Courses and Curricula

The University's first scientific station was the Lick Observatory, obtained by UC in 1888. In its early years, the observatory was the site of the world's most powerful telescope: a 36-inch refractor.
Other courses in the curriculum are devoted to the application of social policy as it affects contemporary black communities. The 190 series accommodates individual and group independent study. In each of the number series, the course ending with 9 (e.g., 159) is designed for Selected Topics. This arrangement allows teachers and students to investigate a specific topic of importance which may not be essential to the curriculum and may not be permanently included in it.

Requirements for Major: Social Science Concentration

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

II. Upper Division.
B. Any one of the following comparative courses:
   (1) AAS 111: Race, Class and Gender: Comparative Social Change in the United States;
   (2) AAS 112A and 112B, Political and Economic Development in the Third World;
   (3) AAS 113: Race, Ideology and Economics: A Comparative Approach;
   (4) AAS 120: American African Cultural and Social History.
C. Any three of the following topical or discipline-oriented courses:
   (1) AAS 107: Race and Public Policy;
   (2) AAS 119C: African American Economic History;
   (3) AAS 121: Black Political Life;
   (4) AAS 122: Black Family;
   (5) AAS 124: Political Philosophy of Martin Luther King, Jr.;
   (6) AAS 137: Urban African American Studies.
E. Majors must complete the senior thesis requirement AAS 192A-192B.

Requirements for Major: Humanities Concentration

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

II. Upper Division.
B. Any two of the following:
   (1) AAS 150A: Survey of African American Literature, 1746-1920;
   (2) AAS 150B: Survey of African American Literature, 1920-1950;
   (3) AAS 151A: African American Plays from 1858 to 1959;
   (4) AAS 151B: Contemporary African American Plays from 1959 to present.
C. Any one of the following sequence:
   (1) AAS 152A: African American Essays: The Nature and Tradition;
   (2) AAS 152B: African American Poetry: The Nature and Tradition;
   (3) AAS 152C: African American Dramatic Literature: Forms and Styles;
   (4) AAS 152D: African American Short Stories;
   (5) AAS 152E: African American Novels and Narratives.
D. Any three of the following area courses:
   (1) AAS 130: African American Communities and Cultures;
   (2) AAS 142A: African American Performance and Drama;
   (3) AAS 143B: Performance of African American Drama;
   (4) AAS 143C: Black Theater Workshop.
E. Any three of the following:
   (1) AAS 142C (Scenario and Film Criticism);
   (2) AAS 143A (Performance of African American Literature);
   (3) AAS 143B (African American Drama);
   (4) AAS 143C (Black Theater Workshop).

African American Studies Social Science Minor

A. Any three of the following:
   (1) AAS 101A-101B: Research Methods in African American Studies;
   (2) AAS 111: Race, Class and Gender: Comparative Social Change in the United States;
   (3) AAS 112A and 112B, Political and Economic Development in the Third World;
   (4) AAS 113: Race, Ideology and Economics: A Comparative Approach;
   (5) One of the following sequence:
      (1) AAS 119C: African American Economic History;
      (2) AAS 120: American African Cultural and Social History; or
      (3) AAS 121: Black Political Life; or
      (4) AAS 122: Black Family; or
      (5) AAS 124: Political Philosophy of Martin Luther King, Jr.; or
      (6) AAS 137: Urban African American Studies.
B. Any of the following:
   (2) Any three of the following area courses:
      (1) AAS 130: African American Communities and Cultures;
      (2) AAS 142A: African American Performance and Drama;
      (3) AAS 143B: Performance of African American Drama;
      (4) AAS 143C: Black Theater Workshop;
      (5) AAS 142C (Scenario and Film Criticism).

Other courses in the curriculum are devoted to the application of social policy as it affects contemporary black communities. The 190 series accommodates individual and group independent study. In each of the number series, the course ending with 9 (e.g., 159) is designed for Selected Topics. This arrangement allows teachers and students to investigate a specific topic of importance which may not be essential to the curriculum and may not be permanently included in it.

Requirements for Major: Social Science Concentration

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

II. Upper Division.
B. Any one of the following comparative courses:
   (1) AAS 111: Race, Class and Gender: Comparative Social Change in the United States;
   (2) AAS 112A and 112B, Political and Economic Development in the Third World;
   (3) AAS 113: Race, Ideology and Economics: A Comparative Approach;
   (4) AAS 120: American African Cultural and Social History.
C. Any three of the following topical or discipline-oriented courses:
   (1) AAS 107: Race and Public Policy;
   (2) AAS 119C: African American Economic History;
   (3) AAS 121: Black Political Life;
   (4) AAS 122: Black Family;
   (5) AAS 124: Political Philosophy of Martin Luther King, Jr.;
   (6) AAS 137: Urban African American Studies.
E. Majors must complete the senior thesis requirement AAS 192A-192B.

African American Studies Humanities Minor

A. One of the following:
   (1) AAS 4A, 4B, 5A or 5B
B. Five courses from the following:
   (1) AAS 101A-101B: Research Methods in African American Studies;
   (2) AAS 111: Race, Class and Gender: Comparative Social Change in the United States;
   (3) AAS 112A and 112B, Political and Economic Development in the Third World;
   (4) AAS 113: Race, Ideology and Economics: A Comparative Approach;
   (5) Any one of the following:
      (1) AAS 119C: African American Economic History;
      (2) AAS 120: American African Cultural and Social History;
      (3) AAS 121: Black Political Life;
      (4) AAS 122: Black Family;
      (5) AAS 124: Political Philosophy of Martin Luther King, Jr.;
      (6) AAS 137: Urban African American Studies.

African American Studies Social Science Minor

A. Any three of the following:
   (1) AAS 101A-101B: Research Methods in African American Studies;
   (2) AAS 111: Race, Class and Gender: Comparative Social Change in the United States;
   (3) AAS 112A and 112B, Political and Economic Development in the Third World;
   (4) AAS 113: Race, Ideology and Economics: A Comparative Approach;
   (5) Any three of the following:
      (1) AAS 119C: African American Economic History;
      (2) AAS 120: American African Cultural and Social History;
      (3) AAS 121: Black Political Life;
      (4) AAS 122: Black Family;
      (5) AAS 124: Political Philosophy of Martin Luther King, Jr.;
      (6) AAS 137: Urban African American Studies.

African American Studies Humanities Minor

A. One of the following:
   (1) AAS 4A, 4B, 5A or 5B
B. Five courses from the following:
   (1) AAS 101A-101B: Research Methods in African American Studies;
   (2) AAS 111: Race, Class and Gender: Comparative Social Change in the United States;
   (3) AAS 112A and 112B, Political and Economic Development in the Third World;
   (4) AAS 113: Race, Ideology and Economics: A Comparative Approach;
   (5) Any three of the following:
      (1) AAS 119C: African American Economic History;
      (2) AAS 120: American African Cultural and Social History;
      (3) AAS 121: Black Political Life;
      (4) AAS 122: Black Family;
      (5) AAS 124: Political Philosophy of Martin Luther King, Jr.;
Lower Division Courses

1A. Freshman Composition. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Subject A. Training in expository, argumentative, and other types of writing. The assignments will focus on themes and issues in African American life and culture. (F,SP) Staff

1B. Freshman Composition. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Subject A and 1A. Continued training in expository, argumentative, and other types of writing. With more emphasis on literary interpretation. (F,SP) Staff

4A. Africa: History and Culture. (4) Three hours of lecture and 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 and 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 national states. (SP)

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

5B. African American Life and Culture in the United States. (4) Three hours of lecture and one hour of discussion per week. Emphasis on the social experiences of African Americans. An interdisciplinary approach designed to help students understand the forces and ideas that are influencing the individual and collective African American experience. (SP) Banks

20. Introduction to African American Social Institutions. (3) Three hours of lecture per week. Prerequisites: 101A or introductory course in sociology. The sociology of the African American experience will be studied through an analysis of the educational, religious, political, economic, and familial dimensions of African American life. (SP) Banks

24. Freshman Seminars. (1) Course may be repeated for credit as topic varies. One hour of seminar per week. Sections 1-2 to be graded on a letter-grade basis. Sections 3-4 to be graded on a passed/not passed basis. The Berkeley Seminar Program has been designed to give students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP)

25. Male and Ethnic in American Culture. (3) Two hours of lecture and one hour of discussion per week. The course examines the interplay of ethnicity and male gender in three groups, Italians, Puerto Ricans, and African Americans. Interdisciplinary in approach, the course will reveal the complexities of gender, class and race in the social quilt of American life. This course satisfies the American cultures requirement. (SP) Banks

28. Black Music and Musicians in American Culture. (3) One and one-half hours of lecture per week. Must be taken on a passed/not passed basis. Examines the impact of African American music, and the artists who produce it, on American culture in the twentieth century. (F,SP) Banks

39. Freshman/Sophomore Seminar. (2-4) Course may be repeated for credit as topic varies. Seminar format. Prerequisites: Priority given to freshmen and sophomores. Freshman and sophomore seminars offer lower division students the opportunity to explore an interdisciplinary topic with a small group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. (F,SP) Staff

98. Directed Group Studies for Freshmen and Sophomores. (1-4) Course may be repeated for credit as topic varies. Students must be taken on a passed/not passed basis. Supervised research on specific topics related to African-American Studies. (F,SP)

99. Directed Group Studies for Freshmen and Sophomores. (1-4) Course may be repeated for credit. Supervised research. Must be taken on a passed/not passed basis. Supervised research on specific topics related to African American Studies. (F,SP) Upper Division Courses

101A. Research Methods for African American Studies. (4) 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.A. as a backdrop. A primary, but not exclusive, focus on qualitative research methods. (F) Staff

101B. Research Methods for African American Studies. (4) Three hours of lecture and one hour of computer laboratory per week. Prerequisites: 101A or introductory statistics. Introduction to quantitative research methods with a special emphasis on survey research techniques and procedures. Introduction to punchcard data processing using S.P.S.S. computer package program. (SP) Hintzen

107. Race and Public Policy. (3) Three hours of lecture per week. This course examines the formation and implementation of public policies directly relevant to African Americans and blacks. While the policies differ from year-to-year, basic public policy methodology will be introduced each year. (SP) Henry

110A. African American Economic History. (3) Three hours of lecture per week. Prerequisites: African American history and/or introductory economic history. Examines the historical development of a black economic base in the United States from 1619-1918. (F)

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

111. Race, Class, and Gender in the United States. (3) Three hours of lecture per week. Prerequisites: SB or 120 or introductory course in sociology. Includes an examination of the social, political, and economic systems and the development of the African American child through adolescence. (F,SP)

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. (4) Three hours of lecture and one hour of discussion per week. A critical appraisal of the theoretically based policies employed by Third World nations in the analysis of Africa, the Caribbean, and the Third World economic system and the impact of the Third World on the world political economy. This focus will be on specific examples that reflect the diversity of developing countries. (SP) Hintzen

113. Race, Ideology, and Economics in Africa and African America. (4) Four hours of lecture per week. Prerequisites: Lower division course in economics. Emphasis on understanding the relationship of the race as systemically defined in the context of the colonial and slave economies in Africa and the New World, including quantitative analysis. (F) Hintzen

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

117. African 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 after slavery, this course will explore the history of African American cultural, institutions and movements from the Civil War to the Civil Rights Movement. (SP) Taylor

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

121. Black Political Life in the United States. (4) Three hours of lecture per week. Prerequisites: SB or 20 or 116 and 117 or History 125A-125B. Analysis of the theoretical and historical development of African 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. African American Families in American Society. (3) Three hours of lecture per week. Prerequisites: 120 or intermediate 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)

124. Political Philosophy of Martin Luther King, Jr. (3) Three hours of lecture per week. Using the thought and work of Martin Luther King, Jr., 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 African American religion, nonviolence, and integration. (SP) Banks

130. 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 Caribbean African religions. (SP) Lagueure

132. Psychology and African American People: Current Issues. (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 Caribbean African religions. (SP) Lagueure

133. Caribbean Cultural History. (3) Three hours of lecture per week. An examination of the history and cultural evolution of the French, Dutch, Spanish, and English-speaking Caribbean societies from the slavery era to the Second World War. Particular attention will be given to the development of the plantation system and its impact on race, class, and gender relations in the Caribbean. (SP) Lagueure

135. Caribbean Cultural History. (3) Three hours of lecture per week. An examination of the history and cultural evolution of the French, Dutch, Spanish, and English-speaking Caribbean societies from the slavery era to the Second World War. Particular attention will be given to the development of the plantation system and its impact on race, class, and gender relations in the Caribbean. (SP) Lagueure

137. Urban African America. (3) Three hours of lecture per week. Examination of the historical roles and functions of families in the development of black people in America from slavery to the present. (SP) Banks

138. Urban African America. (3) Three hours of lecture per week. Examination of the historical roles and functions of families in the development of black people in America from slavery to the present. (SP) Banks

139. Urban African America. (3) Three hours of lecture per week. Examination of the historical roles and functions of families in the development of black people in America from slavery to the present. (SP) Banks
African American literature and the attempt to develop "black socialism." (F) Henry

139. Selected Topics of African-American Social Organization and Institutions. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Reading and composition requirement. Sozial, political, economic, and cultural aspects of African American societies 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

142A. Third World Cinema. (4) Three hours of lecture, 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 pictures. Social, political, and cultural aspects of Third World cinema are discussed, with particular emphasis given to major works from Africa, Asia, and Latin America. Other newly-developed film sources from abroad are presented for critical assessment. (F) Johnson

142B. The Cross-Cultural Images of American Minorities in Film. (4) Three hours of lecture and two hours of viewing/discussion per week. Prerequisites: Reading and composition requirement. A critical, historical course describing the cross-cultural images of black Americans, alongside other ethnic minorities, with attention to comparative changes in their cinematic depictions, from the silent era to the present. Important works that formed specific images of the different nationalities and minorities (including Native American, Asian, Hispanic, and other immigrant groups, recently integrated into American culture) are used to discuss and reconsider in order to expose examples of censorship and stereotypes. The class will also consider the struggles against prejudices and taboos. This course satisfies the American culture requirement. (SP) Johnson

142C. Scenario and Film Criticism. (3) Three hours of lecture per week. Prerequisites: Completion of reading and composition requirement, plus 142B or equivalent. The development of scenes and critical writing for motion pictures, with particular attention directed toward subject-matter concerned with ethnic groups in the United States. A workshop approach is emphasized in the course, and enrollment and seminar discussions of the projects in progress are open to all. (SP) Johnson

143A. Performance of African American Literature. (3) Three hours of lecture per week. Prerequisites: 1A or equivalent or consent of instructor. An introduction to the various aspects of theatre production. Also listed as Dramatic Art 183A and Interdepartmental Studies 143A. (F) Wilkerson

143B. Performance of African American Drama. (3) Three hours of lecture per week. Prerequisites: 143A or equivalent or consent of instructor. Development of performance skills as a way of knowing and understanding the oral and written African American literature. Selections and assignments include poetry, essays, and excerpts from plays. Also listed as Dramatic Art 183B and Interdepartmental Studies 143B. (F) Wilkerson

143C. Black Theatre Workshop. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 143A or equivalent or consent of instructor. Introduction to dramatic performance as a way of knowing and understanding the oral and written African American literature. Selections and assignments include poetry, essays, and excerpts from plays. Also listed as Dramatic Art 193C and Interdepartmental Studies 143C. (SP) Wilkerson

150A. African American Literature 1746-1920. (3) Three hours of lecture per week. Introduces the early literary creations and thought of African America through examination of written and oral expression: poetry, essays, sermons, spirituals, slave narratives, letters, proverb, folktales, novels, etc. (F)

150B. African American Literature 1920 to Present. (3) Three hours of lecture per week. Survey of African American literature from the Harlem Renaissance to the present. A close analysis of major writers, premises. (SP) Christian

151A. African American Plays from 1858 to 1959. (4) Three hours of lecture per week. Prerequisites: Reading and composition requirement. Historical survey of plays by African American writers and the portrayal of the black experience in theatre. Emphasis on predominant themes, structural tendencies, socio-historical context. Also listed as Dramatic Art 131A and Interdepartmental Studies 131A. (F) Wilkerson

151B. Contemporary African American Drama. (4) Four hours of lecture per week. Prerequisites: 151A or consent of instructor. Survey of contemporary plays by African American playwrights, with particular emphasis on the black experience in American theatre. Emphasis on predominant themes, structural tendencies, socio-historical context. Also listed as Dramatic Art 131B and Interdepartmental Studies 131B. (SP) Wilkerson

152A. African 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 African Americans. (F) Christian

152B. African 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 African Americans. (SP)

152C. African American Dramatic Literature: Forms and Styles. (3) Three hours of lecture/laboratory per week. Introduction to play analysis with emphasis on the African American playwright 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 plays and performance of plays. Also listed as Interdepartmental Studies 132. (F) Wilkerson

152D. African American Short Stories. (3) Three hours of lecture per week. Prerequisites: Reading and composition requirement. Discussion and analysis of the African American writer with the short story forms and techniques. (SP)

152E. African American Novels and Narratives. (3) Three hours of lecture per week. Prerequisites: Reading and composition requirement. Analysis and discussion of techniques and structure in the development of African American novels, beginning with the slave narrative and tradition. (SP)

153A. Images of African American Women in Literature: Slavery to the 20th Century. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Reading and composition requirement. Analysis of the cultural, literary, and social assumptions that contribute to the various images of African American women in African American literature. Course explores the literature of the 19th-century African American women, an exploding field in American literary discourse. Also listed as Interdepartmental Studies 153A and Women's Studies 153A. (F) Christian

153B. Contemporary Images of African American Women in Literature. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Reading and composition requirement. Analysis of the cultural and social assumptions and dynamics that shape the images of African American women in contemporary Western African American writing. Also listed as Interdepartmental Studies 153B and Women's Studies 153B. (SP) Christian

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

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

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

159. Special Topics in African American Literature. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Reading and composition requirement, plus those set by instructor. Special topics will vary from semester to semester. (F,SP) Staff

192A-192B. Senior Thesis. (3,3) Three hours of tutorial per week. Prerequisites: Senior standing and two-thirds of the courses required in the major. Three units awarded for each semester's work. For departmental credit, student must attain a C grade or better in each part of the sequence. Applications and details at departmental advisor's office. This sequence is required for the major. (F,SP) Staff

H195A-H195B. Senior Honors Thesis. (3,3) Credit and grade to be awarded on completion of sequence. Prerequisites: Senior standing and 3.3 GPA overall and in major. The Senior honors thesis is a primary research and writing project based on study of an advanced topic undertaken through weekly appointments with faculty sponsor. Consent of instructor required. Students must enroll for both semesters of the sequence. (F,SP) Staff

197. Field Study in African American Life. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Supervised field work in off-campus organizations. Regular individual meetings with faculty sponsor and written reports required. Independent study available in the department office. (F,SP) Staff

198. Directed Group Studies for Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Supervised research or study on a specific topic. (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 restrictions apply: see the Introduction to Courses and Curriculum section of this catalog. Individual study or research program to be worked out with sponsoring faculty before approval by department chairperson. Regular meetings arranged with faculty sponsor. (F,SP) Staff

Graduate Courses

299. Individual Study or Research. (1-4) Prerequisites: Credit and grade to be awarded on completion of sequence. Supervised independent study or research program to be worked out with sponsoring faculty before approval by department chairperson. Regular meetings with faculty sponsor. (F,SP) Staff

Agricultural and Environmental Chemistry

(As per the original document, the composition appears to be a catalog description of courses, not the text of a specific agricultural or environmental chemistry course.)
Undergraduate Program

Political Economy of Natural Resources

The object of the PENR major is to offer an opportunity to students to consider the impacts of economic and political institutions which affect the development and management of natural resources and the environment. The focus of concern includes both renewable and non-renewable resources such as forests, fisheries, and minerals. The distinctive feature of the major is that it adopts a problem-solving approach to these issues. Therefore, requirements for the major is microeconomics theory and the economics of resources and the environment. These core courses are supplemented by other courses that apply the methods of social science to resource problems.

The major is structured to ensure that students obtain a sufficient background in the natural and physical sciences and sufficient training in basic mathematics, statistics, and communication skills in order to approach resource-related issues in an effective and practical manner. Students who graduate from the major should be prepared to undertake a career in public or private agencies engaged in the planning or management of natural resources, or to enter a graduate school for further study in some program such as economics, law, public policy, or resources administration.

Lower Division Breadth Requirements

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; and at least 10 semester units in science (including one lab science course and one course in physical science).

Upper Division Courses

- PENR 100 and PENR 101; two semester courses in quantitative methods (a combination of one course in statistics and PENR 115 or 118; or two courses in statistics).

Minor Program

Students may declare a minor in political economy of natural resources. At least six courses from the PENR curriculum are required. Students should declare their intention to minor in PENR with the head undergraduate adviser. Students who believe they have already completed the requirements for a PENR minor should apply for departmental certification. For more information, contact Gail Vawter, Student Affairs Officer, 203 Gladden Hall (642-3347).

Graduate Programs

The Department of Agricultural and Resource Economics offers programs leading to the M.S. and Ph.D. degrees. Because of quota limitations, students are not admitted to the master's degree, although it may be awarded to students who are pursuing work toward the Ph.D. in our program (or in another field at Berkeley) after fulfillment of the appropriate M.S. requirements. Applicants should hold a degree (not necessarily in agricultural economics) comparable to a bachelor's degree at the University of California and must have demonstrated strong scholarship potential.

The agricultural and resource economics program is relatively flexible; however, each program follows basic economic principles and methodology, and two elective fields defined in consultation with the graduate adviser. Some common elective fields include markets and trade, agriculture in economic development, agricultural policy, and natural resources economics.

The first year of course work in the Ph.D. program is normally devoted to economic theory and quantitative methods, after which the student writes departmental preliminary examinations in each of these areas. Although there are no specific course requirements, the level of sophistication expected in these preliminary examinations is defined with reference to a specific set of courses, and most students are advised to take these courses.

Outstanding facilities are available within the department, including the Giannini Foundation Agricultural Economics Library, one of the world's foremost research libraries of its type.

Political Economy of Natural Resources

Lower Division Courses

1. Introduction to Political Economy of Natural Resources.
2. Political Economy of Growth and Institutions.
3. Microeconomic Analysis of Natural Resources. (4) Students who have taken Econ 100A, Econ 101A or Bus Adm 110 will receive only 2 units of credit for 100. Three hours of lecture and one hour of discussion per week. Prerequisites: Math P. Introduction to microeconomics with emphasis on resource, agricultural, and environmental economics.

