modern extensions of the theory. (F)

Willy

101. Modern Rhetorical Theory. (4) Three 1-hour lectures per week. Prerequisites: Rhetoric 30. Close reading of the works of modern writers on language. Course content may be chosen from rhetorical traditions of Richards, Burke, Cassirer, and others. (F) B. Connelly

102. Intermediate Oral Interpretation. (4) Students who have taken 32A may not receive credit for 32B. Three 1-hour meetings per week. Prerequisites: 32A. Three 1-hour meetings per week. Use of oral performance as a critical instrument in the rhetorical analysis of literature, primarily lyric poetry. (F,SP)

Beloff

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)

Quinn

105A. Middle Ages. (3) Formerly 101. (F) Richardson

105B. Renaissance. (3) Formerly 102. (F) Shapiro

105C. Seventeenth Century. (3) Formerly 103. (SP) Shapiro

105D. Enlightenment. (3) Formerly 104. (SP) Shapiro

105E. Nineteenth Century. (3) Formerly 105. (SP) Shapiro

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) Melia

121A-121B. Rhetoric of Fiction. (4,4) 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, order, and related matters. (SP) Chairman

B: Content and Context: Interpretation of authorial inten:
sionality 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. Prerequisites: 30. Examination of the way character is created in drama by repetitive rhetorical patterns and the way themes are defined by manipulation of such patterns. (SP)

124. Rhetoric of Poetry. (4) Three 1-hour lectures per week. Prerequisites: 30. Consideration of the relationship between the texture of poetic discourse largely defined by figures of speech and overall poetic structures. (F)

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 contemporaries as Ashbery and Stafford, and including works from such European poets as Rilke, Valery, Eliot, and Milosz.

126. Rhetoric of Symbolism. (4) Three 1-hour lectures per week. Prerequisites: 30. The functions of language in literature, especially poetry; the literary symbol; the nature and function of figures of speech.

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 the problems arising from the transformation of five novels, which will be read into their filmed versions.

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 Thucydides, the Athenians, Cicero, Sallust, Tacitus, and 18th and 19th centuries British and American political orators.

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 persuasive intent. (F) Quinn

135. Rhetoric of Narrative Genres in Nonliterary Societies. (4) Three 1-hour lectures per week. Examination of how the rhetorical and cultural principles common to various genres of narrative are realized in the nonliterary societies. Mythic, epic and folk narratives considered as well as written works from cultures in transition. (SP) Meila

142. The Lyric Mode. (4) Three 1-hour meetings per week. Prerequisites: 32 and either 102 or 144. Qualities of various lyric traditions developed through oral reading; advanced study of the traditional lyric forms in major American and English literary periods. (F) Nathan

144. Readers' Theater. (4) Three 1-hour meetings per week. Prerequisites: 32 and 102. Understanding of literary genres through group performances. (SP) Beloff

150. Rhetoric of Contemporary Politics. (4) Three 1-hour lectures per week. Examination of the character of modern politics, with special attention to Middle Eastern and African spheres of political influence, and Caiiyle; historical discourse considered as a suasory act. (F) Quinn

154. English Political Rhetoric. (4) Three 1-hour lectures per week. Theory and practice of historical rhetoric, with emphasis on the interpretation of political rhetoric and the role of the political theorist. Specific themes and readings vary from year to year. Limited enrollment.

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. (SP) Willy

156. Rhetoric of the Political Novel. (4) Three 1-hour lectures per week. Investigation of major 19th and 20th century works of fiction in which political stances are exploited as dominant themes; close reading of authorial motivations and rhetorical strategies. (SP)

157. Rhetoric of Political Theory. (4) New course. Three 1-hour lectures per week. Exploration of the textual strategies of important works of modern European and American political theory from the 17th century onward. Specific themes and readings vary from year to year. (SP) Dolan

158. Advanced Problems in the Rhetoric of Political Theory. (4) New course. Three 1-hour meetings per week. Close study of selected works of modern political theory, including debates over the nature and interpretation of political theory and the role of the political theorist. Specific themes and readings vary from year to year. Limited enrollment.

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 rhetoric and values in legal argumentation, with emphasis on the interplay of interpretation and policy in the definition of social values through legal persuasion. (SP) Cohen

164. Rhetoric of Legal Theory. (4) Three 1-hour lectures per week. Rhetorical methodology applied to close analysis of the authoritative framework of important works in modern legal theory. (F) Constable

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. (SP) Constable

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. (F)

167. Advanced Topics in Law and Rhetoric. (4) New course. Three 1-hour meetings per week. Prerequisites: At least one course from 160, 161, 164 or 165. In-depth consideration of particular topics concerning rhetorical aspects of legal, social, or political theory, legal philosophy, legal argumentation, etc.

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. (SP) Shapiro

170. Rhetoric of Social Science. (4) New course. Three 1-hour lectures per week. Analysis of the ways in which political scientists, sociologists, anthropologists, and economists and psychologists establish the authoritativeness of their claims. Focus is on the presentation of data as fact, the use of quantitative methods, and other "strategies" through which social knowledge is transformed into objective information. (F) Constable

171. The Problem of Mass Culture and the Rhetoric of Social Theory. (4) New course. Three 1-hour lectures per week. Study of the textual strategies through which the masses and mass culture emerge as objects of anxiety, hope, and scrutiny for social theorists of the 17th and 20th centuries. (F) Dolan

172. Rhetoric of Social Theory. (4) Three 1-hour lectures per week. Rhetorical analysis of texts from Durkheim and Weber, as well as Marx, Ricardo, and Marxists, 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 susory act. (F) Quinn

174. Rhetoric of Scientific Discourse. (4) New course. Three 1-hour lectures per week. Examination of the
characteristic functions of discourse in and about the natural sciences; with particular examination of the ways in which scientific language both guarantees, and at the same time, obscures the expression of social norms in scientific facts.

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 theological/philosophical justifications, the interaction within the dialogue, the participation required of the reader/listener, and the relation of such interaction and participation to thinking, speaking, and knowing.

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)

H190. Honors Thesis. (3) Tutorial. Prerequisites: Senior standing with a 3.3 GPA. Independent study under guidance of a faculty director culminating in a written thesis. Required of all rhetoric majors desiring to earn the A.B. degree with honors.

196. Special Topics. (3) Course may be repeated for credit. Three 1-hour lectures/seminars per week. Prerequisites: Consent of instructor. Group instruction and investigation of topics not accommodated in regular course offerings. (F,SP)

198. Supervised Group Study. (1-3) Course may be repeated for credit. Must be taken on a pass/fail basis. Tutorial. Prerequisites: Junior standing and approval of advisor. Instruction to a small group of students on a topic initiated by those students. (F,SP)

199. Supervised Independent Study. (1-3) Course may be repeated for credit. Must be taken on a pass/fail basis. Tutorial. Prerequisites: 3.0 GPA. For special projects that cannot be otherwise accommodated. (F,SP)

Graduate Courses

200. Classical Origins of the Rhetorical Tradition. (4) Formerly 200A-200B. Students who have taken 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. (SP) Mayall

205. Contemporary Rhetorical Theory and Criticism. (4) Three hours of seminar per week. Prerequisites: Graduate status. Intensive examination of the issues concerning rhetorical criticism in the 20th century. Normally required of all graduate students. (F) Chatman

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 practiced by theorists and as it permeated various forms of discourse. Special topics to be announced. 230A. Ancient Greece. (SP) Quinn 230B. Ancient Rome.
its component dialects combining historical grammar and reading of texts. **Staff**

204. Problems in Romance Morphology and Syntax. (3) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Consent of instructor. The major schools and scholars that dominated the scene over a century and a half (1800-1850) and the vital problems they raised. **Malkel**

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 scene over a century and a half (1800-1850) and the vital problems they raised. **Malkel**

212. The Romance Epic. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. The major schools and scholars that dominated the scene over a century and a half (1800-1850) and the vital problems they raised. **Stefanini**

213. Old Catalan. (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. **Malkel**

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. (1-8) May not be used for unit or residency 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**

**Staff**

Related Courses in Other Departments


**Scandinavian (College of Letters and Science)**

Department Office: 1314 Dwinelle Hall, 642-4484


Associate Professor: Gregory P. Nybo, Ph.D. Norwegian folklore, literature, drama. 

**Honors Program.** Students must complete with distinction the courses required for the major as well as two seminars of Scandinavian 145. A thesis is also required. **The Minor**

Required courses: Five upper division courses.


2) Four electives.

**Graduate Program**

Aims of the Program. The graduate program in Scandinavian is designed for future scholars and teachers in 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 with their application for admission.

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 adviser. Students will prepare a major and a minor field, the major field to be studied during the master's course. Students preparing a Scandinavian literature as a major field, for example, must work in three periods: Middle Ages, Reformation to Romanticism, and Realism to the present. An examination will test the student's knowledge of both the major and minor fields with emphasis upon the literature in the major language.

**The Ph.D. in Scandinavian.** General requirements: an M.A. in Scandinavian, or its 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. 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**

1A. Elementary Swedish. (5) Five 1-hour sessions per week. Elementary grammar, conversation. (F) **Staff**

1B. Elementary Swedish. (5) Five 1-hour sessions per week. Prerequisites: 1A. Elementary grammar, conversation, easy prose reading. (SP) **Staff**

3A. Elementary Norwegian. (5) Five 1-hour sessions per week. Elementary grammar, conversation. (F) **Staff**

3B. Elementary Norwegian. (5) Five 1-hour sessions per week. Prerequisites: 3A. Elementary grammar, conversation, easy prose reading. (SP) **Staff**

4A. Elementary Danish. (5) Five 1-hour sessions per week. Elementary grammar, conversation. (F) **Staff**

4B. Elementary Danish. (5) Five 1-hour sessions per week. Prerequisites: 4A. Elementary grammar, conversation, easy prose reading. (SP) **Staff**

11. Intermediate Swedish. (5) Language instruction. Five 1-hour sessions per week. Prerequisites: 1B. Intermediate grammar, extensive reading, composition. (F) **Staff**
Freshman Seminar. (3) New course. One 3-hour seminar or two 1½-hour sessions per week. Designed to introduce students to an area of Scandinavian culture. Topics will vary from year to year. All readings are in English. Prospective students should consult with the instructor before enrolling in the course. (F,SP)

Scandinavian Culture and Society. (3) Three 1-hour lectures/discussions per week. Course to concentrate upon four historical periods: the Viking Age, the Baroque (emphasis on scientific and political developments), the late nineteenth century (emphasis on literary and artistic developments), and the twentieth century (emphasis on the politics and culture of the welfare state). (SP)

Upper Division Courses

101. Advanced Swedish. (5) Language instruction. Five 1-hour sessions per week. Prerequisites: 11 or the equivalent. Grammar review, reading, conversation, composition. (F,SP)

103. Advanced Norwegian. (5) Language instruction. Five 1-hour sessions per week. Prerequisites: 13 or the equivalent. Grammar review, reading, conversation, composition. (SP)

104. Advanced Danish. (5) Language instruction. Five 1-hour sessions per week. Prerequisites: 14 or the equivalent. Grammar review, reading, conversation, composition. (SP)

107. Plays of Ibsen. (3) Three 1-hour lectures/discussions per week. Reading and discussion of Ibsen's major plays. (F)

108. Strindberg. (3) Three 1-hour lectures per week. Prerequisites: 16 or the equivalent. Emphasis on his dramas and their significance. (F,SP)

120. Old Norse Literature. (3) Three 1-hour lectures per week. An introduction to the language of medieval Iceland and Norway. Grammar, historical phonology, and texts. (F,SP)

121. Norse Literature. (3) Three 1-hour lectures. Prerequisites: 10 or the equivalent. Literary production of early Iceland and Norway. Reading and analysis of representative works. (F,SP)

122. Medieval Scandinavian Literature. (3) Two 1½-hour lectures per week. Law, historical writings, courtly works, Saxo Grammaticus, ballads. Emphasis on Denmark and Sweden. (F,SP)

126. Studies in Philology and Linguistics. (3) Formerly 205 and 250. Course may be repeated for credit. Three hours of lecture per week. Sample topics: etymology, history of the Scandinavian languages; dialectology. (F)

130. Reformation Through the 18th Century. (3) Two 1½-hour lectures per week. Reading and analysis of representative literature and culture. (F,SP)

135. Modern and Contemporary Scandinavian Literature. (3) New course. Course may be repeated for credit. Three 1-hour lecture/discussions per week. Historical topics from the Viking Age to the Reformation; emphasis is on extraterritorial sources. (F,SP)

140. Introduction to Danish Literature. (3) Formerly 144A and 144B. Three 1-hour discussions per week. Prerequisites: 15 units lower division Danish or equivalent. Reading and analysis of representative works from 1879 to the present. (F)

141. Introduction to Swedish Literature. (3) Formerly 144A and 144B. Three 1-hour lectures per week. Prerequisites: 15 units lower division Swedish or equivalent. Reading and analysis of representative works from 1879 to World War II. (F,SP)

142. Introduction to Norwegian Literature. (3) Formerly 144A and 144B. Three 1-hour lectures/discussions per week. Prerequisites: 15 units lower division Norwegian or equivalent. Reading and analysis of representative works from Wergeland to 1900. (F,SP)

149. Major Studies. (1) New course. One hour of discussion section per week. Prerequisites: Knowledge of Reading and Interpretation of Scandinavian literature. Additional work for majors in Scandinavian and other qualified students with permission of the instructor, in connection with one of the following: Scandinavian 107, 108, 115, 116, 117, 120, 165. Students attend lectures and do all written work in the "main" course and also read assignments in the Scandinavian languages and write a short paper. (F,SP)

150. Studies in Scandinavian Literature. (3) New course. Three hours of lecture per week. Prerequisites: 15 units lower division Scandinavian literature. Reading and discussion of representative works. Sample topics: Scandinavian romanticism; the Modern Breakthrough; literature by and about women; the political tradition. (F,SP)

150A. Reformation Through the 18th Century. (3) Two 1½-hour lectures per week. Reading and analysis of representative literary and cultural works. (F,SP)

160. Scandinavian Myth and Religion. (3) Three 1-hour lectures per week. Prerequisites: 15 units lower division course. Reading and analysis of representative works. Sample topics: Scandinavian romanticism; the Modern Breakthrough; literature by and about women; the political tradition. (F,SP)

161. 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, and Finno-Ugric materials may also be considered. (SP)

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' study of one Scandinavian language. Advanced reading and interpretation of Scandinavian texts. (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. Advanced reading and interpretation of Scandinavian texts. (F,SP)

Graduate Courses

200. Introduction to Graduate Study in Scandinavian. (3) Two 1½-hour sessions per week. A problem-oriented course concerned with major areas of graduate study in Scandinavian: linguistics and philology, folklore, history, literary criticism. (F)

201A. Old Norse. (3) Three 1-hour lectures per week. Reading and interpretation of medieval Icelandic and Norwegian. Grammar, historical phonology, and texts. (F,SP)

201B. Norse Literature. (3) Three 1-hour lectures. Prerequisites: 201A or the equivalent. Literary production of early Iceland and Norway. Reading and analysis of representative works. (F,SP)

202. Medieval Scandinavian Literature. (3) Two 1½-hour lectures per week. Law, historical writings, courtly works, Saxo Grammaticus, ballads. Emphasis on Denmark and Sweden. (F,SP)

205. Introductory Scandinavian. (3) Three 1-hour lectures per week. Prerequisites: 10 or the equivalent. Reading and interpretation of representative works from 1879 to World War II. (F,SP)

206. Studies in Philology and Linguistics. (3) Formerly 205 and 250. Course may be repeated for credit. Three hours of lecture per week. Sample topics: etymology, history of the Scandinavian languages; dialectology. (F,SP)

220. Early Scandinavian Literature. (3) New course. Formerly 208 and 220. Two 1½-hour meetings per week. Prerequisites: 206 or the equivalent. For advanced majors. Prerequisite: departmental announcement for description. Course normally focuses on one of two areas: Edic and skaldic poetry; or sagas (royal, family, legendary, courtly, epicopal). (SP)

221. Early Scandinavian History and Culture. (2) Course may be repeated for credit. One 3-hour meeting per week. Historical topics from the Viking Age to the Reformation; emphasis is on extraterritorial sources. (SP)

230. Reformation Through the 18th Century. (3) Two 1½-hour lectures per week. Reading and analysis of representative works. Topics vary from semester to semester; see departmental announcement for description. (F,SP)

240. Modern and Contemporary Scandinavian Literature. (3) New course. Course may be repeated for credit. Three 1-hour lecture/discussions per week. Reading and analysis of representative works. Topics vary from semester to semester; see departmental announcement for description. (F,SP)

249. The Scandinavian Lyric. (3) Two 1½-hour reading/discussions per week. Prerequisites: Graduate standing, reading knowledge of a Scandinavian language. The lyric in Scandinavia. Reading, critical analysis, and interpretation; see departmental announcement for description. (F,SP)

251. Scandinavian Myth and Religion. (3) Three 1-hour lectures per week. Prerequisites: 15 units lower division course. Reading and analysis of representative works. Sample topics: Scandinavian romanticism; the Modern Breakthrough; literature by and about women; the political tradition. (F,SP)

252. Graduate Studies. (1) New course. Course may be repeated for credit. One 3-hour seminar per week. Investigation of selected authors, topics, or problems. Variable subject matter; see departmental announcement for description. (F,SP)

250. Seminar in Scandinavian Literature. (3) Formerly 251. Course may be repeated for credit. One 3-hour seminar per week. Investigation of selected authors, topics, or problems. Variable subject matter; see departmental announcement for description. (F,SP)

298. Special Study. (2-12) Course may be repeated for credit. Tutorial. Designed to explore a restricted field involving the writing of a report. May not be substituted for available seminars. (F,SP)

299. Dissertation Writing. (2-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Supervised study. (F,SP)

601. Individual Study for M.A. Candidates. (1-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Supervised study. Individual study for the comprehensive or language re-
Science and Mathematics Education (College of Letters and Science)  

Group Office: 4533 Tolman Hall, 642-4206  

Faculty:  
Mary Elizabeth Brenner, Ph.D. University of California at Irvine.  
Cross-cultural studies on education; development of mathematical cognitions. Familiar studies of early literacy and numeracy. (SEAME, Anthropology)  

Martin V. Cervenka, Ph.D. University of California at Berkeley.  
Classroom learning dynamics, student motivation.  

Marlin D. Diamond, Ph.D. University of California at Berkeley.  
Neuroanatomy, environment, asymmetry, and hormones. (Physiology-Anatomy)  

Andrea A. diSessa, Ph.D. M.I.T. Computers in education, programming languages for non-professionals, instruction in physics and mathematics, learning/genetic epistemology. (Education)  

Bernard R. Gifford, Ph.D. University of Rochester.  
Organizational charts, network theory, policy analysis. Resource allocation policies, micro-implementation, fiscal stress, management, technology and education. (Chair, Department of Administration and Organization, Assistant Director, Graduate School of Education)  

Leon A. Henkin, Ph.D. Princeton University.  
Mathematics education, mathematical logic. (Mathematics)  

Walter B. Laetsch, Ph.D. Stanford University, Experimental Psychology (Psychology, Vice Chancellor, Undergraduate Affairs)  

Lawrence E. Lowery, Ph.D. University of California at Berkeley.  
Science and Mathematics education, teacher education. (Education)  

John G. Marsden, Ph.D. Princeton University.  
(Mathematics)  

Charles L. Merchant, Ph.D. University of Wisconsin.  
Science and technology; historical and philosophical perspectives; cultural and social dimensions; ethical issues; gender. (Chair, Department of Conservation and Resource Studies)  

John C. Miller. Oregon State University.  
Science and computer-based education, history of science (organization)  

John Ogbi, Ph.D. University of California at Berkeley.  
Comparative studies of minority education, cultural education, education and culture. (Chair, Program on Comparative and Cooperative Socio-Systemic Research on Education)  

Peter R. Pellegrino, Ph.D. Cresskill-Milton University.  
Intelligent computer instruction, computer-based assessment of cognitive skill in programming, analytical problem-solving and transfer of learning. Applied in extensive programs on long-term memory retrieval and inference. (Education)  

Alan M. Rogoff, Ph.D. University of California at Berkeley.  
Molecular taxonomy in order to obtain phylogenetic relationships between organisms from comparative DNA organization. (Physiology, Associate Dean for Interdisciplinary Studies, College of Engineering)  

Frederick R. Strebe, Ph.D. Stanford University.  
Information processing analyses and problem solving. (Education at Stanford)  

Alan Schoenfeld, Ph.D. Stanford University.  
Psychology of mathematical problem solving, metacognition, belief systems, topology. (Education and Mathematics; Chair of SEAME)  

Glenn S. Stroebel, Ph.D. University of California at Berkeley.  
Science education, educational policy, science education for the general public, transmural elements. (Chair, Department of Science, Nobel Laureate)  

Richard M. White, Ph.D. Harvard University.  
Institutional technology, instruction, technology education. (Electrical Engineering and Computer Sciences)  

M.I. Charles Woodson, Ph.D. University of California at Berkeley.  
Human-computer interaction, scientific and educational applications of computers, measurement theory. (Education and Computer Sciences)  

Affiliated Members of the SEAME Group:  
Michael Clancy, Ph.D. Stanford University.  
Electrical Engineering and Computer Sciences  

Marjorie Gardner, Ph.D. University of Washington, Science education and international teacher curriculum. (Director of Lawrence Hall of Science)  

Curriculum development, marketing curricula, classroom organization. (Science Education, Assistant Director, Lawrence Hall of Science)  

Marcia C. Linn. Stanford University.  
Psychology of instruction and problem solving in science, cognitive development, classroom climate, computer-mediated instruction, individual differences in aptitudes and problem solving. (Research Psychologist, Lawrence Hall of Science)  

Elizabeth Stange, Ed.D. Harvard University.  
Research Educator, Lawrence Hall of Science)  

Herbert D. Thier, E.D. New York University.  
Current projects: Chemical education for Public Understanding, California Earthquake Education Program. (Science Education, Lawrence Hall of Science)  

Jennifer White, University of California at Berkeley.  
Science in education, how individuals learn science in an informal setting. (Dir. of Exhibits, Lawrence Hall of Science)  

Description of the Program  

The Group in Science and Mathematics Education offers a graduate program designed to allow students to combine advanced training in one of the natural sciences, computer science, or mathematics with the pursuit of certain interests in the area of education. Students enrolled in the program will be expected to arrive in their chosen scientific discipline a degree of competence comparable to that of a departmental Ph.D. candidate in that discipline. Their thesis work will consist of a project dealing with the development of improved educational applications based on new instructional models or basic research on learning processes in mathematics and science. Upon satisfactory completion of their studies and thesis work, students will obtain the degree of Ph.D. in science (or mathematics) education.  