2. Political Economy of Growth and Institutions. (3) Two hours of lecture and one hour of discussion per week. Analysis of policy at the economywide level, focusing on the relationship between economic theories, economic policies, and the environment. Theories and models presented include the statistical foundations of economic growth analysis, macro models, input-output models, alternative theories of political economy, and theories of the state. Policy areas include macroeconomic analysis of monetary and fiscal, agricultural policy, pollution, and environmental degradation. (SP) Robinson

Minor

100. Microeconomic Theory with Application to Natural Resources. (4) Students who have taken Econ 100A, Econ 101A or Bus Adm 110 will receive only 2 units of credit for 100. Three hours of lecture and one hour of discussion per week. Prerequisites: Political Economy of Natural Resources 1 or Econometrics 1 and Math 16A or consent of instructor. Covers the basic microeconomic tools for further study of natural resource problems. Theory of consumption, production, theory of the firm, industrial organization, general equilibrium, public goods and externalities. Applications to agriculture and natural resources. (F,SP) Staff

Upper Division Courses

101. Economics of Resources and the Environment. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Math 16A-16B, Political Economy of Natural Resources 100, or Economics 100A or 101A. Theory of demand and supply, market rationing and application to renewable and exhaustible natural resources. Resource development and environmental transformation. Pollution control. Pesticide management. Water quality management in agro-eco. (SP) Staff

115. Modeling and Management of Biological Resources. (4) Three hours of lecture per week and ad hoc computer laboratory meetings. Prerequisites: Two semesters of calculus and consent of instructor. Models of population growth, chaos, life tables, and Other Courses

Agricultural and Resource Economics

(College of Natural Resources)

Department Office: 207 Gladden Hall, 642-3345
Chair: Andrew Bork, Ph.D.

Associate Professors:
- George W. Cheng, Ph.D. (Nutritional Sciences)
- Barrett Jones, Ph.D. (Nutritional Sciences)
- Sharon E. Fleming, Ph.D. (Nutritional Sciences)

Lecturer:
- Jonas E. Richardson, Ph.D. (Emeritus) (Nutritional Sciences)

Associate Research Biochemist:
- Alexander A. Karu, Ph.D. (Plant Pathology; CNR Hybrid Bacteriology Facility)

Graduate Adviser: Mr. de Lumen.

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

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

Graduate Courses

299. Research in Agricultural and Environmental Chemistry. (1-12) Course may be repeated for credit. Approximate graduate research is directed by a member of the group whose activities most closely coincide with the student's interests. Courses may be taken in various departments of the College of Natural Resources.

299. Research in Agricultural and Environmental Chemistry. (1-12) Course may be repeated for credit. Approximate graduate research is directed by a member of the group whose activities most closely coincide with the student's interests. Courses may be taken in various departments of the College of Natural Resources.

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299. Research in Agricultural and Environmental Chemistry. (1-12) Course may be repeated for credit. Approximate graduate research is directed by a member of the group whose activities most closely coincide with the student's interests. Courses may be taken in various departments of the College of Natural Resources.
Leslie matrix theory. Harvesting and exploitation theory. Methods for analyzing population interactions, predation, and competition. Fisheries, forest stands, and insect pest management. Genetic aspects of population management. Mathematical theory based on simple difference and ordinary differential equations. Use of simulation-based, econometric applications to agricultural and resource issues. (F) Karp

118. Introductory Applied Econometrics. (4) Hours of lecture and one hour of discussion per week. Prerequisites: Mathematics 16A-16B and Stat 131A or equivalent. Single equation regression models, hypothesis testing, econometric applications to agricultural and resource issues. (F) Karp

141. Industrial Organization. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 100 or Economics 100A or Economics 101A. The ways firms and markets are organized and their interactions are studied. Special attention is paid to market structure, market power, information, and government policies in agriculture and natural resource markets. (F) Perloff

142. Agricultural and Resource Policy Analysis. (3) Three hours of lecture. Prerequisite: Economics 1 or consent of instructor. Review and analysis of government programs and policies. Role of markets in determining allocation of resources to farm products. Description and evaluation of impacts and consequences of policy alternatives on the farm, state, national, and general economy. Design and implementation of appropriate policies to achieve specific goals and objectives. Application of economic theory and case studies in the development of agricultural and resource policies and programs. (SP) Staff

151. Agriculture in Economic Development. (4) Three hours of lecture 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 Janury

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 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. (SP) Staff

161. Natural Resource Economics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 100 or Economics 100A or Economics 101A; Political Economy of Natural Resources 101 recommended. Institutional land economics. Theories of land rent. Models of optimal use of minerals, timber, water, and related environmental resources. Relationships between economic growth and natural resource issues. (F) Fisher

162. Economics of Water Resources. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 100 or Economics 100A or Political Economy of Natural Resources 101 recommended. Urban demand for water; water supply and economic growth; water utility economics; irrigation demand; large water projects and their effects on the farm, state, and national economy; international law and institutions; economics of salinity and drainage; economics of groundwater management. (SP) Hahnemann

185. Senior Thesis. (4) Course may be repeated for credit. Three hours of lecture. Prerequisite: senior status. Prerequisites: Senior standing in Political Economy of Natural Resources and consent of instructor. Writing of a thesis under the direction of member(s) of the faculty. Subject matter chosen by student and faculty sponsor. (SP) Staff

197. Field Study in Political Economy of Natural Resources. (1-3) Course may be repeated for credit. Prerequisites: Consent of instructor. Supervised experience in off-campus organizations relevant to specific aspects of political economy of natural resources. (F,SP) Group study of selected topic or topics in Political Economy of Natural Resources. (F,SP)

198. Directed Group Studies for Advanced Undergraduates. (1-3) Course may be repeated for credit. Meetings to be arranged. Must be taken on a pass/no pass basis. 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. Independent meetings. Must be taken on a pass/no pass basis. Prerequisites: Upper Division standing and consent of instructor. 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. Production, Industrial Organization, and Regulation in Agriculture. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Economics 201A or equivalent or consent of instructor. Basics concepts of micro and welfare economics: partial equilibrium; market interaction; market structure; the demand, supply, and price of agricultural products; market behavior over time and under uncertainty. Asset and agricultural supply models. (SP) Zilberman

211. Econometrics: Statistical Foundations and Single Equations. (4) Four hours of lecture and one hour of discussion per week. Prerequisites: Economics 211A-211B or consent of instructor. Introduction to mathematical probability and statistics as foundation for econometrics. Probability axioms, random variables and distributions, estimation, inference, Bayesian statistics. Introduction to the multivariate normal and related distributions, basic linear regression model. (F) Staff

212. Econometrics: Multiple Equation Estimation. (4) Four hours of lecture and one hour of discussion per week. Prerequisites: 211 or consent of instructor. Basic elements of a multivariate statistical model and a survey of the following econometric tools of economic data analysis: generalized least-squares, seemingly unrelated regression, simultaneous-equations models, discrete random variables, time series and combining sample and non-sample information via Bayes’ rule. (SP) Judge


239. Markets and Trade Workshop. (1) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Applications of microeconomic theory to international trade. (SP) Staff

252. Sectoral and Regional Planning in Economic Development. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Analysis of policy issues in agricultural development using sectoral and regional models of growth and development. (SP) Staff

259. Rural Economic Development Workshop. (1) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Topics in economics. History, institutions, and policies affecting agriculture markets and environmental quality. Market behavior over time and under uncertainty. Asset and agricultural supply models. (SP) Zilberman

261. Natural Resource Economics. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. The theory of optimal management of renewable resources. Open access resources. Extraction. Applications to fisheries and forests. The demand for exhaustible resource depletion. Applications to energy and minerals. Relationships between resource and growth. (F) Berck, Fisher


269. Natural Resource Economics Workshop. (1) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Applications of microeconomic theory to natural resource management. (SP) Staff

271. Nutritional Economics and Policy. (1-3) Three hours of lecture per week. Prerequisites: Economics 201A-201B or equivalent or consent of instructor. Economic theory of food and nutrition. Analysis of government food and nutrition programs. Theories of food and nutrition policy. (SP) Staff

272. Economics of Consumption and Demand Analysis. (3) Three hours of lecture per week. Prerequisites: Economics 201A-201B or equivalent, or consent of instructor. This course is designed to provide a comprehensive understanding of subject matter in the areas of consumption and demand analysis, 119
American Studies

(College of Letters and Science)

**Group Major Office:** Division of Undergraduate and Interdisciplinary Studies, 301 Campbell Hall, 642-9220

**Dean:** Donald A. McCuade, Ph.D.

**Faculty Co-Directors:** Carolyn Porter (English), Paul Groth (Architecture)

**Affiliated Faculty:** Norma Alarcon (Chicano Studies), Julia Bader (English), Earl F. Chelt (Business), Barbara Christian (American Studies), Geraldine J. Clifford (Education), "Fred" Dolan (Rhetoric), Edwin Epstein (Business), Louis Falcon (Entomology and Parasitology), Claude S. Fischer (Sociology), Jenny Frankot (English), Tom Goldstein (Journalism), James Gregory (History), "Paul" Groth (Architecture), Bob Hass (English), Charles P. Henny (American Studies), "Richard Hut-"(English), Judith Innes (City and Regional Planning), Clara Sue Kidwell (Native American Studies), Michel S. Laguerre (African American Studies), Thomas C. Leonard (Journalism), "Lawrence W." Levine (History), Kent Lightfoot (Anthropology), Jean Malecki (English), Margaretta Lovell (Art History), "Waldo" Martin (History), "Mary Ann" Mason (Social Welfare), Donald A. McCuade (English), Kathleen Moran (Interdisciplinary Studies), C. David Mosier (Economics), Yuki Nakamura (Economics), "Marg"aret Porter (Porter), Michael Reich (Economics), Michael Ro-"ggin (Political Science), Christine Rosne (Business), "Mary" Ryan (History), "Alex" Saragpza (Chicano Studies), "Sandra" Shenn (Social Work), "Carol" Stack (Women's Studies), Ann Swidler (Sociology), Ron Takake (Asian American Studies), Dali Upton (Architecture), Fernando E. Viteri (Native American Studies), David J. Vogel (Business), Kim Voss (Sociology), "Richard" Walker (Geography), Ling-chi Wang (Asian American Studies), Margaret Wilk-"son (Asian American Studies), Trigg Wilson (Native American Studies), Herbta Wong (English), Alex Zerdling (English).

**Faculty Advisers:** 1993-94

**Lower Division Requirements.** A minimum grade of a "C" is required in all lower division courses taken for the major. The lower division requirement consists of American Studies 10, Introduction to American Studies (4 units), plus three courses from the following list of courses, with no more than two courses from any one department. (This list is subject to annual review and revision.)

**Lower Division Course List:**
- African Am Studies 5A: African Am Studies 5B
- African Am Studies 20: Anthropology 2
- Anthropology 16: Anthropology 17
- Arts 81: American Studies 82
- African Am Studies 20A: Asian Am Studies 20B and 20C
- American Studies 20: African Am Studies 20C
- Chicano Studies 10 and 20: Chicano Studies 20 and 30
- Chicano Studies 50: Chicano Studies 80
- Comparative Lit 52B: Comparative Lit 56
- English 30A: English 37
- Environmental Design 4: Ethnic Studies 21
- Environmental Design 17: Environmental Design 19
- History 7B: History 16: History 17B
- History 30B: IDS 1D: Journalism 39
- Landscape Arch 10: Linguistics 55: Mass Comm 10
- Native Am Studies 50: Native Am Studies 71A

**Upper Division Requirements.** 30-36 units distributed among the following:

1. **Core Courses.** (8 units) American Studies 101, 102, 103: American Society, American Institutions, and American Culture.
2. **Area of Concentration.** At least 22 units of upper division courses from the College of Letters and Science and the professional schools and colleges, in the student's individually articulated area of concentration. Areas of concentration may be highly individualized, depending on the student's intellectual focus, prior preparation, and the availability of courses. Therefore, students planning to declare the major should meet with a faculty adviser early in their junior year, at the latest, to plan their upper division program. Subsequently, this program can be revised only with the approval of the faculty adviser.
3. **Senior Thesis.** All majors are required to write a substantial research paper in which they apply their American studies knowledge and training. Honor students must enroll in H195 (see "Honors Program" below). All other students must fulfill the requirement by enrolling in either A.S. 190 or in a course which has been approved for their area of concentration requirement. In the latter case, the project itself must be approved by the student's faculty adviser.
4. **Honors Program.** Students who wish to be eligible to graduate with departmental honors in American studies must enroll in H195. Admission to H195, students must have senior standing, an overall grade-point average of 3.51, and a grade-point average of 3.65 in the major.

For further information, please contact Jean Hutzell, Student Affairs Office, 301 Campbell Hall, 642-9220.

**Lower Division Courses**

10. Introduction to American Studies. (4) Three hours of lecture and one hour of discussion per week. American culture and cultural change, with attention to the multicultural basis of American society and emphasis on the need for multiple methods of analysis. The course will consist of a written examination and a research paper, which are due at the end of the term. The written examination will consist of a written response to a given research paper, which is due at the end of the term. The research paper will be graded on a satisfactory/unsatisfactory basis. All prerequisites: Graduate standing, appointment as a graduate student assistant, or consent of instructor. This course may be repeated for credit, provided that the student takes a different course each time. (F.S.P)
Ancient History and Mediterranean Archaeology

(College of Letters and Science)

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

Professors:
Gyula Argazay, Ph.D. University of California at Berkeley. (Near Eastern art history)
Daniel Boyarin, Ph.D. Hebrew University. (Judaism, Talmudic culture)
Stanley H. Brandes, Ph.D. University of California at Berkeley. (Near Eastern history, art and archaeology)
Victor R. Gold, Ph.D. University of Chicago. (Near Eastern history, archaeology)
Ronald S. Stroud, Ph.D. University of California at Berkeley. (Near Eastern history, art and archaeology)

M.A. Requirements. The M.A. by examination requires 24 semester units of course work and a thesis. The examination is composed of three parts: (a) two written examinations in the student's major field, (b) an oral examination covering three fields and the area in which the student is studying, and (c) a thesis in the major. The thesis may be written in either English or the student's native language. The three parts of the examination may be taken in either order, and the student must pass all parts before the thesis is submitted for examination.

Ph.D. Requirements. The Ph.D. program requires the completion of a dissertation and the successful defense of a dissertation proposal in open session. The dissertation must be based on original research conducted by the student. The dissertation proposal must be approved by the student's dissertation committee. The dissertation must be written in English and must be approved by the dissertation committee. The dissertation must be submitted for examination in accordance with the regulations of the Graduate Division of the University of California at Berkeley.

For more information about the Ancient History and Mediterranean Archaeology program, please visit the department's website or contact the department office.
The Department of Anthropology offers students the opportunity to study humankind from the broadest possible theoretical perspective. 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; and to serve as a foundation for students who wish to become professional anthropologists. Students who do not intend to do graduate work in anthropology may plan their 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, either 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 specific intellectual interests.

Undergraduate students, both majors and non-majors, are encouraged to obtain information or advice about liberal programs or about courses should inquire at 209 Kroeber Hall.

The collections and research facilities of the Phoebe A. Hearst 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 those related to the Kroeber Hall Museum. These interested may address the Director, 103 Kroeber Hall, for further information on the Hearst Museum, see the index.

The Anthropology Library, 230 Kroeber Hall, is part of the campus library system. It contains nearly 65,000 bound volumes and receives 965 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 facilities for reading microfilm.

The department maintains a laboratory for quantitative analysis in all branches of the discipline. The laboratory is centered on a sophisticated minicomputer system used in teaching as well as in undergraduate and graduate research. It functions both independently and as a link to a campus Computer Service. Courses 194A and Lab, 150A and Lab, 190B and Lab, and 193 and Lab use these facilities intensively. Package programs for statistical analysis, mapping, and computer graphics are available for use by students and faculty of the department.

Preparation for Graduate Study

Admission to graduate studies at Berkeley does not presuppose an A.B. in anthropology. The graduate program is oriented toward the doctorate, and the undergraduate major is not prescribed. 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 for entry in the fall and spring semesters. The deadline for applications is December 16.

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 qualifying examination. With the successful passage of this examination, students are advanced to candidacy for the Ph.D. degree.

Step III. Students undertake research for the Ph.D. dissertation under supervision of a three-person committee in charge of research and dissertation.

In addition to the lower division requirements described above, the major requires that the student complete the divisional anthropology course requirements, for a minimum of 31 units: Anthropology 114, one upper division course from each of three subdisciplines (physical, archaeology, social/cultural), one area course (numbered 121 through 124, or 170 through 178), one method course (102L, 103, 104L, 107L, 131 through 134, 136B, 141 when taught by Prof. Nader, 169A-169B, 190A-190B, IDS 123). Note: Area and method courses can simultaneously fulfill one of the required subdisciplines. A grade of C- or better is required in the upper division courses. Five upper division elective courses are also required. Substitution of no more than 8 units from other relevant departments is permitted only with the approval of the faculty undergraduate adviser. The total units required of majors are the lower division requirements and a minimum of 31 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 one unit only one counted at the rate of full unit for three hours’ work per week per term on the part of a student, or the equivalent."

Honors Program. The Department of Anthropology offers an individualized program leading to the A.B. degree. The program consists of 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. Students should plan the year of junior status for approval of the major adviser, enroll in the major during the senior year, and include the writing of a thesis supervised under the H195A-195B series of courses.

Medical Anthropology Ph.D. Program

General Information. The Department of Anthropology of the University of California at Berkeley, and the Graduate Group in Anthropology of the University of California at San Francisco, currently offer a joint Ph.D. in medical anthropology. Students may apply to enter the program through either the Berkeley or the San Francisco campus but not both. The point of entry is determined by 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. Students may 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 examination committees and on the dissertation committees. The degree is the same and bears the name of both campuses.

Medical Anthropology. Medical anthropology entails the exploration of humans as simultaneously physical and symbolic beings in both contemporary and evolutionary contexts. As such, medical anthropology participates in anthropology as a whole, encompassing theory and practice from sociocultural, psychological, biological, biocultural, symbolic, and linguistic anthropology. It is characterized by the examination of both the 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 and disease are accompanied by seminars that explore pain, suffering, madness, 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?" (differential risks, forms of medical knowledge, and medical systems) and "Why?" (what social arrangements, cultural forces, and biotechno-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-USCF is extremely flexible, allowing for the individual needs of students and faculty members. During the first year of study, students are required to take core courses in both sociocultural and biological aspects of medical anthropology, taught at both campuses. After the first year and successful completion of the preliminary qualifying examination, medical anthropology students develop a more specialized and individually tailored program under the supervision and guidance of their advisor.

For students entering the Berkeley campus with the B.A., the doctoral training program is estimated to take between five and six years, as follows: three years of course work, one to two years of doctoral research, and one to two years of doctoral preparation. For a complete listing of courses, consult the Medical Anthropology brochure available from the Program Office. Questions about the major emphasis of each campus or the American Anthropological Association's Guide to Departments of Anthropology. Medical anthropology students 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 deadline is December 16. The minimum requirement for admission to the medical anthropology program is a bachelor's degree with major course work in the social sciences, and on the San Francisco campus, a master's degree in anthropology or a related discipline, or a postbacalaureate professional degree.
1. Introduction to Physical Anthropology. (4) Three hours of lecture and one hour of discussion per week. An 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, racial differences, genetic components of behavior are defined and evaluated. (F,SP) Sarich, Milton

2. Introduction to Archaeology. (4) Three hours of lecture and one hour of discussion per week. Prehistoric and cultural growth. (F,SP) Conkey, Tringham

3. Introduction to Social and Cultural Anthropology. (4) Three hours of lecture and one hour of discussion per week. The structure and dynamics of human culture and social institutions. (F,SP) Potter, Nader

3L. Anthropological Fieldwork Research Methods Seminar. (3) Two hours of lecture/laboratory, seven hours of fieldwork/study, plus consultation per week. Prerequisites: Lower-division status, concurrent enrollment in one of the courses of the methods in social and cultural anthropology for students concurrently enrolled in Anthropology 3. Students will design and carry out their own research project under the guidance of the instructor and the assistants.

10. The California Frontier. (4) Three hours of lecture and one hour of discussion per week. This course will focus upon the beginning of the historic period in California and on the interactions between California Indians and Euro-Americans. The course will begin with an introduction to the indigenous peoples of California and to their contacts with the expanding world-system. It will focus upon the Spanish/Mexican, Russian, and American periods and will conclude with an overview of how these several communities, colonizer and colonized, interacted with and shaped one another. This course satisfies the American cultures requirement. (SP) Simmons

11. Human in America: Cross-Cultural Perspectives. (3) Two hours of seminar per week. This seminar explores social scientific approaches to ethnic human, especially as applied to American cultures. The seminar covers three major domains: (1) sources of ethnic human; (2) types of ethnic human; and (3) impact of ethnic human on American society. We will discuss the humor of each of the following groups: African-Americans, Asian-Americans, Native-Americans, Chicano/Latina, and Euro-Americans. This course satisfies the American cultures requirement.

15. Seminar in Physical Anthropology. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor; lower-division standing. Each instructor will select one or more of the following topics in physical anthropology: evolutionary theory, the fossil record, stages of the life cycle, the biological basis of behavior, the roots of human behavior, human adaptation, genetic components of human behavior, ecological adaptations, controversies and issues in physical anthropology such as the structure and dynamics of human culture and social institutions.

16. Seminar in Archaeology. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor; lower-division standing. Topics in archaeology such as the origins of human culture, domestication of plants and animals, settlement patterns, urbanism, and methods of archaeological interpretation.

17. Seminar in Social and Cultural Anthropology. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor; lower-division status. Special topics in anthropology with an emphasis on integrated and interdisciplinary problems.

21. Languages and Peoples of the World. (4) Three hours of lecture and one hour of discussion per week. An evolutionary perspective on the unity and diversity of languages and peoples of the world. Also listed as Interdepartmental Studies 21 and Linguistics 21. (F,SP) Sarich, Wang

71. Proseminar in Physical Anthropology. (3) One hour of seminar, one hour of lecture, and one hour of discussion per week. Prerequisites: 1. Physical and behavioral adaptations of humans and their prehistoric and living relatives.

72. Proseminar in Archaeology. (3) One hour of lecture, one hour of seminar, and one hour of discussion per week. Prerequisites: 2. Prehistory and cultural growth.

73. Proseminar in Social and Cultural Anthropology. (3) One hour of seminar, one hour of lecture, and one hour of discussion per week. Prerequisites: 3. The structure and dynamics of human culture and social institutions.

74. Proseminar in Anthropological Topics. (3) Course may be repeated for credit. One hour of lecture, one hour of seminar, and one hour of discussion per week. Prerequisites: Consent of instructor. Topics in anthropological theory and method.

90. Exploring Anthropology. (1) Freshmen may repeat course in sophomore year. One and one-half hours of seminar every other week. Must be taken on a passed/not passed basis. Prerequisites: Freshman or sophomore status. This course is designed for lower-division students who are considering Anthropology as a major or minor field. It will offer an introduction to the various fields of anthropology (cultural, physical, archaeology, linguistics, medical) through structured meetings with anthropology faculty at Berkeley and occasional distinguished visitors to the Anthropology Department who will discuss their research interests and their own interpretation of the anthropological imagination.


98. Directed Group Study. (1-4) Course may be repeated for credit. Three to twelve hours of group study or tutorial work per week, Prerequisites: Consent of instructor; Sophomore status. Organized group study on topics selected by lower division students under the direction and supervision of a member of the Anthropology Department's faculty. (F,SP) Staff

99. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Three to twelve hours of tutorial (or fieldwork) per week, Prerequisites: Consent of instructor; Sophomore status. Organized group study on topics selected by lower division students under the supervision of a member of the Anthropology Department's faculty. (F,SP) Staff

Upper Division Courses

Physical Anthropology

100. Human Paleontology. (5) Three hours of lecture and one hour of laboratory per week. Prerequisites: 1. Origin and relationships of the extinct forms of mankind.

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

102L. Physical Anthropology Laboratory. (1-3) Six hours of laboratory per week. Prerequisites: 100 or 105. Descriptive and analytical techniques and methods applicable to the study of intra- and intergroup resemblances and differences.

103. Introduction to Human Osteology. (6) Six hours of lecture and fourteen hours of laboratory 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 archaeological contexts; introduction to use of statistics in osteological analysis. (SP) White

104L. Advanced Human Osteology Laboratory. (1-4) Three to six hours of laboratory per week. Prerequisites: 103 with an average of B or better. This course and consent of Instructor. Laboratory analysis of human skeletal remains including original research on paleodemography, paleopathology, and non-metric analyses, dental anthropology, curatorial and computerization of Hearst Museum skeletal collections.

105. Primate Evolution. (5) 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.

106. Primate Social Behavior. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 1 or Integrative Biology 21. Primates. Humans, apes, and selected monkeys are the primates of concern, and among this array patterns and degrees of social behavior vary greatly. Lectures present a general introduction to behavior and its ecological context, the interaction of biology and behavior from an evolutionary perspective, and an examination of the roots of modern human behavior.

107L. Primate Social Behavior Laboratory. (4) Two hours of lecture and five hours of laboratory per week. Prerequisites: 106 or consent of instructor. Students observe the social behavior of monkeys living in normal groups and prepare a comprehensive written report based on the analysis of their observations. A laboratory session is provided to acquaint students with computer analysis of behavioral data. (F) Dolfing

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.

109. Dietary Anthropology. (3) Three hours of lecture per week. This course focuses on different aspects of the human diet seeking insight into factors related to patterns of food selection, diet breadth, food aversions and avoidances, unusual behaviors with respect to food, body politics, dietary politics, food festivals, folklore of food, etc. In the first few lecture brief mention will be made of the nature of food, itself and its preparation will be related to the dietary patterns of non-human primates and the probable diet of early humans.

110. Theory and Method in Physical Anthropology. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 1. A unitary view of past historical and current trends in physical anthropology emphasizing schools of thought, important figures and major areas of research.

111. Evolution of Human Behavior. (4) Three hours of lecture 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 anthropology.

114. History of Anthropological Thought. (4) Three hours of lecture and one hour of discussion per week. Formerly 114A. This course will present a history of anthropological thought from the mid-19th century to the present, and will discuss the major principles of anthropology. It will focus both on the integration of the anthropological subdisciplines and on the relationships between these and other disciplines outside anthropology. (F) Staff

Medical Anthropology

115. Introduction to Medical Anthropology. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Consent of instructor. Cultural, psychological, and biological aspects of the definitions, aministration of major disease-related ecological con

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

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 the interaction of diet, genetics, and evolutionary selection in human populations.

118. Special Topics in Medical Anthropology. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Upper division status and consent of instructor. Special topics in cultural, biomedical and applied approaches to medical anthropology.

Archaeology

121. Historical Archaeology. Archaeology of the period from the first European settlement in America, Australasia, South Africa, etc.

121A. American Material Culture. (4) Three hours of lecture per week. Prerequisites: 2 or consent of instructor. Formerly 121A. Patterns in material culture as it reflects behavioral and psychological aspects of American culture since the 17th century. Topics include mortuary art, mortuary art, use of artifacts, mortuary art, foodways, and trash disposal. Euro-American, African American, and Native-American examples are considered. (F) Deetz

121B. Archaeology, Material Culture and Ethnicity in America. (4) Three hours of lecture per week. Prerequisites: 2 or consent of instructor. A comparative study of the archaeology and material culture of the various ethnic groups who have contributed to the formation of American culture, and the way in which material culture is used to live the lives of diverse groups of people in the American past. Topics will include Black-White interaction in colonial Virginia, Indian-Hispanic interaction in 16th century Florida, the impact of the fur trade and the commercial expansion on the Native Americans of the Plains. This course satisfies the American cultures requirement. (SP) Deetz

122. New World Cultures. Three hours of lecture per week. Prerequisites: 2, except no prerequisites for 122A. This course will 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. (4) Prerequisites: 2. Formerly 122B. Prehistory of North American Indians; prehistoric culture areas; relations with historic Indians. (SP) Deetz

122C. Ancient Civilization of Mexico and Central America. (4) Formerly 122A. A study of the development, form, and history of pre-Columbian Indian civilizations, surveying the achievements of the Maya, the Aztec, and their neighbors. (SP) Graham

122D. World of Ancient Maya. (4) Formerly 122A. A comprehensive study of the development and cultural history of the longest sustained tradition of aboriginal New World civilization. (F) Graham

122E. People of the Andes. (4) Prerequisites: 2. Formerly 122B. Inca culture and its antecedents; a survey from the earliest times to the present.

122F. California Archaeology. (4) Prerequisites: 2. Prehistory of California Indians; selected archaeological sites and current interpretations. (SP) Blackmer

123. Old World Cultures. 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 a range of relevant fields. No specific sequence to courses; students may take any or all of the following in any sequence.

123A. Stone Age Archaeology. (4) Prerequisites: 2. Overview of stone age cultures and development. Selected topics or geographic areas of paleolithic research.

123B. Archaeology of Africa. (4) Prerequisites: 2. Formerly 123B. Prehistory of early civilizations of Africa; selected archaeological sites and current issues in interpretations.

123C. Archaeology of Europe. (4) Prerequisites: 2. Formerly 123C. Selected topics and research problems in the archaeology of the Pleistocene and/or post-Pleistocene. (SP) Bahn


123E. Mediterranean Archaeology. (4) Prerequisites: 2 or consent of instructor. Prehistory and early civilizations of the Mediterranean basin and its hinterland.

124. Pacific Cultures. Three hours of lecture per week. Prerequisites: 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, ethnohistory and other relevant fields. No specific sequence of courses; students may take any or all of the following in any sequence.

124A. Archaeology of the South Pacific. (4) Selected topics and research problems in the archaeology of the southern Pacific from prehistory through to the establishment of complex chiefdoms in many locales. Stress on current issues and interpretations.

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

124C. Prehistoric Art. (4) Three hours of lecture per week. Prerequisites: 2 or 3 or consent of instructor. Three hours of lecture per week. Prerequisites: Consent of instructor. Development of prehistoric art; prehistoric ceramics. Uses illustrative material from the Hearst Museum of Anthropology.

129. Prehistoric Art. (4) Three hours of lecture per week. Prerequisites: Consent of instructor. Origin, history, and spread of fundamental inventions; illustrative material from the Hearst Museum of Anthropology.

130. Science in Archaeology. (4) Three hours of lecture and two hours of laboratory per week. Prerequisites: 2 or consent of instructor. A survey of the application of principles and techniques of science to the physical and life sciences to the interpretation of archaeological materials. (SP) Shackley

132. Analysis of Archaeological Materials. (4) Course may be repeated for credit. Two hours of lecture and three hours of laboratory per week. Prerequisites: 2 or consent of instructor. Laboratory in analyzing the materials of prehistory (e.g., stone tools, ceramics, and/or metals).
143. Advanced Survey of Social and Cultural Anthropology. (4) Three hours of seminar per week plus extensive reading and writing assignments. Prerequisites: 3 and senior standing or consent of instructor. Formerly 188. Historical survey of anthropological theories, methods, and findings. Intended for majors and pre-
honors students.

144. Social and Cultural Change. (4) Three hours of lecture per week. Prerequisites: 3 or consent of in-
structor. Western theories of evolutionary and revolu-
tionary change inform our general understanding of sociocultural change. The course will evaluate these models by reading about the particular and mul-
tifaceted experiences of social change in different times and places, and will consider new forms of con-
sciousness and culture generated by the colonial en-
counter, modernization, industrialization, emigra-
tion, and the impact of cosmopolitan culture on non-Western societies.

145. Urban Anthropology. (4) Three hours of lecture per week. Prerequisites: 3 or consent of in-
structor. A comparative study of peasant society as a social type contrasted with primitive and industrial so-
 ciety.

146. Comparative Peasant Society. (4) Three hours of lecture per week. Prerequisites: 3 or consent of in-
structor. A comparative study of peasant society as a social type contrasted with primitive and industrial so-
 cieties. (SP) Graburn

147. Gender, Culture and Sexuality. (4) Three hours of lecture and one hour of discussion per week. Prere-
quisites: 3 or consent of instructor. Explores the meanings of gender in both evolutionary and com-
parative anthropological perspectives and in an effort to un-
 derstand the interplay of biology and culture in the pro-
duction of sex roles and sexuality. Themes to be ad-
 dressed include: science and its theories of gender;
the question of universal male dominance; cultural con-
struction of gender and sexuality; health, mental health,
as affected by gender and sexuality; gender play (gen-
der reversals, gender crossing, and symbolic resis-
tance). (SP) Helburn

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

149. Culture and Personality. (4) Three hours of lec-
ture and one hour of discussion per week. Prerequi-
tes: 3 or consent of instructor. Relationships of cul-
tural behavior as factors in human personality in repre-
sentative societies; techniques for studying culture-personality relations.

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

151. Anthropology of Tourism. (4) Three hours of lecture per week. (1) Variations in touristic motivations and behavior and (2) the political, economic, and cul-
tural impact of tourism on host cultures and commu-
nities. (SP) Graburn

152. Art and Culture. (4) Three hours of lecture per week. Graphic and plastic arts and their relations to art and religion; family, kinship and community orga-
nization; economic and social changes; art and religion; family; kinship and community organ-
ization; economic and social changes.

153. Education and Culture. (4) Three hours of lec-
ture per week. Prerequisites: 3 or consent of instruc-
tor. Anthropological approaches to the study of edu-
cation in traditional and modern culture. (SP) Ogbum

154. Social Inequality. (4) Three hours of lecture per week. Prerequisites: 3 or Sociology 1 or consent of in-
structor. Comparative examination of theories and sys-
tems of social inequality by reference to societies rang-
ing from band to state, from foraging to industrial, from
egalitarian to stratified, with attention to inequality de-
 fined by kinship, gender, age, servitude, class, caste,
race, ethnicity, colonial status, etc. (SP) Graburn

155A. Politics and Anthropology. (4) Three hours of lecture per week. Prerequisites: 3. Anthropological concepts relevant to the comparative analysis of po-
 litical ethnography and socio-political change. Partic-
ular attention will be given to the interrelations of cul-
ture and politics.

156B. Culture and Power. (4) Three hours of lecture per week. The course examines how representations are structured within fields of power and, in turn, how po-
 litical considerations are translated into cultural forms. Topics include the role of science, power and social sci-
ence, power/knowledge, the social, difference and power, social science and ethics. (F) Rabinow

156C. Anthropology of Modernity: Science. (4) Three hours of lecture per week. Prerequisites: A back-
ground in critical theory. The course will take an anthropological approach to modern science under-
stood as an historically situated, socially constructed set of practices, discourses and institutions. Readings will include theoretical works drawn from Kuhn, Hei-
gel, Foucault as well as cases studies with particular reference to contemporary bioscience. Students are expected to have a background in con-
temporary theory. (SP) Graburn

157. Anthropology of Law. (4) Three hours of lecture per week. Prerequisites: 3 or consent of instructor. Comparative survey of the ethnography of law; meth-
ods and concepts relevant to the comparative analy-
sis of the forms and functions of law.

158. Religion and Anthropology. (4) Three hours of lecture per week. Prerequisites: 3 or consent of in-
structor. A comparative consideration of religious beliefs and institutions and other aspects of cul-
ture.

159. Ethnic Interaction: Contemporary Issues. (4) Three hours of lecture and one hour of discussion per week. This interdisciplinary course will discuss com-
parative topics in ethnic groups, ethnicity and ethnic iden-
tity. The approaches considered are those of re-
cent sociology, political science, comparative anthro-
pology, and comparative psychology. The course con-
siders various topics such as conflicts and accommodations. Readings required cover both literature and social sci-
cence.

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 folk-
lore with special emphasis upon proverbs, riddles, su-
perstitions, games, songs, and narratives.

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

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

163. Linguistic Anthropology. (4) Three hours of lecture per week. Prerequisites: Consent of instruc-
tor. Introduction to the study of the collection, analysis, and presentation of linguistic data. Will involve loc-
al field research. There is no specific sequence to the courses; students may take any or all of the fol-
lowing courses in any sequence.

164A. Ethnolinguistics and Language Policy. (4) Three hours of lecture per week. Prerequisites: 3. For-
merly 164A. Introduction to ethnolinguistics and lan-
 guage policy. Focus will be on the theoretical perspec-
tives. Laboratory sessions will pro-
vide an introduction to the use of Suh workstations for data entry, archiving of field notes, and basic text anal-
ysis.

168. Research Theory and Methods in Socio-Cul-
tural Anthropology. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 3. For-
merly 168. Introduction to research problems and re-
search design techniques. Will involve local field re-
search on the collection of raw data. Course will require an additional 15 hours of work per week includ-
ing class time, outside work and preparation. One section meeting per week will be required. (F) Ogbu

Area Studies

170. China. (4) Three hours of lecture per week. Chi-
inese culture and society with an emphasis on the cul-
tural level.

171. Japan. (4) Three hours of lecture and one hour of discussion per week. Ethnological treatment of his-
tory and modern Japanese culture, covering history, art and religion; family, kinship and community orga-
nization; political, economic and occupational patterns; cultural psychology and social problems in modern Japan. (SP) Ogbu

172. United States Culture and Society. (4) Three hours of lecture per week. Anthropological theory and research on American culture and society. This course
satisfies the American cultures requirement.

173. North American Indians. (4) Three hours of lec-
ture per week. Historical and cultural anthropology of the native peoples of the United States and Canada.

174. Indians of California. (4) Three hours of lecture per week. Survey of the cultures of the native people of California. Tribal divisions, arts, customs, archae-
ology.

175. Native Peoples of South America. (4) Three hours of lecture per week. Anthropology, ethnography, eco-

176. Contemporary Latin America. (4) Course may be repeated for credit. Three hours of lecture per week. Emphasis on indigenous and mestizo culture with special emphasis on comparative orga-

177. Mexico and Central America. (4) Three hours of lecture per week. Ethnology of Indian and Mestizo culture with special emphasis on comparative organ-


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. Focus will be on the cultural and social aspects of Arabic and Middle Eastern societies, with special emphasis upon Arab populations. (F) Eernme

182. Circumpolo Peoples. (4) Three hours of lecture per week. Arctic and sub-arctic peoples of Europe, Asia, and North America; traditional cultures and pre-
 sent status in national societies.
183. Sub-Saharan Africa. (4) Three hours of lecture per week. Cultures and social institutions of sub-Saharan Africa.

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

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

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.

187. Peoples and Cultures of the Himalayas. (4) Three hours of lecture per week. Formerly 188, emphasis on the peoples and cultures of the Himalayan regions of India, Pakistan, Bhutan, and less centrally, Afghanistan and China (Tibet).

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

189. Special Topics In Social/Cultural Anthropology. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. Various topics covering current research theory, method; issues of social and cultural concern; culture-change, conflict, and adaptation. May contain more than one subdiscipline of Anthropology. (F,SP)

Application of Quantitative and Qualitative Computer Methods to Anthropology

Note: See also 169A, above.

190A. Quantitative Methods In Anthropology I. (5) Three hours of lecture and three hours of laboratory per week. Formerly 195 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.

190B. Quantitative Methods In Anthropology II. (5) Three hours of lecture and three hours of laboratory per week. Prerequisites: 195 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.

193. Practical Computer Use and Laboratory. (3) One hour of lecture and a minimum of three hours of laboratory per week. Must be taken on a pass/no pass basis. Setting data for computer analysis; data entry; editing data; sorting and categorizing data; word-processing; exploratory data analysis. Must be taken concurrently with laboratory.

193B. Advanced Computer Techniques. (1-5) Course may be repeated for credit with different instructors and one-half hour per credit and three hours of laboratory per week. Must be taken on a pass/no pass basis. Prerequisites: 193 or equivalent and permission 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, data base design and use, and electronic communications.

194. Anthropological Demography. (4) Students will receive two hours for each 184 after taking 94. Three hours of lecture per week. Prerequisites: Consent of instructor. Formerly 169A. Population theory and methods applied to anthropological data and problems. Major topics include: the demographic processes of population growth and change. Nonhuman primates, paleodemography, hunter-gatherers, historical and modern peasant populations, migration, and social-cultural factors in fertility, mortality. (F,SP) Hammel

195A-195B. Advanced Medical Anthropology. (4-4) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Consent of instructor. Anthropological theory, data, and methodology in relation to the health sciences. Lectures, readings, and supervised field research. May be taken in association with other courses. UCSC. Staff.

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. Three hours of lecture and one hour of discussion per week. Prerequisites: Consent of instructor. Modules 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.

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

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

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

224. African Protohistoric 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) 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.

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

229A-229B. Archaeological Research Strategies. (4-4) Three hours of seminar per week. Prerequisites: Consent of instructor. Required for all first and second year graduate students in archaeology. Three hours of seminar discussion of major issues in the history and theory of archaeological research and practice (229A), and of the research strategies and design for various kinds of archaeological problems (229B). To be offered alternate semesters. (F) Conkey, Kirch

230. Special Topics In Archaeology. (4) Two hours of seminar per week. Prerequisites: Consent of instructor. (F) Yingham

Seminars and Independent Study

H195A-H195B. Senior Honors. (4-4) Three hours of tutorial per week. Credit and grade to be awarded on completion of sequence. 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

219. Supervised Independent Study. (1-4) Course may be repeated for credit. One to three hours of tutorial per week. Must be taken on a passed/not passed basis. Prerequisites: 60 units; good academic standing. Undergraduate research by small groups. Enrollment is restricted by regulations governing 198 courses. (F,SP) Staff

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

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

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

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

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

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

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

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

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

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

229. 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.

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

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

Medical Anthropology

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

Graduate Courses

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

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.

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. (SP) 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.

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.
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. Formerly a portion of the 240A-240B-240C series. Advanced survey of the major theoretical and empirical areas of social and cultural anthropology. Sequence begins Fall. (F,SP) 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. Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of Instructor.

250A. Culture and Personality. (4)
250B. Devi/cy. (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) Formerly 251Q and 251P and 250L.
250J. Ethnological Field Methods. (4)
250L. Urban Anthropology. (4)
250M. Ecological Anthropology. (4) Formal prerequisite: Consent of Instructor.
250N. Education and Culture. (4) Formerly 251S, 251T, and 250Q, (SP) Optp
250O. Social Interaction. (4)
250P. Social Change and Development. (4)
250Q. Peasant Societies. (4)
250R. Analysis of Field Data. (4) (F) Brandes
250S. Material Culture. (4) 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 Hearst Museum of Anthropology. Successful design may result in an exhibition. The seminar is interdisciplinary.
250T. Tribal Societies. (4) Prerequisites: Consent of Instructor. The comparative study of small-scale, kin based, patrilineal 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.
250X. Special Topics. (4) Formerly 250R, 251Y and 251Z. (F,SP) Staff

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

Folklore

250A. Semantics. (4) Formerly 270A and 271A-271B.
270B. Interactional Socio-Linguistics. (4) Formerly 270C and 271C-271D.
270C. Language Variation. (4) Formerly 270E and 271E-271F.
270D. Ethnolinguistics. (4) Formerly 270H and 271H-271I.
270F. Ethnobiology. (4) Formerly 270K and 271K-271L.
270G. Color Categorization. (4) Formerly 270M and 271M-271N.
270H. Ethnolinguistics. (4) Formerly 270O and 271O-271P)
270L. Decision Making. (4) Formerly 270Q and 271Q-271R
270X. Special Topics in Linguistic Anthropology. (4) Formerly 270S and 271S-271T.

Area Studies

280. Seminars in Area Studies. 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 Catalogue 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)
280G. Oceania. (4)
280H. European Society. (4)
280L. United States Culture and Society. (4)
280J. South American Ethology. (4)
280K. Special Topics in Area Studies. (4)

290. Survey of Anthropological Research. (1) Course may be repeated for credit. Two hours of lecture every other week. Must be taken on a satisfactory/unsatisfactory basis. Required each term of all graduate students entering the Department and prior to their advancement to Ph.D. candidacy. (F,SP) Grabum

Application of Quantitative and Computer Methods to Anthropology

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

Independent Study

296A. Supervised Research. (2-12) Course may be repeated for credit. Variable units for field research per week. Prerequisites: Consent of Instructor. Practice in original field research under staff supervision. One unit of credit for every four hours of work in the field. (F,SP) Staff

296B. 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

298. Directed Reading. (1-8) Course may be repeated for credit. One to eight hours of conference per week. Prerequisites: Consent of instructor. Individual conferences to provide directed reading in subject matter not covered by available seminar offerings. (F,SP) Staff

299. 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) Staff

200. Individual Study for Doctoral Students. (1-12) Course may be repeated for credit. One to eight hours of consultation per week. Must be taken on a satisfactory/unsatisfactory basis. 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 resistance requirements for the degree. (F,SP) Staff

Professional Courses

301. Professional Training: Teaching. (1-6) Course may be repeated for a maximum of 12 units. Two hours of attendance at one of the university's seminars per week. Must be taken on a satisfactory/unsatisfactory basis. Group consultation with instructor. Supervised training with instructor on teaching undergraduates. (F,SP) Staff

Interdepartmental Studies Courses

Lower Division Course

IDS 21. Languages and Peoples of the World. (4) Three hours of lecture and one hour of discussion per week. An evolutionary perspective on the unity and diversity of languages and peoples of the world. Also listed as Anthropology 21 and Linguistics 21. (SP) Sarich

Upper Division Course

IDS 122. Animal Behavior Laboratory. (3) Course may be repeated for credit. One hour of lecture, three hours of laboratory, and one hour of discussion per week. Prerequisites: Biology 1 or Integrative Biology 2; or Anthropology 106; and/or consent of instructor. A laboratory introduction to the observational study of comparative animal behavior in a semi-naturalistic setting. Students will learn sampling and observational methods, recording formats, data analysis and writing presentation of observational data. Lecture and discussion will focus on comparative animal behavior. Animals will be those in the vertebrate colonies at the Field Station for Behavior Research. Sponsoring departments: Anthropology, Integrative Biology, and Psychology.

Graduate Courses

IDS 215. Faunal Analysis in Archaeology. (4) One hour of lecture, one hour of discussion, and six hours of laboratory per week. Prerequisites: Integrative Biology 184, 184L or a course in comparative anatomy. Introduction of systematics of animals commonly found in archaeological contexts, principles and procedures in faunal analysis of archeological sites. Includes training in osteology and research methods, and preparation of a faunal analysis of an archeological site. Sponsoring departments: Anthropology and Integrative Biology.

IDS 228. Human Evolution, Prehistory and Palaeoanthropology. (3) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. A seminar course devoted to consideration of current research in paleoanthropology and related subjects. Sponsoring departments: Anthropology and Integrative Biology.

Applied Science and Technology

(College of Engineering)

Office: 230 Bechtel Engineering Center, 542-6790

This graduate program, new at Berkeley, operates under the auspices of the College of Engineering's Interdisciplinary Studies Center. The program has two major areas of emphasis: applied physics and applied mathematics. Faculty associated with the new program are drawn from several departments within the College of Engineering, as well as from the University of California's Division of Engineering and Mathematics. Topics of interest include the novel properties and applications of nanostructures, thin films and interface science, short wavelength coherent
radial, X-ray micro-imaging for the life and physical sciences, plasma physics and plasma-assisted materials processing, high-field magnetic processes, laser probing of complex reacting systems, ultrafast phenomena, particle accelerators, non-linear dynamics, chaotic systems, numerical methods, and topics in computational fluid mechanics and reacting flows. This program awards the Doctor of Philosophy degree.