Admission Requirements  

To enter the program, a student must have an excellent academic record with a bachelor's or, preferably, a master's degree in a natural science, mathematics, or engineering/computer science.  

Experience teaching, developing instructional materials, or doing educational or psychological research in these areas will also be favorably considered. Knowledge of psychology, cognitive science, education, or statistics is helpful but not required.  

More detailed information about the program and its requirements can be obtained from the group office.  

Graduate Courses  

210. Practicum in Science and Math Education Research and Development. (1-4) Course may be repeated for credit. One unit of credit for each four hours of student effort per week. One 2-hour meeting per week. Prerequisites: Consent of instructor. Practical experience on an educational research or development project on campus or elsewhere for 8-12 hours per week. Class meetings augment research experience with discussions of readings and interaction with guest speakers. (F,SP)  

211. Cross-Cultural Cognition and Learning. (3) New course. One 3-hour lecture per week. This course will examine cognition and learning as culturally and contextually situated activities from a variety of research perspectives. Topics cover an overview of theoretical issues and for-mal model presentation including mental models, schema, and neuronal systems. Emphasis will be placed on exploring how context is incorporated into research design. Course concludes with review of the impact of cognitive studies on educational practice. (F)  

212. Cognition and Learning in Social Context. (3) New course. Three hours of seminar per week. Though thinking and learning often occur in social interactions, research on cognition tends to focus on the intra-individual level. This course explores the social dimension of cognition in the context of mother-child dyads, peer teaching, and teacher-led small group instruction. Classroom includes discussion of published research and analysis of videotaped classroom encounters. The course concludes with a critical overview of educational programs that use group approaches to learning. (F,SP)  

220A. Introduction to the Psychological Bases for Science and Mathematics Education. (3) One 3-hour lecture/discussion per week. Prerequisites: 220A or consent of the instructor. Survey of experimental, quasi-experimental, and ethnographic methods in science and mathematics education research; critical evaluation of published research papers; and development of proposal for research project. Emphasis on process of formulating, criticizing, and refining research plans.  

220C. Instructional Design in Science and Mathematics Education. (3) One 3-hour lecture/discussion per week. Prerequisites: 220B or consent of the instructor. Survey of current literature on design of instruction in science and mathematics, including computer-based instruction. Includes consideration of evaluation methods and development of instruction modules for topics in science and mathematics. (SP)  

290. Human-Computer Communication. (3) Two hours meeting and three hours lab per week. Prerequisites: 294 or consent of instructor. Survey of the current state of the art of design and implementation, and applications of human-computer communication systems. Software, hardware, and cognitive aspects of communication. Help systems, windows, menus, command languages, and knowledge representation. Implications for the design of instructional computing systems. (SP)  

292. Research Seminar and Colloquium. (1) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. One 2-hour lecture-discussion per week. Prerequisites: 220B or consent of the instructor. Survey of current research education research conducted by students, faculty, and guest speakers. A written analysis of several presentations required. (F,SP)  

294. Survey of Instructional Computing Systems. (3) One 3-hour lecture per week. Prerequisites: 220B or consent of instructor. Surveys current literature on design and implementation of instructional computing systems. Plans, prototypes, and applications for human-computer communication systems. (SP)  

295. Research. (1-12) Course may be repeated for credit. One unit of credit for each four hours of student effort per week. Individual conferences. Independent research activities under supervision of a faculty member. (F,SP)  

299. Individual Reading and Study. (1-5) Course may be repeated for credit. One unit of credit for each four hours of student effort per week. Individual conferences. Prerequisites: Consent of instructor. Individual reading and study under the supervision of a faculty member. (F,SP)  

602. Individual Study for Qualifying Examination. (1-8) Course may be repeated for credit. Course may 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. Individual reading and study under the supervision of a faculty member for Ph.D. qualifying examination. (F,SP)
Slavic Languages and Literatures
(College of Letters and Science)

Department Office: 5416 Dwinelle Hall, 642-2979

Professors:
Romas Alexander, Ph.D. Harvard University. Yugoslav literature, Slavic linguistics
Božidar Galin, Ph.D. Academy of Science, Minak.
Semiotics, Slavic linguistics
Jean Grossman, Ph.D. Harvard University. 19th-century European modernism
Olga Rasevsky Hughes, Ph.D. University of California. Russian linguistics
Robert P. Hughes, Ph.D. University of California. Russian and European modernism
Simone Kasten, Ph.D. University of California. Russian and Slavic linguistics
Arkady Alexeev, Ph.D. University of California. Russian literature

Assistant Professor:
David A. Frick, Ph.D. Vate University, Polish language and literature
Irina Paperno, Ph.D. Stanford University. Russian literature

Senior Lecturers:
Arkady Alexeev, Ph.D. Harvard University. Russian language and literature
Serge Kassatkin, M.A. (Emeritus)

Assistant Professor:
Ina Pappeno, Ph.D. Stanford University. Russian literature

Senior Lecturers:
Olga Astromoff, M.A. University of California. Russian language and literature
Serio Kassatkin, M.A. (Emeritus)

Associate Professor:
Agnes Mihalik, Diplomat. Debrecen, Hungary. Hungarian language

Major Advisers:
H. McLean, A. Timberlake

Graduate Advisers: B. Gasparov (Linguistics), J. Grossman (Literature).

The Department of Slavic Languages and Literatures offers courses in several 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 literature courses require no knowledge of any foreign language. Courses in Slavic languages and literatures are open to native speakers; courses in Slavic linguistics are open to non-native speakers.

Lecturers:

Arndt Akenhead, Ph.D. University of California. Russian language and literature
Galya Dimel, Ph.D. University of California. Russian language
Agnes Mihalik, Diplomatica. Debrecen, Hungary. Hungarian language

Minor Programs:
H. McLean, A. Timberlake

Graduate Advisers: B. Gasparov (Linguistics), J. Grossman (Literature).

Lower Division, 26 units. Emphasis on Russian: courses 1, 2, 3, 4 or their equivalents; courses 45 and 46, taken in sequence if possible. Emphasis on Czech, Polish, or Serbo-Croatian: courses 1 and 2 or their equivalents; 10 units of the 180-series; 10 units of the 25-series in Slavic language (25A-25B, 26A-26B, or 27A-27B); two of the following courses: 37, 38, 39, 45, 46. A 3.0 grade-point average is required in the four Slavic courses completed in preparation for the declaration of major.

Upper Division, 27-28 units. Emphasis on Russian: course sequence 103A, 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 111 are intended for native speakers; the waiver requires a proficiency test. Emphasis on Czech, Polish, or Serbo-Croatian: the relevant advanced language course sequence (115AB, 116AB, or 117AB); the relevant literature, readings, and tutorials, and one elective course in the 180-series; 10 units of the 150-151-152, 160-161-162, or 170-171-172; one 3-unit course in the emphasized field; one 3-unit 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 department may apply for admission to the honors program. This program includes a thesis which a thesis, is written, and one additional course of 3 or 4 units, beyond those required for the major, in a Slavic language or in a literature course conducted in the language of the major. Successful completion of the honors program requires a minimum grade of B+ in both of these endeavors and a 3.0 grade-point average or higher in the major. Interested students should discuss these 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 faculty member will submit a preliminary statement of the topic to be investigated and the names of the students' honors committee. An 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 last term of course work in the minor. Earlier consultation with a departmental minor adviser concerning completion of the minor is advised.

Minor in Russian Language. Slavic 103A-103B, 104, 102* or any course in the Slavic 180 series. The minor in Russian language is not open to native speakers of Russian.


Minor in Slavic Language and Literature. Two advanced language courses (Slavic 115A-115B, 116A-116B, or 117A-117B); one literature course (Slavic 151, 161, or 170); two of the following: 130, 131, 137, 140, 151, 161, 171, 152, 162, 172. Native speakers of Polish, Serbo-Croatian, and Czech cannot minor in those languages.

* 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 or have completed one of these degrees. See the index and the graduate section for additional information.

Admission to Graduate Study
Candidates for higher degrees must have completed the undergraduate major program in Slavic languages and literatures or equivalent. Prospective and current students are encouraged to acquire a background in other related fields: European languages and literatures (especially French, German, Italian and English), literary theory, Russian and Western European intellectual history are useful for candidates in literary studies; for those in linguistics, preparation in French, German, Greek or English, and in 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. Both the M.A. and Ph.D. degrees require work in two Slavic languages or literatures, of which one must be Russian. Three Slavic languages are required of linguists in the Ph.D. program.

M.A. Course Requirements. Literature Program: A proseminar in literary scholarship, a graduate seminar 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 Slavic, one year of a second Slavic language, two graduate literature courses in the major field, and at least one seminar.

Linguistics Program: A proseminar in linguistic scholarship, a graduate course in composition and style in major language, introductory descriptive and historical grammar of major language, history of literary language or (for Russian majors) 18th-century Russian literature, Old Church Slavic, introductory comparative Slavic linguistics, three seminars of paper on the Slavic languages and one literature course.

All candidates for the M.A. must demonstrate advanced proficiency in their major language, pass the department's French or German 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 qualitative examinations on the history of the major Slavic literature, its relations with other European literatures, and the history of a second Slavic literature. In addition, students will take one seminar of a 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 qualitative examinations on the structure of the major language, its history, including the history of the literary language, and general Slavic and Indo-European. Continuing students with the student's completed course work in advanced descriptive grammar in their major language, advanced comparative Slavic linguistics, and one graduate seminar of another Slavic language.

All candidates for the Ph.D. must pass the department's French and German reading examinations, three comprehensive written examinations, and an oral qualifying examination.

*Not offered 1989-90
*On leave, spring
*On leave, fall
*Recalled to active service
*Recipient of Distinguished Teaching Award
Russian Language

Lower Division Courses

1. Elementary Russian. (5) Five hours of meeting and 2 hours of language laboratory per week. Beginner’s course. (F,SP) Yekushew

2. Elementary Russian. (5) Five hours of meeting and 2 hours of language laboratory per week. Prerequisites: 1, 14A, or equivalent. (F,SP) Yekushew

3. Intermediate Russian. (5) Five hours of meeting and 1 hour of language laboratory per week. Prerequisites: 2, 14B, or equivalent. (F,SP) Yekushew

4. Intermediate Russian. (5) Five hours of meeting and 1 hour of language laboratory per week. Prerequisites: 3, 14C, or equivalent. (F,SP) Yekushew

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. Prerequisites: 3 (may be taken concurrently). Life and language in the Russian world.

14. 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 requirements. All units beyond those contracted for are completed, credit will be given. (F,SP) Astromoff

14A. Self-Paced Russian. (1-5) (F,SP)

14B. Self-Paced Russian. (1-5) Prerequisites: 14A or equivalent. (F,SP)

14C. Self-Paced Russian. (1-5) Prerequisites: 14B or equivalent. (F,SP)

14D. Self-Paced Russian. (1-5) Prerequisites: 14C or equivalent.

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, dialogues of neutral and emphatic intonational coloring, and extensive use of audio tapes. (F,SP)

102. Readings in Specialized Russian. (3) Course may be repeated for credit up to a maximum of 6 units. 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 voc- calulary, 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

104A. Word Formation and Word Order in Russian. (3) New course. Three hours of lecture per week. Prerequisites: 103B or equivalent. Emphasis on word for- mation, syntax, and word order in Russian. (F) Astromoff

104B. Advanced Russian Composition. (3) Formerly 104. Three hours of lecture per week. Emphasis on writing, translation, and composition 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 Turgenev. 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 emigre literature. No knowledge of Russian required. Prerequisite to admission to the Slavic major and recommended for prospective graduate students. (SP) R. Hughes

Polish

Lower Division Courses

25A-25B. Introductory Polish. (5-5) Five hours of lecture per week. Prerequisites: 25A is prerequisite to 25B. Beginner’s course. Sequence begins fall. (F,SP) Staff

Upper Division Courses

115A-115B. Advanced Polish. (4,4) Three hours of meeting per week. Prerequisites: 115A is prerequisite to 115B. Sequence begins fall. (SP) Staff

150. Polish Literature and Intellectual Trends. (3) Three hours of lecture per week. Prerequisites: 115A (may be taken concurrently). Studies in Polish literature or linguistics, or conversation, depending on the needs of the students enrolled. (SP) Schornschała

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 conversation, depending on the needs of the students enrolled.

154. Polish Literature of the 20th 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 in the turn of the century, the literature of independent Poland, Polish literature during World War II and in Poland’s Poland, as well as Polish literature in emigration. No knowledge of Polish required.

Czech

Lower Division Courses

25A-25B. Introductory Czech. (4,5) Five hours of class per week. Prerequisites: 25A is prerequisite to 25B. Beginner’s course. Sequence begins fall. (F,SP) Staff

Upper Division Courses

116A-116B. Advanced Czech. (4,4) Three hours of class per week. Outline history of Czech literature from the 10th century to the present, including medieval literature of the 14th century, the National Revival of the 19th century, and the modern period. No knowledge of Czech required. (SP) Staff

160. Survey of Czech Literature. (3) Three hours of class per week. Outline history of Czech literature from the 10th century to the present, including medieval literature of the 14th century, the National Revival of the 19th 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. Selected readings in Czech literature or linguistics, or conversation, depending on the needs of the students enrolled. (SP) Schornschała

American Studies

356 / Slavic Languages and Literatures

Instruction in teaching methodology is provided for graduate student instructors and prospective teachers of Russian, Polish, Czech, and Serbo-Croatian.

Czech

Lower Division Courses

25A-25B. Introductory Czech. (5-5) Five hours of class per week. Prerequisites: 25A is prerequisite to 25B. Beginner’s course. 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 10th century to the present, including medieval literature of the 14th century, the National Revival of the 19th 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,SP) Staff

162. Topics in Czech Language and Literature. (3) Three hours of meeting per week. Prerequisites: 116A. Selected readings in Czech literature or linguistics, or conversation, depending on the needs of the students enrolled. (SP) Schornschała

Polish

Lower Division Courses

25A-25B. Introductory Polish. (5-5) Five hours of class per week. Prerequisites: 25A is prerequisite to 25B. Beginner’s course. Sequence begins fall. (F,SP) Staff

Upper Division Courses

115A-115B. Advanced Polish. (4,4) Three hours of meeting per week. Prerequisites: 25B is prerequisite to 115A; 115A is prerequisite to 115B. Sequence begins fall. (F,SP) Staff

150. Polish Literature and Intellectual Trends. (3) Three hours of lecture per week. Prerequisites: 115A (may be taken concurrently). Studies in Polish literature or linguistics, or conversation, depending on the needs of the students enrolled.

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 conversation, depending on the needs of the students enrolled.

154. Polish Literature of the 20th 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 in the turn of the century, the literature of independent Poland, Polish literature during World War II and in Poland’s Poland, as well as Polish literature in emigration. No knowledge of Polish required.

American Studies

356 / Slavic Languages and Literatures

Instruction in teaching methodology is provided for graduate student instructors and prospective teachers of Russian, Polish, Czech, and Serbo-Croatian.
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.

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 18th century to the present. Required for Russian-English majors. (F,SP) Karinsky

182. Pushkin. (4) Three hours of lecture per week. Prerequisites: 103A (may be taken concurrently). An overview of the writer's principal artistic works, treated in relation to his life and to developments in Russian and European literature.

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 19th century to the present. (F,SP) Hughes, Karinsky

Serbo-Croatian

Lower Division Courses

27A-27B. Introductory Serbo-Croatian. (5-6) 27A: Three-2 hour meeting per week. 27B: Two-2 hour meeting per week. Prerequisites: 27A is prerequisite to 27B. Beginner's course. Sequence 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. Sequence begins fall. Staff

170. Survey of Yugoslav Literatures. (3) Three hours of lecture per week. Outline of major developments in Serbian (including Montenegrin) and Croatian (including Dalmatian) literatures from the beginnings to the present. No knowledge of Serbo-Croatian required.

171. Readings in Yugoslav Literatures. (4) Three hours of meeting per week. Prerequisites: 117A. Selected readings in Serbo-Croatian, tailored to the academic interests of students enrolled.

172. Topics in Serbo-Croatian. (3) Three hours of meeting per week. Prerequisites: 117A (may be taken concurrently). Studies in Serbo-Croatian literatures or linguistics or conversation, depending on the needs of the students enrolled.

178. 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 Krizelja.

General and Other Slavic

Lower Division Courses

111A-111B-111C-111D. Self-Taught Bulgarian. (1-5:1-5:1-5:1) 111A, 111B, 111C and 111D may be repeated for credit up to a maximum of 5 units. Students may not receive credit for 111A after taking any duplicating units of EnEarUbtS 603. Individual conferences and language laboratory. Prerequisites: 111A: none; 111B: 111A or equivalent; 111C: 111B or equivalent; 111D: 111C or equivalent. Self-paced course needs instructor's permission to enroll. Students may enter at any level. The student's program, including this course, must meet the minimum study list unit requirements. If units beyond those contracted for are completed, credit will be given. Split grading will be permitted: units not completed, for which student is given an "F," are not averaged in final grade. Student may repeat units assigned "F." (F,SP) Alexander

114. Readings in Old Russian. (3) 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 languages, their structures and histories, and descriptive and theoretical principles for their analysis. The origin and ancient history of the Slavic languages. (SP) Alexander

140. Twentieth-Century Slavic Literary Criticism. (3) Three hours of lecture per week. Symbolism and Aesthetics, Russian Formalism, the Prague School, Structuralism, Russian Formalism, the Prague School, Structuralism, poststructuralism, and the history of literary criticism. (SP) Gasparov

147. Slavic Folklore. (3) Course may be repeated for credit once with permission of instructor. Three hours of lecture per week. Oral traditional literature (tales, epics, lyrics, proverbs) 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 assignment of texts. Critical reports on selected English prose translations. Class discussions of translations prepared by members of the class.

195. Honors Seminar. (4) Individual conferences. Prerequisites: Overall and major grade point average of 3.3. Study and research on a topic selected by the student in consultation with the faculty advisor, to culminate in the writing of a thesis. See departmental description of the Honors Program. (F,SP) Staff

197. Field Studies. (1-4) New course. Course may be repeated for credit. Two hours of fieldwork per week. Prerequisites: Consent of instructor. Supervised field programs involving experiences in schools and school-related activities. Regular individual meetings with faculty sponsor and written reports required.

198. Supervised Group Study for Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Variable. (Minimum of one meeting per week and individual consultation.) Prerequisites: Students must have completed 60 units of undergraduate study and have a minimum GPA of 3.0. Supervised cooperative study of topics in Slavic and East European languages and literatures not covered by regularly scheduled courses. (F,SP) Alexander

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual conferences. Prerequisites: Overall GPA of 3.0. (F,SP) Staff

Slovic 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

201. Advanced Russian Proficiency Maintenance. (2-3) Course may be repeated for credit. Three hours of meeting per week. Prerequisites: Graduate standing; 102B or equivalent; consent of instructor. Advanced work in speaking, writing, and comprehension in order to develop and maintain Superior proficiency. Discussions 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) Gagarin

202. Advanced Russian Readings for the Social Sciences. (3) New course. Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 102 and 102S, or equivalent; social science background; consent of instructor. Development of skills for reading expository and scientific Russian texts; understanding of content; vocabulary and usage; logical organization of paragraphs or sentences; knowledge of syntax of Russian scientific text, word formation and rhetorical devices; argument evaluation, scanning and skimming. Texts from technical literature of the social sciences. Topics (and field(s)) will vary according to student needs. Conducted party or wholly in Russian. (F,SP) Gasparov

204. Russian Composition and Style. (3) Three hours of meeting per week. Prerequisites: 102B. Essay writing, analysis of texts, oral and written reports, and translation. (F) Gasparov

210. Old Church Slavic. (3) Three hours of meeting per week. Prerequisites: Knowledge of language (Czech, Polish, Russian, or Serbo-Croatian); see departmental announcement for description. An introduction to Old Church Slavic, with special attention to inflectional morphology. Assigned translations and sight reading of selected texts. (SP) Petrić

214. Readings in Old Russian. (3) Three hours of meeting per week. Prerequisites: 210. Assigned translations and sight reading of selected Old Russian literary texts. (F) Petrić

220. Comparative Slavic Linguistics. (3) Three hours of lecture per week. Prerequisites: 102B or equivalent. Survey of sound patterns of contemporary Russian, divided into three sections of five weeks each: (a) segmental phonology; (b) stress and (c) metrics and tonology. Course may be taken either for two units (any two of the three sections) or three units (three sections). (SP) Gasparov

222. Descriptive Grammar of Slavic Languages. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Knowledge of a modern Slavic language. Survey of morphology and syntax of a contemporary Slavic language (Czech, Polish, Russian, or Serbo-Croatian); see departmental announcement for topic. Recommended for prospective teachers. (SP) Gagarin, Garro, Nichols

223. Advance Structure of Slavic Languages: Grammatical Analysis and Theory. (3) New course. Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 222. Analysis of synchronic grammar and structure of discourse of a Slavic language (Czech, Polish, Russian, or Serbo-Croatian) with attention to theoretical models; see departmental announcement for topic. (F) 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
231. History of Slavic Literary Languages. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Advanced knowledge of the modern language of at least one advanced or graduate level literature course recommended. Analysis of language and style of a Slavic literary language (Czech, Polish, Russian, or Serbo-Croatian) from the beginnings to the present, with emphasis on periods of particular significance. See departmental announcement for topic. (F) Gasparyov

281. Proseminar: Aims and Methods of Literary Scholarship. (3) Three hours of seminar per week. Course designed for new graduate students in literature. Introduction to modern literary theory and criticism; principles of textual analysis; methods of bibliographic research. (F) R. Hughes

282. Proseminar: Aims 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 phonology, semantics, and the relation of linguistic to literary studies. Methods of research and critical analysis. Current issues and goals of research. (F) Gasparyov

287. Russian Poetry. (3) 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 (18th, 19th, and 20th centuries); close readings of texts. Variable topics. (SP) O. Hughes

299. Directed Research. (2-12) Course may be repeated for credit. Individual conferences. Preliminary exploration of a restricted field involving research and an oral report. (F,SP) Staff

601. Individual Study for Master's Students. (2-6) Course may be repeated for credit up to a maximum of 16 units. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Normally reserved for students working on the doctoral dissertation. (F,SP) Staff

602. Individual Study for Doctoral Students. (2-6) Course may be repeated for credit up to a maximum of 16 units. Must be taken on a satisfactory/unsatisfactory basis. Individual conferences. Must be taken 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 to meet unit or residence requirements for a major degree. (F,SP) Staff

Professional Courses

301. Slavic Teaching Methods. (3) Course to be repeated for credit each semester of employment. Must be taken on a satisfactory/unsatisfactory basis. Group and individual conferences. Course on practical teaching methods, grading, testing, and design of supplementary course materials. Required of all graduate student instructors in Slavic. (F,SP) Staff

East European Studies

Lower Division Courses

1A-1B. Introductory Hungarian. (5;5) Students who have taken S1A and S1B will receive no credit for 1A. Students who have taken 10 units of 10A will receive no credit for 1B. Five hours of class meeting per week plus language laboratory. Prerequisites: 1A is prerequisite to 1B. Sequence begins fall. (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.
Sandra Hellman, Dr. P.H.
Jean Morton, M.S.W., M.P.H.
James Jackson, M.D., M.P.H.
Abby M. Rincon, M.P.H.
Catherine B. Tassan, M.P.H.

Associate Field Program Supervisors:
The Department of Social and Administrative Health Sciences in the School of Public Health is concerned with improving the quality of life through the prevention and solution of community health problems. The scope of faculty and student interests in health research and practice is broad. Numerous aspects of health programs and issues are studied: administrative, behavioral, educational, political, and economic.

Flexibility in the curriculum enables students to prepare themselves to pursue many possible career goals. Students may specialize in the following areas: health policy and administration, maternal and child health, genetic counseling, public health nutrition, applied behavioral sciences, and public health education. Students are urged to take an interdisciplinary approach to the study of health problems. Each program prescribes the knowledge and skill areas in which competency must be demonstrated prior to graduation.

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: anthropology, business administration, city and regional planning, economics, education, genetics, nutritional sciences, psychology, public policy, and social welfare. Opportunities for supervised field experience are offered by many health agencies in nearby communities, the state, and the nation. For physicians, certain training programs are structured to meet certification requirements for medical board specialties in preventive medicine or public health. 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, 296, 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)

Upper Division Courses

150. Introduction to Community Nutrition. (3) Two 1-hour lectures per week. Prerequisites: NS 100 or concurrent 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) Disbrow

175A-175B. Health Promotion in a College Setting. (2,2) Course may be repeated for credit. Credit and grade to be awarded upon completion of the sequence. One 1-hour lecture per week and one seminar in every other week; 4-8 hours per 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 interrelated to individual campus health field experiences in which students may be involved. (F,SP) Rincon

176. Issues in Personal and Community Health Promotion. (3) Course may be repeated for credit. Three hours of lecture-discussion and one optional hour of discussion per week. Prerequisites: NS 175A, 175B, and consent of instructor. Topics include: health promotion, public health and social welfare with emphasis on the social and political factors that influence both the definition of health and actual health status. (SP) Griego

178. Policy, Planning, and Evaluation of Health Promotion in a College Setting. (3) Course may be repeated for credit. Three hours of lecture-discussion and one optional hour of discussion per week. Prerequisites: NS 175A, 175B, and consent of instructor. Topics include: health promotion, public health and social welfare with emphasis on the social and political factors that influence both the definition of health and actual health status. (SP) Griego

191. Drugs, Health and Society. (2) Two 1-hour lectures and one 1-hour discussion per week. Assumptions: Smaller and 201. Health PE u^digms and Deliberate Social Change. (SP) Griego

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 organizations. Regular individual meetings with faculty sponsor 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 87 and 88 of this catalog. (F,SP) Staff

Graduate Courses

200. Introduction to Public Health and Health Care Systems. (2-4) Two 2-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 dilemmas. Variable-unit course; 4 units for 2 modules; 2 units for Social and Behavioral Aspects of Health System. Examination examinations offered for both modules. (F) Wallack

201. Health Paradigms and Deliberate Social Change. (3) Formerly 205. Two 1-½ hour lecture-discussions per week. Part I: General introduction to old and new health care paradigms and practices. Part II: Underlying theory and techniques of social change. (F) Duhl

202. Health Policy and Planning. (3) Formerly 206. Two 1-½ hour-lecture-discussions per week. Use of planning as a means of social change: Presentation of theories and alternative methods of planning for health. (F) Duhl

203. Program Planning, Development, and Evaluation. (3) Formerly 209. Two 1-½ hours per week. Prerequisites: Public Health students. Basic elements and methods of program planning and implementation are reviewed. Prerequisite 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'Orchio, 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 1-½ hours per week. Analysis of the principles underlying governmental policy in occupational and environmental health, drawing on diverse perspectives from the health sciences, law, economics, and social science. Particular 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 1-½ hour lectures/discussions per week. An introduction to health care organization, policy, and planning in several nations throughout the world—rich and poor, capitalist and socialist, and decentralized. Health systems will be analyzed within the context of the cultural, social, economic, and political forces within each country. (SP) Duhl

207. Health and Social Policy in Mexico and Latin America. (3) One 2-hour lecture per week. 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 demographic, social, economic, and political perspectives. Particular topics include social movements, professional organization structure, environmental influences, occupational health, and migration. (SP) Guendelman

208. Advanced Medical Care Organization. (2) Formerly 232. Two 1-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. (SP) Bloom, Scheffler

210. The Hospital As a Social and Economic Enterprise. (3) Formerly 225. Two 1-hour lectures per week. Development of the hospital as a social and economic institution: role in health care delivery, ownership, governance, management, and decentralized and centralized. Health systems will be analyzed within the context of the cultural, social, economic, and political forces within each country. (SP) Duhl

211. Health Politics, Policy, Law. (3) Two 1-½ hour lectures per week. A multidisciplinary treatment is given to the major themes contained in the course title. Major emphasis is placed on theoretical, social, scientific, and legal perspectives. Current California community health realities serve as a base of examples in order to develop ethical, organizational, service funding, legislative, and health care dimensions and issues. (F) Garcia

212. Legislation and Organization for Health and Health Services. (2) Formerly 212. Two 1-hour discussions per week. Description and analysis of the principal federal health, and social legislation, translation of legislation

On leave, spring
On leave, fall
On leave, spring, fall
On leave, fall
Recipient of Distinguished Teaching Award
Recalled to active service
Not offered 1989-90

213. Legal Basis for Health Facility Administration. (3) Formerly 215. One 3-hour lecture-discussion per week. Prerequisites: An introductory grad course in public health, medical care administration, and law related to hospitals. (SP) Garcia

216. Introduction to Health Economics. (3) Formerly 222. Two 1½-hour lecture-discussions per week. Prerequisites: Principles of economics (macro or micro), or consent of instructor. Helps students gain an introductory understanding of the key concepts of economics designed to provide an overview of the field: production and utilization of health care services, health insurance, preventative health programs, cost-benefit analysis, issues or competition and regulation, and public health nutrition. (SP) Bailey, Hu, Robinson, Scheffler

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, HMOs, selective contracting by health insurers and state Medicaid programs, rate regulations, and Medicare’s Prospective Payment System. (F) Garcia

218. Macroeconomics of Health. (3) Formerly 222. Two 1½-hour lectures per week. Prerequisites: 216 or consent of instructor. Application of basic concepts of macroeconomics and public finance to the provision of health services. Alternative methods of financing health services from public and private sources are examined. (SP) Garcia

219. Advanced Health Economics. (2) Formerly 223. Two 1-hour lecture-discussions per week. Prerequisites: 216 or a recent graduate course in microeconomics. An economic analysis of the production and distribution of health services, including the role 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 are discussed. Includes laboratory sessions on uses of microcomputer technology in health services management. (F) Grazier

221. Managerial Accounting In Health Care. (3) Formerly 224. Two 1½-hour lectures per week. Principles of managerial accounting in health care organizations, with emphasis on government and community service agencies. (SP) Grazier

222. Health Care Finance. (3) Formerly 228B. Two 1½-hour lecture-discussions per week. Prerequisites: Knowledge of basic financial accounting or consent of instructor. Introduction to theory and practice of finance as applied to health care enterprises. Topics include valuation, risk, investment, financing decisions, and reimbursement policy. (SP) Grazier

223. Advanced Financial Management and Regulation of Health Care Institutions. (3) Formerly 225A. Two 1½-hour lecture-discussions per week. Prerequisites: (1) 222 or Business Administration 223; or (2) 204 and 230. Students emphasizing management must meet prerequisites 1. Students emphasizing planning/management must also meet prerequisites 2. Financial management and regulation of health care institutions, including relationships between institutional and national policies with regard to reimbursement, incentive systems, public regulation, and control of health care costs. Course is based on a computer game simulation. (SP) Starkweather

225. Health Care Organizations and Environments. (3) Formerly 231A. Two 1½-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 health and medical care organizations; inter- and intra-organizational relationships; power and control; conflict and change. (F) 

227. Advanced Health Organizations and Environments. (2) Formerly 231B. One 2-hour lecture-discussion per week. Prerequisites: 225 or consent of instructor. Study of current approaches to the theories of organizational behavior, as well as theories of complex organizations, inter-organizational relationships in health administration. (F) Bloom

230. Quantitative Analysis for Health Policy and Administration. (4) Formerly 233. Two 1½-hour lectures and one 2-hour discussion per week. Prerequisites: BEHS 130A or consent of instructor. Application of quantitative analyses and operations research methods to problems and decision-making in health service systems and facilities; introduction of selected quantitative techniques; emphasis on identifying and formulating systems problems that are amenable to solution through use of quantitative techniques. (SP) Grazier, Hu

231. Advanced Quantitative Methods for Health Policy and Administration. (2) Formerly 233B. Two 1½-hour lectures and one 2-hour discussion per week. Prerequisites: Business Administration 234B or SAHS 230 or equivalent. Selected advanced operations research topics and applications to decision making in the health care sector. Topics include linear programming, quadratic programming, integer programming, Markov chains, and dynamic programming and simulation. (SP) Grazier, Hu

233. Research Issues In Health Services. (3) One 3-hour seminar per week. Critical analysis of selected topics in health services research, including approaches to conceptualizing research issues on particular programs, methodological problems in planning and conducting research, and management of large-scale research projects. A major focus will be on characterizing the interrelationships between health services research and health policy. (F) Bloom

234. Research Methods for Health Services I. (3) Two 1½-hour lectures per week. Prerequisites: SAHS 217, BEHS 130A, and BEHS 130B (may be taken concurrently). Review of multivariate statistical methods including time series for analyzing health services. Includes regression analysis, empirical applications, and model building. (F) Hu

235. Research Methods for Health Services II. (3) New course, fall 2009. Two 1½-hour lecture-discussions per week. Prerequisites: 234 or consent of instructor. Introduces methods of large-scale model building for health care delivery systems, forecasting methods, and other multivariate methods. (SP) Grazier

240. General Theories of Social Change. (3) Two 1½-hour lecture-discussions per week. Prerequisites: Program Planning (209) and Sociology 208. Analysis of the major theories of behavioral change and practice: positivist social theories of change, interpretive cultural theories of change, and ideological theories of change, as these relate to health and human behavior. (F,SP) Saunders

241. Social Theory In Public Health. (3) Two 1½-hour lecture/discussions per week. A presentation of the current theoretical and empirical analyses of the relationships among social factors and health. Major theoretical perspectives are introduced, including those in which major substantive issues are discussed, including socio-demographic 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. A critical discussion and analysis of recent developments in health-relevant psychological theories as they relate to the implementation, design, and evaluation of programs planned to improve the health status of designated groups. (SP) Brudevold

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 approaches to 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 these dynamics may be influenced in such ways to promote effective group work. (SP) D’Onofrio

245. Health Education in Medical Care Settings. (3) Two 1½-hour lecture/discussions per week. Prerequisites: Graduate standing. Overview of trends and issues in patient education, including planning, staffing, and evaluation processes. Concepts, research, principles, and practices of health care and behavior models as these relate to patient learning. Analysis of actual patient education programs in diverse settings. (SP) D’Onofrio

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 sociopsychological concepts and theories basic to the practice of public health education, including analysis of community organization process, theory, and research. (F) M. Mirkler

247. Mass Communications in Public Health. (3) Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. Review general theories, models, and assumptions for measuring, reaching, and interacting with various target populations for communication health information and assess various American health campaigns. Study unplanned health campaigns—i.e., using content analysis techniques to understand and evaluate mass media messaging, and program evaluation and advertising in various media. Examine the structure of the mass communication system and its implications for public health. (SP) Wallack

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 a process. Examines the history, development, and application of training 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. (2) Two 1½-hour lecture/discussions per week. Prerequisites: Graduate standing and consent of instructor. Concepts, methods, and limitations in the determination of nutritional status; application of methodologies for determining and interpreting data; technical, social, and political implications of nutritional assessment and related community needs. (F) Sabry

251B. Public Health Nutrition. (3) Two 1½-hour lectures per week. Prerequisites: 251A. Evaluation of nutrition programs. (Second semester core course.) (SP) Staff

251C. Nutrition Intervention Programs. (3) Two 1½-hour lecture/discussions per week. Prerequisites: Graduate standing and consent of instructor. Intervention strategies for nutritional improvement, including food and income distribution, subsidies and price regulation, nutritional education, and the market and political and organizational realities of such programs, and approaches to their evaluation. (SP) Sabry

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, 250B (203), or concurrent enrollment. The course is taken concurrently with 251A in fall semester and with 209B (203) in spring semester. Students observe and participate in the work of community agencies, carrying out the assessment and planning functions of a public health nutritionist; the Bay Area community serves as the laboratory. (SP,SP) Detrov

252. Current Developments In Public Health Nutrition. (3) Two 1½-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 and the public. (SP)

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, adolescence, and adulthood. Introduction to nutritional assessment of individuals and communities. Discussion of programs, policies, and activities to improve nutritional status for mothers and children. Course is intended for students of maternal and child health, social welfare, and other disciplines as well as nutrition students. (F) 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 its influence on nutritional requirements of the elderly from a biological, psychological, and social perspective; with emphasis on impediments to satisfying these needs and the necessary intervention programs. (SP)

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 production, consumption, and nutrition; effects of income and prices on food consumption and nutrition; effects of income and prices affecting the elderly from a biological, psychological, and social perspective; with emphasis on impediments to satisfying these needs and the necessary intervention programs. (SP)

256A. Public Health Aspects of Nutritional Care: Hospital Setting. (5) One 2-hour lecture/discussion and one 3-hour laboratory per week for 10 weeks. Prerequisites: Admission to M.P.H. nutrition internship and Nutrsci 161, 161L or equivalent. The nutritional care of people with major diseases is reviewed, observed, and practiced in various Bay Area hospitals. Current nutritional concerns of heart disease, cancer, diabetes, renal diseases, liver diseases, gastrointestinal disorders, and trauma are reviewed. The organization and delivery of nutritional care services in hospital settings. (SU) Sabyk

256B. 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 256A 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, skilled nursing facilities, and selected research programs. Included are nutrition education, counseling, food service, nutrition assessment, consultation, and training. (F,SP) Distrow

257. National Food and Nutrition Policy. (2) New course. One 2-hour lecture-discussion per week. Prerequisites: Some educational or work experience in the nutrition and food industries. Emphasis on the functioning of the administrative, judicial, and legislative branches of our government as they affect nutrition policy. Impediments, interventions and implementations of programs will also be examined. (SP)

260A-260B. Problems and Programs in Maternal and Child Health. (1 or 3; 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 problems of health of children, youth, and women, and the role of childbearing age in context of the family and community. Emphasis on primary prevention and planning. (F,SP) O'Grady

266C. 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 public and private health centers will write an MCH program plan. (SP) Eskenazi

266D. 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 epidemiologic methods. Specific adverse reproductive outcomes, risk factors and prevalence. Will include critiques of published studies and techniques of proposal writing. (SP)

261. Human Growth and Development: The Life Span. (2) One 2-hour lecture-discussion per week. Fetus into man: human biological bases; somatic growth; psychosocial development; family and environmental factors; socio-economic and environmental factors, and public health issues. (F) Falkiner

262. International Maternal and Child Health. (2) One 2-hour lecture-discussion per week. Assessment of health status of mothers, infants, and children on worldwide basis; special emphasis on problems of nutrition, and programs affecting MCH and family planning in developing countries. (F) Falkiner

263. Evaluation and Improvement of Perinatal Health: International Perspective. (3) Formerly 263B. One 3-hour lecture-discussion per week. Designed for students planning to do perinatal program development or research. Perinatal outcome variables and their measurement, factors that affect the quality of outcome and strategies to improve perinatal outcome will be considered. Readings address both national and international issues. (F) Gould

264. Application of Genetics to Maternal and Child Health. (3) Two 1-hour lectures/discussions per week. Basic principles of, and recent advances in, genetics, and their application to health care professionals. Topics will include drug management, fitness, nutrition, etc., as they relate to aging; how service providers have developed health promotion and related programs for the elderly; and critical aspects of genetic counseling. Activities may include field interviews of elderly persons in a variety of settings to identify health needs. (F) Pasick

267A-276B. Clinical Aspects of Human Genetics. (3) Formerly 258A-258B. One 3-hour lecture per week. Prerequisites: Consent of instructor. An examination of genetic and biochemical characteristics of human disease, with special emphasis on the delineation of human genetic diseases, including chromosomal abnormalities and polygenic disorders. Genetic diagnoses, clinical management, and developmental aspects of disease states.

270. 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-based 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; specifically policy, program goals, local needs assessment and evaluation of programs. Then takes a closer look at the contemporary community mental health environment, impacts of recent budgetary policy shifts, a profile of community needs, and projections of future trends and policy options. (SP) Morgan

280. Research Methods: Logic and Design. (3) Two 1-hour lectures-discussions per week. The study of logic, theory, concepts, and methods of behavioral research as they apply to public health. (F) Brudol

281. Research Methods: Program Evaluation. (3) Two 1-hour lecture-discussions per week. The study of concepts, methods, and evaluation research as they apply to public health. (SP) Rundall

283. Advanced Methods: Field Applications. (3) One 3-hour lecture-discussion per week. Critical analysis of selected research topics in health, including approaches to conceptualizing research on particular issues, methodological problems in planning and conducting field investigations, and management of large-scale research projects. (F) Margen

284. Advanced Methods: Interpretive Research. (3-4) One 3-hour lecture-discussion per week and one optional 3-hour laboratory per week. Prerequisites: Doctoral student in Public Health or a related discipline, or consent of instructor. The study of observational and

*Not offered 1988-89
*On leave, spring
*Rescued to active service
*Recipient of Distinguished Teaching Award

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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 attitudes and approaches to Indian health problems. The course is intended to draw students from all disciplines within the School of Public Health so they can share their diverse perspectives in resolving specific Indian health problems. (SP)Duhl

272. Aging: Value and Social Policy Issues. (3) One 3-hour lecture/discussion per week. Prerequisites: Graduates standing in public or related discipline. This seminar examines key issues and themes central to understanding the complex linkages between public health education, public policy, 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: the scope of hazards faced by workers; an overview of social, legal, and political issues that impact occupational safety and health; health education programs designed to prevent occupational illness and injury; and practical skills for planning and implementing effective occupational health programs. (SP) Baker
Field Major in Social Sciences: The Major Program

The field major in social science is especially devised for students who are interested in a liberal arts education in the social sciences. The major combines breadth—courses chosen from a number of disciplines—with a student area of concentration tailored to the individual student. The major students are responsible for developing their own program of studies with the advice and approval of a faculty member of the Stu- dent Senate who will act as their official adviser.

The field major is administered by a faculty advisory committee and is one of the programs of the Division of Undergraduate Studies.

Admission to the Major: Students will be considered for the social science field major by competitive application. Applicants are expected to have completed the equivalent of Social Science 103A-103B, Theory, Methods, and Applications of the Social Sciences. The unsuccessful application of the social sciences to specific problems in contemporary society. (F,SP) Staff

Field Major Office: Undergraduate Interdisciplinary Studies (Division of Undergraduate Studies), 301 Campbell Hall, 642-0108

Professors: Kenneth T. Jowitt, Ph.D. (Divisional Dean)

Lecturers: Gerald J. Cavanaugh, Ph.D. (Robert Ehrlich, Ph.D. Earl Klee, Ph.D. Kathleen Moran, Ph.D. Gary P. Wren, Ph.D.

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H195. Honors Thesis. (4) Individual conferences. Prerequisites: Senior in the honors program; completion of 100B; at least 9 upper division units in history and the social sciences. Entails writing a bachelor's thesis pertaining to the student's individual area of concentration within the social sciences 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: Must have completed 80 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.

198. Directed Group Study for Upper Division Students. (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

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, 642-4541
Dean: Harry Specht, Ph.D.

Professors:
Eileen Gambrill, Ph.D. University of Michigan. Child welfare, mental health
Robert Pruger, D.S.W. University of California at Berkeley. Social administration
Kermit T. Wiltse, D.S.W. (Emeritus) University of Rochester. Economics and social service
Yu Wen Ying, Ph.D. University of California at Berkeley. Clinical psychology, immigration and refugees

Lecturers:
Paul Neil, D.S.W. University of California at Berkeley. Social policy and planning
Richard P. Barth, D.S.W. University of California at Berkeley. Human development in the social environment
Mary Ann Mason, J.D. University of San Francisco, Ph.D. College of Letters and Science. Research and statistics

Senior Lecturers:
Joseph M. Mixon, Ph.D. University of California at Berkeley. Social policy and administration

Lecture:
C. Angela Browne, D.S.W. University of California at Berkeley. Employee services policy and practice

Graduate Program

For program description, see page 85.

Lower Division Courses

20. Social Problems and Social Welfare: A View Through Literature. (2) One 2-hour seminar per week. (F,SP) Staff

210. Topics in Human Development. (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 psychological and social perspectives. (F,SP) Smelser

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) Smelser

212. Infant Development. Topics and issues in infant development, including infant mental health, parent-child relationships, behavior assessment, predictors of disturbance, and intervention with high risk infants. (SP) Richins

2120. Aging Processes. Sociological, psychological, and physiological variables relevant to the assessment of older persons. (SP)

*Not offered 1989-90
*On leave, spring
*Recalled to active service
*Recipient of Distinguished Teaching Award
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 formulation, critical examination, and redefinition of clinical case studies and psychobiographies. (F) Runyan

210E. Human Development and Social Policy. Selected topics in human development and their relevance for social planning and administration. Attention to topics such as child welfare 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—those significant others associated with a person. In terms 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 welfare policy, their development and repression of 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 providing 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; how optimum solutions to such problems are determined; new directions in the roles of community mental health workers.

226. 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) Robinson

227. Advanced Study in Aging Policy. (2) One 2-hour lecture per week. Advanced study in special programs and policy areas.