Graduate research in the AS&T Program benefits from state-of-the-art experimental facilities at the Berkeley campus and the Lawrence Berkeley Laboratory. Recent additions to these are the National Center for Electron Microscopy, with the world's highest resolution high-voltage microscope and a microfabrication lab for student work involving lithography, ion-implantation, and thin-film deposition; an integrated sensors laboratory; femtosecond laser laboratories; optical, electrical, and magnetic resonance spectroscopies; short wavelength X-ray and X-ray research laboratories; an unparalleled variety of material, chemical, and surface science analytic equipment; and a soon-to-be-completed soft X-ray synchrotron dedicated to materials, chemical, and biological research based on high-brightness and partially coherent radiation. The interdisciplinary, collaborative nature of the AS&T Program provides ample opportunity to develop a professional career by making the best use possible of these facilities and of the other research instrumentation available to AS&T faculty.

Graduate Courses. Students in the AS&T Program take the following courses, drawn largely from regular departments with the concurrence of faculty. (See Bulletin 210, Introduction to X-Ray Physics and Technology (3 units); Engineering 230, Applied Science and Technology Seminar (1 unit); and Engineering 239B, Topics in Soft X-Ray Microscopy and Lithography (1 unit).

Admission. The complete application, including transcripts, letters of reference, a statement of academic and professional goals, is due February 12 for the following fall semester. To obtain application forms, students should contact the Ray School of Social Sciences, Berkeley Graduate School, 230 Bechtel Engineering Center, University of California at Berkeley; Berkeley, CA 94720. Telephone: 642-8790.

Undergraduate Programs

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

Accreditation. Most states require that an individual who successfully completes a five-year professional degree in architecture be accredited by the National Architectural Accrediting Board. There are two types of degrees that are accredited by the National Architectural Accrediting Board: (1) the Bachelor of Architecture, which requires a professional degree, and (2) the Master of Architecture, which requires a minimum of three years of study following an unrelated bachelor's degree or two years following a related preprofessional bachelor's degree. These professional degrees are structured to educate those who aspire to registration/licensure as architects.

The four-year, preprofessional degree, where offered, is not accredited by NAAB. The preprofessional degree is useful for those wishing a foundation in the field of architecture, as preparation for either continued education in a professional degree program or for employment opportunities in architecturally related areas.

Graduate Programs

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

Master of Architecture. The professional degree, Master of Architecture, will be awarded to students who successfully complete a program of study from one to three years duration depending upon previous education and experience. The department recognizes no restrictions as to the undergraduate preparation. However, the length of the required residence period, the number of required semester course units, and the specific list of required courses may vary depending upon under-graduate major, professional, and other 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 analytic geometry 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 bachelor's degree with a major in architecture or comparable five-year degree from an accredited school, or comparable five-year degrees from foreign universities and technical institutes.

Doctor of Philosophy 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 study and research. Applicants must meet Graduate School admission requirements with respect to admission, the language requirement, candidacy, and the dissertation under Plan B apply (see index). Applicants must hold a professional degree in architecture and continue their postgraduate studies in the discipline of undergraduate preparation. Additional information is available from the department graduate secretariat.

Architecture

(College of Environmental Design)

Department Office: 222 Wurster Hall, 642-4942
Chair: (To be announced)

Professors:
Christopher Alexander, Ph.D. Harvard University, Architectural design, pattern language
Edward A. Arena, Ph.D. University of Edinburgh. Building simulation
David Davis, M.E.D., F.A.I.A. Yale University, Architectural design
Mark P. Dismukes, Ph.D. University of California, Los Angeles. Social factors in design
Bob Sweat, Ph.D. University of California at Berkeley. Architectural design
Jerome H. Zaniewski, B.Arch. University of California at Berkeley. Architectural design

Assistant Professors:
Cassandra Adams, M.Arch. University of Washington. Architectural design
Ralph A. Upton, B.Arch. University of Virginia. Architectural design
Gayle Kunz, Ph.D. University of Chicago, Social factors in design
Richard S. Cotton, B.Arch. University of California at Berkeley. Architectural design

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

Although ability in building design is often considered to be the hallmark of an architectural education and our graduates, knowledge about how people can affect environments and manage human, financial, and natural resources in the creation of that environment is of equal or greater importance. Many students follow low programs in environmental history, behavioral sciences, resource management, and design theory. Problem identification and formulation and the recognition of the dual nature of architectural cultures and concerns are pursuits which often do not entitle building construction. The department prides itself on educating not only good architects, but also environmentally knowledgeable citizens.

Stephan O. Tobihter, Ph.D. Harvard University, Architectural history

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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 issues in the areas 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 varies with the individual, depending in part 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.

Special Degree Program with the Department of City and Regional Planning. The two departments offer a special degree program for exceptionally qualified students who hold the five-year Bachelor of Architecture degree, or its equivalent. All upper division students and 24 units in the Department of Architecture, and three semesters and 36 units in the Department of City and Regional Planning, the candidate may receive both the Bachelor of Architecture degree and the Master of Arts degree in the small-seminar setting. Berkeley Seminars are presented in the form of a professional seminar, with lecture and discussion per week. Sections 1-2 to be graded on a letter-grade basis; Sections 3-4 to be graded or a passed/not passed basis. 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 (Mar. Arch. Program) and indicate on their application the interest in the joint program.

Architectural Design

Upper Division Courses

100A-100B. Fundamentals of Architectural Design. (5-5) Forty-five hours of lecture/seminar and 75 hours of studio/tutorial per semester. Prerequisites: ED 111A-111B. Must be taken in sequence. Introductory courses in the design of buildings. Introduction to the major social, technological and environmental determinants.

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

100B stresses structures, materials, and energy considerations. Studio work is supplemented by lectures, discussions, readings and field trips. (F,SP)

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, readings and field trips. (F,SP)

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 the architectural design including the integration of structure, construction and building systems, and the production of construction documents. Studio work is supplemented with lectures, discussions, readings and field trips. (F,SP)

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

109. Seminar in Architectural Design. Course may be repeated for credit as topic varies. Prerequisites: Consent of instructor. Selected topics in the theories and concept of architectural design. For current selection offerings, see departmental announcement.

109A. Seminar in Architectural Theory. (1-4) (F,SP)

109B. Seminar in Architectural Criticism. (1-4) (F,SP)

109C. Current Issues in Architecture. (1-4) (F,SP)

109X. Special Topics: Architectural Design. (1-4) (F,SP)

Graduate Courses

200A-200B. Fundamentals of Architectural Design. (7-7) Sixty hours of lecture/seminar and 120 hours of studio per semester. 200A must be taken on a satisfactory/unsatisfactory basis. 200B must be taken for a letter grade. 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, readings, and field trips.

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

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 prior to graduation for M. Arch. degree. Each section deals with a specific topic such as urban design, design development, energy issues, or with individual student-initiated projects. Projects in 202 frequently are presented in the form of a professional report or a thesis. (SP)

208. Structural, Mechanical, and Electrical System Design in Buildings. Prerequisites: At least one third year graduate standing. Seminar on structural, electrical, and mechanical systems relating to the student's current graduate design studio project.

208A. Structural Design System. (2) (SP)

208B. Mechanical System Design. (1) (SP)

208C. Electrical System Design. (1) (SP)

209. Seminar: Architectural Design. Course may be repeated for credit as topic varies. Prerequisites: Second or third year graduate standing. Topics deal with major problems and current issues in architectural design.

209A. Seminar in Architectural Theory. (1-4) (F,SP)

209B. Seminar in Architectural Criticism. (1-4) (F,SP)

209C. Current Issues in Architecture. (1-4) (F,SP)

209X. Special Topics: Architectural Design. (1-4) (F,SP)

Social and Cultural Factors in Design

Upper Division Courses

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

111. Housing: An International Survey. (3) Three hours of lecture per week. Introduction to international housing from the Architectural and City Planning perspectives. Housing issues (social, cultural, and policy) ranging from micro-scale (house) to macro-scale (city) presented with a comparison of housing situations in developed and developing countries. (SP) Nazar Alsayed

112. Housing for Different Subcultures. (3) Three hours of seminar per week. Prerequisite: 100A. Course examines housing and neighborhood needs and solutions for different subcultures in the U.S. Topics include how housing in general is a reflection of culture and how subcultural differences contribute to the overall variety and choice of housing types that may make housing more reflective of the American culture. These questions will be looked at more specifically in the context of the Mission, Chinatown, Tenderloin, and Fillmore districts in San Francisco. (F) Ilaiahkawa

Graduate Courses

210. Advanced Study in Social and Cultural Factors in Design. (3) Forty-five hours of lecture/seminar per semester. Prerequisite: 100A. Study of relationships between social and institutional functions and environments. (F,SP)

211. Social and Cultural Factors in Design: Research Methods. (2) Course may be repeated for credit. Thirty hours of lecture/seminar per semester. Prerequisite: 100A. Study of relationships between social and institutional functions and environments. (F,SP)

218. Colloquium on Social, Cultural, and Behavioral Issues in Env. Design. (1) Course may be repeated for credit. Three hours seminar every other week. Prerequisite: 100A. Course examines housing and neighborhood needs and solutions for different subcultures in the U.S. Topics include how housing in general is a reflection of culture and how subcultural differences contribute to the overall variety and choice of housing types that may make housing more reflective of the American culture. These questions will be looked at more specifically in the context of the Mission, Chinatown, Tenderloin, and Fillmore districts in San Francisco. (F) Crazzo Marcus

219. Seminar on Social and Cultural Bases in Design. (3) Course may be repeated for credit as topic varies. Formerly 211 and 219A through 219G. Selected topics such as social policy and building form, environmental concerns for special populations, mourning 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.
120 / Architecture

219A. Design and Housing in the Developing World. (3) (SP) AlSayyad
219B. Designing for Special Populations. (1-4) (F,SP)
219C. Programming and Evaluation. (1-4) (F,SP)
219D. Social Aspects of Housing Design. (1-4) (F,SP)
219E. Social Form and Spatial Organization. (1-4) (F,SP)
219F. Urban Parks. (1-4) (F,SP)
219K. Special Topics: Social and Cultural Bases of Design. (1-4) Fifteen hours lecture/seminar per unit per semester. Prerequisites: 210 or consent of Instructor. (F,SP)

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

122. Introduction to Community Development. (5) Fifteen hours of lecture per week. Prerequisites: 100A. (F)

129. Seminar in the Practice of Design. Course may be repeated for credit as topic varies. (F,SP)
129A. Housing Design Seminar. (1-4) Fifteen hours lecture/seminar per unit per semester. (F,SP)
129B. Written and Graphic Skills for Designers. (1-4) Fifteen hours lecture/seminar per unit per semester. (F,SP)
129X. Special Topics in the Practice of Design. (1-4) Fifteen hours lecture/seminar per unit per semester. (F,SP)

Graduate Courses
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. (F)

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

229. Seminar on the Practice of Design. Course may be repeated for credit as topic varies. Prerequisites: Designated section 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.

229A. Advanced Project Development Analysis. (1-4) Prerequisites: Designated section of 129. (F,SP)
229B. Architectural Practice: Construction Document Phase. (1-4) (F,SP)
229C. Architectural Practice: Construction Phase. (1-4) (F,SP)
229D. Construction Management. (1-4) (F,SP)
229E. Cost Estimation. (1-4) (F,SP)
229F. Introduction to Construction Law. (1-4) (F,SP)
229G. On the Profession of Architecture. (1-4) (F,SP)
229H. Problems and Opportunities in Architecture. (1-4) (F,SP)

229I. Professional Writing. (1-4) (F,SP)
229J. The Market for Architecture. (1-4) (F,SP)
229K. Case Studies in Design. (1-4) (F,SP)
229X. Special Topics in the Practice of Design. (1-4) (F,SP)

Design Theories and Methods
Upper Division Courses
130A. Introduction to Design Theories and Methods. (5) Students will receive no credit for 130A after taking Environmental Design 130. Sixty hours of lecture and twenty 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)

130B. Computer Applications to Design 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 applications or have been specifically developed for such applications. The usefulness, problems, and limitations of the software will be discussed. (F,SP)

132. Computer Applications in Architecture. (3) Three hours of lecture and one hour of laboratory per week. Prerequisites: IDS 110 or equivalent or consent of instructor. Survey of applications of computers in the architectural profession. Topics include 2D/3D computer-aided design, architectural databases, computer-aided analysis and models, and impact on the profession. Final grade is based on homework and programming assignments, midterm, project, and final exam. (F,SP)

135. Project Development: Analysis, Strategy, Financing. (3) Two hours of lecture and one hour of discussion 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. (SP)

139. Seminar in Design Theories and Methods. Course may be repeated for credit as topic varies. Prerequisites: 130. Special topics such as evaluation methods, information problems in design, development of computer-aided design, computer programming for design. For current section offerings, see departmental announcement. (F,SP)

139X. Special Topics: Design Theories and Methods. (1-4) Fifteen hours lecture/seminar per unit per semester. Prerequisites: 130. (F,SP)

Graduate Courses
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)

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)

235. Seminar in Design Theories and Methods for Doctoral Students. (1) Course may be repeated for credit. Forty-five hours of seminar/discussions per semester. Must be taken on a satisfactory/unsatisfactory basis. Required for doctoral students in this area study. (F,SP)

238. Seminar in Design Theories and Methods. Course may be repeated for credit as topic varies. Prerequisites: 130A or consent of instructor. (F,SP)

239A. Design and Computers. (1-4) (F,SP)
239B. Environmental Models and Model Environments. (1-4) (F,SP)

239C. Ethics of Design. (1-4) (F,SP)
239D. Logics of Design. (1-4) (F,SP)
239E. Mathematical Models of Design. (1-4) (F,SP)
239F. Planning and Design of Infrastructure. (1-4) (F,SP)
239G. Spatial Configurations. (1-4) (F,SP)
239H. The Knowledge of the Designer. (1-4) (F,SP)
239X. Special Topics: Design Theories and Methods. (1-4) (F,SP)

Building Environments
Upper Division Courses
140. Introduction to Energy and Environmental Management. (4) Fifty hours of lecture and 30 hours of discussion per semester. Prerequisites: Physics equivalent, or consent of instructor. Study of the thermal and lighting environments in buildings, with emphasis on quantitative design techniques. (F,SP)

149. Seminar on the Physical Environment in Buildings. Course may be repeated for credit as topic varies. Prerequisites: 140 or consent of instructor. Introduction to the physical environment for the five investigations of daylight in architectural presentation techniques. (RSP)

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. Preparation for advanced study in thermal building sciences. This course provides a theoretical basis for advanced elective courses in the area of energy, including principles of heat transfer, airflow, psychrometry, and thermal comfort. (F,SP)

243. Natural Cooling and Ventilation. (3) Forty-five hours lecture/seminar per semester. Prerequisites: 140, 242 or consent of instructor. Course focuses on a wide range of passive cooling strategies, including solar control, natural ventilation, radiation, evaporation and earth-contact cooling and their treatment in architectural design. (F)

244. Mechanical Systems for Environmental Control. (2) Thirty hours lecture/seminar; offered last 10 weeks of semester. Prerequisites: 140, 242 or consent of instructor. Introductory overview of principles and practical aspects of heating, ventilating, and air-conditioning (HVAC) of buildings. Discussion of criteria for comfort, and methods for estimating energy flows in buildings and resulting heating and cooling loads. Various types of HVAC systems will be described. (SP)

245. Daylighting Analysis Using Physical Models. (3) Three hours of seminar per week. Prerequisites: 140 or consent of instructor. Focuses on a wide range of passive cooling strategies, including solar control, natural ventilation, radiation, evaporation and earth-contact cooling and their treatment in architectural design. (F)
249. Seminar: Physical Environment in Buildings. Course may be repeated for credit as topic varies. Prerequisites: 140. Selected topics such as climatic design, mechanical systems, natural lighting, artificial lighting, acoustics. For current section offerings see departmental announcement. (F,SP)

249A. Appropriate Technology. (1-4) (F,SP)

249B. Artificial Lighting. (1-4) (F,SP)

249C. Lighting Design. (1-4) (F,SP)

249D. Natural Lighting. (1-4) (F,SP)

249E. Occupant Response. (1-4) (F,SP)

249F. Solar Technology. (1-4) (F,SP)

249X. Special Topics in the Physical Environment in Buildings. (1-4) (F,SP)

Structures and Construction

Upper Division Courses

150. Introduction to Structures. (4) Forty-five hours of lecture and thirty hours of discussion per semester. Prerequisites: Physics 8A. Study of forces, materials, and structural significance in the design of buildings. Emphasis on understanding the structural behavior of real building systems. (F,SP)

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

153. Performance of Wood in Structures. (3) Three hours of lecture per week. The survey of wood properties and wood products of importance to building design and construction. Emphasis is placed on prevention of biodeterioration. Case studies will be presented to avoid wood failure in structures, showing proper usage of wood products. Also listed as Forestry 153. (F,SP)

154. Design and Computer Analysis of Structure. (3) Thirty hours of lecture and 45 hours of laboratory per semester. Prerequisites: 150. Design and analysis of whole structural building systems with the aid of finite element analytical methods. Advanced structural concepts explored in a laboratory environment. (F, Black)

155. Seminar on Structures and Construction. Course may be repeated for credit as topic varies. Prerequisites: 150. Special topics such as building performance failures, architectural preservation, construction management implementation, and geologic hazards to construction. For current section offerings see departmental announcement. (F,SP)

254. Structures, Construction and Space In Great Historical Buildings. (3) Forty-five hours of lecture/discussion and thirty hours of laboratory work per semester. Prerequisites: 150 and 170. Study into the relationships between architectural space, structural behavior, and construction systems/methods in building from the fourth century B.C. to the Middle Ages. Emphasis is placed on the understanding of whole buildings. (F,SP)

259A. Construction and Geologic Hazards. (1-4) Prerequisites: 252 and consent of instructor. (F,SP)

259B. Experimental Structures. (1-4) Prerequisites: 250 and consent of instructor. (F,SP)

259C. Materials and Specifications. (1-4) Prerequisites: 250 or 252 and consent of instructor. (F,SP)

259D. Preservation and Conservation: Theory. (1-4) Prerequisites: 250 or 252 and consent of instructor. (F,SP)

259E. Preservation and Conservation: Implementation. (1-4) Prerequisites: 250 or 252 and consent of instructor. (F,SP)

259X. Special Topics: Structures and Construction. (1-4) Prerequisites: 250 or 252 and consent of instructor. (F,SP)

The Building Process

Upper Division Courses

160. The Nature of Order. (3) Three hours of lecture per week. Lectures to determine the foundation of all architecture, and the four methods of seeing architecture which brings practical function and inner spirit together in one conception that finds its origin in the physical nature of matter. (F)

163. Architecture Shop Course. (3) Six hours of laboratory per week. Materials and processes in the fabrication of wood, plastic and metal. (F,SP)

Graduate Courses

260A. The Nature of Order, Graduate Seminar. (2) Two hours of seminar per week. Prerequisites: Required of graduate students taking 160. This seminar examines the advanced level concepts and theories presented in Architecture 160. Students will make regular presentations with criticism or commentary on Architecture 160 lecture topics. (F) Alexander

260B. Advanced Theory of Order. (3) Forty-five hours seminar per semester. Prerequisites: 260A. Advanced topics in the theory of order. (F,SP)

260D. Patterns in Different Cultures. (3) Forty-five hours lecture/term per semester. Prerequisites: Consent of Instructor. Housing patterns and other patterns in different cultures and subcultures. Emphasis on the problem of variation between cultures and subcultures and on the uniqueness of each culture. (SP) Azarian

262X. City Building—Formation of Urban Wholes. (3) Three hours of seminar per week. Theory of the formation of urban wholes, based on the main principles of, first, "wholesness in the structure of the city," and, second, "city as a growing whole." (SP) Alexander

263A. Building Construction: Elementary Construction Experience. (3-5) Course may be repeated for credit. One hundred-eight to one hundred-eighty hours field work per semester. A laboratory course with on-site experience in building construction, with emphasis on the processes of innovation and the relationship of architect to builder. Work includes projects in concrete, masonry, steel, wood, and tile. (F,SP) Alexander

263B. Building Construction: Advanced Construction Experience. (3-5) Course may be repeated for credit. One hundred-eight to one hundred-eighty hours field work per semester. Prerequisites: 263A or consent of instructor. A laboratory course with advanced on-site experience in building construction, with emphasis on the processes of innovation and new techniques. (F) Alexander

265. Color. (5) Sixty hours of seminar/workshop each semester. Prerequisites: 160 is recommended but not required. The meaning and rules governing the use of color, with special reference to the use of color phenomena in space, color systems, and colorants. Students will be expected to make a series of paintings and designs and colored objects. (SP) Alexander

History of Architecture

Upper Division Courses

170A-170B. An Historical Survey of Architecture and Urbanism. (4-4) Forty-five hours of lecture and 15 hours of seminar/discussion per semester. Formerly 170A and 170B. 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)

171. Survey of Urban Design. (3-4) Forty-five hours of lecture per semester. Additional 15 hours of seminar for one additional unit. Prerequisites: 170A-170B. A study of the physical fabric of a great city and its changing character through time. (F,SP)

173A. Modern Architecture. (3) Forty-five hours of lecture per semester. Prerequisites: 170A-170B and consent of instructor. (SP)

173B. Baroque Architecture. (3) Forty-five hours of lecture per semester. Prerequisites: 170A, 170B and consent of instructor. (F)

174A. American Architecture. (3) Forty-five hours of lecture per semester. Prerequisites: 170A-170B and consent of instructor. (F)

174B. Vernacular Architecture. (3) Forty-five hours of lecture per semester. Prerequisites: 170A-170B and consent of instructor. (SP)

174C. San Francisco Architecture. (3) Forty-five hours of lecture per semester. Prerequisites: 170A-170B and consent of instructor. (SP)

175A. Pre-Columbian Architecture. (3) Forty-five hours of lecture per semester. Prerequisites: 170A-170B and consent of instructor. (SP)

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

175C. Japanese Architecture. (3) Forty-five hours of lecture per semester. Prerequisites: 170A-170B and consent of instructor. (SP)

175D. Islamic Architecture. (3) Course may be repeated for credit. Forty-five hours of lecture per semester. Prerequisites: 170A-170B and consent of instructor. (F)

179. Proseminar in the History of Architecture. (1-4) Course may be repeated for credit. Fifteen hours of lecture per unit per semester. Prerequisites: 170A-170B and consent of instructor. Special topics in Architectural History. For current section offerings, see departmental announcement. (F,SP)

Graduate Courses

271. Methods of Historical Research and Criticism in Architecture. (4) Sixty hours of lecture/term per semester. Prerequisites: Doctoral candidate or consent of instructor. (F,SP)
Visual Studies

Upper Division Courses

180A/180B. Introduction to Visual Studies: Word and Image. (4,4) Thirty hours lecture and 90 hours studio 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)

180C. California Architecture. (1-4) (F,SP)

180D. History of Housing. (1-4) (F,SP)

180E. Mesoamerican Architecture. (1-4) (F,SP)

180F. Modern Architecture. (1-4) (F,SP)

180G. San Francisco Architecture. (1-4) (F,SP)

180H. Urban Design. (1-4) (F,SP)

180I. Victorian Architecture. (1-4) (F,SP)

180J. Renaissance-Baroque Architecture. (1-4) (F,SP)

180X. Special Topics: Architectural History. (1-4) (F,SP)

Special Studies Courses

Upper Division Courses

188. 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)

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 in the General Catalog. Studies developed to meet individual needs. (F,SP)

Graduate Courses

288. Special Group Study. (1-4) May be repeated for credit up to unit limitation. Sections 1-3 to be graded on a satisfactory/unsatisfactory basis. Sections 4-10 to be graded on a letter grade basis. Special group studies on topics to be introduced by instructor or students. (F,SP)

289. Individual Study and Research for Master's and Doctoral Students. (1-4) Course may be repeated for credit. Individual studies including reading and individual research under the supervision of a faculty adviser and designed to reinforce the student's background in areas related to the proposed dissertation topic. (F,SP)

605. Individual Study for Doctoral Students. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual study in consultation with the major field adviser, intended to provide students with an opportunity to prepare themselves for the various examinations required of candidates for the Ph.D. This course may not be used for units or residence requirement for the doctoral degree. (F,SP)

Interdepartmental Studies Course

IDS 235. Community Scale Energy Systems. (3) Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. Energy supply at the community scale through development of locally available renewable energy resources (solar, wind, biomass). Architecture, site planning, and urban development; review of conservation and supply technologies. For students in design, planning, energy, public policy, and related fields. Term project. Sponsoring departments: Architecture, Landscape Architecture, and Energy and Resources Group.