230. Social Policy: Children and Families. (2) One 2-hour lecture per week. Introduction to current problems, programs, and policies. (SP) Runyan

231. Advanced Study in Children and Family Policy. (2) One 2-hour lecture per week. Advanced study in special programs 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) Mason

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) Mason

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)

238A. Social Welfare in the Workplace. Course reviews characteristics of and controversies in modern employment welfare services. Examines employer-sponsored programs in mental health, substance abuse, family counseling, and day care. Analysis of benefit plan design. (F) Browne

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 subsequent treatment/intervention strategies. Focus on alcohol abuse and on individual and social control mechanisms of 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) Midanik

238C. Health Policy—A Social Welfare Perspective. Major issues relevant to 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) Engel

239B. Women's Issues. The changes in the roles of women will be examined. Major 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 analytical framework to investigate impact on women. (F) Grossman

240. Introduction to the Field of Social Welfare and the Profession of Social Work. (1) New course. Fifteen hours of lecture per week. Course examines the history, development, and mission of the field and profession, fundamental social work tasks, and the organizational contexts of practice. (F) Specht


243. Topics in Direct Practice. (2) former 298. Social work with Groups. (1-2) Theory and practice regarding the formation, sustenance, and termination of groups. Emphasis on the role of the social worker in facilitating interpersonal processes in groups. (SP) Segal

250A. Social Work with Groups. (1-2) Theory and practice regarding the formation, sustenance, and termination of groups. Emphasis on the role of the social worker in facilitating interpersonal processes in groups. (SP) Segal

250B. Family Therapy. (2) One 2-hour lecture per week. Prerequisite: 242 or consent of instructor. Theoretical frameworks and intervention skills for family work. (FSP) Peakin

250C. Brief Therapy and Crisis Intervention. (2) One 2-hour lecture per week. Prerequisite: 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) Smelser

250D. Psychotherapeutic Methods with Adults. (2) One 2-hour lecture per week. Prerequisite: 242 or consent of instructor. Treatment planning and applications for clinicians. Examines supportive treatment, depression and suicide management, and other advanced techniques for establishing and maintaining helping relationships. (F) Segal

250E. Social Work with Adolescents. (2) One 2-hour lecture per week. Prerequisite: 242 or consent of instructor. Examines the psychotherapeutic interactions of the therapist, child, and parents. Topics include the form the basic knowledge and repertoire of skills for clinicians working with children. (F) Wallerstein

250F. Social Work with Children. (2) One 2-hour lecture per week. Prerequisite: 242 or consent of instructor. Examines the psychotherapeutic interactions of the therapist, child, and parents. Topics include the form the basic knowledge and repertoire of skills for clinicians working with children. (F) Wallerstein

250G. Social Work with Adolescents. (2) One 2-hour lecture/discussion per week. Prerequisite: 242 or consent of instructor. Examines the psychotherapeutic interactions of the therapist, child, and parents. Topics include the form the basic knowledge and repertoire of skills for clinicians working with children. (F) Wallerstein

250H. Health and Aging. (2) One 2-hour lecture/discussion per week. Prerequisite: 242. Course addresses the dynamics and problems of families as the underlying theoretical orientation. Emphasis is placed on the role of family and their families. Emphasis given to the biopsychosocial model of assessment and treatment and the impact of the health care system on the elderly. (F) Dunkel

250I. Intervention with Adult Families. (2) Formerly 298. 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. Emphasis will be on the structure of 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 after the parents become dependent in later life. (SP) Runyan

250K. Social Work Practice with Sexual Problems. (1) One 2-hour lecture per week for 7½ weeks. Prerequisite: 242 or consent of instructor. Skills applicable to sex-related concerns encountered in social work practice. Emphasis will be on the etiology of sexual problems; explores treatment modalities. (SP) Runyan

250L. Child Welfare Practice. (2) One 2-hour lecture per week. Prerequisite: 242 or consent of instructor. Examines the role of the child welfare worker. Examines permanency planning as a guiding framework. (F) Barth

250M. Curriculum and Career Counseling in Schools. (1) Fifteen hours of seminar per semester. This course is designed to help students meet the counseling and curriculum development competencies of the P.P.S. credential in school social work. Emphasizes 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) Barth

250N. Social Work with Chronically Mentally Ill Adults. (2) Formerly 298. One 2-hour seminar per week. Prerequisite: 242. Course will focus on the methods for the assessment and treatment of disturbed and deficient adolescents. Psychosocial, psychodynamic, sociocultural and ecological perspectives on adolescents will be examined. A variety of early intervention and treatment modalities will be examined. (SP) Segal

250S. School Social Work. (2) One 2-hour lecture/discussion per week. Prerequisite: 242. Addresses the competency requirements for the California Pupil Personnel Credential. Examines the organizational context of school social work; practice with children; practice with parents, children, and youth in the school context; issues of child abuse and handicaps; psychosocial and educational assessment; and career and curriculum counseling. (FSP) Segal

250T. Treatment of Children and Youth. (2) One 2-hour lecture/discussion per week. Prerequisite: 242 or consent of instructor. Examines treatment methods used to help children and youth. The practice framework presented in this course is designed to help children and their families learn cognitive and social skills to achieve dis...
Social Welfare / 365

250U. Substance Abuse Treatment. (2) One 2-hour lecture per week. Prerequisite: 242. Course provides an introduction to the history, theories, and methods of substance abuse treatment. Focus on the assessment and treatment of substance abuse problems. The bulk of the course will be devoted to the disease model and the interactional, behavioral, and psychological theories currently used in the diagnosis and treatment of substance abuse disorders. Though the bulk of the course will be devoted to the disease model and the interactional, behavioral, and psychological theories currently used in the diagnosis and treatment of substance abuse disorders, some attention will be given to prevention and epidemiology. Emphasis will be placed on the unique practice role of social work in the prevention/intervention of substance abuse problems. (F) Kramer

252. Social Agency Management. (2) One 2-hour lecture per week. Basic theories, areas of knowledge, and practice skills for the administration of human services. Topics include program development and implementation, relationships with community groups, staff development, supervision, training and finances. (SP) Kramer

254A. Program Development and Proposal Writing. (2) One 2-hour lecture per week. Prerequisite: 252. Principles and methods of program design and proposal writing. (SP) Kramer

254B. Efficiency in Social Welfare Administration. (2) One 2-hour lecture per week. Prerequisite: 252. Theories of organization and practice of administration. Special problems of power, conflict, and change in human service organizations. (SP) Pruger

254C. The Good Bureaucrat. (2) One 2-hour lecture per week. An analysis of the problems and opportunities faced by service bureaucracies. Addresses the question: How can the professional manage the bureaucratic environment of service giving rather than be managed by it? (F) Pruger

254D. The Management Cycle. (2) One 2-hour lecture per week. Prerequisite: 252. Basic skills in human service agency planning, budgeting, monitoring, and assessment of results. (SP) Pruger

254E. Boards, Legislators, and Volunteers. (2) One 2-hour lecture per week. Prerequisite: 252 or consent of instructor. Study of the structure, function, and dynamics of task groups; various concepts of leadership; board-executive and professional-volunteer relationships, techniques and skills for conducting meetings, conferences, and workshops. (SP) Sandra

255. Social Welfare Planning. (2) One 2-hour lecture per week. Principles and methodology of the social planning process. Focus on: general planning, budgeting, social research. Topics include: program development and implementation, relationship with community groups, staff development, supervision, training and finances. Individual consultation. (SP) Gilbert

256A. Topics in Social Welfare Planning: Community Planning. (2) One 2-hour lecture per week. Prerequisite: 256. Theory and practice of planning as an organizational, socio-political, and technical process. Examines roles, tasks, and value choices. Compares alternative systems of planning. (SP)

270. Access to Human Services Among Low-Income and Minority Populations. (2) One 2-hour seminar per week. Examines how services can be made effective and appropriate for minorities and the poor. Problems of utilization will be considered with respect to: cultural beliefs and expectations; self-help and in-digent care; and the design of service systems. Focus on health care, mental health, and services for children and families. (F) Snowden

272. Conceptualizing Mental Health Interventions with Ethnic Minority Populations. (2) One 2-hour seminar per week. Course examines mental health and mental health services. Emphasis is on: 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) One 2-hour seminar per week. Overview of immigration policy in the U.S., its historical and international perspective, and 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 research and treatment models and issues in devising cross-cultural intervention strategies. (SP) Colón

275. Racial, Ethnic, and Cultural Factors in Social Welfare. (2) One 1-hour lecture per week plus one 1-hour discussion section per week. Course emphasizes cultural factors in social work, with emphasis on Asian, minority groups, the impact of social institutions on ethnic groups, and the role of social workers in rendering agency and case practice responsive to cultural diversity. (SP) Snowden, Gibbs

276. Social Work Practice with Families and Children. (2) One 2-hour lecture per week. Prerequisites: 242 or consent of instructor. Course focuses on the assessment and treatment of Asians, blacks, Hispanics, and American Indians. While the major emphasis is on families, the course also addresses issues of the child welfare, health care, and juvenile justice systems. Issues of access and utilization will also be explored. (F) Gibbs

277. Seminar in the History and Philosophy of Social Welfare. (2) One 2-hour seminar per week. Emphasis is on the linear stochastic specification; the reason why one should expect squares estimates are desirable— the Gauss-Markov theorem; sampling distribution, testing, and the goodness-of fit of OLS estimates; detection and treatment of problems associated with regression analysis such as serial correlation, measurement error, multicollinearity, and nonlinearity. (F) Miller

280. Introduction to Social Welfare Research. (2) One 1-hour lecture and one 1-hour discussion per week. Introduction to theory and practice of research in social work. (SP) Miller

282A-282B. Seminar in Social Welfare Research. (2-2) One 2-hour seminar per week. Prerequisite: 280. Problem formulation, design, and implementation. (SP) Snowden, Gambill, Gilbert, L. Miller

287. Library Research in Social Welfare. (1) Must be taken on a satisfactory/unsatisfactory basis. Two 2-hour sessions per week for the first three weeks of the fall semester. Primarily for doctoral students. A systematic introduction to secondary and tools of library research in social welfare: reference works, finding references to books, articles, and data. Attention to historical sources, current data flow and storage, and arrangements for collecting and retrieving information. (F)

288. 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. Supervised practical experience in the writing, criticizing, and editing articles, reports, or student papers. Attention to formal organization, style, selection of material for publication, and preparation of manuscripts. (SP)

289A. 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 statistical inference. (SP)

289F. Inferential Statistics. (2) One 2-hour lecture per week. Prerequisites: 289A. This is an intermediate-level course in statistical concepts, methodology, and application of statistical inference. Topics include probability, random variables, statistical distributions, descriptive statistics, hypothesis testing, t-tests, F-tests, and chi-square tests. (SP)

295C. Introduction to Regression. (2) One 2-hour lecture per week. Prerequisites: 289A, 289B. Course addresses: the linear stochastic specification; the reason why one should expect squares estimates are desirable— the Gauss-Markov theorem; sampling distribution, testing, and the goodness-of fit of OLS estimates; detection and treatment of problems associated with regression analysis such as serial correlation, measurement error, multicollinearity, and nonlinearity. (F) Miller

296. Community Organizing. (2) One 2-hour lecture per week. Introduction to the theory and practice of community organization. (SP)

297. Individual Study for Graduate Students. (1-12) Course may be repeated for credit. One unit will be awarded for each four hours per week of practicum work. Prerequisites: Consent of instructor. Supervised field work in social agencies. Taken in the first semester of the M.S.W. program. (F) Grossman

298. Group Study for Graduate Students. (1-12) Course may be repeated for credit. One unit will be awarded for each four hours per week of study work. Prerequisites: Consent of instructor. Intensive examination of selected social welfare topics. (F,SP) Grossman

301. Training in Teaching. (1-4) 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. (3) 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 responsibilities in social work through University-based seminars, agency visits, 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. Regularly scheduled field work and group meetings. (F,SP) Grossman

403. Training in Research. (1-4) 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. (1-8) 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 with the major advisor, intended to provide an opportunity for qualified students to prepare themselves for the rigorous examinations required of candidates for the Ph.D. in Social Work. May be used for units of residence requirements for the doctoral degree. (F,SP)

Interdepartmental Studies Courses

Undergraduate Courses

IDS 111A-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 (i.e., 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. Co-sponsored by: Optometry, Physiology-Anatomy, Public Health, Social Welfare. (F,SP) Timmins, Minkler

IDS 119. Multidisciplinary Studies and Field Experience in Aging. (2) New course. Seven weeks of one 2-hour seminar each week and a total of six hours of field work. Prerequisites: Library Research in Social Welfare. Prerequisites: Consent of instructor. Class size limited to 15. Designed for student standing and consent of instructor. Study of adults 70 and older. Students will visit older patients from a local geriatric clinic and confer with clinic staff. One hour weekly seminar consists of a lecture by faculty on aging from a specific discipline. The other hour is

*Not offered 1989-90
*On leave, spring
*Recalled to active service
*Recipient of Distinguished Teaching Award
devoted to a case presentation by students on a patient's condition. Course grade based on student participation and a final paper demonstrating understanding of the illness and its relationship to the patient's life, family, and social system. Students are expected to attend all lectures and participate actively. No substitute for the instructor's lectures is available.

Stanley Lieberson, Ph.D. University of Chicago. Race/ethnicity, demography, research procedure.


H. Franz Schumann, Ph.D. Harvard University. Organizations, cities, China, America.

Russell Thornton, Ph.D. Florida State University. Historical demography, demography of the Indian and African American communities.

Kenneth E. Bock, Ph.D. (Emeritus) University of California at Berkeley. Demography, social security.


Kingsley Davis, Ph.D. (Ford Professor of Sociology and Comparative Studies) (Emeritus) Harvard University. Demography, family, urbanization, population.

Vorlham Eberhard, Ph.D. (Emeritus) Berlin University. Chinese sociology.


Leo Lowenthal, Ph.D. (Emeritus) University of Frankfurt. Culture, literature, theory.

Philip Selznick, Ph.D., Dr. Jur. h.c. (Emeritus) Columbia University. Theory, law, organizations/institutions.

Associate Professors:

Victoria E. Bonnell, Ph.D. Harvard University. Historical, labor, Soviet Union.

Nancy J. Chodorow, Ph.D. Brandeis University. Feminist theory, family, psychoanalysis.

Thomas Gold, Ph.D. Harvard University. Modernization/development, comparative, China.

Harry Edwards, Ph.D. Cornell University. Race, sport, family, ethnic relations.

Jerome Karabel, Ph.D. University of California, Education, stratification, intellectuals, political.

Ann Swidler, Ph.D. University of California at Berkeley. Culture, religion, theory, organizations.

Assistant Professors:

Tomas Simmons, Ph.D. University of California at Berkeley. Race, stratification, Chicano studies, sexuality.

Martin Sanchez-Jankowski, Ph.D. Massachusetts Institute of Technology. Development, political, urban, youth.

Kim Voas, Ph.D. Stanford University. Labor, movements, historical methods.

Visiting Professor:

Wolfgang Schlicchter, Ph.D. Free University of Berlin. Visiting from University of Heidelberg. History, theory of sociology.

Adjunct Associate Professors:

Carolee Hurst, Ph.D. California University at Berkeley. Medical, adult development, aging.

James Wiley, Ph.D. Vanderbilt University. Methods, medical, family.

Affiliated Professors:

Reinhard Bendix, Ph.D. (Emeritus) (Political Science) University of Chicago. Theory, political, Germany, intellectuals.

Glenn Carroll, Ph.D. (Business Administration) Stanford University. Organizations, methods, ecology, urban.

W. Reginald K. City (Regional Planning) University of Paris. Urban politics, economic, technology.

W. Russell Ellis, Jr., Ph.D. (Architecture) University of California at Berkeley. Race, ethnicity, social location factors in design.

Gail Lapidus, Ph.D. (Political Science) Harvard University. Sociology, political movements.

S. J. Schurmann, Ph.D. (Emeritus) University. Theory, law, organizations/institutions.

Sheldon L. Meisnger, Ph.D. (Law) University of California at Los Angeles. Criminal justice, theory.

Philippine Nonet, Ph.D. (Law) Jurisprudence, sociology of law.

Leonard J. Pearl, Ph.D. (Psychiatry) University of California at San Francisco. Conceptualization, psychoanalysis.


Jerome S. Klein, Ph.D. Yale University. Criminal justice.

Practical work experience, criminal justice, law enforcement, public policy.

Ph.D. City (Regional Planning) University of Paris. Urban politics, economic, technology.

W. Russell Ellis, Jr., Ph.D. (Architecture) University of California at Berkeley. Race, ethnicity, social location factors in design.

Gail Lapidus, Ph.D. (Political Science) Harvard University. Sociology, political movements.

S. J. Schurmann, Ph.D. (Emeritus) University. Theory, law, organizations/institutions.

Sheldon L. Meisnger, Ph.D. (Law) University of California at Los Angeles. Criminal justice, theory.

Philippine Nonet, Ph.D. (Law) Jurisprudence, sociology of law.

Leonard J. Pearl, Ph.D. (Psychiatry) University of California at San Francisco. Conceptualization, psychoanalysis.


Jerome S. Klein, Ph.D. Yale University. Criminal justice.

Practice and modern sociological methods.

M.A. Degree Requirements. Eight courses taken for a wiser letter grade are required, as follows:

1. Sociology 101A-101B and a third course in either statistics or logic

2. Three additional courses which must be upper division sociology courses numbered 102A-190, or graduate sociology courses (subject to instructor approval)

3. Three more courses which must be upper division sociology courses numbered 102A-190, or graduate sociology courses (subject to instructor approval)

4. One 90 or 190.

Hons. and Honors. Majors who enter their senior year with a 3.3 grade-point average overall and a 3.3 grade-point average in the major may join the honors program, after petitioning by taking Sociology H190A-190B, Senior Honors Theses 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, cultural behavior, culture, demography, development, deviance, education, economy, 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 10, except those applying for a fellowship, who must apply by January 5. 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 Aptitude Test of 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. Eight courses taken for a letter grade are required, as follows:

1. Sociology 201A and 201B

2. One additional course from the categories may be applied to the eight-course requirement. No units in Sociology 295, 296, 301, 401, 601, or 602 may be applied to the eight-course requirement. No units in Sociology 295, 296, 301, 401, 601, or 602 may be applied to the eight-course requirement. No courses for the M.A. may be taken satisfactory/unsatisfactory.

The Major

Students intending to major in sociology are advised to prepare themselves by taking background courses 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 either 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 101A-101B.

Upper Division. A student must take the following courses:


3. Three additional courses which must be upper division sociology courses numbered 102A-190, or graduate sociology courses (subject to instructor approval)

4. One course in either statistics or logic
Upper Division Courses

101A. Sociological Theory. (5) Three hours of lecture and two hours of 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 title will vary. Undergraduate study in subfields of sociological theory. The course will prepare a general background in social theory. Consult instructor as to whether 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 of discussion per week. Prerequisites: 5 or consent of instructor. Problems of research design, measurement, and data collection, processing, and analysis will be considered. Attention will be given to both qualitative and quantitative studies.

106. Intermediate Sociological Methods. (5) Three hours of lecture and two hours of 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 methodological and/or analysis. Recommended for students interested in graduate work in sociology or research careers.

110. Organizations and Institutions. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. Administrative organizations and voluntary associations; systems and institutions in industry, government, religion, and education.

111. Sociology of the Family. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. The course will locate the place of religious consciousness in human action and then survey comparatively and critically the role that religion has played in human society. It will include a general theory of the nature of religious experience, religious symbolism, and the basis of religious community.

112. Sociology of Religion. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. The course will locate the place of religious consciousness in human action and then survey comparatively and critically the role that religion has played in human society. It 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. Educational systems in relation to the religious, cultural, economic, and political forces shaping their character.

114. Sociology of Law. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. Selected legal rules, principles, and institutions treated from a sociological perspective. Influence of culture and social organization on law; role of law in social change; social aspects of the administration of justice; social knowledge and the law.

115. Deviance and Social Control. (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.

116. Industrial and Occupational Sociology. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. The labor force; social control within and of occupations and professions (professionalization, occupational associations vs. labor unions, codes of ethics, legal controls); social structure of the work-place, work experience of the participants, relation of this to social structure and functions; male-female role contrasts, race and sport; economics of sport; the roles of coach, athlete, fan—their interrelationships and complexities; current turmoil in sport and the ideological struggle which has emerged.

117. Sport As a Social Institution. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. Analysis of sport as social institution, its structure and functions; male-female role contrasts, race and sport; economics of sport; the roles of coach, athlete, fan—their interrelationships and complexities; current turmoil in sport and the ideological struggle which has emerged.

118. Comparative Institutions. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. Comparison of selected social institutions; their relation to ideas and social change.

125. Urban Sociology. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. The nature of problems, causes, consequences, and solutions in urban areas; social and demographic characteristics of urban populations.

126. Population. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. Population as an important perspective in the study of sociology. Population in historical context as well as detailed coverage of population problems in contemporary society including population growth and the economy, aging of populations, contraceptive revolution, suburbanization, and environment.

130. Social Stratification. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. Recent trends in occupational stratification; social classes in local communities and the nation as related to interest organizations.

131A. Race and Ethnic Relations: The U.S. Experience. (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 comparisons with the present and past patterns in the United States. Emphasis on social, 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 focus of attention, depending on instructor. The course will cover more technical issues in quantitative research methods introduced in 105, and will include, according to discretion of instructor, a practicum in methodological and/or analysis. Recommended for students interested in graduate work in sociology or research careers.

131B. Race and Ethnic Relations: International Comparisons. (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 comparisons with the present and past patterns in the United States. Emphasis on social, economic, political, institutional, social psychological, and demographic processes.

133. Gender and Society: The Sociology of Women. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. The position of women in American society examined from standpoint of socialization and role analysis; family, subcultures, and social change, and personal experience.

134. Gender and Society: The Sociology of Men. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. The position of men in American society examined from standpoint of socialization and role analysis; family, subcultures, 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; includes traditions of Western thought and the role of institutions, patterns of social change, contemporary social/political movements, socialization and the development of individual identity, and the implications of evolving public attitudes.
140. Political Sociology. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. Political processes in organized groups, the social bases 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. 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. Policy making on three 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 currents, economic 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, psychoanalytic analysis, 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 the development and growth of personality, and of varieties of personality, as a consequence of social experience and an evaluation of social-psychological 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 status relations, communication, coalitions, 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 or 3 or consent of instructor. Study of human meanings systems, particularly as manifested in art, literature, music, and other media. Includes study of the production, reception, and aesthetic experience of cultural forms.

162. Sociology of Literature. (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 Moral Philosophy. (4) Students who have taken 158 (quarter system) will receive no credit for this course. 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.

166. 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 as well as the ways through which they spread; their meaning for individuals and institutions.

171. Historical Sociology. (4) Three hours of lecture per week. Students who have received credit for former 171 will receive no credit for this course. Prerequisites: 1 or 3 or consent of instructor. Study of the major concepts, problems and works of scholarship in the field of historical sociology, with attention to such topics as industrialization, revolution, transformation of social structure, social life, political authority, institutions and culture viewed from an historical and comparative perspective.

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 Asia, Africa, and Latin America.

180. American Sociology. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. African examples and American examples of how each sector is influenced by policy currents, economic trends, and social conflicts. Thought reform (i.e., coercive "brainwashing") and terrorism are addressed.

181. Soviet Society. (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. Various aspects of the class system, economic life, nationality groups, the family, education, demographic factors; comparison of communist social structure with the West.

186. Irish Society. (4) New course. Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. An introduction to Ireland since the 1840 famine. Aspects of the social structure, economy, demography, politics, and religious institutions are covered. Special emphasis is given to the causal factors and consequences of the division between Northern Ireland and the Republic.

189. Selected Topics in Area Studies. (4) New course. Course may be repeated for credit when subject changes. Three hours of lecture per week. Prerequisites: 1 or 3 or consent of instructor. There will be a variation in areas studied, depending on the instructor in charge. Possibilities include concentration on one society or a particular aspect of one society, consideration in depth of specific theoretical or methodological issues within area studies, or comparative regional studies.

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. Advanced study in sociology, with specific topics to be announced at the beginning of each semester.

H190A-H190B. Senior Honors Thesis and Seminar. (H190A: 4 units; H190B: 5 units.) Credit and grade will be assigned only upon completion of the full sequence. All students preparing for individual conferences. Prerequisites: Restricted to senior honors candidates. Intensive study of individual topic to provide background for honors thesis which is completed during the second semester of the sequence. Group and individual conferences.

197. Field Study in Sociology. (1-4) Course may be repeated for credit. Must be taken on a pass/No Credit basis. Individual conferences. Prerequisites: 1 or 3 and consent of instructor. Supervised experience relevant to specific aspects of academic or professional training. Individual arrangements with faculty sponsor and written reports required.

198. Directed Group Study for Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a pass/No Credit basis. Individual conferences. Prerequisites: 1 or 3 and consent of instructor. Group studies of selected topics which vary over time.

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a pass/No Credit basis. Individual conferences. Directed individual study in special topics approved by the division.

Graduate Courses

201. Sociological Theory. (4) Four hours of lecture per week. Prerequisites: Consent of instructor. Representative of major theoretical traditions in sociology will be examined historically and critically. An effort will be made to identify the recurrent substantive and methodological issues that arise in sociological theorizing. This is the required M.A. theory course.

202. Advanced Study in Sociology Theory. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. Particular theorists or theoretical traditions will be selected for intensive study, according to the interests of the instructor. Graduate students must take at least one such 202 before taking the qualifying examination.

203. Classical Sociological Theory. (3)

208. Contemporary Sociological Theory. (3)

202C. Systematic Sociological Theory. (3)

205. Supervised Preparatory Course Work. (3) Individual conferences, as well as class attendance. Prerequisites: Consultation with and approval of regular faculty to be responsible. Introductory study of a sociological field, among those listed in the 280 series, including participation in the appropriate undergraduate course in that field and also including individual meetings with the faculty sponsor and additional requirements as stipulated by that sponsor.

205A. Law and Deviance. (3)

205B. Race and Ethnic Relations. (3)

205C. Political Sociology. (3)

205D. Organizations. (3)

205E. Industrial Sociology. (3)

205F. Family and Life Cycle. (3)

205G. Social Stratification and Class Analysis. (3)

205H. Development and Modernization. (3)

205I. Religion. (3)

205J. Urban Sociology. (3)

205K. Social Psychology. (3)

205L. Gender. (3)

205M. Culture. (3)

205N. Education. (3)

205O. Health and Medicine. (3)

205P. Area Studies. (3) Section may be repeated for credit as topic varies.

271A-271B. Methods of Sociological Research. (3) Credit and grade to be assigned at the end of each semester. Four hours of lecture per week. Prerequisites: Consent of instructor. A two-semester sequence course in teaching research methods currently employed in sociological research. The methodological issues involved in sociological research will be examined historically and critically. An effort will be made to identify the recurrent substantive and methodological issues that arise in sociological theorizing. This is the required M.A. methods course.
272. Directed Group Studies for Graduates. (1-9) Course may be repeated for credit. Prerequisites: Consent of instructor. Group studies of selected topics which vary from year to year.

299. Individual Study and Research. (1-9) Course may be repeated for credit. Prerequisites: Consent of instructor. Individual conferences.

601. Individual Study for Master's Students. (1-12) Course may be repeated for credit. Prerequisites: Consent of instructor. Individual study for the master's requirements in consultation with the adviser. May not be used to meet either unit or residency requirements for the master's degree.

602. Individual Study for Doctoral Students. (1-12) Course may be repeated for credit. Prerequisites: Consent of instructor. Individual study for the doctoral degree.

Professional Courses

301. Professional Training: Teachers. (3-6) Units may not be used to meet unit or residency requirements for 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. May not be used to meet unit or residency requirements for either the master's or doctoral degree.

South and Southeast Asian Studies

(College of Letters and Science)

Department Office: 1203 Dwinelle Hall, 642-4546
Chair: Amin Sweeney, Ph.D.

Professors:
George F. Dales, Ph.D. University of Pennsylvania. South Asian archaeology
Robert P. Goldman, Ph.D. University of Pennsylvania. Sanskrit literature, Indian epics
George L. Hart, III, Ph.D. Harvard University. Tamil language and literature
P.S. Jaini, Ph.D. University of London. Buddhism, Jainism, Hinduism
J.F. Steal, Ph.D. University of Madras. Comparative philosophy, Sanskrit, ritual
Amin Sweeney, Ph.D. University of London. Malay language and literature, oral tradition

Associate Professors:
Bruce R. Pray, Ph.D. University of Michigan. Hindi/Urdu language and literature
Barend A. van Norden, Ph.D. University of California. Sanskrit, grammar, linguistics, paleography

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. Annamalai University. Tamil language and literature
Usma R. Jain, M.A. University of California. Hindi language
Sally Sutherland, Ph.D. University of California. Sanskrit language, Indian mythology

Major Advisers: Hindi-Urdu, South Asian Civilization, Mr. Pray; Sanskrit, Mr. Goldman; South Asian Archaeology, Mr. Dales; Tamil, Mr. Hart; Malay-Indonesian, Mr. Sweeney.

Graduate Advisers: R.P. 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. Instruction includes a) intensive training in several of the major languages of the area: Sanskrit (including Buddhist Sanskrit), Pali and Prakrit, Hindi and Urdu, Tamil, Malay-Indonesian, and Thai; b) specialized training in literature, philosophy and religion, and archaeology; and c) general cross-disciplinary studies of the civilizations of South and Southeast Asia.

The program maintains a balance between ancient and modern studies and between linguistic and cultural research. Students may be awarded the B.A. and B.S. degrees in South and Southeast Asian studies, or they may pursue the M.A. and Ph.D. degrees in the field. The department also offers a graduate major in South and Southeast Asian studies.

Graduate study in South and Southeast Asian Studies 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 this field. Both M.S. and Ph.D. programs are available. For admission the student must have a bachelor's degree in South and Southeast Asian studies 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.

Study in South and Southeast Asian Studies offers opportunities to study problems of increasing food and fiber production and maintenance of these at high levels without adverse effects on the soil and plant ecosystem. The principal lines of study in this field include the following:

- **History and Culture:** The study of the historical and cultural development of South and Southeast Asia, including the study of prehistory, ancient and medieval history, and modern history.
- **Language and Literature:** The study of the languages and literatures of South and Southeast Asia, including the study of Sanskrit, Pali, Hindi, Urdu, Tamil, Malay, and other South and Southeast Asian languages.
- **Archaeology:** The study of the material culture of South and Southeast Asia, including the study of prehistoric and ancient sites, artifacts, and monuments.
- **Philosophy and Religion:** The study of the philosophical and religious beliefs and practices of South and Southeast Asia, including the study of Hinduism, Buddhism, Islam, and Christianity.
- **Economics and Politics:** The study of the economic and political systems of South and Southeast Asia, including the study of agriculture, trade, and governance.
- **Environmental Studies:** The study of the environmental challenges facing South and Southeast Asia, including the study of climate change, natural resources, and biodiversity.

South and Southeast Asian Studies offers a comprehensive approach to the study of the region, integrating the various disciplines and perspectives to provide a deep understanding of the complex and diverse societies of South and Southeast Asia.
tural disciplines. Programs of study thus can be devised to fit 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 Asia Studies and the South and Southeast Asia Library Service and are closely related to the interdisciplinary Group in Buddhist Studies Ph.D. program.

**Major Program**

A major is offered in South and Southeast Asian studies with emphases in South Asian language, archaeology, or civilization, and Southeast Asian language (Malay-Indonesian).

**South Asia**

General requirements for the South Asian emphases are:

- Lower division: (1) South Asian 1A-1B; (2) South Asian 5A-5B.
- In addition, specific requirements for each South Asian emphasis as follows:

  **I. South Asian Language**

  **A. Hindi-Urdu**
  - (1) Hindi-Urdu 1A-1B; (2) Hindi-Urdu 100A-100B; (3) South Asian 124; one other South Asian literature course in translation or an advanced Hindi-Urdu literature course; (4) South Asian 127; South Asian 131; (5) six upper division units to be chosen from Lists I 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 I through V below; (4) Linguistics 5 is recommended; (5) South Asian 127 and South Asian 131 are optional.
  - C. Tamil:
    - (1) Tamil 1A-1B; (2) Tamil 100A-100B; (3) South Asian 127; South Asian 131; (4) 12 upper division units to be chosen from Lists I 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 133 or Anthropology 134; prerequisite, consent of instructor; (3) nine upper division electives to be chosen from Lists I 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 chosen as follows:
    - (a) one literature course from List I below;
    - (b) one course in religion or philosophy from List II below;
    - (c) one course in history or social science from List III below;
    - (d) one course in the area from List IV below;
    - (e) six upper division units to be chosen from Lists I through V below; (f) South Asian 127; South Asian 131.

  Courses recommended for fulfillment of the upper division unit requirement for the South Asian emphases.

  **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 105A, 105B, History 114A-114B; Anthropology 114; Political Science 145A, 145B.

  **List IV. Fine Arts:** History of Art 136A, 136B; Music 133A, 133B.

  **List V. Archaeology:** Relevant courses in archaeology, geography, geology, statistics, or other departments as the student's specific field of archaeology.

  With written permission from the student's advisor, other relevant courses may be substituted for not more than two of the courses listed above, particularly in the event that certain of these courses may not be offered each year or new courses may be added to the curriculum. For the language emphases, a minimum of two upper division courses in literature in translation must be taken in fulfillment of the general upper division requirement.

**Southeast Asia**

**Southeast Asian Language: Malay/Indonesian**

General requirements for the Southeast Asian language emphasis are: lower division: Southeast Asian 10A-10B; Linguistics 5. Specific requirements are as follows:

- (1) Malay/Indonesian 1A-1B; (2) Malay/Indonesian 100A-100B; (3) Malay/Indonesian 122, 123, 124; (4) six upper division units to be chosen from Lists I through V below.

  **List I. Religion and Philosophy:** South Asian 127, 129, 131, 140, 155.

  **List II. Social Science:** Anthropology 160, 161 (with consent of instructor); Anthropology 185, 186; Geography 163; Political Science 143C, 143D.

  **List III. Fine Arts:** History of Art 137; Music 133A, 140 (with consent of instructor).

  With written permission from the student's advisor, other relevant courses may be substituted for not more than two of the courses listed above, particularly in the event that certain courses may not be offered each year or new courses may be added to the curriculum.

**Honors Program.** To be eligible for admission to the honors program, a student must attain a 3.5 grade-point average or higher in courses completed in the major and a 3.3 grade-point average in all courses completed in the University. An honors thesis is required. Students who wish to participate must choose a thesis topic in consultation with their major adviser and apply for admission to the program through the department office no later than the first week of spring semester of the senior year. Additional information concerning the honors program is available in the departmental office, 1203 Dwinelle.

**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 archaeology, 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 area studies. Students in general are 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 without credit toward the M.A. unit requirement.

The M.A. degree is offered under Plan II (see Index under Graduate Division) which requires the student to take courses totalling at least 24 upper division and graduate units. The M.A. degree must be completed by the student. The distribution of courses is determined in consultation with the graduate adviser, following the special requirements for each emphasis. All M.A. 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, German, French, Japanese, Russian. For the Malay/Indonesian emphasis, the student must pass a reading exam in Dutch. The language required for admission to the M.A. program may be offered one time in addition. In the case of the Malay/Indonesian emphasis, the student must complete the reading requirement, a semester of fieldwork, and a final oral examination or by earning a satisfactory grade (B- or better) in relevant course work. For the Malay/Indonesian emphasis, the language is to be chosen from Sanskrit; Arabic, or other major Indonesian language; Thai.

Before being admitted to the comprehensive examination, students are required to submit to the graduate adviser two acceptable scholarly papers, one to be prepared in conjunction with SSEAS 294, and to fulfill the language requirements.

Students must then successfully complete three written examinations, one in a given field and two in areas of specialization (toward which they have directed their reading and course work) and a final oral examination.

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 in the appropriate field. Students without such an M.A. degree would 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 emphases will complete a coursework requirement in Indo-Eu-

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 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 Ph.D. candidacy, the student must have completed three
graduate units of the department 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, and Russian. Under special circumstances students may offer another language with the approval of the advisor. 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 or her program, and must pass a written and oral qualifying examination in three fields of specialization. One of these fields may be in an area other than literature.

These languages will normally be selected from the following: classical Malay literature, traditional drama, oral literature, Indonesian literature, Malay-Indonesian literature, dialect studies; outside the department are classical Dravidian linguistics, Vedic, Prakrit, the Sanskrit grammarians; outside the department examples are classical Vedic, Prakrit, the Sanskrit grammarians; outside the department the maj or field adviser, intended to provide an opportunity for qualified students to prepare themselves for the major examinations required for candidates for the Ph.D. (F, SP)

200A. South Asian Studies. (1-8) (F, SP)
200B. Tamil. (1-8) (F, SP)
200C. Hindi-Urdu. (1-8) (F, SP)
200D. Malay-Indonesian. (1-8) (F, SP)
200E. Southeast Asian Studies. (1-8) (F, SP)

Graduate Courses

200. 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: For or consent of instructor. An introduction to the use of computers for students in SSEAS. The course will cover the special needs of students in our department and will involve use of our departmental multi-user microcomputer. (SP)

201. Special Studies. (1-5) Course may be repeated for credit. Individual conferences. Students may enroll in more than one section of 250, but the total number of units of Special Study in any one semester may not exceed 12. (F, SP)

202A. South Asian Studies. (1-5) (F, SP)
202B. Tamil. (1-5) (F, SP)
202C. Hindi-Urdu. (1-5) (F, SP)
202D. Malay-Indonesian. (1-5) (F, SP)
202E. Southeast Asian Studies. (1-5) (F, SP)

202F. Sanskrit. (1-5) (F, SP)

204. Department Colloquium in South and Southeast Asian Studies. (3) Two-hour seminar per week. Preparation and discussion of research papers in the area of South or Southeast Asian studies. Topics at School each year in consultation with faculty and students. Papers are presented at weekly meetings during the spring semester. (SP) Staal

209. Dissertation Preparation and Related Research. (1-8) Course may be repeated for credit. Must be taken on a satisfactory/un satisfactory basis. Prerequisites: Advanced Candidate with consent of instructor and graduate advisor. Normally reserved for students directly engaged in writing the doctoral dissertation. (F, SP)

209A. South Asian Studies. (1-8) (F, SP)
209B. Tamil. (1-8) (F, SP)
209C. Hindi-Urdu. (1-8) (F, SP)
209D. Malay-Indonesian. (1-8) (F, SP)
209E. Southeast Asian Studies. (1-8) (F, SP)
209F. Sanskrit. (1-8) (F, SP)

201. Individual Study for Masters Students. (1-8) Units may not be used to meet either unit or language requirements for a master's degree. Course may be repeated for credit. Must be taken on a satisfactory/un satisfactory basis. Individual conferences. Prerequisites: For candidates for master's degree. Individual study for the comprehensive or language requirements in consultation with the graduate advisor. (F, SP)

201A. South Asian Studies. (1-8) (F, SP)
201B. Tamil. (1-8) (F, SP)
201C. Hindi-Urdu. (1-8) (F, SP)
201D. Malay-Indonesian. (1-8) (F, SP)
201E. Southeast Asian Studies. (1-8) (F, SP)
201F. Sanskrit. (1-8) (F, SP)

202. 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/un satisfactory basis. Individual conferences. Prerequisites for doctoral degree. Individual study in consultation with

Hart

210. 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 Indus Valley and Brahmanic civilization to the advent of Islam. Special emphasis on the development of religious, philosophical, and artistic systems of traditional India. (F, SP) Hart

211. 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 Bhakti and Indian Islam and the conflict of traditional and modern values in contemporary India. (SP) Pray

5A. Great Books of India. (4) Three 1-hour classes and one two-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, SP) van Nocten

5B. India in the Writer's Eye. (4) Three 1-hour classes and one two-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) Hess

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 traditional India. Readings in translation and important secondary works on the psychology of Indian culture, and selected works from the psychoanalytic literature. (F) Goldman

110A-110B. Origins of South Asian Civilization. (3,3) Students who have taken South Asian 193A-193B will receive credit for 110A-110B. Three 1-hour lectures per week.

112. 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

113. South and Southeast Asian Studies / 371

121. India and its Ancient Written Legacy. (3) New course, see catalogue. Three 1-hour lectures per week. Literary works of ancient India are read in English translations and studied critically. The course aims at giving a comprehensive picture of many important areas of the Indian literary heritage that are normally omitted in general courses. (SP) Dales

van Nocten

122. 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 Indus Valley and Brahmanic civilization to the advent of Islam. Special emphasis on the development of religious, philosophical, and artistic systems of traditional India. (F, SP) Hart

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 Bhakti and Indian Islam and the conflict of traditional and modern values in contemporary India. (SP) Pray

5A. Great Books of India. (4) Three 1-hour classes and one two-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, SP) van Nocten

5B. India in the Writer's Eye. (4) Three 1-hour classes and one two-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) Hess
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 stress the historical development of Indian society and culture through literature. (F, Pray)

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 Epics including the Gita. These will be supplemented with translations of writings of modern scholars on Hindu castes and the formation of various cults within the tradition. (F, Pray)

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)

130. History and Structure of South Asian Languages. (3) Three 1-hour classes per week. Relationship of Indo-Aryan to Indo-European languages. Linguistic development of old Indo-Aryan (Vedic and Sanskrit), Middle Indo-Aryan (Prakrit, Avadhamas) and modern Indo-Aryan languages. The rise of literary languages. South Asia as a linguistic area. (Pray)

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 traditions. The vocabulary of the historical development of the Buddhist sangha and its impact on the peoples of South and Southeast Asia. (SP)

137. Cinema and Society: India. (3) Two 1½-hour lectures per week. The course will study 1) the place 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 but excludes others, and the profound effect of this naming and exclusion on the lives of Indians. Reading in contemporary fiction and drama; films by Raj Kapoor, Shyam Benegal, and Satyajit Ray; slides of traditional and contemporary architecture, classical and modern painting.

139. Women in India: Religion and Society. (3) Three 1-hour lectures per week. Besides studying a wide variety of material on images, definitions, roles, and activities of women, we will ask ourselves how it is possible to study "women in India," and we will consider how to relate western feminist understandings with Indian traditional and feminist viewpoints. (Hess)

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, SP)

141. Religion in South India. (3) Two 1½-hour classes per week. The development and practice of religion in South India. Emphasis on themes sources translated directly from Indian languages. Subjects covered include: the indigenous religion, the effect of Brahmical religion, bhakti movements, and the practice of Hinduism in modern South India. (Hart)

149. 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 Hindi-Urdu as taught in the department.