Visual Studies

Upper Division Courses

180A/180B. Introduction to Visual Studies: Word and Image. (4,4) Thirty hours lecture and 90 hours studio 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)

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

285. Selected Topics: Word and Image. Course may be repeated for credit as topic varies. Prerequisites: Environmental Design 11A-11B. Studio sections in areas such as calligraphy, the history of letter forms, and typography. For current offerings see the departmental announcement. (F,SP)

285A. Typography. (1-4) (F,SP)

285X. Special Topics: Word and Image. (1-4) (F,SP)

286. Selected Topics: Photography. Course may be repeated for credit as topic varies. Prerequisites: 181. Studio sections in Photography as an Art Form, Documentary Photography, Light and Motion Studies, Architectural Lighting Photography. For current section offerings see departmental announcement. (F,SP)

286A. Documentary Photography. (1-4) (F,SP)

286B. Lighting and Motion Studies. (1-4) (F,SP)

286C. Photography as an Art Form. (1-4) (F,SP)

286X. Special Topics: Photography. (1-4) (F,SP)

287. Selected Topics: Drawing. Course may be repeated for credit. Prerequisites: Environmental Design 11A-11B.

287A. Freehand Drawing. (1-4) (F,SP)

287B. Life Drawing. (1-4) (F,SP)

287X. Special Topics: Drawing. (1-4) (F,SP)

289. Seminar In Visual Studies. (1-3) Course may be repeated for credit. Fifteen hours lecture/seminar per unit per semester. Prerequisites: 180A-180B for current section offerings see departmental publications. (F,SP)

297. Field Studies in Visual Studies. (1-4) No more than 4 units allowed each semester. Course may be repeated for credit. Must be taken on a passed/not passed basis. Supervised experience relevant to specific areas of design in off-campus organizations. Regular individual meetings with faculty sponsor and written reports required. See General Catalog regarding unit limitation toward the degree. (F,SP)

298. Special Group Study. (1-4) No more than 4 units allowed each semester. Course may be repeated for credit. Must be taken on a passed/not passed basis. Studies developed to meet needs. See General Catalog regarding unit limitation toward the degree. (F,SP)

299. 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 in General Catalog. Studies developed to meet individual needs. (F,SP)

Graduate Courses

290. Advanced Visual Studies. (1-3) Course may be repeated for credit as topic varies. Fifteen hours of lecture/seminar per unit per semester. Prerequisites: 180A-180B. Advanced work in visual studies and photography. (F,SP)

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

292. Seminar In Visual Studies. (2) Course may be repeated for credit. Fifteen hours lecture/seminar per semester. Orientation seminar required of all graduate students in the M.A. program in Visual Studies. (F,SP)

298. Special Group Study. (1-5) No more than 5 units allowed each semester. Course may be repeated for credit. Special group studies on topics to be introduced by instructor or students. (F,SP)

299. Individual Study and Research for Master's Students. (1-6) Course may be repeated for credit. One unit will be assigned for each 4 hours of student effort per week. Individual studies including reading and individual research under the supervision of a faculty adviser and designed to reinforce the student's background in areas related to the proposed topic. (F,SP)

Art and History of Art

(College of Letters and Science)

Practice of Art

Department Office: 238 Kroeber Hall, 642-2582
Chair: Anne L. Healy, B.A.

Professors:

Christina B. Brown, M.F.A.
George J. Miyasaki, M.F.A.
BoyG. Allen, M.A. (Emeritus)
Sidney Gordin (Emeritus)
Robert L. Hartman, M.A. (Emeritus)
Karl A. Keaten, M.A. (Emeritus)
Erie Loren, M.F.A. ( hon.) (Emeritus)
James Paul McCartney, M.F.A. (Emeritus)
David W. Simpson, M.A. (Emeritus)
Peter H. Vossius, M.F.A. (Emeritus)
Brian A. Wall (Emeritus)

Associate Professors:

Jerold C. Bellaline, M.F.A.
Anna L. Healy, B.A.
Mary L. O'Neill, M.F.A.
Richard B. Shaw, M.F.A.

Asst Professors:

Katherine D. Sherwood, M.F.A.
Wendy Susman, M.F.A.

Four goals underlie the teaching in the Department of Art:

1. To advance the body of knowledge of human experience through artistic investigation.
2. To help students learn to think visually.
3. To help students understand the strategies that artists have devised to deal withesthetic problems in both traditional and nontraditional methods of art making.
4. To help students develop a creative intelligence through practicing a visual arts discipline.

To the extent that art making is a means for rendering the unknown knowable, it can be regarded as complementary to scientific investigation.

While the undergraduate major is largely made up of studio courses, it also requires at least three courses in art history and one in the analysis of art works (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 exhibits 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.
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 coursework 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 Office of Academic Affairs, 238 Kroeger Hall.

Lower Division Courses

1A-8A. Introduction to Visual Thinking. (3-3) Six hours of instructional studio and three hours of open studio per week. A first course in recognizing visual problems and in learning to improve solutions to them. The assignments will follow specific themes, such as autobiography or illusion, to be explored through whatever processes and mediums seem appropriate. (F,SP)

12. The Language of Drawing. (3) Six hours of instructional studio and three hours of open studio per week. Prerequisites: 1A, 2A or 8A. A study of drawing as a tool for articulating what the eyes, hand, and mind discover and investigate when coordinated. Some session will be devoted to drawing the human figure. (F,SP)

13. Language of Painting. (3) Six hours of instructional studio and three hours of open studio per week. Prerequisites: 8A or 8B. A concentrated investigation of what painting on a two-dimensional surface can effect from the points of view of color and space. Illustrated talks will help familiarize you with issues that have concerned painters in the 20th century. (F,SP)

14. The Language of Sculpture. (3) Six hours of instructional studio and three hours of open studio per week. Prerequisites: 8A or 8B. A study of how interactions between physical form and space it generates can serve as a metaphor. Field trips and illustrated talks will help acquaint you with issues that have concerned sculptors in the 20th century. (F,SP)

15. Lecture; Ideas and Issues in Contemporary Art. (1) One hour of lecture per week. A lecture designed to introduce students to issues, ideas, and works of art that comprise the context of contemporary art. (F,SP)

Upper Division Courses

102. Approaches to Painting. (3) Course may be repeated for credit. Six hours of instructional studio and three hours of open studio per week. Prerequisites: 10, 12, 13, 14, and 15 or equivalents. Inquiry into concepts of order, process, and content as related to human experiences. Students with subjects are highly individualized, the course involves group seminars and lectures as well as assigned field trips. (F,SP)

117. Drawing and Composition. (3) Course may be repeated for credit. Six hours of instructional studio and three hours of open studio per week. Prerequisites: 12, 13, 14, 15, or 8B equivalents. Advanced drawing and composition, color and black-and-white, primarily on paper. Art 117 or 118 is required of all art majors. (F,SP)

118. Figure Drawing. (3) Course may be repeated for credit. Six hours of instructional studio and three hours of open studio per week. Prerequisites: 12, 13, 14, and 15 or equivalents. Emphasis on the human figure seen in the context of pictorial space, dark and light and color. Various media. Art 118 or 117 is required of all art majors. (F,SP)

120. Approaches to Printmaking: Intaglio. (3) Course may be repeated for credit. Six hours of instructional studio and three hours of open studio per week. Prerequisites: 12, 13, 14, and 15 or equivalents. An opportunity to discover what an artist can do with an etching press. Interested processes as etching, drypoint, aquatint, color, and monotype printing. The difference in the ways that these mediums enhance and condition your ideas will be made clear through individual and group critiques. (F,SP)

122. Approaches to Printmaking: Lithography. (3) Course may be repeated for credit. Six hours of instructional studio and three hours of open studio per week. Prerequisites: 12, 13, 14, and 15 or equivalents. In the course of making lithographs, you will be encouraged to find an esthetic direction of your own. Your instructor will also help you develop skill in using both stone and metal plates. (F,SP)

124. Advanced Projects in Printmaking. (3) Course may be repeated for credit. Six hours of instructional studio and three hours of open studio per week. Prerequisites: 10, 12, and 14, plus six units of either 120 and/or 122. Non-traditional projects in printmaking. (SP)

130. Approaches to Sculpture: Metal. (3) Course may be repeated for credit. Six hours of instructional studio and three hours of open studio per week. Prerequisites: 12, 13, 14, and 15 or equivalents. The projects will introduce you to a variety of ways in which you can use metal to make spatial structures that will speak to your esthetic imagination. Illustrated talks will acquaint you with the artists whose ideas and processes have given form to metal sculpture in the 20th century. (F)

132. Approaches to Sculpture: Ceramics. (3) Course may be repeated for credit. Six hours of instructional studio and three hours of open studio per week. Prerequisites: 12, 13, 14, and 15 or equivalents. An opportunity to learn the many ways of shaping and giving form to wet clay, then making it permanent by firing it. Illustrated talks will examine the ideas that have engaged ceramic sculptors in many traditions and the processes that they have used to experiment them. (F,SP)

133. Approaches to Sculpture: Mixed Media. (3) Course may be repeated for credit. Six hours of instructional studio and three hours of open studio per week. Prerequisites: 12, 13, 14, and 15 or equivalents. Further exploration of the relationship between two or three-dimensional form and space. The term "mixed media" refers to combining two or more materials to make an image, often ones not normally associated with sculpture making. This will be made clear through both the projects and illustrated talks on such sculpture as found in many cultures. (F)

137. Advanced Projects in Ceramic Sculpture. (3) Course may be repeated for credit. Six hours of instructional studio and three hours of open studio per week. Prerequisites: 12, 13, 14, 15, and 132 or equivalents. An opportunity to continue developing your ideas and their technical command of ceramic materials and processes. (F,SP)

138. Installations. (3) Course may be repeated for credit. Six hours of instructional studio and three hours of open studio per week. Prerequisites: 12, 13, 14, and 15 or equivalents. Installation and site-specific work, indoor and outdoor. Each student will select a site and develop an individual strategy for that site. The choice of materials will depend on the exigencies of the site and of the student's interest. (SP)

141. Temporal Structures: Video and Performance Art. (3) Course may be repeated for credit. Six hours of instructional studio and three hours of open studio per week. Prerequisites: 12, 13, 14, 15, or equivalents. Projects are aimed at understanding and inventing new strategies in which the elements of stage, space, and time are integrated to form a whole. (F,SP)

142. New Genres. (3) Course may be repeated for credit. Six hours of instructional studio and three hours of open studio per week. Prerequisites: 12, 13, 14, and 15 or equivalents. A survey intended to expose you to the nature and potential of such non-traditional tools for artmaking as performance, video, and audiotape. (F,SP)

146. Analytical Analysis: Theory and Criticism. (3) Requisite for all art majors. Four hours of open studio per week. Prerequisites: 12, 13, 14, and 15 or equivalents and two courses in history of art. A forum for discourse on theories of contemporary artmaking as well as a forum for criticism where you develop your skills in thinking analytically and in articulating your perceptions of works of art. (SP)

160. Workshop on Special Problems. (3) Advanced studio course for art majors. Course may be repeated for credit. Six hours of instructional studio periods and three hours of open studio per week. Prerequisites: 12, 13, 14, and 15 or equivalents. An opportunity to investigate topics and mediums on an ad hoc basis when there is a compelling reason to do so, providing there is no other course that deals with these concerns. (F,SP)

H195A-H195B. Special Study for Honors Candidates in the Practice of Art. (3-3) Course may be applied toward major requirements. Hours to be arranged. Prerequisites: Eligibility for admission to the Honors Program. Honors students are required to take three units of H195A and/or H195B. They may elect to take an additional three units (H195B) the following semester. (F,SP)

199. Supervised Independent Study for Advanced Undergraduates. (1-3) Course may be repeated for credit. Course does not satisfy major requirement for Art. Course to be arranged and be taken on a pass/no pass basis. (SP, F)

Graduate Courses

Only UC graduate students are allowed to take graduate courses in studio art.

200. Advanced Problems in Drawing. (3) Course may be repeated for credit. Six hours of instructional studio and three hours of open studio per week. Prerequisites: Graduate standing and consent of instructor. (F,SP)

201. Advanced Workshop in Painting. (3) Course may be repeated for credit. Six hours of instructional studio and three hours of open studio per week. Prerequisites: Graduate standing and consent of instructor. Exploration of individualized problems/ideas in painting under supervision of instructor. Individual and group critiques of student work as well as presentations and discussion of related outside topics. (F,SP)

202. Advanced Workshop in Printmaking. (3) Course may be repeated for credit. Nine hours of studio per week. Prerequisites: Graduate standing and consent of instructor. Exploration of individualized problems/ideas in etching, lithography and/or other printmaking processes under supervision of instructor. Individual and group critiques of student work as well as presentations and discussion of related outside topics. (F,SP)

203. Advanced Workshop in Sculpture. (3) Course may be repeated for credit. Six hours of instructional studio and three hours of open studio per week. Prerequisites: Graduate standing and consent of instructor. Individual exploration of problems/ideas in sculpture, focused on a particular faculty member. (F,SP)

204. Advanced Workshop in Nontraditional Modes of Artmaking. (3) Course may be repeated for credit.
Major Program

The major provides an introduction to 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 provides majors with essential training in those perceptual and historical, research and critical skills needed for many professions. Majors frequently go on to careers in business, law, or the arts as well as to graduate study in the History of Art and careers in teaching, museum work, and conservation.

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

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

All courses must be taken for a letter grade.

Honors Program: Students with at least a 3.3 grade-point average both overall and in all upper division courses completed in the major are eligible for admission to 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 an acceptable research paper or seminar in each of the three areas (Asian, Chinese, and India/Southeast Asian), and at least two seminars of continuing faculty work under faculty supervision. The first semester is usually a seminar, directed research, or independent study course; work done in History of Art 192 or in another upper division course requiring an acceptable research paper may also be counted as the first semester project. The second semester is taken as History of Art H195. Those who wish to work toward Honors in the program will graduate with Honors, High Honors, or Highest Honors in the major depending upon their final GPA in upper division art history courses. Applications, which require the signature of the project director and undergraduate major advisor, 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 (192). All courses must be taken for a letter grade. An overall GPA of 2.0 is required in all courses applied to the minor. A minimum of three courses must be taken at Berkeley. The minor is not open to practice of art majors.

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

Graduate Study

The department offers two degree programs:

M.A./Ph.D. Program: A two- or three-year integrated master's and doctoral program in preparation for college teaching, advanced research, and specialized curatorial careers. Students are not admitted to work specifically for the M.A. degree, although it may be awarded to those pursuing work toward the Ph.D. after fulfillment of the requirements for Stage I of the M.A./Ph.D. program.

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.

Preparation and Application for Admission

1. Undergraduate Training: Applicants must hold a Bachelor of Arts or its equivalent from an institution of acceptable standing. An undergraduate major in the history of art is not necessary. Students with high academic achievement in history, literature, 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. Post-M.A. Transfer Students: Applicants applying with an M.A. degree in history of art or a closely related field from another institution must submit their M.A. thesis or two substantial research papers with their application.

3. Statement of Purpose: Students should be as precise as possible in describing their intellectual background and interests in the history of art, their expectations for graduate study at Berkeley, and their professional goals.

4. Languages: Students are expected to be proficient in one or more of the appropriate foreign languages when they begin graduate study. The specific languages will vary according to the field of study (see below, Languages). It is strongly urged that students do everything possible to satisfy both language requirements before entering the program. The summer before enrollment is particularly recommended as a time to improve language proficiency.

5. Graduate Division Requirements: Each applicant is encouraged to become familiar with Graduate Division regulations as described in the beginning sections of this catalog, specifically regarding GRE and TOEFL examinations, and minimum grade-point average.

Requirements for Completion of Stage I of the M.A./Ph.D. Program

1. Breadth: (a) Students of Western art. One upper division course or seminar in Asian art and in four of the following areas: Ancient, Medieval, Renaissance-Baroque (160s-170s), and Modern (180s). (b) Students of Asian art. One upper division course or seminar in each of the three Asian areas (Japan, China, and India/Southwest Asia), and at least two upper division courses or seminars in one or two of the areas of Western art listed above in (a). These requirements may be satisfied by previous course work at the undergraduate level.

2. Course Work: Ten courses selected to fulfill breadth requirements above (if necessary); at least five must be at the graduate level, including three research seminars. One course may be taken in connection with teaching (History of Art 200) and the history of art is not necessary. Students with M.A. degrees in art history (History of Art 601). Additional courses may include upper division undergraduate courses; the proseminar designed especially for first-year grad-
ual students (History of Art 203); additional gradu-
ate students (History of Art 203) attend the colloquium and
individual study on selected topics (History of Art 299).

3. Languages. Two are required: (a) Students of western
art, German, and French, Italian, Dutch, Latin, or Greek.
In certain cases the graduate adviser and the head of the
department may substitute another language for German,
French, Italian, Dutch, or Latin. (b) Students of Asian
art. One European language (normally French or
German), and one major Asian language (normally
Chinese, Japanese, Sanskrit, or Hindi).

4. Qualifying Paper or M.A. Thesis. The qualifying
paper is a perfected version of a seminar paper, no
longer than 50 pages including footnotes and bibliog-
raphy. It should demonstrate scholarly competence in the inves-
tigation of a limited problem. The qualifying paper is read and
approved by three regular faculty members. If the pa-
per is to serve as a thesis for the M.A. degree, it
must be submitted in accordance with Graduate Di-
vision regulations and be approved by a committee of
three readers, including one faculty member from
another department. Applications for candida-
acy for the Master's degree may be obtained from
the Graduate Division or Graduate Assistant, and
must be filed by the end of the third week in
September in whichever semester (fall or spring) the
degree is expected. All degrees are awarded in
December or May.

5. Graduate Student Instructors (GSIs). Since
stretching is considered an important part of grad-
uate training, the program requires that GSIs nor-
mally serve at least once as a teaching assistant.
Appointments are made in the spring semester for
the following year. Entering students are normally
not appointed as GSIs the first year, unless they already had teaching experience
elsewhere. To qualify as a GSI, students in West-
ern art must have satisfed both language re-
quirements, and all students must have made up
intermediate level courses in the field. All first-time GSIs are required to attend an orien-
tation workshop as well as a training session in
the Visual Resources Collection. In addition, first-time International GSIs must pass an examination to
demonstrate English language proficiency.

6. Length of Stage I. For students in Western art,
good progress is two years, or two years and a
summer; for Asian or Classical art, three years. (Al-
though it is not required, students should expect to spend
several summers studying languages, working on
the qualifying paper, or travelling to study works of
art.)

Requirements for Completion of Stage II of the M.A./Ph.D. Program

1. Review. (a) Students enrolled in the M.A./Ph.D.
program at Berkeley. Before beginning Stage II, the
student's qualifying paper or M.A. thesis and sem-
inar work must be reviewed by the faculty. For this
review the student submits a letter addressed to
the graduate adviser outlining the work accom-
mplished during the first year, including the
field of concentration, and requesting permis-
sion to begin Stage II. (N.B.: The M.A. degree is
not required to begin Stage II or to receive a Ph.D.
degree, although many students do file for and re-
ceive the M.A. degree.) (b) Post-M.A. transfer
students. Students must complete one year of course
work, including at least two research seminars, with
regular faculty. They must also be reviewed by the
faculty. For this review the student submits a letter
addressed to the graduate adviser outlining the
graduate work accomplished to date and plans for
Stage II, including the field of concentration,
and requesting permission to begin Stage II. The basis
for this review will be the M.A. thesis (or equivalent)
and course and seminar work during the first
semester at Berkeley.

2. Preparation for the Qualifying Examination. Af-
fter a student has been reviewed, a guidance com-
mittee is appointed to help the student map out a
plan of study for the qualifying examination of a
general field, an emphasized area of study, and a related
outside subject, which together will provide the appropriate background for
dissertation research. This committee, nominated
by the student in consultation with the graduate adviser,
consists of two or more faculty members from History of Art and normally one from an
outside department. During Stage II students are ex-
pected to enroll for 12 units of coursework each
semester. These courses can include lecture courses or seminars inside or outside the depart-
ment; language courses; History of Art 296 (dis-
sertation); History of Art 298 (special study); History of Art 300 (taken in conjunction with
GSI appointment); and History of Art 602 (individ-
ual study for the qualifying examinations).

3. Languages. More than two languages are often
necessary for research in a student's general field. These additional language requirements are de-
termined by the graduate adviser in consultation with
the student and the guidance committee. For students of Classical or Medieval Art, Latin and/or
Greek is required.

4. Dissertation Prospectus Colloquium. Before tak-
ing the qualifying examination, a student prepares
a written proposal that defines the scope, ap-
proach, and rationale of the dissertation. It is pre-

duced to the guidance committee for review and
suggestions at a colloquium which is scheduled to
take place two weeks before the qualifying exam-
ination. At this meeting, normally augmented by
the other members of the qualifying exam committee,
the precise scope of the qualifying exam-
ination is discussed and determined.

5. Qualifying Examination. The examination is con-
ducted by a five-member interdisciplinary commit-
tee nominated by (and usually including) the guidance committee in consultation with the stu-
dent and appointed by the dean of the Graduate
Division. The committee consists of one written part followed by an oral ex-
amination, and will include consideration of specific
works of art, sources, and the states of scholarship in
the field. The examination is passed and approved forms filled at the Graduate Division, the student is formally ad-
vanced to candidacy. The only further requirement is
the dissertation.

6. Dissertation. The dissertation is a book-length study of a problem in the history of art written un-
der the supervision of a dissertation committee.
The dissertation committee is nominated by the
graduate adviser following consultation with the
student. It consists of three Academic Senate
members from the Berkeley campus, one of whom
must be from outside the department. Dissertation
chapters should be submitted to the committee,
together with appropriate illustrations, as they are written. Note: A student must receive the disserta-
tion committee's approval for the entire dissertation, with illustrations, at least three
months before the filing deadline.

7. Dissertation Writing Colloquium (History of Art 296). In order to break down the isolation of
dissertation writing, establish dialogue among ad-
vanced graduate students, encourage productivity,
and improve mentoring between advisers and stu-
dents, all students in residence who have passed
their qualifying examinations and have written at least a first chapter of the dissertation may enrol in the colloquium under the direction of the graduate adviser. The collo-
quium will meet at regular intervals throughout the year and will be open to all Berkeley graduate students. At each meeting one student will present a disséri-
tation chapter which will have been circulated and read in advance by all colloquium members.
The author will briefly outline the aims, methods,
results, and significance of the chapter submitted and
will answer questions from the dissertation com-
mittee. With an eye toward encouragement and
improvement, it will then be discussed critically by the
colloquium (which must include the student's adviser or, if the adviser is on leave, the second or third
one). The colloquium is expected until at least two chapters have been pre-
sented (normally two semesters), but students are
couraged to enroll and present chapters until the dissertation is completed. Colloquium members also
will be encouraged to take part in campus sympo-
ia such as the Berkeley Symposium.

8. Annual Review of Ph.D. Candidates. All doctoral
students at the dissertation stage must meet annu-
ally with at least two members of the dissertation commit-
tee. The purpose is to review and evaluate progress on the dissertation and to map out a plan for
the next year. Students who are away from camp-
us may complete the evaluation process by mail.

9. Length of Stage II. Good progress is one year to
the qualifying examination, plus three or four ad-
ditional years for research and completion of the
dissertational dissertation. (Total time for Stage I and
Stage II is six to seven years.)

Requirements for Completion of M.A./M.L.I.S. Program

1. Requirements for the History of Art component of this concurrent degree program is identical to
those of Stage I of the graduate program, except
that one less upper division course is required. Stu-
dents are not eligible during their first year's residence, un-
less they have 'already had teaching experience
elsewhere. To qualify as a GSI, students in West-
ern art must have satisfed both language re-
quirements, and all students must have made up
intermediate level courses in the field. All first-time GSIs are required to attend an orien-
tation workshop as well as a training session in the
Visual Resources Collection. In addition, first-time International GSIs must pass an examination to
demonstrate English language proficiency.

2. Normative time for students in the M.A./M.L.I.S.
program is three years. Further information concerning the programs above may be obtained from the Graduate Assistant, History of Art Department, 405 Doe Library, University of California at Berkeley, Berkeley, CA 94720.

University Art Museum

The University Art Museum plays an active role in
instruction and research, giving students an op-
portunity for experience in connoisseurship and or-
ganization of exhibitions. (See University Art Mu-
seum in Index for further information.)

Lower Division Courses

10. History of Western Art. Three hours of lecture
and one hour of discussion per week. Prerequisites: If
possible the two courses should be taken consecu-
tively. Integrated overview of the history of Western
works of painting, sculpture, and architecture. Em-
phasis on the acquisition of perceptual and critical
skills, the analysis and interpretation of style and
meaning, and the ability to relate works to a broader vi-

On leave, spring
On leave, fall
Recipient of Distinguished Teaching Award

ucleus of current events and traditional context.
13A. Early Chinese Art, Part I. (4) Three hours of lecture and one hour of discussion per week. Chinese art of the Neolithic and Bronze Age. From the earliest period to the end of the Han dynasty (early third century B.C.), especially ceramics, bronzes, jade, and lacquer.

13B. Early Chinese Art, Part II. (4) Three hours of lecture and one hour of discussion per week. Chinese art in the medieval period: Six Dynasties through Sung Dynasty (third century B.C. to fifth century A.D.). Especially Buddhist sculpture, ceramics, tomb figurines, and metalwork and other "minor arts." (SP) Cahill

13A. Early Chinese Painting. (4) Three hours of lecture and one hour of discussion per week. The history of Chinese pictorial art and painting from the beginning of the dynasties through the Sung Dynasty (fourth century B.C. to ca. A.D. 1270). Focusing on the later periods (10th-13th centuries). (SP) Cahill

13B. Later Chinese Painting. (4) Three hours of lecture and one hour of discussion per week. The history of Chinese painting in the Yuan, Ming, and early Ch'ing dynasties (14th-17th centuries). (SP) Cahill

11C. Modern Chinese Painting. (4) Three hours of lecture and one hour of discussion per week. The history of Chinese painting from the beginning of the Ch'ing dynasty (1644-1912) to the present. For recent decades, paintings done both inside and outside China will be treated. The work will be treated as a major influence on the traditional materials and techniques (kua-hua).

133. Arts of Japan. (4) Three hours of lecture and one hour of discussion per week. A survey of the art of Japan from the earliest times to the nineteenth century.

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

135A. Japanese Painting to 1650. (4) Three hours of lecture and one hour of discussion per week. The three main topics will be paintings by Buddhist priests, narrative handscrolls, and painting in the Zen milieu. (F) Phillips

135B. Japanese Painting of the Momoyama and Tokugawa Periods (c. 1500-1800). (4) Three hours of lecture and one hour of discussion per week. The period will be treated in detail, with an emphasis on Buddhist architecture and sculpture with emphasis on the development of (pictorially) narrative, the evolution of style and iconography, and problems of dating.

135C. The Art of India, 1350-1650 A.D. (4) Three hours of lecture and one hour of discussion per week. A survey of Indian art from the Indus civilization through 1550 A.D. This class will focus on Buddhist architecture and sculpture and its relationship to the development of (pictorially) narrative, the evolution of style and iconography, and problems of dating.

136A. The Art of India, 500-1350 A.D. (4) Three hours of lecture and one hour of discussion per week. A survey of Indian art from the Indus civilization through 1550 A.D. This class will focus on Buddhist architecture and sculpture and its relationship to the development of (pictorially) narrative, the evolution of style and iconography, and problems of dating.

136B. The Art of India, 1350-1650 A.D. (4) Three hours of lecture and one hour of discussion per week. A survey of Indian art from the Indus civilization through 1550 A.D. This class will focus on Buddhist architecture and sculpture and its relationship to the development of (pictorially) narrative, the evolution of style and iconography, and problems of dating.
of Italian painting and sculpture from about 1400 to about 1627. The main topics are: artists' careers, patron- ship, religious and secular art, Renaissance art (corporate and civic), court; subject-matter, religious and secular; physical techniques; institutional techniques; mediation between "high culture" (literature, mathematics, science) and art; historical survey; exception in Italy: contemporary re- ception abroad; modern view of the Renaissance since Burekhard.

166. Early Netherlandish Painting. (4) Three hours of lecture and one hour of discussion per week. Survey of Franco-Flemish and Early Netherlandish painting from ca. 1255-1600. Major artists treated chronologically (Jace Pucelle, the Limbourg brothers, Robert Campin, Jan van Eyck, Rogier van der Weyden, Hugo van der Goes, Hieronymus Bosch, and oth- ers) but emphasis is placed on the changing func- tion of art, its transition from the late medieval to the early Renaissance periods in the North.

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

170. Southern Baroque Art. (4) Three hours of lec- ture 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, portrait, landscape, still-life, and notions of imitation and illusionism) of seventeenth century art in Italy, France, and Spain.

174. Types of Dutch and Flemish Painting in the 17th Century. (4) Three hours of lecture and one hour of discussion per week. A general study of Nether- landish painting of the seventeenth century organized according to the genres or types of painting done at the time. The historical and social as well as the art historical contexts for the development in the Nether- lands of such genres as history painting, portrait, landscape, still-life, and notions of imitation and illusionism with which they were endowed.

175. Rubens, Rembrandt, and Vermeer. (4) Three hours of lecture and one hour of discussion per week. The works of these three leading painters in the north will be contrasted and used to introduce the major concerns of northern artists of the time.

180A. Modern art: Neoclassicism and Romanti- cism, 1750-1830. Three hours of lecture and one hour of discussion per week. Pre requisites: Upper divi- sion standing and consent of instructor. The course will address major developments in the history of Eu- ropean art, emphasizing Neoclassicism with emphasis on French and English painting. Equal impor- tance will be given to the study of selected artists and works and to that of artistic movements considered in their historical and intellectual context. Architecture and sculpture will be considered insomuch as they shed light on the major artistic concerns of the period (rev- olutionary architecture, the picturesque garden, etc.)

180B. Sculpture in 19th Century France. (4) Three hours of lecture and one hour of discussion per week. Pre requisites: Upper division standing, consent of instructor. Special courses subject to Instructor's approval. The course will discuss the transformations of sculpture in France in all of its aspects between the First and the Third Republic (approximately 1789-1870), ending with the emergence of Rodin's art. It will comprise a study of major works and major artists and will address the numerous theoretical and practical problems that have counted for the thematic and stylistic changes of sculpture during the 19th century.

180D. Rodin and His Time. (4) Three hours of lec- ture and one hour of discussion per week. A study of the art of Rodin from 1870 to 1914, with reference to the social, political, and historical contexts of the Art Nouveau period. Monuments and other works considered with involvement in architecture, draughtsmanship and artistic criticism. (F, de Caso)

181. Contemporary Art. (4) Three hours of lecture and one hour of discussion per week. Painting, sculpture in America and Europe from World War II to the present.

182A. The Beginnings of Modernism: French Paint- ing from 1848 to 1900. (4) Three hours of lecture and one hour of discussion per week. The topic of this course is the history of French painting from 1848 to 1900: the triumph of Realism, the formulation of the modernist aesthetic within the social context of late nineteenth century France.

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 during the two world wars: representational and anti- representational practices and strategies in painting, sculpture and photography from Cubism to Surrealism.

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 specifics of technology, quality, and style as well as on a chronological overview.

183B. American Art Survey II (1800-Pre-present). (4) Three hours of lecture and one hour of discussion per week. A survey of the major developments in archi- tecture, painting, sculpture, and printmaking by painting from Romanticism to post-modernism, focusing on the aca- demic and vernacular traditions and institutions of patronage and audience. Field trips to local muse- ums.

184. American Architecture: Domestic Forms. (4) Three hours of lecture and one hour of discussion per week. Both vernacular and high-style architectural forms studied from the perspectives of the history of style, of technology, and of social use. Some field trips. (SP) Lovell

186. Problems in 20th Century Sculpture. (4) Three hours of lecture and one hour of discussion per week. Focus on specific concerns such as abstraction, ide- alism, etc. Pre requisites: 104 or 105. An in-depth consideration of selected artists and problems within twentieth cen- tury sculptural practices. (F) Wagner

188. Histories of Photography. (4) Three hours of lecture and one hour of discussion per week. The different 19th and 20th century histories of photography that together constitute the past and present of photo- graphic practice in Europe and the U.S.: pre-photographic and photographic devices and the culture of inven- tions; the photographic book and photographic exhibitions; the development of photographic cul- ture; photography, the document and the reproduc- tion; photography and pictorial genres; photography and modernism; photography and consumerism; photo- graphy and gender and so on.

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 two hours of fieldwork per week. The lectures will trace the major trends in the history of American architecture from the colonial pe- riod through the 1960's. Special attention will be paid to current discussions about urban planning, the development of the Bay Area and will be studied and related to the nationwide developments.

190. Special Topics in Various Fields of Art His- tory. Course may be repeated for credit. Three hours of lecture and one hour of photography and prepara- tions of concern to the instructor, usually related to current research, which may fall outside of the normal cur- riculum or be of more restricted content than regular courses. Primarily for advanced undergraduate alumni and graduate students in History of Art but open to others. For specific topics and enrollment, see listings outside of 405 Doe.

190A. Asian. (4)

190B. Ancient. (4)

190C. Medieval. (4) (SP) Baxter

190D. Renaissance-Baroque. (4) (F, Alpers

190E. Modern. (4) (F,SP) Staff

192. Graduate Seminar: Problems in Research and Interpretation. Course may be repeated for credit. Three hours of seminar per week plus ex- tended outside work. Pre requisites: Primarily for juniors and seniors with major status or consent of the in- structor. Concentration on specific problems or works in a particular area of History of Art. Assigned read- ings, discussion and a substantial paper. For specific topics and enrollment, see listings outside of 405 Doe. (F)

192A. Asian. (4) (F) Staff

192B. Ancient. (4) (F) Stewart

192C. Medieval. (4)

192D. Renaissance - Baroque. (4) (SP) Baxandall

192E. Modern. (4) (F,SP) Staff

192F. Museum Studies. (4)

192G. American and British. (4)

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

194. Museum Internship. (4) Course may be re- peated for credit. Ten hours of fieldwork per week plus conferences. Pre requisites: Approval of undergradu- ate adviser and departmental chairman. 192B recom- mended. Study and practical professional experience, usually for no less than ten hours per week. Includes a substantial project of a curatorial nature. Jointly super- vised by a member of the professional staff of the participating museum and a faculty member. Intern- ships are arranged individually by the student and the instructor. Further information, inquire at 405 Doe. (F,SP) Staff

195. Special Study for Honors Candidates in the History of Art. (1-4) Individual conferences. Pre requisites: Senior standing and qualifying scholastic record (3.3 GPA overall and 3.3 GPA in courses com- pleted in major). Directed study leading to the comple- tion 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. Pre requisites: Junior or Senior with major status or con- cerned instructor. A seminar intended to introduce ma- jors to (1) the tools and methodology required for basic research in History of Art and (2) the history of the dis- cipline and varied approaches to its study. Sign up outside 405 Doe.

199. Supervised Independent Study. (1-4) Course may be repeated for credit. Individual conferences. Must be taken on a passed/not passed basis. Pre requisites: Consent of instructor, major adviser, and de- partment chairman. For students wishing to pursue an interest not represented in the curriculum by develop- ing an individual program of study supervised by a faculty member. Study may involve readings, projects, papers, fieldwork, etc. For continuing or advanced re- search projects, see 193. (F,SP) Staff

Graduate Courses

General prerequisites: Graduate standing and con- sent of the instructor, and possibly courses 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. Pre requisites: Graduate standing and consent of instructor. An introduction to the fundamentals of art history, in- cluding traditional and innovative perspectives des- ignated in the curriculum. Doctoral students are encouraged to pursue at a high level specialized topics not ordinarily included in the curriculum. May vary from year to year. Students should consult the department's "Announcement of Classes" for offerings before the beginning of the semester. (F, Partridge
200X. Special Topies: Short Course, (2) Course may be repeated for credit. Four hours of lecture/seminar per week plus extensive outside work. Prerequisites: Consent of instructor. Introduction to the history, philosophy, and methods of art museums including film and video for graduate and advanced undergraduates. Seminars will be offered in the fields of history of art, exhibition practice, and related disciplines. Emphasis on connoisseurship and exhibition writing skills. Visits to Bay Area museums, conservation center, and media workshop.

202. Proseminar in Chinese Painting: Bibliography and Methods, (2) Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Some ability in literary Chinese. The course will familiarize students with reference works and research materials for the study of Chinese painting. Students will gain hands-on experience in using such materials. The course will provide an opportunity for students to contribute to ongoing research projects, bibliography in Chinese, Japanese, and western language sources will be treated, but the emphasis will be in materials in Chinese.

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,SP) Staff

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

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

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

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

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

255. Seminar in Byzantine 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.

257. Seminar in Romanesque and Gothic 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,SP) Staff

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) Staff

286. Seminar in 20th Century Painting and Sculpture, (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) Staff

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

275. Graduate Seminar in 18th Century Art, (4) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Graduate standing and consent of instructor. Analysis of 18th century art painting.

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) Staff

283. 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. This seminar deals in topics drawn from the history of French painting and photography from 1848 to 1914. Other media and national traditions of this period are also covered when relevant. Emphasis is placed on interdisciplinary approaches and issues of methodology. (F,SP) Clark, Wagner

286. Seminar in 20th Century Painting and Sculpture, (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) Lowell

296. Directed Dissertation Research, (3-12) Course may be repeated for credit. Independent study. Must be taken on a satisfactory/unsatisfactory basis. Independent study open to qualified students directly engaged upon the doctoral dissertation. (F,SP) Staff

299. Special Study for Graduate Students in the History of Art, (1-12) Course may be repeated for credit. Individual conferences. Must be taken on a satisfactory/unsatisfactory basis. Individual study in consultation with the graduate advisor. (F,SP) Staff

601. Individual Study for Master's Students in the History of Art, (1-12) Course may be repeated for credit. Course does not satisfy unit or residence requirements for master's degree. Individual conferences. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: For candidates for master's degree. Individual study in consultation with the graduate advisor. (F,SP) Staff

602. Individual Study for Doctoral Students in the History of Art, (1-12) Course may be repeated for credit. Course does not satisfy unit or residence requirements for doctoral degree. Individual conferences. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: For candidates for doctoral degree. Individual study in consultation with the graduate advisor, 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: Graduate standing and consent of 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 student individually his or her performance and make any necessary recommendations for improvement. (F,SP) Staff

Interdepartmental Studies Courses
Upper Division Course
IDS 118. Enlightenment and the Visual Arts in 18th Century France, (4) Three hours of lecture per week. Prerequisites: Students must have a reading knowledge of French and/or appropriate background in the history of Western art. The course will deal with the interrelation of the visual arts and ideas. Starting with Louis XIV, which were covered early from classicism in the 17th century, the course will examine topics indicative of a change in style, ideas and attitudes, fostered by selected points of interest. Sponsoring departments: History of Art and French.

Related Courses in Other Departments
Undergraduate Interdisciplinary Studies 191. Seminar: Critical Approaches to Works of Art, (4)

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

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

Undergraduate Program
The Asian American Studies Program offers a unified and comprehensive undergraduate curriculum which seeks to make at least three major contributions. First, it prepares students for positions of service and leadership in Asian American communities. To do this, the program draws heavily on the curricula of such schools and departments as Education, Public Health, Law, and Sociology. The program itself offers instruction in those areas relating to the special needs of Asian American communities. Second, the program explores the hitherto neglected aspects of the cultural, political, and historical experience of Asians in America. In doing so, it provides the undergraduate with thorough instruction on the experience of Asians in the United States, and prepares students for graduate work in their own and allied fields. Third, the program broadens the curriculum at Berkeley to in-
 include instruction which reflects the conditions of Asian 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 or equivalent); (2) Asian American Community Language or Spanish (one year); (3) 20A; (4) 20B or 20C; (5) Ethnic Studies 20; (6) two courses related to the major, offered outside of the Department of Ethnic Studies, in either the humanities or social sciences (subject to the approval of the major advisor).

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, Ethnic Studies, Native American Studies or African 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 and 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 by the faculty advisor. The major and honors student will be required to complete H195 Senior Honors Seminar for Asian American Studies Majors. In order to graduate with an A.B. degree with honors, a student must obtain at least a 3.3 GPA for all 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, 180, or 192C
   d) Electives: Two courses in Asian American Studies

Lower Division Courses

1. Basic Reading and Composition. (2) Three hours of lecture, and one hour of 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. Topics include: ethnic identity, language and communication, racism, stereotyping, sex roles, family relationships, career choices, etc. A grade of C or higher fulfills the Subject A requirement. Two units recorded credit but recognized as four units of workload in computing study lists.

2A. Reading and Composition. (4) Three hours of lecture and one hour of tutorial per week. Prerequisites: Subject A or equivalent. Through the study of the literary, political, social and psychological dimensions of representative works of Asian American literature, this course aims to develop the student's ability to comprehend, interpret, and analyze works, fostering critical judgment, and reinforces academic writing skills. [F,SP] Staff

2B. Reading and Composition. (4) Three hours of lecture and one hour of tutorial per week. Prerequisites: 2A, English 1A or equivalent. This course examines literary works by Asian American, African 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. Emphasis is on literary interpretation and sustained analytical writing. [F,SP] Staff

20A. Introduction to the History of Asians in the United States. (4) Three hours of lecture and one hour of discussion per week. Introductory comparative analysis of the Asian American experience from 1848 to present. Topics include an analysis of the Asian American perspective; cultural roots; immigration and settlement patterns; labor, legal, political, and social history. [F,SP] Omi, Staff

20B. Introduction to the Contemporary Issues in the Asian American Community. (4) Three hours of lecture and one hour of discussion per week. Introduction to Asian American communities covering the evolution of social, economic, and political institutions of Asian American communities and their relationships to the larger American Society. Course employs race and class analysis. [F,SP] Staff

20C. Introduction to the Culture of Asians in the United States. (3) Three hours of lecture and one hour of discussion per week. An analysis of the intellectual and artistic activity characteristic of Asian American communities. Focus will be on the arts, social patterns, and expression (e.g., language and literature) reflecting the historical aspects and political concerns which influence the culture.

Upper Division Courses

120. Comparative History of Asian Experience in America. (4) Three hours of lecture or three hours of seminar per week. Prerequisites: 20A. Analysis of the similarities and dissimilarities of the Asian experience in America; methods and approaches to the 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. [F] Staff

121. History of the Chinese in the U.S. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 20A. Chinese American history, 1848 to present. Topics include 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. [SP] Staff

122. Japanese American History. (4) Three hours of lecture and one hour of 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 the development of Japanese American communities in the West Coast; concentration camps; agriculture, art, and literature, and personality and culture.

123. Korean American History. (4) Three hours of lecture and one hour of 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 Korean American history. Topics include the development of Korean American communities in the West Coast; concentration camps, agriculture, art, and literature, and personality and culture.

124. Filipino American History. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 20A. Topics include: consequences of the Spanish-American War on Filipino emigration; conditions in Hawaii and California and the need for Filipino labor; community development; changing relations between the U.S. and the Philippines; effects of independence movement in the Philippines and contemporary issues. [F,SP] Staff

125. Socio-Economic and Educational Issues of Southeast Asians in the U.S. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 20A or consent of Instructor. An analysis of the contemporary issues and social-conflict of Asian American communities. Topics include: socio-economic adaptation, education, and political organizations. This course will also examine the refugee policies, and programs, services, and problems together with their impact on the community. [F,SP] Staff

126. Southeast Asian Migration: From Tradition to Resettlement. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 20A. A study of the background and characteristics of the Southeast Asian migration and resettlement in the U.S. with special focus on the impact of this migration on cultural traditions in the adaptation of Southeast Asians to American society. [SP] Staff

127. South Asian American Historical and Contemporary Issues. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 20A. Historical study of the experiences of South Asian American individuals and groups in the United States; the social and political history of Indians and Pakistanis in the U.S. from beginning 20th century to present. Development of South Asian American communities within the social, political, and economic issues in South Asia and the U.S. [F,SP] Staff

129. The Peoples of Hawaii: A Comparative Historical Analysis. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 20A. A comparative historical study of the experiences of Asian, Pacific Islander, and Hawaiian communities in Hawaii from 1778 or the arrival of Captain James Cook to the present. Readings and lectures will examine immigration, labor, culture, politics, and economic developments in the islands.

130. Asian American Environment and U.S. Foreign Policy. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 20A or consent of Instructor. A historical and comparative examination of the impact of U.S. foreign policy toward East and Southeast Asian countries on the formation and development in Chinese, Filipino, Indo-Chinese, Japanese, and Korean communities with emphasis on such issues as race relations, cultural nationalism, national security and internal political dynamics.

141. Law in the Asian American Community. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 20A or 20B. Course will examine the nature, structure, and operation of selected legal institutions as they affect Asian American communities and will attempt to analyze the roles and effects of law, class, and race in American society. May be taken with 197. [F] Staff

142. Asian American Psychology. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 20A or 20B. This course is designed to acquaint the student with selected topics in the concepts relevant to the mental health of Asian Americans with particular emphasis on the services delivery aspect. It attempts to correct the traditional deficiencies in the educational and clinical training of students in the ethnic and cultural complexity of the Asian American communities in the area. May be taken with 197.