155. Philosophy of India. (3) Two 1½-hour classes per week. The philosophy of India, Hindu, and Buddhist, beginning with the Vedic period and concentrating on the classical systems. (F, Staal)

165. India’s Most Popular Epic: The Rāmāyaṇa as Literature, Performance, Scripture and Ideology. (3) Three 1-hour class plus one 2½-hour lecture per week. In its Sanskrit and vernacular versions, the Rāmāyaṇa 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 Rāmāyaṇa is and how it lives in the culture. (Hess)

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 reading from both canonical and non-canonical sources, notably the Acaranga, Uttaradhyayana, Samayasara and Tatvarthasutra, and relevant commentaries in Sanskrit. (Jaini)

205. Indian Paleography. (3) Course may be repeated for credit. Three hours of lecture per week. A survey of the paleographical materials in South and Southeast Asia and readings from early inscriptions in various Indian alphabets. 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. (van Nooten)

212. Indian Philosophical Texts. (3) Course may be repeated for credit. One 1½-hour class plus one 1-hour class per week. Prerequisites: Some knowledge of Sanskrit. Reading of Sanskrit texts on Indian philosophy (e.g., Vedanta, Mimamsa, Yoga, Nyaya). (Staal)

215A-215B. Readings in Indian Buddhist Texts. (3, 3) Course may be repeated for credit. One 1-hour class and one ½-hour class per week. Prerequisites: Introduction to Indian religions. Two 1½-hour classes per week. One year of Sanskrit and/or consent of instructor. A survey of the origins and development of the Abhidharma texts and commentaries in Pali and Sanskrit. (FSR, Pray)

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. (Jaini)

253. Seminar in South Asian Archaeology. (3) Course may be repeated for credit. Two 1½-hour classes per week. Prerequisite: 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. (Dales)

257. Archaeological Project in South Asia. (12) Course may be repeated for credit. Students may receive credit for 297 after taking South Asian 110A-110B (or equivalent), courses in archaeology, anthropology, natural science, or other related subjects. Forty hours field work 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, Dales)

Southeast Asian

Lower Division Courses

10A-10B. Introduction to the Civilization of Southeast Asia. (3, 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 1-hour meetings per week. Prerequisites: To be taken in conjunction with 10A-10B. The intention of this lower division seminar is to improve the ability of students to discuss and present papers on a number of selected topics concerning the languages, literatures and cultures of the Malay world. (Staff)

Upper Division Courses

122. Authors and Audiences in the Malay World. (3) Three hours of lecture per week. Lectures, readings (in translation), and tapes. Survey of palace and folk traditions with emphasis on the interface between orality and literacy, schemata of composition, aural consumption and the rhetorical framework. (Sweaney)

123. The Poetry of Indonesia and Malayasia in Translation. (3) Three hours of lecture per week. Survey of the traditional and modern poetry of the area. Oral and written poetry. The concepts “poetic” and “prosaic.” Traditional functions of poetry in storytelling, instruction, magic and preservation of knowledge. Antecedents and development of modern poetry. Rhetoric of poetry. (Sweaney)

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 genres. 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. (Sweaney)

128. Introduction to Modern Indonesian and Malayasian Literature. (3) Three 1-hour classes per week. This course will examine the role of contemporary literature in Indonesian/Malaysian society. Emphasis on the socio-political aspects of this literature in historical context. Genres discussed will include poetry, the novel, the short story, and drama. (F, Staff)

Hindi-Urdu

Lower Division Courses

1A-1B. Introductory Hindi and Urdu. (5,5) 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. Sequence begins fall. (F,SP)

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. (5,5) 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 and/or Urdu 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. (F, Pray)
215. Urdu Poetry. (3) Course may be repeated for credit. Two 1/2-hour classes per week. Prerequisites: Two years or equivalent of Hindi-Urdu and a good knowledge of Urdu script. Readings and analysis of Urdu poetry from both the classical and the modern periods, with emphasis on the classical Urdu ghazal. (SP) Pray

220. The Hindi Short Story. (3) Course may be repeated for credit. Three 1-hour classes per week. Prerequisite: 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) Pray

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 a complete major Hindi novel. Other readings will include criticism, literary history and translations of other novels. (SP) Pray

Sanskrit

Lower Division Courses

101A-101B. Elementary Sanskrit. (3-3) Two 2-hour lectures, one hour of lecture and one 1-hour lab per week. Elements of Sanskrit grammar and practice in reading Sanskrit texts. (F,SP) Sweeney

101A-101B. Intermediate Sanskrit. (3-3) Three 1 1/2-hour classes per week. Prerequisites: 100B. Readings from the Sanskrit epics and Puranas; introduction to the Kavya style of classical Sanskrit poetry; readings in the Sastras. (F,SP) Staff

103. Conversational Sanskrit—Second Year. (2) Two 1-hour meetings per week. Prerequisites: Concurrent enrollment in 1A-1B. Practice of spoken Sanskrit as a supplement to Intermediate Sanskrit. (F,SP) Staff

Graduate Courses

200A-200B. Sanskrit Literature. (3-3) Course may be repeated for credit. Two 1 1/2-hour classes per week. Prerequisite: 101B or equivalent. Advanced readings in Sanskrit literature, including Sanskrit ornate poetry with emphasis on the canon 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 Brahmanas 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 (ghnya) 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. (SP) Staff

206. 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) van Nooten

207. Sanskrit Philosophical Texts. (3) One 3-hour seminar or two 1 1/2-hour seminars per week. Reading of a Sanskrit philosophical, logical, or grammatical text with attention to philosophical, logical, or grammatical features. Text to be chosen in consultation with students. (SP) Staff

208. Buddhist Sanskrit. (3) New course. Course may be repeated for credit. Two 1 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

Tagalog

Lower Division Courses

1A-1B. Introductory Tagalog. (5-5) New course. Five 1-hour classes plus one hour of laboratory per week. A systematic introduction to the grammar, sentence patterns, and essential vocabulary of modern standard Tagalog. Emphasis is placed on extensive practice in idiomatic Tagalog conversation, with additional practice in reading and writing Tagalog. (F,SP) Staff

100A-100B. Intermediate Tagalog. (5-5) Five 1-hour lectures plus 1-hour laboratory per week. Prerequisites: Tagalog 1A-1B or equivalent. The goal of this course is to enable students to increase their proficiency in Tagalog to at least the Intermediate-High Level of the national ACTF Proficiency Guidelines. While speaking and listening comprehension will be stressed, training in reading and writing Tagalog will be an integral part of this instruction. Films and video/audio will supplement written tests. (F,SP) Staff

Tamil

Lower Division Courses

1A-1B. Introductory Tamil. (5-5) Five 1-hour classes per week. The grammar of modern Tamil will be covered followed by readings in simple texts. Practice will also be given in spoken Tamil. (F,SP) K. Hart

2. Conversational Tamil. (2) Two 1-hour meetings per week. Prerequisite: Concurrent enrollment in Introductory Tamil. Practice of spoken Tamil as a supplement to Introductory Tamil.

Upper Division Courses

100A-100B. Intermediate Tamil. (5-5) Five 1-hour or three 1 1/2-hour classes per week. Prerequisites: 18B. Readings from modern Tamil fiction; practice in speaking and composition; consideration of advanced topics in grammar. (F,SP) Staff

102. Conversational Tamil—Second Year. (2) Two 1-hour meetings per week. Prerequisite: Concurrent enrollment in 1A-1B. Practice of spoken Tamil as a supplement to Intermediate Tamil. (F,SP) Staff

Graduate Courses

210A-210B. Seminar in Tamil Literature. (3-3) Course may be repeated for additional credit with consent of instructor. Three 1-hour classes plus one hour of laboratory per week. Prerequisites: Concurrent enrollment in 1A-1B. Practice of spoken Tamil as a supplement to Intermediate Tamil. (F,SP) Staff

Thai

Lower Division Courses

1A-1B. Introductory Thai. (5-5) Five 1-hour classes per week. Survey of grammar, graded exercises, readings drawn from Thai literature, leading to a mastery of basic grammatical patterns, essential vocabulary and achievement of basic reading and writing competence. (F,SP) Staff

2. Conversational Thai. (2) Two 1-hour meetings per week. Prerequisite: Concurrent enrollment in Introductory Thai. Practice of spoken Thai as a supplement to Introductory Thai.

Upper Division Courses

100A-100B. Intermediate Thai. (5-5) Five 1-hour or three 1 1/2-hour classes per week. Prerequisites: Concurrent enrollment in 1A-1B. Practice of spoken Thai as a supplement to Intermediate Thai. (F,SP) Staff

Graduate Courses

210A-210B. Seminar in Thai Literature. (3-3) Course may be repeated for additional credit with consent of instructor. Three 1-hour classes plus one hour of laboratory per week. Prerequisites: Concurrent enrollment in 1A-1B. Practice of spoken Thai as a supplement to Intermediate Thai. (F,SP) Staff

Malay/Indonesian

Lower Division Courses

1A-1B. Introductory Indonesian. (5-5) Five 1-hour classes plus 1-hour of laboratory per week. Survey of grammar, graded exercises, and readings drawn from Indonesian literature, leading to a mastery of basic grammatical patterns, essential vocabulary and achievement of basic reading and writing competence. (F,SP) Staff

2. First-Year Indonesian/Malay Conversation and Composition. (2) Two 1-hour meetings per week. Prerequisite: Concurrent enrollment in 1A or 1B. Practice in spoken and written Indonesian/Malay as a supplement to Introductory Indonesian.

Upper Division Courses

100A-100B. Intermediate Indonesian and Malay. (5-5) Five 1-hour classes plus 1-hour of laboratory per week. Prerequisites: 1A-1B. Representative readings in Malay and Indonesian 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) Charles

102. Second-Year Indonesian/Malay Conversation and Composition. (2) Two 1-hour meetings per week. Prerequisite: Concurrent enrollment in 100A or 100B. Practice in spoken and written Indonesian/Malay as a supplement to Intermediate Indonesian and Malay.

103. Readings in Modern Indonesian and Malaysian Literature. (3) Three 1-hour classes per week. Prerequisites: Two years of Malay/Indonesian or consent of instructor. This course covers Indonesian and Malaysian literature of the twentieth century. Selected texts will be studied, including such genres as the novel, the short story, and poetry. (F) Staff

104. Tamil Studies. (3) Three 1-hour lectures per week. Prerequisites: 100A or 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 Tamil. (F,SP) Staff
resonant readings in Thai 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 Thai—Second Year. (2) Two 1-hour meetings per week. Prerequisites: Concurrent enrollment in 100A-100B. Practice of spoken Thai as a supplement to Intermediate Thai. Staff

Interdepartmental Studies Courses

Graduate Courses

IDS 255A-255B. Eastern Frontiers of the Classical World. (4-4) Cr. 1-4 per quarter. 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 Indus Valley and the valleys of Central Asia. Sponsoring departments: Near Eastern Studies and South and Southeast Asian Studies. Dales, Stronach

Spanish and Portuguese

(College of Letters and Science)

Department Office: 4319 Dwinelle Hall, 642-0471
Chair: Jerry R. Craddock, Ph.D.

Professors:

Arthur L. Askins, Ph.D. University of California, Berkeley
Spanish, Portuguese Renaissance poetry

Jerry R. Craddock, Ph.D. University of California, Berkeley
Spanish philology, medieval literature

Oho G. Nwogwu, Ph.D. Harvard University, Modern Spanish literature

Jose Duran, Doctor en Filosofia, University of San Marcos.

Spanish American Colegio life

Charles B. Faubert, Ph.D. Yale University, Medieval Spanish literature

John H. Pott, Ph.D. University of California, Berkeley
Modern Spanish literature

Candace Slater, Ph.D. Stanford University, Contemporary Hispanic literature

John K. Walsh, Ph.D. University of Virginia, Medieval Spanish poetry

G. Arnold Chapman, Ph.D. (Emeritus)

Luis Monguio, Licenciado en Derecho, L.L.D. (Emeritus)

Artemio T. Amado, Ph.D. Johns Hopkins University,

Spanish Golden Age literature

Anthony J. Caram, Ph.D. Harvard University, Spanish Golden Age literature

M. Gwen Kirkpatrick, Ph.D. Princeton University, Modern American literature

Francisco R. Masiello, Ph.D. University of Michigan, Spanish American literature

Asst. Professor:

Ignacio E. Navarrete, Ph.D. Indiana University, 16th-century poetry and literary theory.

Lecturers:

Hernania Jiménez Kerr, M.A. University of California at Berkeley

Lyris Wiedemann, Ph.D. Stanford University

Major Advisers: Option A: Mr. Durand, 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 competence in written and spoken Spanish or Portuguese, through an acquaintance with the structure and history of one or both of these languages and with 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 and literature and between Peninsular and Hispanic-American facets of a unified field.

The Major in Spanish

Option A: Spanish and Spanish American

Lower Division. Courses 1, 2, 3, 4, and 25 (or their equivalents). Students transferring from other institutions with advanced standing and intending to major in Spanish must present evidence (by examination or otherwise) that their preparation includes the equivalent of Spanish 25.

Upper Division. A minimum of 28 units of upper-division work in the department, including the core courses Spanish 100, 102A-102B, 104A-104B, 107A-107B; four elective courses. (i.e., upper-division courses in Spanish other than core courses) taken under the following conditions: Spanish 100 to be completed before enrollment in any of the elective courses, Spanish 102A-102B, 104A-104B, 107A-107B to be completed before enrollment in any elective course in Spanish American or Spanish literature, respectively; and Spanish 142, 147, and 197 not to be included as one of the four. With the approval of the major adviser, one upper-division course in Brazilian, Catalan, or Portuguese literature may be substituted for one of the four elective courses. In addition, students are required to complete two courses (upper- or lower-division) specifically related to the major but outside the department. Students will normally complete the core courses in the first two semesters of upper-division study and the elective courses within the department in the following semesters: Recommended: Further study in Western European and Latin American history, languages, and literatures.

Candidates for the teaching credential in Spanish as a single subject are advised to include courses 112, 113, and 125 in their program.

Option B: Spanish, Spanish American, and Luso-Brazilian

Lower Division. Courses Spanish 4 (or equivalent) and Portuguese 4 (or equivalent). Students transferring from other institutions with advanced standing and intending to enroll in the program must present evidence (by examination or otherwise) that their preparation includes the equivalents of Spanish 4 and Portuguese 4.

Upper Division. A minimum of 28 units of upper-division work in the department, including the core courses Spanish 100, Portuguese 104 and 107, two courses from the series Spanish 104A-104B, and 107A-107B. In addition, upper-division courses in Spanish/Portuguese language and/or literatures, but excluding Portuguese 101A-101B, 102, and 144, and Spanish 142, 147, and 197. Portuguese 104 and 107 should be completed before enrollment in other elective courses in Portuguese or Brazilian literature, respectively. Students are required to complete two courses (upper- or lower-division) specifically related to the major but outside the department, unless these courses would bring the total work for the major to more than 60 units.

Honors Program. To be admitted to the honors program in Spanish, Option A or Option B, students shall have completed at least two semesters of work on this campus with an overall grade-point average of at least 3.0 and a grade-point average of at least 3.3 in courses in the major. Students must also have the approval of the major adviser in consultation with other members of the department.

Students admitted to the honors program must complete, preferentially before, but not later than, the first semester of the junior year, seven courses for either Option A or Option B, or give evidence, by special examination, of equivalent preparation. Students passing an examination in lieu of any of the required courses will be deemed to have satisfied the corresponding requirement for the major, though without obtaining unit credit.

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-H195B for Option A, Portuguese 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 Language and Literatures; Minor in Luso-Brazilian Language 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 and Spanish 197 may not be offered in satisfaction of the elective portion of the minor programs.

The Minor in Spanish Language 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 Spanish language and/or literatures, selected in consultation with the minor program adviser.

Minor in Luso-Brazilian Language 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 literatures (excluding Portuguese 101A-101B, 102, and 144), selected in consultation with the minor program adviser.

Graduate Program

Preparation for Graduate Study. Students who may wish to pursue work toward advanced degrees in the department should note that one semester of course Latin (or equivalent) is prerequisite for such work, while a minimum of one year of college Latin (or equivalent) is strongly recommended. They should note that the M.A. degree program in Spanish also requires a reading knowledge of another language, that the Ph.D. degree program in Romance Languages and Literature requires a reading knowledge of Latin, French, and Italian, besides Spanish; and that the Ph.D. degree program in Hispanic Languages and Literatures requires a reading knowledge of Latin, French, and one additional modern foreign language pertinent to Hispanic scholarship.

Students other than Berkeley A.B. Spanish majors applying for admission to graduate work in the Department of Spanish and Portuguese should have an undergraduate preparation reasonably approximating that of the undergraduate major in Spanish at Berkeley.
The M.A. Program. The requirements for an M.A. degree in Spanish are an A.B. degree with a major in Spanish equivalent to the undergraduate major in Spanish at the University of California, Berkeley (Option A) or a corresponding major in Portuguese (Option B). No specific courses are required, but students, in consultation with a graduate advisor, 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 written examination or an appropriate course work in the others. A reading knowledge of German is recommended. The precise nature of the qualifying examination will depend on the student's choice of two alternative plans of preparation, both of which require knowledge of the literature and applied philology of Spanish and Spanish American literature and familiarity with Roman philology, with emphasis on Spanish. Plan I further requires a knowledge of a second Romance language as a collateral, and it 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 philological should see the statement under Roman Philology.

 ii. The Program in Hispanic Languages and Literature. 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, of which at least 27 units (or the equivalent) must be in strictly graduate courses; (c) work at an advanced level in an appropriate collateral subject (literature or linguistics) and (d) at least one college semester of Latin, or the equivalent, in the university of second language (Latin). There are no specific courses or unit requirements within the program, but in preparing to take the qualifying examination to advance to candidacy, the student will fulfill the following requirements, by means of course work or examination unless otherwise indicated: (1) a comprehensive knowledge of Spanish and Spanish American or of Luso-Brazilian languages, literature, and general linguistics. (The chair, in consultation with the student's graduate advisors, will appoint a committee which, during the student's first term in the program, will evaluate previous preparation and determine what additional courses and/or examinations, if any, will be required); (2) a reading knowledge of Latin, French, and one additional modern foreign language pertinent to Hispanic scholarship; (3) a knowledge of the history of the Spanish or the Portuguese language. The qualifying examination will test the student's knowledge of a specific, emphasized field to be selected in consultation with the graduate advisor from among the following: medieval Hispanic literature, Spanish and Spanish American literature (16th-19th century), modern Spanish literature, Brazilian literature, and Portuguese literature, and Hispanic linguistics. The examination will also test the student's knowledge of selected collateral subjects pertinent to the main field.

Spanish

Lower Division Courses

1. Elementary Spanish. (5) Students who have taken Spanish 14A may not receive credit for Spanish 1. Not open to students who have completed two years or more of high school Spanish, or to nationals of Spanish-speaking countries. Five 1-hour classes and 1½ hours of laboratory per week. Introduction to Spanish grammar, vocabulary, and customs. (F,SP)

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. 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 students who have completed three years or more of high school Spanish, or to native speakers. (F,SP)

2G. Beginning Spanish for Graduate Students. (0) Preparation for the Graduate Reading Examination. (SP)

3. Intermediate Spanish. (5) Course may be repeated. Must be taken on a satisfactory/unsatisfactory basis. Three 1-hour classes per week. Prerequisite: Completion of 1. Not open to students who have completed three years or more of high school Spanish, or to native speakers, (F,SP)

3G. Preparation for the Graduate Reading Examination. (SP)

4. Intermediate Spanish. (5) Three 1-hour classes and 1½ hours of laboratory per week. Prerequisite: 3 or equivalent. Development of grammatical concepts taught in 1-3 and further practice in composition. (F,SP)

5. Advanced Speaking Spanish. (3) Three 1-hour classes and 1½ hours of laboratory per week. Prerequisite: 4 or equivalent. Development of grammatical concepts taught in 1-3 and further practice in composition. 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. A4A: 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)

4A-14B. Individualized Instruction in Elementary Spanish. (1-5) Students who have taken Spanish 1 or 2 may not receive credit for 14A-14B. Hours to be determined on an individual basis. 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. Only for students whose native language is not Spanish. Enrollment limited: 16 students per section. (F,SP)

101B. Survey of Spanish Literature. (3) Three 1-hour classes per week. Prerequisite: 101A. Not open to students who have completed three years or more of high school Spanish. 102A: Not open to students who have completed three years or more of high school Spanish. 102B: Not open to students who have completed three years or more of high school Spanish. (F,SP)

102B. Advanced Grammar and Composition. (3) Three 1-hour classes per week. (F,SP)

104A. Survey of Spanish American Literature. (3) Three hours of lecture per week. Beginnings to 1880. (F,SP)

104B. Survey of Spanish American Literature. (3) Three hours of lecture per week. 1880 to the present. (F,SP)

107A. Survey of Spanish Literature. (3) Three hours of lecture per week. Beginnings to 1700. (F,SP)

107B. Survey of Spanish Literature. (3) Three hours of lecture per week. 1700 to the present. (F,SP)

109. Spanish Drama of the 16th and 17th Centuries. (3) Three hours of lecture per week. (F,SP)

110. The Generation of '98. (3) Three hours of lecture per week. Analysis and discussion of selected works by Unamuno, Azorin, Valles-Inclan, etc. (F,SP)

111A-111B. Cervantes. (3-3) Three hours of lecture per week. Analysis and discussion of selected works by Cervantes, including his dramatic writings. (F,SP)

111C. Studies in Spanish Culture. (3) Three hours of lecture per week. An overview of the culture of Spain, through emphasis on selected topics. (SP)

113. Studies in Latin American Culture. (3) Three hours of lecture per week. An overview of the culture of Spanish America, through emphasis on selected topics. (F,SP)

114. The Contemporary Spanish American Novel. (3) Three hours of lecture per week. (F,SP)

115. Lyric Poetry of the Golden Age. (3) New course. Three hours of lecture/discussion per week. A study of 16th- and 17th-century lyric poetry from the Cancionero of Juan del Encina, through the first wave of Italian influence (Boscan, García), the mystic poets (San Juan, Fray Luis), the second Iberian poets (Hernández), and the great poets of the Baroque (Góngora, Quevedo, Lope de Vega). (SP)

123A-123B. Modern Spanish Prose Fiction. (3-3) Three hours of lecture per week. (Dougherty)

125. Spanish Phonetics. (2) Two 1-hour classes and one 1-hour laboratory per week. Training in phonetic transcription; exercises in laboratory; comparative (English-Spanish) phonetics. (F,SP)

Welsh

*Not offered 1989-90
*On leave, spring
*On leave, fall
*On leave, spring
*Recipient of active service
*Recipient of Distinguished Teaching Award
126. Medieval Spanish Literature. (3) Three hours of lecture per week. Faulhaber

127. Eighteenth-Century Spanish Literature. (3) Three hours of lecture per week. (SP) Pott

128. Contemporary Spanish Literature. (3) Three hours of lecture per week. Developments in Spain's literature since 1939. Dougherty

130. Twentieth-Century Spanish American Poetry. (3) Three hours of lecture per week. (SP) Staff

131. The Spanish American Short Story (Twentieth Century). (2) Two hours of lecture per week. Briefly examines the development of the short story. Dougherty

132. Hispanic Avant-Garde Literature. (3) Three hours of lecture per week. Experiments in poetry, novel, and theater during the 1920s, in Spain, Spanish America, or both. Masieillo

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: Modern Spanish Poetry. Topic for spring 1990: The Post-Civil War Spanish Novel and Film. (F,SP) Dougherty

142. The Spanish American Novel in English Translation. (2) Two hours of lecture per week. Prerequisites: none. Discussion of the Spanish American novel from its beginnings; reading and discussion of selected twentieth-century novels as translated. 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. Topic for Fall 1989: Golden Age Drama. (F) Navarrete

148. Supplementary Work in Upper Division Hispanic Literatures. (1-2) Course may be repeated for credit. To be arranged. Prerequisites: 25 and consent of instructor. Staff

179. Advanced Course in Hispanic Linguistics. (2) Course may be repeated for credit when topic changes. Two hours of lecture/seminar per week. Prerequisites: 120 or equivalent. Graduate standing or consent of instructor. Topic for fall 1989: Book marking and interpretation of the works of Cervantes, such as Galatea, and the dramatic works. Focus will change according to the needs and interests of members of the course, but will address 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. Cascardi

185. Senior Course in Hispanic Literature. (2) Course may be repeated for credit when the topic changes. Two hours of lecture/seminar per week. Prerequisites: Restricted to majors in Spanish with 90 units upper division Hispanic literature courses may satisfy the remaining portion under this heading. (F,SP) Staff

219. Field Studies. (1-4) Course may be repeated for credit. Topic for fall 1989: Translation. Topic for spring 1990: Book marking and interpretation of the works of Cervantes, such as Galatea, and the dramatic works. Focus will change according to the needs and interests of members of the course, but will address 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. Cascardi

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. Students may not receive credit for both Portuguese 201 and Spanish 201. Two hours of lecture per week. A study of grammatical structure, with emphasis on the contrastive analysis of selected aspects of English, Spanish, and Portuguese. Recommended for preparation for the linguistics part of M.A. examination. Azvedo

202A. History of Ibero-Romance. (3) Two or three hours of lecture per week. (F) Craddock

202B. History of Ibero-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. Walsh

222. Major Poets of the Golden Age. (3) Two or three hours of lecture per week. Navarrete

223. Major Dramatists of the Golden Age. (3) Two or three hours of lecture per week. (F) Navarrete

225. The Spanish Enlightenment. (3) Two or three hours of lecture per week. Pott

226. Spanish Romanticism. (3) Two or three hours of lecture per week. Pott

227A. The Spanish Novel Since 1850. (3) Two or three hours of lecture per week. (F) Pott

227B. The Spanish Novel Since 1850. (3) Two or three hours of lecture per week. (SP) Pott

228. Modern Spanish Drama. (3) Two or three hours of lecture per week. Pott

229. Modern Spanish Poetry (After Romanticism). (3) Two or three hours of lecture per week. Dougherty

230. 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 1880-1920, on the poetry of modernismo. Special attention given to the work of Rubén Darío and the heritage of symbolism in Latin America. (SP) Staff

234B. Modern Spanish American Poetry. (3) Three or four hours of lecture per week. Kirkpatrick

238A. Modern Spanish American Prose. (3) Two or three hours of lecture per week. Kirkpatrick

238B. Modern Spanish American Prose. (3) Two or three hours of lecture per week. Staff

240. Techniques of Literary Scholarship. (3) One 2- or 3-hour lecture/seminar per week. Faulhaber

242. Literary Theory and Criticism. (3) Course may be repeated for credit when topic changes. Two or three hours of lecture/seminar per week. (F) Frasso

246. Hispanic Paleography. (3) One 2- or 3-hour lecture/seminar per week. (F) Faulhaber

260. Cervantes. (3) Course may be repeated when topic changes and with permission of instructor. One 2- or 3-hour lecture/seminar per week. Prerequisites: Graduate standing or consent of instructor. Topic for spring 1990: El ingenioso Hidalgo Don Quijote and the heritage of modernismo. Special attention given to the work of Rubén Darío and the heritage of symbolism in Latin America. (SP) Staff

270. The Colonial Period in Spanish America. (3) Course may be repeated for credit. Topic for spring 1990: El ingenioso Hidalgo Don Quijote and the heritage of modernismo. Special attention given to the work of Rubén Darío and the heritage of symbolism in Latin America. (SP) Staff

276A. The Spanish American Novel. (3) One 2- or 3-hour seminar per week. Staff

276B. The Spanish American Novel. (3) One 2- or 3-hour seminar per week. Staff

278. The Literature of a Single Spanish American Country. (3) Course may be repeated for credit when topic changes. One 2- or 3-hour seminar per week. Topic for spring 1990: Peru. (SP) Durand
8. Spoken Portuguese. (4) Five 1-hour lecture/discussion meetings per week. Prerequisites: 2 or equivalent. Course designed to increase vocabulary and to improve listening comprehension, pronunciation accuracy, grammar control, and speaking fluency by means of oral exercises and practice. Some reading/laboratory work required. Not open to native speakers. (F,SP) Staff


12. Intensive Intermediate Portuguese. (5) Five 1-hour classes and two hours of lab per week. Prerequisites: 2 or 11, or equivalent. Continuation of Portuguese 2 or 11. Not open to native speakers. Slater in charge.

26. Advanced Spoken Portuguese. (3) New course. Must be taken on a passed/not passed basis. Three hours of lecture/discussion per week. Prerequisites: Portuguese 11 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. Wiedemann

Upper Division Courses

(Unless otherwise indicated, 20 units or equivalent of another Romance language or pre-requisite are prerequisite to all upper division courses.)

101A. Portuguese for Advanced Students. (3) Three hours of lecture per week. Prerequisites: Credit of 16-20 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 knowledge. In conjunction with 101B, it constitutes an intensive introduction to Portuguese, and prepares the student for further upper division course work. (F) Staff

101B. Portuguese for Advanced Students: Workshop. (2) Two 1-hour workshops per week. Prerequisites: Credit of 16-20 units or equivalent of another Romance language, or consent of instructor. Must be taken concurrently with 101A. No independent registration. This offering may be taken independently for reading knowledge. Taken in conjunction with Portuguese 101A, this course provides an intensive introduction. (F) Staff

102. Readings in Portuguese. (3) Three hours of lecture/discussion per week. Prerequisites: 101A-101B or equivalent. The continuation of Portuguese 101-103. This course focuses on a variety of texts with special emphasis on 20th-century Brazil. Discussion in Portuguese; reinforcement of language skills. (SP) Staff

103. Advanced Grammar and Composition. (3) Formerly 102. Three hours of lecture/discussion per week. Prerequisites: 1-4, 102 or consent of instructor. Advanced work in Portuguese grammatical structures. Practice in writing.

104. Introduction to Brazilian Literature. (3) Formerly 123A-123B. Two 1½-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. (SP) Slater

107. Survey of Portuguese Literature. (3) Formerly 122A-122B. Three hours of lecture per week. Prerequisites: Portuguese 4 or the equivalent. A survey of Portuguese literature from the beginning through the 20th century. (F) Azevedo

113. Brazilian Civilization. (3) Three hours of lecture/discussion per week. An overview of major themes in Brazilian cultural expression with emphasis on the 19th centuries. Discussions in English; readings available in both English and Portuguese. (F) Slater

114. Contemporary Brazilian Novel. (3) Three hours of lecture per week. Slater

125. Camões. (3) Three hours of lecture per week. (SP) Azevedo

126. 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 "Brazilianism" or brasileiridade and on new directions in contemporary poetry and fiction. (F) Slater

135. Studies in Luso-Brazilian Literature. (2-3) Course may be repeated when topic changes. Two or three hours of lecture per week. Topic for fall 1989: The idea of the Amazon. Topic for spring 1990: Modern Portuguese Literature. (F,SP) Slater

144. Modern Brazil Through the Novel. (3) Two 1½-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. Slater

150. Introduction to Portuguese Linguistics. (2) Two hours of lecture per week. Azvedo

180. Special Study for Undergraduates. (2-3) Course may be repeated for credit. Individual conferences. Prerequisites: Twenty units or equivalent of Portuguese or another Romance language. Consent of instructor. Special tutorial or seminar on selected topics. (F,SP) Staff

H195A-H195B. Portuguese Honors Course. (3) Individual conferences. Prerequisites: 20 units or equivalent of Portuguese or another Romance language. Senior honors standing. Limited to senior honors candidates. Directed study centering on the preparation of an honors thesis. (see Honors Program, Option B, above). (F,SP) Staff

199. Supervised Independent Study and Research. (2-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Individual conferences. Restricted to senior honors students with an adequate preparation for the subject proposed for special study, and by previous arrangement with members of the departmental staff. (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. Prerequisite: Spanish 201. A study of grammatical structure, with emphasis on the contrastive analysis of selected aspects of English, Spanish, and Portuguese. Recommended as preparation for the linguistic part of the MA exam. (SP) Staff

275. Critical and Stylistic Studies of a Single Author or Period. (3) Course may be repeated for credit. One, two or three hours of oral study per week. Prerequisite: Graduate standing. 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. (SP) Staff

298. Special Study for Graduate Students. (3-8) Course may be repeated for credit. As topic varies. May be taken in conjunction with 299, but not for credit. Individual conferences. (SP) Staff

Special Programs

(See Undergraduate Interdisciplinary Studies)

Statistics

(See College of Letters and Science)

Statistics / 377

Statistics

Chair: Terence P. Speed, Ph.D.

Professors

David J. Aldous, Ph.D. Cambridge University. Theoretical and applied probability

Robert A. Bern, Ph.D. Johns Hopkins University. Bootstrap, asymptotic theory

Robert P. Beke, Ph.D. University of California at Berkeley. Nonparametric inference, asymptotic methods

Leo Breiman, Ph.D. University of California at Berkeley. Nonparametric inference, asymptotic methods

Robert L. Dobson, Ph.D. University of California at Berkeley. Nonparametric inference, asymptotic methods

John E. Dubins, Ph.D. University of Chicago. Probability theory, intuition geometry

Jacob Feldman, Ph.D. University of California at Berkeley. Statistical inference, probability

Leo A. Goodman, Ph.D., Sc. (hon.) Princeton University. Applied statistics, statistical methods for the social sciences

Joseph L. Hodges, Jr., Ph.D. University of California at Berkeley. Nonparametric inference

Nicholas Jewell, Ph.D. University of Edinburgh. Biostatistics, surveys, geometric probability

Michael Klass, Ph.D. Theoretical and applied probability

Lucien LeCam, Ph.D. University of California at Berkeley. Probability and statistics

David A. Freedman, Ph.D. Princeton University. Statistical methods, stochastic process

David R. Brillinger, Ph.D. Stanford University. Nonparametrics, stochastic processes

Michael S. Perlman, Ph.D. University of Washington. Nonparametrics, stochastic processes

James W. Pitman, Ph.D. University of California at Berkeley. Nonparametrics, survival analysis

Philip Stark, Ph.D. University of California at Berkeley. Inverse problems, computational statistics, data analysis

Ralph G. Strawderman, Ph.D. University of California at Berkeley. Nonparametrics, computational statistics

Johanna R. Schervish, Ph.D. University of California at Berkeley. Inverse problems, computational statistics, data analysis

William G. Kinsman, Ph.D. Stanford University. Probability, stochastic processes

Terry P. Speed, Ph.D. University of California at Berkeley. Statistics, asymptotic theory, nonparametrics, stochastic processes

Graduate Courses

298. Special Study for Graduate Students. (3-8) Course may be repeated for credit as topic varies. May be taken in conjunction with 299, but not for credit. 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. (SP) Staff

103. Survey of Modern Catalan Literature. (3) Course may be repeated for credit as topic varies. Three 1-hour lectures per week. Prerequisites: 1 or 101, or consent of instructor. An introduction to modern Catalan literature from the nineteenth century Renaixença to the present. Azvedo

180. Special Study for Undergraduates. (2-3) New course. Course may be repeated for credit. Individual conferences. Prerequisites: Open to students in charge of or instructor's consent. Special tutorial or seminar on selected topics. (F,SP) Azvedo, Bergmann

Graduate Courses

298. Special Study for Graduate Students. (3-8) Course may be repeated for credit as topic varies. May be taken in conjunction with 299, but not for credit. Individual conferences. Prerequisites: Open to students in charge of or instructor's consent. Special tutorial or seminar on selected topics. (F,SP) Azvedo, Faulhaber

Special Programs

(College of Letters and Science)

(College of Letters and Science)
The Graduate Program

The department offers the M.A., Cand. Phil., and Ph.D. degrees. Information concerning the requirements for these degrees is available in the Handbook, Requirements for Higher Degrees in Statistics, available upon request from the department graduate secretary. For specific details the appropriate department graduate adviser should be consulted.

In addition, the department, in conjunction with the School of Public Health, offers degrees in biostatistics through the Interdepartmental Group in Biostatistics. There are also biostatistics graduate programs in the Schools of Public Health and other schools. These programs are appropriate for students who have either a strong mathematical and statistical background with an interest in biomedical sciences, or in public health sciences, or a major interest in mathematics and statistics. For further information see Biostatistics. For course listings in Biostatistics, see Biomedical and Environmental Health Sciences.

Lower Division Courses

**ONLY LOWER DIVISION STATISTICS COURSE MAY BE TAKEN FOR CREDIT.**

**Stat 2.** No credit allowed if you have credit for 2X, 5, 20, 21, 25

**Stat 2X.** No credit allowed if you have credit for 2, 5, 20, 21, 25

**Stat 5.** No credit allowed if you have credit for 2, 2X, 5, 20, 21, 25

**Stat 20.** No credit allowed if you have credit for 2, 2X, 5, 20, 21, 25

**Stat 21.** No credit allowed if you have credit for 2, 2X, 5, 20, 25

**Stat 25.** No credit allowed if you have credit for 2, 5, 20, 21

Consult the undergraduate nonmajor adviser.

2. **Introduction to Statistics.** (4) Students who have taken 2X, 5, 20, 21, or 25 will receive no credit for 2. Three hours of lecture and two 1-hour laboratory periods per week. Population and variables. Standard measures of location, spread and association. Normal approximation. Simple and multiple regression and correlation. Point and interval estimation. Some standard significance tests. (F,SP) LeCam, Staff


5. **Introduction to Probability and Statistics.** (3) Students who have taken 2X, 5, 20, 21, or 25 will receive no credit for 5. Three hours of lecture per week. Probability models for random experiments. Random variables. Expectation. The normal approximation. Testing hypotheses. Non-parametric tests. Point estimation. Bias and variance of estimates. Ideas of experimental design. Illustrations from many fields. (F,SP) LeCam, Staff

**Stat 20.** Introduction to Probability and Statistics. (4) Students who have taken 2X, 5, 20, 21, or 25 will receive no credit for 20. Three hours of lecture and 1-hour laboratory periods per week. Prerequisites: One semester of calculus. For students with mathematical background who wish to take advanced courses. Probability and random variables, expectation, Variance. Discrete and continuous random variables. Distribution, marjinal probability, probability and marginal distribution, expectations of functions of random variables, joint distribution. Maximum likelihood estimates. Some standard statistical inference. (F,SP) Staff

21. **Introductory Probability and Statistics for Business.** (4) Students who have taken 2X, 5, 20, 25 will receive no credit for 21. Three hours of lecture and one 1-hour laboratory period per week. Prerequisites: One semester of calculus. Descriptive statistics, probability models and related concepts, sample surveys, estimates, confidence intervals, tests of significance, controlled experiments versus observational studies, correlation and regression. (F,SP) Freedman, Staff

21X. **Introductory Probability and Statistics for Business—Self Paced.** (4) New course. Students who have taken 2X, 5, 20, 21, or 25 may not receive credit for 21X. Self-paced. Descriptive statistics, probability models and related concepts, sample surveys, estimates, confidence intervals, tests of significance, controlled experiments versus observational studies, correlation and regression. (F,SP) Staff, Purves

25. **Introduction to Probability and Statistics for Engineers.** (3) Students who have taken 2, 2X, 5, 20, or 21 will receive no credit for 25. Three hours of lecture and one 1-hour laboratory period per week. Prerequisites: One year of calculus. Emphasis on concepts and applications. Conditional probability. Independence. Expectation. Standard discrete and continuous distributions. Regression and correlation. Point and interval estimation. Illustrations from engineering. (F,SP) 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: 101A. 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 50D. Random variables, expectation, variance, normal distribution, the central limit theorem, random vectors, multivariate Normal distribution, conditioning, simulation, and other computer applications.

103B. **Intermediate Introduction to Probability and Statistics.** (4) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisites: 103A. A more thorough treatment of probability method, confidence intervals and tests of hypotheses for normal linear regression models, maximum likelihood and likelihood ratio tests for logistic regression and other discrete empirical linear models, chi square tests for multinominal models, interactive use of computers for statistical analyses.

131A-131B. **Statistical Inference for Social and Life Scientists.** (4;4) Three hours of lecture and two hours of laboratory per week. Prerequisites: One semester of calculus or consent of instructor. Ideas of estimation and hypothesis testing basic to applications. Linear estimation and normal regression theory. (F,SP) Staff

131F. **Statistical Inference for Social and Life Scientists: Accelerated.** (4) Three hours of lecture and one 2-hour laboratory per week. Prerequisites: Math 21X. Accelerated introduction to statistical inference, including point estimation, confidence intervals and tests of hypotheses for normal linear regression models, maximum likelihood and likelihood ratio tests for logistic regression and other discrete empirical linear models, chi square tests for multinominal models, interactive use of computers for statistical analyses.

131A-131B. **Statistical Inference for Social and Life Scientists.** (4;4) Three hours of lecture and two hours of laboratory per week. Prerequisites: One semester of calculus or consent of instructor. Ideas of estimation and hypothesis testing basic to applications. Linear estimation and normal regression theory. (F,SP) Staff

131A-131B. **Statistical Inference for Social and Life Scientists.** (4;4) Three hours of lecture and two hours of laboratory per week. Prerequisites: One semester of calculus or consent of instructor. Ideas of estimation and hypothesis testing basic to applications. Linear estimation and normal regression theory. (F,SP) Staff

131A-131B. **Statistical Inference for Social and Life Scientists.** (4;4) Three hours of lecture and two hours of laboratory per week. Prerequisites: One semester of calculus or consent of instructor. Ideas of estimation and hypothesis testing basic to applications. Linear estimation and normal regression theory. (F,SP) Staff
151B. Applied Statistical Models. (4) Three hours of lecture and one 2-hour laboratory per week. Prerequisites: 101 or 103A or 131A or 134. Theory and practice of sampling from finite populations. Simple random, stratified, cluster, and double sampling. Sampling and unequal probabilities. Properties of various estimators including ratio, regression, and difference estimators. Error estimation for complex samples. (F) Donoho

153. Sampling Surveys. (4) Three hours of lecture and one 2-hour laboratory per week. Prerequisites: 101 or 103A or 131A or 134. Theory and practice of sampling from finite populations. Simple random, stratified, cluster, and double sampling. Sampling and unequal probabilities. Properties of various estimators including ratio, regression, and difference estimators. Error estimation for complex samples. (F) Cheng

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 illustrated by detailed study of examples. (SP) Dubins

156. Bayesian Inference. (3) Three hours of lecture per week. Prerequisites: Statistics 102 or 133B. Common nonparametric tests such as the sign, Wilcoxon, Kruskal-Wallis and rank correlation tests, and rank tests for two samples. Properties of various estimators including ratio, regression, and difference estimators. Exact and asymptotic distribution theory, both in randomization and population models. (SP) Donoho

158. Elements of Nonparametric Inference. (4) Three hours of lecture and one 2-hour laboratory per week. Prerequisites: 101 or 103A or 131A or 134. Theory and practice of sampling from finite populations. Simple random, stratified, cluster, and double sampling. Sampling and unequal probabilities. Properties of various estimators including ratio, regression, and difference estimators. Error estimation for complex samples. (F) Donoho


200A-200B. Stochastic Processes. (3) Course may be repeated for credit with the consent of the instructor. The content of this course changes from year to year. Course topics will be selected from: the general theory of processes, sample function properties, weak convergence, Brownian motion, diffusion processes, Markov processes, martingales, Gaussian processes and further topics. (F,SP) Aldous, Pitman


216A-216B. Theory of Nonparametric Inference and Related Methods. Statistics. (3,3) Three hours of lecture per week. Prerequisites: 210A or equivalent. Theoretical properties of significance tests, estimators and confidence procedures when no specific parametric models is believed to hold. Validity of typical and rank tests, robust estimation, estimates of densities and regression functions, asymptotic optimality. (F,SP) Donoho, Nolan

217A-217B. Asymptotic Methods in Statistics. (3,3) Three hours of lecture per week. Prerequisites: 205A, 210B or 210B. Theory and methods for handling a large number of observations. Topics include asymptotic versions of normal forms, sufficiency, minimax and admissible procedures, empirical measures, maximum likelihood and Bayesian estimates, order methods, and higher order efficiency. (F,SP) Miller, LeCam

220A-220B. Linear Models. (4,4) Three hours of lecture and one 2-hour laboratory per week. Prerequisites: Matrix algebra, a year of calculus, two semesters of upper division or graduate probability and statistics. Theory of linear statistical models. Least squares, R-squared, 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: 230A. Randomization, blocking, factorial design, confounding, fractional replication, analysis of variance, model building, and analysis. Applications. (SP) Cheng

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 an Advanced Level. An advanced introduction, without the use of advanced mathematics, to asymptotics. Emphasis is on intuitive understanding rather than proofs. Topics include: Limits, order comparisons, convergence in probability, and in L1. Local applications; approximate confidence, normal and other approximations to distributions, sample size determination, variance stabilizing transformations. There will be particular emphasis on robustness and asymptotic efficiency. (F,SP) Stone


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. Various continuous and non-normal models and nonparametric estimation of quantities; robust estimation of location and scale parameters. Efficiency comparison with the classical procedures. (F) Hodges


243. Introduction to Time Series. (4) Course may be repeated for credit. Three hours of lecture and two hours of laboratory per week. Prerequisites: A year of upper division probability and statistics. The structure and use of statistical languages and packages. Use of graphical displays in data analysis. Statistical data base management. (F,SP) Bickel

244. Statistical Computing. (4) Three hours of lecture and two hours of laboratory per week. Prerequisites: Knowledge of a higher level programming language. Algorithms in statistical computing: random number generation, other distributions, random sampling and permutations. Matrix computations in linear models. Non-linear optimizations with applications to maximum likelihood and spectral domain. Topics will include estimation of trends and seasonal effects, autoregressive moving average models, forecasting, fitting and validation. The principal models. Planning and design. Difficulties that arise. Usage of statistical computer packages. Presentation of conclusions. (F,SP) Breiman, Friedman

245. Analysis of Time Series. (4) Three hours of lecture and one 2-hour laboratory per week. Prerequisites: 102 or 103B. Frequency-based 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. (F,SP) Bickel, Beran, Sarkar, Millar

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) Klass

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) Bickel, Beran, Sarkar, Millar

272. Statistical Consulting. (3) Course may be repeated for credit. Must be taken on a pass/no credit basis. Prerequisites: Consent of instructor. Special tutorial or seminar on selected topics. (F,SP) Staff

278B. Statistical Research Seminars. (1-4) Course may be repeated for credit. Two or more hours of seminar per week. Special topics, by permission. Prerequisites: Some course work in statistics and occasional lectures on consulting. (F,SP) Staff

279. Statistical Consulting. (1-4) Course may be repeated for credit. Must be taken on a pass/no credit basis. Prerequisites: Some course work in statistics and occasional lectures on consulting. (F,SP) Staff

300. Individual Study Leading to Higher Degrees. (2-12) Course may be repeated for credit. (F,SP) Staff
Subject A: English Composition

(College of Letters and Science)

Office: 216 Dwinelle Annex, 642-5570
Lecturers:
Ruth F. Beames, M.A.
Phyllis Brooks, M.A.
Kimberly S. Davis, M.A. (Academic Coordinator)
Sarena T. Johnson, M.A.
Gail Ollesen-Brun, M.
Armstrong S. Robinson, M. Div.
Stephen K. Tollefson, M.A.

The Subject A Program offers courses in satisfaction of the Subject A requirement. (See "University Requirements" in the section on undergraduate education for additional information.) Auditors are not permitted.

Lower Division Courses

1. Introduction to Language. (2) Three hours of lecture/discussion and one hour of tutorial per week.
Prerequisites: Placement by examination. An introductory course leading to the proficiency in expository writing necessary for successful university work. Lectures, readings, discussions, regular writing assignments focusing on the nature and functions of language. A grade of C or higher fulfills the Subject A requirement. Two units of baccalaureate credit but recognized as four units of workload in computing study list. (F,SP) Staff

2. Introduction to Language—Continued. (Two 1-hour lecture/discussions per week for seven weeks.
Prerequisites: Recommendation of Subject A instructor. An intensive, seven-week continuation course in basic English composition. Lectures, readings, discussions, regular writing assignments. A grade of C or higher fulfills the Subject A requirement. Two workload units in computation of study list. (SP) Staff

3. Introduction to Language—Half Course. (1) Three 1-hour lecture/discussions and 1/2-hour conference/tutorial per week for seven weeks.
Prerequisites: Department approval, based upon student CEEB English Composition Test score in 540-590 range and performance on Subject A Essay Examination. An intensive, seven-week course in basic English Composition. Lectures, readings, discussions, regular writing assignments. A grade of C or higher fulfills the Subject A requirement. Two workload units in computation of study list. (F,SP) Staff

Courses for Non-native Speakers of English

Office: Building T-2241, 642-9575
Lecturers:
Esther Chan, M.A.
Melinda B. Erickson, M.A.
Helen Fajadodka, M.A.
Maria Cecilia Freeman, M.A.
Anne Katz, Ph.D.
Denise Mahon, M.A.
Kimberly S. Davis, M.A. (Academic Coordinator)
Phyllis Brooks, M.A.