143. Asian American Employment Patterns and Issues. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 20A or 20B. This course will analyze 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 Language and Culture. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 20A or Spanish-Amer
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208 or consent of instructor. Language needs and problems of Asian Americans; linguistic, psycholinguistic, and sociolinguistic factors affecting acquisition of English and maintenance of native languages; language and cultural identity; implications for research, materials and research, classroom teaching, and educational policy-making.

145. American Political Institutions and the Asian American Communities. (4) Three hours of lecture and one hour of 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 institutions and the Asian community define issues and respond to political challenges. (SP Staff)

149. Housing and Community Development in the Asian American Community. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 20A or 20B. The role of housing-related institutions in minority communities; formal/informal structures and underlying assumptions that permeate housing and community development policies and programs; analysis of how HUD housing and urban renewal policies have come to bear on Bay Area Asian community projects. May be taken with 197.

150. Asian American Family and Culture. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 20A or 20B. The influence of cultural legacy, ethnic background, immigration history, community, and Asian American communities. An analysis of events, forces, movements affecting Asian women in America drawing from material in literature, history, philosophy, political science and other fields. Readings, reports, papers, and discussions. (SP Staff)

151. Asian American Communities. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: 20A or 20B. An analysis of events, forces, movements affecting Asian American families in America drawing from material in literature, history, philosophy, political science and other fields. Readings, reports, papers, and discussions. (SP Staff)

155. Comparative Analysis of Asian American Women. (3) Three hours of lecture per week. Prerequisites: 150 or 151 or consent of instructor. Students will study the Asian American communities as related to American culture and the formation of identity. The course will focus on the experiences of Asian women in America through literature, history, philosophy, and other fields. Readings, reports, papers, and discussions. (SP Staff)

158. Analysis and Research in the Asian American Community. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 20A or 20B. An analysis of events, forces, movements affecting Asian American communities in America. The course will focus on the experiences of Asian American communities in America through literature, history, philosophy, and other fields. Readings, reports, papers, and discussions. (SP Staff)

165. Analysis and Research in the Asian American Community. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 20A or 20B. An analysis of events, forces, movements affecting Asian American communities in America. The course will focus on the experiences of Asian American communities in America through literature, history, philosophy, and other fields. Readings, reports, papers, and discussions. (SP Staff)

192A. Seminar on Asian American History. (3) Three hours of seminar per week. Prerequisites: 165 or 166 or consent of instructor. Students will study the history and development of the Asian American community in the United States. The course will focus on the experiences of Asian American communities in America through literature, history, philosophy, and other fields. Readings, reports, papers, and discussions. (SP Staff)

192B. Seminar on Asian American Communities. (3) Three hours of seminar per week. Prerequisites: 165 or 166 or consent of instructor. Students will study the history and development of the Asian American community in the United States. The course will focus on the experiences of Asian American communities in America through literature, history, philosophy, and other fields. Readings, reports, papers, and discussions. (SP Staff)

208. Seminar on Asian American Studies Majors. (3) Three hours of seminar per week. Prerequisites: 165 and consent of instructor. Research seminars for senior Asian American Studies majors will be 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. Hours to be arranged. Must be taken on a pass/failed basis. Prerequisites: Upper division standing and consent of instructor. Formerly 197A-197B-197C-197D-197L-197M-197R-197Z. Supervised community field study. 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. Hours to be arranged. Must be taken on a pass/failed 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 pass/failed basis. Prerequisites: Upper division standing and consent of instructor. Group discussion, research, and reporting on a topic. (F,SP Staff)

208. Seminar on Asian American Studies Majors. (3) Three hours of seminar per week. Prerequisites: 165 and consent of instructor. Research seminars for senior Asian American Studies majors will be designed to support and guide the writing of a senior thesis. (F,SP Staff)

192A. Seminar on Asian American History. (3) Three hours of seminar per week. Prerequisites: 165 or 166 or consent of instructor. Students will study the history and development of the Asian American community in the United States. The course will focus on the experiences of Asian American communities in America through literature, history, philosophy, and other fields. Readings, reports, papers, and discussions. (SP Staff)

192B. Seminar on Asian American Communities. (3) Three hours of seminar per week. Prerequisites: 165 or 166 or consent of instructor. Students will study the history and development of the Asian American community in the United States. The course will focus on the experiences of Asian American communities in America through literature, history, philosophy, and other fields. Readings, reports, papers, and discussions. (SP Staff)

193. Seminar on Asian American History. (3) Three hours of seminar per week. Prerequisites: 165 or 166 or consent of instructor. Students will study the history and development of the Asian American community in the United States. The course will focus on the experiences of Asian American communities in America through literature, history, philosophy, and other fields. Readings, reports, papers, and discussions. (SP Staff)

194. Seminar on Asian American Communities. (3) Three hours of seminar per week. Prerequisites: 165 or 166 or consent of instructor. Students will study the history and development of the Asian American community in the United States. The course will focus on the experiences of Asian American communities in America through literature, history, philosophy, and other fields. Readings, reports, papers, and discussions. (SP Staff)

195. Seminar on Asian American History. (3) Three hours of seminar per week. Prerequisites: 165 or 166 or consent of instructor. Students will study the history and development of the Asian American community in the United States. The course will focus on the experiences of Asian American communities in America through literature, history, philosophy, and other fields. Readings, reports, papers, and discussions. (SP Staff)

196. Seminar on Asian American Communities. (3) Three hours of seminar per week. Prerequisites: 165 or 166 or consent of instructor. Students will study the history and development of the Asian American community in the United States. The course will focus on the experiences of Asian American communities in America through literature, history, philosophy, and other fields. Readings, reports, papers, and discussions. (SP Staff)

197. Field Study in Asian American Communities. (1-3) Course may be repeated for credit. Hours to be arranged. Must be taken on a pass/failed basis. Prerequisites: Upper division standing and consent of instructor. Formerly 197A-197B-197C-197D-197L-197M-197R-197Z. Supervised community field study. 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. Hours to be arranged. Must be taken on a pass/failed 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 pass/failed basis. Prerequisites: Upper division standing and consent of instructor. Group discussion, research, and reporting on a topic. (F,SP Staff)

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Asian Studies (College of Letters and Science)

Undergraduate Office: 203 Moses Hall, 643-5814 Graduate Office: 2223 Fulton Street, Room 824, 642-0535 Chair and Head Adviser: James Cahill

Advisers: Andrew Barshay (Department of History), James Cahill (Department of History of Art), H. Samuel Cheung (Department of East Asian Languages), Padmanab Jaini (Department of South Asia), Joyce Kaiden (Institute of East Asian Studies), Lewis Lancaster (Department of East Asian Languages), Alwih Ong (Department of Anthropology).

Group Major in Asian Studies

The undergraduate group major in Asian Studies is a rigorous but flexible interdisciplinary program designed to provide a focus for students in the Asian American Studies, Asian languages, and Modern Asian Studies programs. 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: Southeast Asia).


Additional Major Requirements

Once accepted in the major, the student is expected to complete the following:

1. One additional year of language appropriate to the area of regional specialization.

2. A module of six units of upper division coursework, including at least two courses which relate to the theories, methods, and techniques of that discipline, but which is not exclusively an area studies course.

3. Completion of a minimum of 36 units of upper division coursework in at least two departments, including:

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

b. History Requirement. One upper division course must be a course in Asian history of the area appropriate to the student's regional focus.

c. Optional Senior Thesis. Qualified students may complete a senior thesis approximately 50 pages in length under the supervision of the major adviser or other appropriate faculty member. Three units of upper division Asian Studies 198 will be given for work on the thesis.

Note: At press time for this catalog, program revisions were under consideration. Please check with the major office regarding current requirements.
Area I: China

A. The student must complete one additional year of Chinese (Mandarin). 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 discipline 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 146, Comparative Peasant Society (4); Anthropology 148, Human 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, Early Chinese History (4,4,4); History 117A-117B, Topics in Chinese History (4,4).

**History of Art**
1. History of Art 192A, Undergraduate Seminar: Problems in the Research and Interpretation in the Several Areas of the History of Art (4);
2. Two courses from among the following: History of Art 130A-130B, Early Chinese Art (4,4); History of Art 131A, Early Chinese Painting (4), 131B, Later Chinese Painting (4); 131C, Modern Chinese Painting (4).

**Economics**
1. One course treating the theories and/or methods appropriate to the discipline, chosen with the consent of the major adviser;
2. Economics 108, 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); Political Science 144A, Rapid Growth in East Asia (4).

**Sociology**
1. One course treating the theories and/or methods appropriate to the discipline, chosen with the consent of the major adviser;
2. Sociology 172, Development and Modernization (4); and Sociology 185, 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 the following:

Comparative Literature 160, Western Literary Cross-Currents in Twentieth-Century China (3);
Legal Studies 161, Law in Chinese Society (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 East Asian Languages:
Chinese 100A-100B, Advanced Chinese (5,5);
Chinese 101, Readings in Modern Chinese (4);
Chinese 130, Texts Texts (4); Chinese 132, Readings in Early Medieval Literature (4); Chinese 134, Readings in Later Medieval Poetry (4); Chinese 136, Readings in Late Medieval Prose (4);
Chinese 140, Readings in Chinese Buddhist Texts (4); Chinese 152A-152D, Survey of Chinese Literature (4); Chinese 154, Readings in Vernacular Chinese Literature (4);
Chinese 156, Readings in Chinese Vernacular Literature: Drama (4); Chinese 158, Modern Chinese Literature (4);
Chinese 181A-181B, Chinese Literature in Translation (4,4); Chinese 183, The Classics of Chinese Philosophy (4); Chinese 185, Introduction to Chinese Philosophy (4);
Buddhism 181, Development of Buddhism in East and Inner Asia (4); Buddhism 182, Buddhism and Contemporary Society (4).

E. A minimum of one upper division course in Chinese history, which may overlap with the history disciplinary foci above and from among the following:
1. One course from among the following: Anthropology 146, Comparative Peasant Society (4); Anthropology 148, Human Ecological Relationships (4).
2. Two courses from among the following: History 116A-116B, Early Chinese History (4,4,4); History 117A-117B, Topics in Chinese History (4,4).
3. One of the following courses: Anthropology 149, Culture and Personality (4); Anthropology 150, Social Problems in Changing Cultures (4); Anthropology 196, Undergraduate Seminar (4).

**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); Anthropology 196, Undergraduate Seminar (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, Japan (4,4,4); 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 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); Political Science 144A, Rapid Growth in East Asia (4).

**Sociology**
1. One course treating the theories and/or methods appropriate to the discipline, chosen with the consent of the major adviser;
2. Sociology 172, Development and Modernization (4); and Sociology 185, 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 the following:

Comparative Literature 160, Western Literary Cross-Currents in Twentieth-Century China (3);
Legal Studies 161, Law in Chinese Society (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 East Asian Languages:
Japanese 100A-100B, Advanced Japanese (5,5);
Japanese 101A-101B, Fourth Year Japanese (4,4);
Japanese 130, Japanese Poetry (4); Japanese 132, Nikki Literature (4); Japanese 134, Japanese Drama (4);
Japanese 140, Heian Prose (4); Japanese 142, Japanese Medieval Prose (4); Japanese 144, Edo Literature (4);
Japanese 151, Advanced Colloquial Japanese (4);
Japanese 153, Contemporary Japanese Literature (4);
Japanese 182A-182B, Survey of Japanese Literature in Translation (4,4); Japanese 184, Classical Women Writers of Japan (4);
Buddhism 181, Development of Buddhism in East and Inner Asia (4); Buddhism 182, Buddhism and Contemporary Society (4).

E. A minimum of one upper division course in Japanese history, which may overlap with the history disciplinary foci above and from among the following:

**Area II: Japan**

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

B. The student must select one of the following discipline 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); Anthropology 196, Undergraduate Seminar (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 119A-119B-119C, Japan (4,4,4); 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 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); Political Science 144A, Rapid Growth in East Asia (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 the following:

Geography 168, Japan and Korea (4);
History of Art 133, Arts of Japan (4); History of Art 134A, The Arts of the Japanese Temple (4); History of Art 134B, Japanese Painting (4,4); Music 134A, Music of the East Asia Tradition (4); Music 134B, Music of Japan (4).

D. Up to 16 units of the major requirement may be
courses listed under the other disciplinary foci above and from the following:

History of Art 137, Art of Southeast Asia (4);
Music 133A, Music of the Southeast Asian Tradition (4);
South and Southeast Asian Studies (Malay/Indonesian 132B, Modern Play in Southeast Asia; Malay/Indonesian 134, Readings in the Traditional Literature of the Malay World (3);
Southeast Asian Studies 122, Orality and Literacy in Insular Southeast Asia (3); Southeast Asian Studies 123, The Poetry of Indonesia and Malaysia in Translation (3); Southeast Asian Studies 128, Introduction to Modern Indonesian and Malayan Literature in Translation (3); South and Southeast Asian Studies (Malay/Indonesian) 150, Advanced Indonesian (3);

A third year of Dutch or French where appropriate.

D. A minimum of one upper division course in Southeast Asian history.

E. 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 complete Asian Studies H195A-H195B (3.3), which includes the writing of an honors thesis. The honors thesis is expected to be a substantial research paper, both in its length and originality; it is also read by two faculty members.

Minor Program in Asian Studies

Students in the College of Letters and Science may complete one or more minors of their choice, normally in a field both academically and administratively distinct from their major.

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. Minor 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 in the major. There is no Asian language requirement for the minor.

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

Anthropology: 170, China
History: 116A, Early China; 116B, The Middle Period; 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; 131C, Modern Chinese Painting
Legal Studies: 161, Law in Chinese Society
Music: 134A, Music of the East Asia Tradition
Sociology: 183, Contemporary Chinese Society

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

Anthropology: 171, Japan
History: 118A, Japanese History, Archaeological Period to 1800; 118B, Japanese History, 1800 to 1900; 118C, Late Nineteenth Century to the Present; 119A, Social History of Japan; 119B, Economic History of Japan
Music: 134A, Music of the East Asia Tradition; 134B, Music of Japan

East Asian Languages: Buddhism 181, Development of Buddhism in East and Inner Asia; Buddhism 182, Buddhism and Contemporary Society; Japanese 182A-182B, Japanese Literature in Translation; Japanese 184, Classical Women Writers of Japan

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

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

Anthropology: 185, Mainland Southeast Asia; 186, Insular Southeast Asia
Geography: 163, Southeast Asia
History of Art: 137, The Art of Southeast Asia
Music: 133A, Music of the Southeast Asia Tradition
Political Science: 128A-128B, The American Role in Asia; 143A-143B, Northeast Asian Politics

Graduate Program

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

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

Lower Division Courses

1A-B. Introductory Tagalog. (5-5) Five hours of lecture per week, Formerly Taog. 1A-B. 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

1A-B. Introductory Vietnamese. (5-5) Five hours of lecture plus one to two hours in language laboratory per week. An introduction to modern spoken and written Vietnamese, including intensive drill on basic phonology and grammar. By the end of the second semester the student should be able to function successfully in ordinary conversation and read simple texts of moderate difficulty. (F,SP) Staff

10A. Introduction to Traditional Asian Cultures. (4) Three hours of lecture and one hour of discussion per week. This course will cover the period from the earliest origins to around 1600 for South, Southeast, and East Asia. Emphasis will be on humanities and traditional history, although political and social history will also be introduced, and the approach will be interdisciplinary. Religious traditions will be treated, along with geographical factors in the formation of egalitarian societies, and the rise of urban centers. (F) Staff

10B. Introduction to Modern Asian Cultures. (4) Three hours of lecture and one hour of discussion per week. This course will cover the period roughly 1600 to 1950 for South, Southeast, and East Asia. Emphasis will be on social and political history, and the approach will be interdisciplinary. Issues that cut across national boundaries such as trade, development, colonialism, and urbanization will serve as uniting themes for five segments: India, Southeast Asia, China, Korea, and Japan. The course is designed to interest students in Asian cultures early in their undergraduate studies. (SP) Staff

98. Directed Group Study. (1-4) Course may be repeated for credit. Group meetings to be arranged. Must be taken on a pass/fail or satisfactory/unsatisfactory basis. Consent of Instructor required. Group discussion, research and reporting on selected topics. (F) Staff

Upper Division Courses

100A-100B. Intermediate Tagalog. (5-5) Five hours of lecture and two hours of laboratory per week. Prerequisite: Formerly South and Southeast Asian Studies—Tagalog 100A-100B. The goal of this course is to enable students to increase their proficiency in Tagalog to the level of an intermediate-high proficiency level. (F) Staff

101A-101B. Intermediate Vietnamese. (5-5) Five hours of lecture and two hours of laboratory per week. Prerequisites: 1A-B or equivalent. A second-year course in Vietnamese vocabulary and syntax with instruction on short compositions and auditory recognition of speech patterns. First semester course stresses phraseology, sentence building, rules of composition and development of students' communicative skills. By the end of the second semester students will learn to speak and write simple compositions and will have a cursory introduction to Vietnamese literature and sample readings from contemporary Vietnamese writers. (F,SP) Staff

195A-195B. Senior Honors. (3-3) Individual study supervised by two faculty members. Credit and grade to be awarded upon completion of sequence. Prerequisites: 1A-B or equivalent. A second-year course in Vietnamese vocabulary and syntax with instruction on short compositions and auditory recognition of speech patterns. First semester course stresses phraseology, sentence building, rules of composition and development of students' communicative skills. By the end of the second semester students will learn to speak and write simple compositions and will have a cursory introduction to Vietnamese literature and sample readings from contemporary Vietnamese writers. (F,SP) Staff

196. Senior Thesis. (3) A maximum of 3 units of credit to be applied toward the major. May be repeated without credit toward the 36 unit major requirement. Individual study supervised by appropriate faculty advisor. Course work is devoted to preparing and writing the senior thesis. Students interested in participating should make contact with the appropriate faculty advisor and consult the Graduate Program for the senior thesis in the Graduate School of Journalism, the Graduate School of Business Administration, and the School of Law.

197. Field Study. (1-4) Course may be repeated for credit. Individual meetings to be arranged. Must be taken on a pass/fail or satisfactory/unsatisfactory basis. Prerequisites: Upper division standing and consent of instructor. Su-
Astronomy
(College of Letters and Science)

Department Office: 601 Campbell Hall, 842-6275

Professors:
Jonathan Arons, Ph.D.
Donald C. Becker, Ph.D.
G. Stuart Bowyer, Ph.D.
Marc Davis, Ph.D.
Alane Flippers, Ph.D.
Carl E. Heiles, Ph.D.
Steven M. Kahn, Ph.D. (Physics)
Christopher Lemonis, Ph.D. (Physics)
Jenny Nelson, Ph.D.
Frederick Schalock, Ph.D.
Joseph I. Stil, Ph.D.
Hyron Spinrad, Ph.D.
Mary Ann Smith, Ph.D.
Ivan R. King, Ph.D. (Emertius)
Lamont J. Whipple, Ph.D. (Emertius)
John G. Phillips, Ph.D. (Emertius)
Harold F. Weaver, Ph.D. (Emertius)

Associate Professors:
Gloria Basri, Ph.D.
Imke de Pater, Ph.D.

Assistant Professor:
James Graham, Ph.D.

Lecturers:
David D. Cutbake, Ph.D.

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

Major Advisers: Mr. Baker, Mr. Cutbake.
Graduate Advisers: Mr. Arons, Mr. Heiles.

The Department of Astronomy offers undergraduate and graduate instruction in a wide variety of fields, including theoretical and observational astronomy; signal processing; X-ray, radio astronomy; galactic structure and dynamics of stellar systems; high-energy astrophysics and cosmology; and spectroscopy. A considerable amount of research at the University of California at Berkeley 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.

An active program is pursued in research and graduate studies in theoretical and observational astronomy. Graduate research and teaching have been carried on in the fields of high-energy astrophysics and cosmology; spectral line astronomy; the solar system; stellar structure and evolution; and stellar dynamics. Another active research area is theoretical astronomy, which involves the study of the physical processes that govern the properties of stars, galaxies, and other astrophysical objects.

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 or in other careers that benefit from an education in physical science, such as science teaching or technical positions in industry (particularly with aerospace companies). Specifically, the department requires that during the first two years students take courses that provide a thorough understanding of:

2. Basic mathematics: analytic geometry, differential and integral calculus, and linear algebra (Math 1A-1B, followed by Math 50A-50B; or, equivalently, Math 2A-2B).

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

The last two years, leading to the A.B. degree in astrophysics, are divided into two periods, primarily in the fields of astronomy, physics, mathematics, and related topics. For students intending to pursue graduate studies in astronomy, a strong emphasis is placed on the development of knowledge of any one of the three languages: German, Russian, and French.

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 department and must acquire one year's teaching experience. A tutorial program is designed to maintain regular contact with the faculty. The program is for students who are double majors in astrophysics, mathematics, and physics. For students who are double majors in astrophysics and another science, the upper division requirement is reduced to 24 units.

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 three of the following four courses: Astronomy 127A-127B-127C or IDS 160. With the approval of the departmental adviser, outstanding students are urged to take additional courses in astronomy. A student 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 105), Electromagnetism and Optics (Physics 110A-110B), Modern Physics and Advanced Mechanics (Physics 111), Introduction to Statistical and Thermal Physics (Physics 112), Introductory Nuclear Physics (Physics 124), Nuclear and Particle Physics (Physics 129), Quantum Mechanics and its Applications to Physics (Physics 137A-137B), Introduction to Plasma Physics (Physics 142), Analysis for Applied Mathematics (Math 120A-120B), Mathematical Tools for the Physical Sciences (Math 121A-121B), Advanced Calculus (Math 128A-128B), Physics of the Earth (Geophysics 122A-122B), Introduction to the Theory of Probability and Statistics (Statistics 101-102), Concepts of Probability (Statistics 134), Concepts of Statistics (Statistics 135), Foundations of Computer Graphics (Computer Science 184), Introduction to Database Systems (Computer Science 186), Principles of Meteorology (Geography 144), Climatic Change (Geography 147), Plate Tectonics (Geology 107), The Earth (Geology 151), Astronomy and Meteorology in Modern and Early Western Europe (History 151A), Physics and Some of Its Applications (181B), Teaching Science in the Non-School Setting (Education 121A), Production of Mediated Programs (Education 122D).