Placement in Subject A 30, 30A, or 31 is determined by essay examination. Subject A 35A-35B and 35C are elective courses. Auditors are not permitted.

20. English Composition. (2) Two units of baccalaureate credit, but recognized as 4 units of workload in computing study list. Two 2-hour lecture/discussion classes and one 1-hour tutorial per week. Prerequisites: Placement by examination. A course for non-native speakers of English designed to develop proficiency in expository writing preparatory to work in Subject A 30. (F,SP) Staff

30. English Composition. (2) Two units of baccalaureate credit, but recognized as 4 units of workload in computing study list. Two 2-hour classes and one 1-hour tutorial per week. Prerequisites: Placement by examination. A course for non-native speakers of English—designed to develop proficiency in expository writing preparatory to work in Subject A 1. (F,SP) Staff

35A. Oral Communication. (0) Recognized as two workload units in computing the study list. Two 1/2-hour lecture/discussion classes per week. Work on oral communication skills used in academic settings. (F,SP) Staff

35B. Oral Communication. (0) Recognized as two workload units in computing the study list. Two 1/2-hour lecture/discussion classes per week. Work on oral communication skills used in academic settings. (F,SP) Staff

Interdepartmental Studies Courses

IDS 140. Technical Communication for Non-native Speakers of English. (3) Two 1/2-hour lectures per week. Prerequisites: English 1A or equivalent; 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 College of Engineering. (F,SP) Staff

Undergraduate Interdisciplinary Studies

(Division of Undergraduate Studies, College of Letters and Science)

Division Office: 301 Campbell Hall, 642-0180
Divisional Dean: Kenneth T. Jowitt, Ph.D.

The mission of Undergraduate Interdisciplinary Studies (formerly the Division of Special Programs) is to develop and administer innovative and interdisciplinary courses and programs in the College of Letters and Science that do not belong to a single department. At present Undergraduate Interdisciplinary Studies 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 Sciences. This is a liberal arts major designed for students who want to develop individual areas of specialization 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. Beginning fall semester 1989, students will no longer be accepted in the undergraduate major in genetics. Students interested in genetics should consider Track 3 (systematic biology, pa-
leciology, genetics, and evolution) of the major in integrative biology, or Plan I (emphasis in genetics) of the major in molecular and cellular biology. Students in the College of Letters and Science who have already declared the former genetics major may continue in the program, provided they complete all degree requirements and graduate before fall semester 1993.

Mass Communications. The major applies a range of disciplines in the social sciences and humanities to the understanding of contemporary 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. Beginning fall semester 1989, students will no longer be accepted in the undergraduate group major in neurobiology. Students interested in neurobiology should consider Plan II (emphasis in neurobiology) of the major in molecular and cellular biology. Students who have already declared the former neurobiology major may continue in the program, provided they complete all degree requirements and graduate before fall semester 1993.

Religious Studies. The major provides opportunities for securing a broad background in the liberal arts which will, 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. The 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, Undergraduate Interdisciplinary Studies offers special introductory courses such as Western civilization, listed below.

### Lower Division Courses

**Note:** UGIS 44A, UGIS 44B, and 5-unit sections of UGIS 44C and UGIS 44D satisfy one-half of the L&S reading and composition requirements.

**44A. Topics in Western Civilization. (5) Four hours of lecture and two hours of discussion per week. Pre-requisites: Completion of Subject A requirement. Open to freshmen only. Horneric and Classical Greece, Rome in its transition from republic to empire, and the world of the Middle Ages. 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) Anson, Griffith**

**44B. Topics in Western Civilization. (6) Four hours of lecture and two hours of discussion per week. Pre-requisites: Completion of Subject A requirement, 44A or equivalent; open to freshmen only. Priority given to freshmen who have completed UGIS 44A. Will include the history of the Medieval literature (St. Augustine and Dante) and the history and literature of the Renaissance. 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. (SP) Bouwma, Greenblatt**

**44C. Topics in Western Civilization: The Enlightenment. (4-5) Variable. 4 units: Two 2-hour lectures and one hour of discussion section per week. 5 units: Two 2-hour lectures and two 1-hour discussion sections per week. Pre-requisites: Subject A required; 44A-44B recommended. Beginning with the Enlightenment, real and apparent changes in the last years of the seventeenth 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 for writing. (F) Cavanaugh, Traugott**

**44D. Topics in Western Civilization: Industrial Revolution and the Modern World. (4-5) Variable. 4 units: Two 2-hour lectures and one hour of discussion section per week. 5 units: Two 2-hour lectures and two 1-hour discussion sections per week. Pre-requisites: Subject A required; 44A-44B recommended. From the industrial revolution to the present; the world of Jane Austen, Beethoven and David to that of Kafka, Shoenberg and Picasso and from empires and orders to mass society, readings include novelists, poets, and theorists like Marx and Freud. (SP) Laquer, Zwelling**

**55A. The Development of World Civilization. (4) New course. Three lecture and two hours of discussion per week. Pre-requisites: UGIS 44A, 44B and 44C recommended. From the industrial revolution to the present; the world of Jane Austen, Beethoven and David to that of Kafka, Shoenberg and Picazo and orders to mass society, readings include novelists, poets, and theorists like Marx and Freud. (SP) Laquer, Zwelling**

**55B. The Development of World Civilization. (4) Three hours of lecture and two hours of discussion per week. An introduction to the major cultures of the world, on a broad comparative level, since 1500. The course will focus on the process whereby the major parts of the world have become increasingly connected economically and politically, and how the various peoples have evolved, voluntarily or involuntarily, through this experience. (F,SP) Staff**

**79. Undergraduate Colloquium. (1) Course may be repeated for credit. Must be taken on a pass/no pass basis. One 1-hour lecture per week. Topics change each semester. (F,SP) Staff**

**98X. Directed Group Study with UGIS 55. (1) Formerly Special Programs 98X. Must be taken on a pass/no pass basis. Offered as directed group study per week. Only students enrolled in UGIS 55A or 55B. An extra weekly session emphasizing writing and speaking skills. (F,SP) Staff**

**Upper Division Courses**

**179. Undergraduate Colloquium. (1) Course may be repeated for credit as topic varies. Must be taken on a pass/no pass basis. One 1-hour lecture per week. Undergraduate colloquium. Check with department office (301 Campbell Hall) for current topic. (F,SP) Staff**

### Wildland Resource Science

(College of Natural Resources, Interdepartmental Graduate Groups)

**Office:** 145 Muroldt Hall, 842-3765
**Chair:** Joe R. McBride, Ph.D.

**Professors:**
- Lawrence S. Davis, Ph.D. (Forestry and Resource Management, Forest Products Lab)
- Don C. Erman, Ph.D. (Forest and Resource Management)
- William J. Libby, Ph.D. (Forestry and Resource Management, Genetics)
- Robert E. Marshall, Ph.D. (Forestry and Resource Management)
- Joe R. McBride, Ph.D. (Forestry and Resource Management)
- Arno P. Schniewind, Ph.D. (Forest Products Laboratory; Forestry and Resource Management)
- Jeffrey H. Ryan, Ph.D. (Forestry and Resource Management)

**Associate Professors:**
- Paul J. Zinke, Ph.D. (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 for research on forests, woodland, grasslands, and related natural resources. It is concerned with wildland ecosystems and with the vegetation, fauna, water, soil, climate, and social phenomena associated with them. It examines these ecosystems in terms of management and manipulation to achieve particular social purposes.

The master's level program is intended for the graduate in forestry, in other wildland resource fields, or in related disciplines who desires to specialize in some aspect of wildland resources such as agro-forestry, biometrics, ecology, economics, fisheries, forestry, genetics, management, photogrammetry and remote sensing, range, planning and policy, silviculture, sociology, soils, watershed, and wildlife.

The department has excellent facilities for instruction and research, including photogrammetric, physiological, and statistical laboratories as well as several forest properties where students may center their field studies.

### Women's Studies

(College of Letters and Science)

**Group Major Office:** Undergraduate Interdisciplinary Studies Division (Women's Studies), 301 Campbell Hall, 842-6984
**Women's Studies Office:** 333 Campbell Hall, 842-2787
**Directors:** Mary Ryan, Ph.D.; Academic Coordinator: Lorie McNeilly

**Professors:**
- Evelyn Fox Keller, Ph.D. (Rhetoric). History, philosophy, and science of gender
- Carolyn Porter, Ph.D. (History). American literature 19th and 20th centuries
- Carol Stack, Ph.D. (Education). The construction of gender in the context of race, culture, class and classlessness, black families, family policy, research methods.

**Associate Professors:**
- Elizabeth Abel, Ph.D. (English). Women writers, feminist theory
- Nancy Chodorow, (Sociology). Feminist theory and methodology, psychoanalysis and feminism

*Not offered 1989-90
*On leave, spring
*Recalled to active service
†Recipient of Distinguished Teaching Award
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 menu 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 (4); 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).

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 courses listed for social science concentration for the major (above).

II. Humanities Emphasis:

Required: Women's Studies 10 or 20, placement in women's studies majors. (F) Porter

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).

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)

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 pertinent social, political, and cultural theories. (F,SP)

20W. Writing-Intensive Workshop—Feminist Theory. (5) Three hours of seminar and two hours of section per week. Prerequisite: English 1A or equivalent. This course is only open to students who have not completed the second half of the reading and composition requirement. 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. Fulls 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 thought through the dual perspective of the classics of a single problem area. Topics vary; examples include body language and the concept of female culture, women and work. Fall 1989 topic: Narratives of self. (F)

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, field, or existing discipline. Designed primarily for lower division students and nonmajors. Topics vary from semester to semester. Students should consult the women's studies announcement of courses before the beginning of the semester for the semester offerings. (F,SP)

48. Directed Group Study for Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a pass/failed basis. Seminars for the group study of selected topics not covered by regularly scheduled courses. Topics vary from year to year. (F,SP)

Ryan

Upper Division Courses

100. Special Topics. (3) Course may be repeated for credit as topic varies. Three hours of lecture per week. Prerequisites: 10 or equivalent. The findings of feminist scholarship as they apply to a particular problem, such as women and stereotypes, psychoanalysis and feminism, language and gender. Section 1: Women's Work. Instructor: Helmbold. Section 2: Women and Development. Instructor: Tinker. (F,SP)

101. Feminist Literary Theory. (4) Two 11/2-hour seminar meetings per week. Prerequisites: 10 or equivalent. The course is designed to cover various approaches to literary texts (formalist, affirmative, generic, psychoanalytic, Manichist, structuralist) and to investigate different aspects of feminist criticism in relation to these approaches. Seminar; pre-enrollment; preference to women's studies majors. (F)

Porter

102. Feminist Perspectives In Social Science. (3) Two 1 1/2-hour seminar meetings per week. Prerequisites: 10 or equivalent. A course in basic social science method (e.g., participant observation, controlled experiments, surveys and 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)

Staff

103. Feminist Contemporary Feminist Theory. (4) Four hours of lecture and discussion per week. Prerequisite: 20 or consent of instructor. A course in 20th century feminist theory, focusing on interdisciplinary theories of women, gender and sexuality in relation to race, class, and ethnicity. (SP)

Keller

*120. The History of American Women. (3) Three hours of lecture and discussion per week. Prerequisites: Upper
Wood Science and Technology

(College of Natural Resources, Interdepartmental Graduate Groups)

Building 478 Richmond Field Station, 231-9452

Professors: Frank C. Beall, Ph.D. (Forestry and Resource Management, Forest Products Laboratory)
Richard S. Dodd, Ph.D. (Forestry and Resource Management, Forest Products Laboratory)
C.D. Mote, Jr., Ph.D. (Engineering, Mechanical Engineering)
Anne Schreinemachers, Ph.D. (Forestry and Resource Management, Forest Products Laboratory)
Wayne Wicca, Ph.D. (Forestry and Resource Management, Forest Products Laboratory)
Robert B. Williamson, Ph.D. (Civil Engineering)
Eugene Zavarin, Ph.D. (Forestry and Resource Management, Forest Products Laboratory)
David L. Brink, Ph.D. (Forestry and Resource Management, Forest Products Laboratory)
Robert A. Cookell, Ph.D. (Forestry and Resource Management, Forest Products Laboratory)
Charles R. Wilke, Ph.D. (Emetics) (Chemistry, Chemical Engineering)

Assistant Professors: Stephen L. Quarles, Ph.D. (Forestry and Resource Management, Forest Products Laboratory)
Timothy G. Rials, Ph.D. (Forestry and Resource Management, Forest Products Laboratory)

Graduate Adviser: Richard S. Dodd, Stephen L. Quarles.

This program is administered by an interdepartmental group drawn from faculties in chemistry, engineering, forestry, 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 to their chosen 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 wood science, including wood moisture and wood heat relations; chemical processes; wood processing, including machining, drying, and treating; and product pathology.

The excellent facilities of the Forest Products Laboratory are available for both thesis and special research projects.

Zoology

(College of Letters and Science)

As a result of the reorganization of the biological sciences on the Berkeley campus, the faculty and programs of the Department of Zoology will become part of the new Department of Integrative Biology and three divisions (Biochemistry and Molecular Biology; Cell and Developmental Biology; and Neurobiology) of the new Department of Molecular and Cell Biology, effective fall 1989. For an explanation of the full scope of the biological sciences reorganization and its implications, see page 89.

Undergraduate Programs: Beginning fall semester 1989, students will no longer be accepted into the former undergraduate major in zoology. Prospective majors who are interested in zoology should consider one of the tracks of the major in integrative biology or Plan II of the major in molecular cell biology and should contact the major adviser or undergraduate assistant in the appropriate new department. The names and locations of these advisers can be obtained by writing to Ms. Patricia Power, Staff Assistant to the Dean, College of Letters and Science, 201 Campbell Hall, University of California at Berkeley; Berkeley, CA 94720. Continuing students who declared the zoology major before fall 1989 may continue in the program, provided they complete all degree requirements and graduate before fall semester 1993. Such students should contact the major adviser or undergraduate assistant for information.

Graduate Programs: For fall semester 1989, new students have been admitted to the existing graduate program in zoology. Graduate programs for the new biological sciences departments are currently under review, and it is anticipated that new graduate students will receive approval during fall semester 1989. New and continuing graduate students will be notified when these programs are approved. At that time, students will have the option of continuing in the program to which they were admitted or requesting transfer to a related new program. For details of existing graduate programs, students should consult the graduate adviser for the program. Students interested in zoology who wish to apply for admission after fall 1989 and who require further information should contact the graduate department to which they wish to apply. The names and locations of these advisers can be obtained by writing to Ms. Patricia Power, Staff Assistant to the Dean, College of Letters and Science, 201 Campbell Hall, University of California at Berkeley; Berkeley, CA 94720.

Concordance of Courses: On the following page is a list of courses formerly offered by the Department of Zoology, followed by their new names, numbers, and titles. For those courses offered by the new departments, followed by their former names, numbers, and titles, consult lists in this catalog under the headings "Integrative Biology," "Molecular and Cell Biology," or "Plant Biology." At press time for this catalog, some course information was still not available. If you have questions, or if you do not find a course listed with its new name, number, and title, consult staff in one of the new departments for up-to-date information.
## Concordance List for Zoology

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Appendix and Index
Criteria Used in Selecting Freshmen

Berkeley receives applications from many more qualified students than can be admitted as freshmen. So that prospective applicants will know how the five colleges and schools make admissions decisions, the criteria and procedures used are discussed in detail below. (Please note that the criteria and procedures described apply to admission during the 1989-90 academic year; because the admission process is under review, the criteria and procedures may be revised for the 1990-91 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 used to determine which "new from high school" applicants will be offered admission as freshmen to either the College of Letters and Science or the College of Natural Resources.

Selection Criteria

A. Admission on the Basis of Academic Index Score. 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 applicant's 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 does not include weight for designated honors courses taken during the applicant's junior year in high school.)

Although individual honors courses receive additional weight (one grade-point per course) in calculating an applicant's high school grade-point average, the highest GPA used in computing the academic index score is 4.0. Accordingly, a total of 4000 points is possible on this component of the academic index score.

2. The second component of the applicant's academic index score is calculated by adding the scores on five standardized admission tests. The five tests 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.

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.

Additional points may be added to an applicant's academic index score on the basis of the six 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 scores on the academic index and the supplemental criteria. The applicants with the highest combined score (called the supplemental index score) are offered admission.

C. Admission in Complemental Categories.

To ensure that the undergraduate student body reflects the diversity of California, a number of qualified applicants with 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. The ethnic groups are Black, Chicano, Latino, and Native American.

2. Filipino Applicants.

3. Disabled Applicants. Disability must be evaluated and then verified by the staff of the Disabled Students' Program.

4. Students from Rural High Schools.

5. Recruited Athletes.

6. Applicants Admitted after Administrative Review. Applicants admitted in this category include those with special talents (for example in art, foreign, or music), international students, applicants from high schools with non-standard grading systems, applicants with exceptionally high test scores, and other administrative reviews.

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 Berkeley 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 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 particular major 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 used to determine which "new from high school" applicants will be offered admission as freshmen to the College of Chemistry.

Selection Criteria

A. Admission on the Basis of Academic Index Score. 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 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 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 particular major 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 Engineering

This statement describes the criteria used to determine which "new from high school" applicants will be offered admission as freshmen to the College of Engineering.

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 academic record.

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 applicants with the highest combined scores are ranked according to the sum of their scores on the academic index and the supplemental criteria. The process for this review is similar to that used by the College of Letters and Science, and the supplemental criteria and their values are the same for both colleges. 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.

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, decisions are made on approximately 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 of Engineering'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 (blacks, Chicano/Latinos, Native Americans) who are UC-eligible and have reasonable prospects for success in its programs. Accordingly, applicants who are members of underrepresented minority groups or who qualify for the Educational Opportunity Program and have academic index scores above 5500 points are considered on the basis of their academic index scores and the supplemental criteria described above.

Only those applicants whose academic records suggest a reasonable probability of success in the academic programs of the respective departments will be admitted. Positive indicators include (a) grades of "B" or higher in mathematics, science, and English courses, (b) completing four years of mathematics, a chemistry course, and a physics course, 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 succeed in the 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.

The College of Environmental Design

This statement describes the criteria used to determine which "new from high school" applicants will be offered admission as freshmen to the College of Environmental Design.

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 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 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.)

Critera 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 hardships, 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. Applicants who were eligible for admission to the University after high school must have a minimum grade-point average of 2.0 in college courses; applicants who are not eligible after high school must have a minimum grade-point average of 2.2 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 have completed the lower division prerequisites for the intended major and fulfilled 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. Applicants 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 need the motivation imposed by deadlines, you are likely 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. If you enroll in 2 units but complete 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, 2 units of earned grade will be received, along with 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: Computer Science 7S, 8S, 9A, 9B, 9C, 9D; East European Studies 100; Electrical Engineering 40I, 41I; Italian 14A, 14B, 14C; Landscape Architecture 112; Latin 14; Mathematics PS, 1AS-1BS, 16AS-16BS; 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, business, 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 courses and independent research projects in a broad range of academic disciplines. The program for undergraduate students maximizes access to the wealth of educational resources at Berkeley through individual faculty advising and curriculum planning in the student's major; workshops in calculus, seminars on job search skills, and internships 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 and 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, 642-6586

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 public the opportunity to join domestic and foreign field 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 contributing to 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, experiences and abilities 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 Kenya, Argentina, and Australia; archaeological excavations in Italy, California, and Latin America; a museum collecting expedition to the Rendille, an nomadic tribe in Northern Kenya; an anthropological study of Carnival in Brazil; preparation of an archaeological map of the Valley of the Kings, Egypt; marine studies in Hawaii, Jamaica, and Fiji; and ecological studies in Costa Rica, Ecuador, Mexico, Kenya, New Caledonia, and Surinam.

Some of the projects planned for 1989-90, each approximately two to three weeks in duration, are marine biology studies in the

Salary and Employment Information/Representative Colleges*

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<th>Field of Study</th>
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<tr>
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<td>$2276 ($2866)</td>
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<tr>
<td>Engineering</td>
<td>$2361 ($2807)</td>
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<tr>
<td>Humanities</td>
<td>$1630 ($1674)</td>
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<tr>
<td>Physical and Earth Sciences</td>
<td>$1803 ($2841)</td>
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<tr>
<td>Economics</td>
<td>$2051 ($1920)</td>
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<tr>
<td>Other Social Sciences</td>
<td>$1881 ($1920)</td>
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*Source: A July 1988 national survey of representative groups of colleges conducted by the College Placement Council representing the 80 percent range of offers throughout the country. It should be noted that there is a wide variation in starting salaries exists within each discipline based on job location, type of employer, personal qualifications of the individual, and employment conditions at the time of job entry. Recipients of Berkeley degrees are often in demand than degree earners from representative colleges across the nation.
South Pacific and Baja; animal behavior studies in Montana and Costa Rica; archaeological detective work in Ireland and Hawaii; and bird behavior studies in Alaska. Other projects in ecology, biology, botany, anthropology, paleontology, and archaeology will be conducted in Argentina, Brazil, the Virgin Islands, and Italy.

For further information, please contact the University Research Expeditions Program; University of California at Berkeley; Berkeley, CA 94720; telephone 642-6586.

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, at the time of admission you must have established residence in California for more than one year. If you are a minor, you must have established your residence in California on or before your eighteenth birthday or have lived continuously for at least two years in another state, you are entitled to resident 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.

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 resident 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 residence 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 continuously for at least two years before the residence determination date with 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 the natural or adopted child, stepchild, or dependent spouse of a member of the U.S. military stationed in California on active duty. You may retain your resident 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 residence and intent established under state law, the regulations may include among the factors considered if your parents live outside California. Financial independence will not be considered if you are a graduate student instructed to reside temporarily on a 0.49 or more time basis for the term for which you seek 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 explanation 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 reclassification 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 residence 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 at Berkeley; Berkeley, CA 94720, within 30 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. Inquiries regarding these waivers should be directed to the residence deputy.

In addition, certain graduate student instructors and teaching fellows and certain graduate students designated as University Fellows and Distinguished Scholars may be eligible for nonresident tuition waivers or fellowships. Contact the Graduate Division at your campus for further information.

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Director, Office of Relations with Schools
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Director, Student Learning Center
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Dean, University Extension
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Coordinator, Women’s Resource Center
Alice E. Jordan, M.S.W.

Deans of the Colleges, Schools, and Graduate Division

School of Business Administration
Raymond E. Miles, Ph.D.
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