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 and research areas chosen by the student from a list of about 10. Students are urged to make sure their first year's courses are heavily weighted in these areas, with a minimum of two As and one B; (3) an individual project of research or study, involving at least three units of Astronomy H105. The student's project is chosen in consultation with the student's adviser, and written reports are 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

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*On leave, spring
*On leave, fall
*On leave, spring
*On leave, fall
*Recalled to active service
*Recipient of Distinguished Teaching Award
In a small-seminar setting, Berkeley Seminars are of small size undergraduate seminars exploring one aspect of a department to department and semester to semester, to explore an intellectual topic with a faculty member. Freshman Seminars. (1) Course may be repeated for credit. Must be taken in a passed/not passed basis. Prerequisites: 127A-127B. Enrollment is restricted by regulations in the General Catalog. (F,SP) Staff

Graduate Courses


216. Interstellar Matter. (3) Three hours of lecture per week. Prerequisites: 201. A survey of the observational data and theoretical ideas on the interstellar medium; emphasis on the infrared physical conditions. (F) Helios

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

218. Stellar Dynamics and Galactic Structure. (3) Three hours of lecture per week. A course for graduate and advanced undergraduate students. Various galactic population concepts; dynamics of stellar systems with and without encounters. (F) Davis

228. Extragalactic Astronomy and Cosmology. (3) Three hours of lecture per week. Formerly 228 and 229. A survey of the extragalactic universe. Classification and morphological types of galaxies, the distance scale, galaxy dynamics and masses, the stellar population of galaxies, clusters of galaxies, galaxy evolution, the active galactic nuclei (including QSOs). Cosmological models, and the early universe. (SP) Davis

236. Radio Astronomy. (3) Three hours of lecture per week. Prerequisites: 216 recommended. Comparison of radio and optical instrumentation and techniques. Detailed application of radio and optical techniques to objects observed in the radio and optical regions of the electromagnetic spectrum. Nebulae, gas clouds, and relativistic plasmas, with application to current observations. (F) Ford

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

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 planetary 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 will vary from semester to semester. See department for announcements. (SP) Bowyer
proaches for Lagrangian and Eulerian dynamics; applications in normal and x-ray irradiated stellar atmospheres, pulsating variables and stellar mass loss, supernova explosions, x-ray pulsars, sequential star formation and 2-D evolution of Hill regions. (SP) Klein

286. Advanced Stellar Dynamics. (3) Three hours of lecture per week. Prerequisites: 201 recommended. Application of theoretical stellar dynamics to problems in astrophysical theories. Topics will be chosen from magnetospheric physics, solar and stellar flares and winds. Mhd dynamos, pulsars, X-ray sources, supernovae and supernova remnants, and cosmic rays and active galactic nuclei. (F)

287. Plasma Astrophysics. (3) Three hours of lecture per week. Prerequisites: 201 recommended. Application of theoretical plasma physics and the physics of space plasmas to problems in astrophysical theories. Problems will be chosen from magnetospheric physics, solar and stellar flares and winds, mhd dynamos, pulsars, X-ray sources, supernovae and supernova remnants, and cosmic rays and active galactic nuclei. (F

288. Modern Observing Techniques. (3) Three hours of lecture and two to four hours of observational and reduction laboratory per week. Prerequisites: Consent of Instructor. Advanced instruction in observational and reduction techniques making use of the observing facilities of the Lick Observatory, the Las Campanas Observatory, and Galassia Galactica. The facilities of the Department of Astronomy and the Computer Center. (F)

289. Advanced X-Ray Astrophysics. (2) Course meets one hour per week, two hours of laboratory per week. Prerequisites: Consent of instructor. Advanced topics in X-ray astronomy and high energy astrophysics. (F)

290. Techniques of Instrumentation in High Energy Astrophysics. (2) Course meets one hour per week, two hours of laboratory per week. Prerequisites: Consent of Instructor. Intrinsic limitations of existing instrumentation in high energy astrophysics and current methods of data retrieval will be discussed. Basic physical characteristics of existing and potential future instrumentation will be analyzed. (F)

290A. Introduction to Current Research. (1) One hour of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Survey of research currently being performed in the Department or the University. (F,SP) Arons

290B. Introduction to Current Research. (1) One hour of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of Instructor. Continuation of 290A. Study of research topics in the Department. (SP) Arons

292. Seminar. (1-2) Course may be repeated for credit. Two hours of semirnar per week. Must be taken on a satisfactory/unsatisfactory basis. In addition to the weekly colloquium, the Department offers seminars in advanced topics, several of which are announced at the beginning of each semester. A maximum of 5 units may be taken per semester with a limitation of 2 in any one section. (F,SP)

298. Directed Group Study. (1-4) Course may be repeated for credit. Tutorial. Must be taken on a satisfactory/unsatisfactory basis. Tutorial for groups of two or three students. (F,SP) Staff

299. Advanced Study and Research. (2-12) Course may be repeated for credit. (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. Individual study. Must be taken in consultation with the major field adviser. Intended to provide the opportunity for qualified students to prepare themselves for the comprehensive examinations of the Ph.D. (and other doctoral degrees). May not be used for unit or residence requirement for the doctoral degree. (F,SP) Staff

Professional Courses

300. Instruction Techniques In General Astronomy. (2-6) Two hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Discussion and practice of teaching techniques as applied to astronomy. Open to graduate students who are presently teaching assistants or associates. Two units for course plus one section; three units for two discussion sections. (F,SP) Staff

201. Undergraduate Astronomy Instruction. (1-2) Course may be repeated for a maximum of 4 units. One hour of lecture and three to six hours of laboratory per week. Must be taken on a passed/not passed basis. Prerequisites: An elementary astronomy course and consent of Instructor. Open to a limited number of highly qualified undergraduate students interested in astronomy teaching at the college level. Students will participate in a seminar on educational methods and engage in tutorial or laboratory teaching under supervision of a faculty member. Staff

Interdepartmental Studies Courses

Graduate Courses

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

IDS 254. High Energy Astrophysics. (3) Three hours of lecture per week. Prerequisites: 201 or consent of instructor. Basic physics of high-energy radiation processes. Magnetic fields and cosmic-ray propagation. Applications selected from pulsars, x-ray sources, supernovae, interstellar medium, intergalactic medium, extragalactic radio sources, quasar, and dark-matter cosmologies. Sponsoring departments: Physics and Astronomy. (F)

IDS 285. Theoretical Astrophysics Seminar. (2) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Theoretical aspects of modern astrophysics. Sponsoring departments: Astronomy and Physics.

Berkeley Programs for Study Abroad (Special Studies)

Office: 160 Stephens Hall, 642-1356
Berkeley Programs for Study Abroad (BPSA) offers the Education Abroad Program for undergraduate and graduate students. For additional information, see Index.

BPSA also sponsors the Professional Studies Program in India. The program is open to American graduate students with professional interests in India. The program awards the Doctor of Philosophy in an area of study of the student's choosing. The program comprises the field work and research aspect of the Professional Studies Program. (F,SP)

Bioengineering—Graduate Training at Berkeley and UC San Francisco (Special Studies)

The University of California at Berkeley and San Francisco campuses offer a joint graduate program in Bioengineering. This program permits students to benefit from both the strong research programs and the excellent science resources available on the San Francisco campus and the strong engineering and basic life science resources available on the Berkeley campus. The program is interdepartmental as well as intercampus. It combines related interests and research specialties of faculty from the seven engineering departments and from several non-engineering departments at Berkeley with those of the faculty at all four professional schools (Design, Engineering, 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 the Doctor of Philosophy in Bioengineering degree from 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 the Bioengineering Graduate Group, Coates Engineering Building, Center for Biotechnology and Medicine, Berkeley, CA 94720, 642-8789.

Upper Division Courses

100. Cultural Traditions of India. (1-4) Three hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate status and acceptance into program. Course provides background on Indian culture and civilization which is critical in understanding professional problems within the whole context of India. The course will involve lectures and field trips intended to orient students to India.

Graduate Courses

200. Cultural Traditions of India. (1-4) Independent study. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate status and acceptance into program. If students have a background in Indian studies, they may elect to take the Cultural Traditions course for a 200 basis, in which they must write a paper on a topic of their choosing, in consultation with the instructor.

299. Independent Study. (1-5) Independent study. Prerequisites: Graduate status and acceptance into program. Independent study through various academic departments.

Professional Courses

400. Modernization in Contemporary India. (1-4) Three hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate status and acceptance into program. This course will deal with problems of development and social change, the economics of modernization and the impact of industrialization. The course will also direct itself toward the professional interests of graduate participants. Interdisciplinary emphasis.

497A. Internship in India. (4-5) Field work and research done by student. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate status and acceptance into program. Independent study through various academic departments.
Biology (College of Letters and Science)

The three courses below provide a broad, basic introduction to the biological sciences for both majors and nonmajors. The courses are taught by faculty from all three of the biology departments on campus. Each student must take all three courses because there is no department of biology at Berkeley, the name "biology" has been retained for these courses to reflect their interdisciplinary character.

Biology 1A and 1B are each taught both semesters, and students may enroll in either (but not both) during the fall or spring semester. Neither is a prerequisite for the other.

Lower Division Courses

1A. General Biology. (4) Three hours of lecture, three hours of laboratory, and one hour of discussion per week. Prerequisites: Chemistry 1A-B. Concurrent enrollment in Chemistry 3A may be used in lieu of Chemistry 1B. General introduction to cell structure and function, molecular and organismic genetics, animal development, form 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. Neither is a prerequisite for the other. Sponsored by Molecular and Cell Biology. (SP) Staff

1B. General Biology. (4) Three hours of lecture, three hours of laboratory, and one hour of discussion per week. Prerequisites: Chemistry 1A. General introduction to plant development, form and function; population genetics, ecology and evolution. Intended for students majoring in the biological sciences, but open to all qualified students. Students must take both Biology 1A and 1B to complete sequence. Sponsored by Integrative Biology. (SP) Staff

11. Introduction to the Science of Living Organisms. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: Chemistry 1A-B. Concurrent enrollment in Chemistry 3A may be used in lieu of Chemistry 1B. General introduction to cell structure and function, molecular and organismic genetics, animal development, form 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 sequence. Neither is a prerequisite for the other. Sponsored by Plant Biology. (SP) Jones, Rowell

Biomedical and Environmental Health Sciences (School of Public Health)

Department Office: 318 Warren Hall, 542-5716

(To be announced)

Professors:


Patricia A. Butcher, Ph.D. University of California at Berkeley. Epidemiology related to the workplace and environmental pollution.

James L. Hardy, Ph.D. University of Minnesota. Pathogens and immune relating to the natural history of arbovirus.

Nicholas P. Jewell, Ph.D. University of Edinburgh, AIDS. Biostatistics and applications of statistical methods.

Mary-Claire King, Ph.D. University of California at Berkeley. Genetics and epidemiology of breast cancer.

Joyce S. Lashof, M.D. Women's Medical College of Pennsylvania. Epidemiology of maternal and perinatal care.

Nicholas T. Petrakis, M.D. University of Washington, St. Louis. Epidemiology of infectious diseases.


Arthur L. Reinfurt, M.D. University of Chicago. Epidemiology of infectious diseases.

Stephen B. Hulley, M.D., M.P.H. University of California at San Francisco. Biostatistics and application of data analysis techniques to environmental and epidemiological problems.

The Department of Biomedical and Environmental Health Sciences has a dual mission: (a) to provide graduate training in the scientific foundation of disease prevention in human populations, and (b) to expand this foundation through research. The faculty of the department brings to the mission interdisciplinary perspective to this mission, and both the teaching and research programs are designed to facilitate interdisciplinary communication and cooperation. Important public health objectives served by the department include identifying the biological, chemical, physical, and social factors that affect human health; development of analytic methods and innovative models to measure and assess the impact of these factors on health; and design and evaluation of health programs. Some areas of special interest include the study of arthropod-borne viral diseases, air and water pollution in the etiology of cancer, and other diseases, host-parasite relationships in infectious diseases, the toxicology of chemicals in the environment, the human health aspects of the work place, and forensic science.

Disciplines represented by faculty in the department include biostatistics, chemistry, engineering, entomology, forensic science, genetics, immunology, medicine, microbiology, psychology, sociology, and toxicology. The faculty are organized into four center programs that measure and assess the impact of these factors on health; and design and evaluation of health programs. Some areas of special interest include the study of arthropod-borne viral diseases, air and water pollution in the etiology of cancer, and other diseases, host-parasite relationships in infectious diseases, the toxicology of chemicals in the environment, the human health aspects of the workplace, and forensic science.

biostatistics, epidemiology, social sciences, environmental health sciences, and other studies are conducted by students. Students are encouraged to take advantage of the diversity within the department, in the school, and in the campus in designing their programs of study.

The department offers both professional and academic degree programs. The professional degree programs lead to the M.P.H. and Dr.P.H. degrees and are administered by the School of Public Health. Academic degree programs leading to the M.A. or M.S. and Ph.D. degrees are offered in biostatistics, epidemiology, environmental health sciences, environmental health sciences, and epidemiology, immunology, microbiology, and parasitology. These graduate group degree programs are administered by the Graduate Student. Students seeking detailed information about any of these programs regarding admission, curriculum, and financial support should direct inquiries either to the department or to the program of interest within the department.

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. Infectious Diseases

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

S. Forensic Science

Lower Division Courses

24. Freshman Seminars. (1) Course may be repeated for credit as topic varies. One hour of seminar per week. Sections 1-2 to be graded on a letter-grade basis. Sections 3-4 to be graded on a pass/no pass basis. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (SP)

39. Freshman/Sophomore Seminar. (2-4) Course may be repeated for credit as topic varies. Seminar format. Prerequisites: Prior given to freshmen and sophomores. Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are
Introduction to Health Statistics. (4) Three and corr... medically important viruses. (F) Hardy. (F) Hardy take... department and from semester to semester. (F,SP) Staff.

Upper Division Courses

103. Public Health Microbiology. (1-4) Three hours of lecture and two hours of demonstration/discussion/laboratory per week. Prerequisites: Basic biology and public health bacteriology may not be taken together or alone. Satisfies most requirements for a laboratory course in microbiology. Introduction to properties of microorganisms; their relationships with human being in causing infectious diseases, and in maintenance of health, including food production and sanitary engineering. (F) Buhring, Tempski.

104. Introduction to Medical Virology. (3) Three hours of lecture per week. Prerequisites: Elementary courses in biology and chemistry, including biochemistry, molecular biology, pathogenesis, immunity, epidemiology, and control of medically important viruses. (F) Hardy.


122. Introduction to Health Statistics. (4) Three 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 table, rates, tables and ratio adjustment. Regression and correlation, statistical aspects of basic experimental and observational health research designs. (F) Brand.

130A. Introduction to Probability and Statistics in Biology and Public Health. (4) Three hours of lecture and two hours of discussion per week. Prerequisites: High school algebra or equivalent. Probability, probability distributions, point and interval estimation, hypothesis testing, chi-square, correlation, regression with biomedical applications. (F) Jewell.

130B. Introduction to Probability and Statistics in Biology and Public Health. (4) Three hours of lecture each and two hours of 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) Lahitte.

138. Introduction to Health Survey Methods. (4) Three hours of lecture and two hours of discussion/laboratory per week. Prerequisites: 130A or equivalent. Design of surveys in public health. Sampling techniques and theory. Program evaluation. Health service research and analysis. Construction of health status indexes and scales. Staff.

140. Chemical Hazards in the Environment. (3) Three hours of lecture per week. Prerequisites: Biology 1A-1B, or Chem 84A-88B or permission of instructor. An introduction to the scientific and technical basis of the evaluation and control of toxic substances related to environmental hazards in the community and in the work environment. (SP) Staff.

151. Air Pollution. (3) Three hours of lecture per week. Prerequisites: Chemistry 1A; Mathematics 1B; Physics 7A. An introduction to the technology of air pollution dealing with air pollutants, effects, sources, combustion processes, control technology and abatement. Also listed as Engineering 150. (F) Staff.

153. Introduction to Pharmacology. (3) Prerequisites: Organic Chemistry; upper division biological sciences courses; principles of drug action and toxicology. Staff survey of major groups of chemicals used in therapy. (SP) Wei.

155. Microbiology of Water and Waste Water. (3) Two hours of lecture and three hours laboratory/demonstration per week. Prerequisites: Elementary courses in biology and chemistry. Formerly 152 and 158L. Principles of microbiology applicable to the aquatic environment, drinking water, and waste water. (SP)

160. Introduction to Epidemiology and Environmental Health. (1-3) Three hours of lecture and one or one-half hours of discussion per week. Prerequisites: Prior background in biological sciences and a course in probability and statistics. Emphasis on the scientific basis of environmental health. enrollment in a college course in 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 two modules; 2 units for epidemiology module, 1 unit for environmental health module. Offered for both modules. (SP) Reingold, Speer, Staff.

181. Trace Microanalysis. (4) Two hours of lecture and six hours of laboratory per week. Prerequisites: Upper division standing in a physical or natural science. A systematic approach to the measurement of materials using chemical and physical techniques. Emphasis on principles of forensic and environmental pollution significance. (SP) Thornton.

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) Sho. Staff.

183L. Forensic Toxicology Laboratory. (2) One hour of lecture/discussion and three hours of 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) Shugart.

197. Field Study in Public Health. (1-4) Course may be repeated for credit. Requires three hours of work per unit per week. Individual conferences. Must be taken on a passed/not passed basis. Prerequisites: Enrollment is restricted by regulations listed in the General Catalog. (SP) Joosten.

198. Directed Study. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: Enrollment is restricted by regulations listed in the General Catalog. (F,SP)

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Requires three hours of work per unit per week. Must be taken on a passed/not passed basis. Prerequisites: Enrollment is restricted by regulations listed in the General Catalog. (F,SP)

Graduate Courses

201A. Principles of Infectious Disease. (4.5) Four hours of lecture and two hours of laboratory per week. Prerequisites: Graduate standing in biological sciences, biochemistry, molecular biology immunology, or consent of instructor. A critical analysis of the various types of interactions that occur at the molecular, organ, and community level. Prerequisite: Infectious disease agents, humans and their environment that result in infection, disease and immunity in humans and human populations. One unit of credit given to medical students who take the component on laboratory diagnosis of infectious diseases. (F) Hardy.

201B. Infectious Disease: Host-Parasite Interactions. (4) Four hours of lecture/discussion per week. Prerequisites: 201A or consent of instructor. A critical analysis of the host-parasite interactions that occur after exposure to infectious agents with various in- fection disease agents, including representative Dave, trematodes, cestodes, protozoa, fungi, bacteria, viruses and prions. The epidemiology, pathogenesis, host immune response, diagnosis, treatment, and control will be presented for each infectious disease discussed. (SP) Shulgin.

204. Advanced Medical Virology. (3-4) Four hours of lecture per week. Prerequisites: 104 or consent of instructor. Analysis of viral and host factors that play a role in viral diseases of medical importance. Four units of credit given to doctoral students who write a research paper on a subject other than that proposed for their dissertation. (SP) Hardy, Volkman.

205. Advanced Medical Microbiology. (3) Course may be repeated for credit. Four hours of lecture/discussion per week. Prerequisites: 201A or consent of instructor. Analysis of bacterial and fungal cell components and host factors in that play a role in medically important diseases. Offered alternate odd years.

206. Public Health Immunology. (3) Three hours of lecture per week. Prerequisites: Some prior knowledge of immunology is desirable. Current Immunological developments in relation to hygiene/surveillance, tolerance, immunological disorders, autoimmune diseases, transplant and infectious diseases. (F) Tempels.

210A. Current Problems in the Public Health Laboratory. (1.5) One and one-half hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing in Biomedical Sciences or equivalent. Three units toward current and standards for clinical and public health laboratories; current diagnostic, surveillance and safety problems associated with micro-organisms; hospital infection control. (SP) Tempels.

210B. Current Issues in the Public Health Laboratory. (1.5) One and one-half hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing in Biomedical Sciences. In depth discussion of a policy issue affecting Public Health Laboratory, culminating in a paper debate on the issues, with minimum of one credit. (SP) Setsabaugh.

212. Molecular Parasitology. (3) Course may be repeated for credit. Three hours of lecture/discussion per week for 10 weeks plus term paper. Prerequisites: Basic course in molecular biology, biochemistry, immunology or consent of instructor. Advanced course in molecular aspects of parasitic immunology, biochemistry, and molecular biology. Will cover molecular parasite biology in relation to diagnostic mechanisms of pathogenesis and strategies for control. Critical evaluation of scientific approaches and methodologies will be included. Course content will rely heavily on current literature and will cover selected topics in parasitology, diseases which will be based on the art research and knowledge in these areas. (SP) Agbanian.

220A. Biostatistical Methods. (4) Three hours of lecture and two hours of 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 multivariate prediction and analysis. Male.

220B. Biostatistical Methods. (4) Three hours of lecture and two hours of laboratory per week. Prerequisites: A course in biological sciences or two years of calculus plus linear algebra and a mathematical statistics course taken concurrently. Two distinct topics will be presented: Survival Analysis and Clinical Trials. Analysis of survival time in medical and clinical studies. Statistical parametric models, hypothesis testing, and regression methods for censored data with covariates. Biostatistical concepts and modelling relevant to design, conduct and analysis of clinical trials. Must be repeated for credit. In the laboratory. (SP) Staff.

220C. Biostatistical Methods. (4) Three hours of lecture and two hours of laboratory per week. Prerequisites: 220A and 220B or consent of instructor. 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 multivariate prediction and analysis. Male.

220D. Biostatistical Methods. (4) Three hours of lecture and two hours of laboratory per week. Prerequisites: A course in biological sciences or two years of calculus plus linear algebra and a mathematical statistics course taken concurrently. Two distinct topics will be presented: Survival Analysis and Clinical Trials. Analysis of survival time in medical and clinical studies. Statistical parametric models, hypothesis testing, and regression methods for censored data with covariates. Biostatistical concepts and modelling relevant to design, conduct and analysis of clinical trials. Must be repeated for credit. In the laboratory. (SP) Staff.

220E. Biostatistical Methods. (4) Three hours of lecture and two hours of laboratory per week. Prerequisites: A course in biological sciences or two years of calculus plus linear algebra and a mathematical statistics course taken concurrently. Two distinct topics will be presented: Survival Analysis and Clinical Trials. Analysis of survival time in medical and clinical studies. Statistical parametric models, hypothesis testing, and regression methods for censored data with covariates. Biostatistical concepts and modelling relevant to design, conduct and analysis of clinical trials. Must be repeated for credit. In the laboratory. (SP) Staff.
blossom experiments, parallel line and ratios slope for estimating potency, probit and logistic models, and combining results of experiments. Stochastic modelling in biology, medicine and public health. Random phenomenon, probability, stochastic processes, population dynamics, survival analysis, state-space models.

221. Clinical Trials. (3) Three hours of lecture per week. Prerequisites: Calculus, matrix algebra, one year of mathematical statistics. Biostatistical concepts and modeling relevant to the design, conduct, and analysis of clinical and preventive trials with human subjects. Staff.

222. Biometrical Data Analysis—Pathological and Incomplete Data. (4) Three hours of lecture and two hours of discussion per week. Prerequisites: 130A or equivalent, or consent of instructor. Survey of classical and modern instrumental methods, clustered, grouped, incomplete, Cox-model, and truncated data simulation and analyses. (SP) Tarter

223. Introduction to Risk and Intervention Research Methods. (4) Three hours of lecture and two hours of discussion per week. Prerequisites: 130A or consent of instructor. Biostatistical concepts and modeling relevant to the design and analysis of multifactor cohort studies, matched and unmatched case-control studies, and intervention studies. (SP) Malani


225. Biometrical Data Analysis—Model-Free Curve Estimation. (4) Three hours of lecture and two hours of discussion per week. Prerequisites: 220A or equivalent, or consent of instructor. Current issues in biostatistics research. Topics will vary from term to term depending on student demand and faculty availability. Possible topics are bioassay, meta-analysis, compartmental models, biostatistical consulting, coverage structure models, bootstrap and jackknife methods, artificial intelligence techniques in biostatistics. (F,SP) Staff.

230. Stochastic Processes in Biology and Health. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Formerly 230A-230B. Introduction to a wide variety of models and methods, illustrated with biological and biomedical examples. Generating functions, binomial process, Poisson process, random walk, brownian motion, renewal processes, Markov chains, branching processes, birth-and-death processes, model fitting, industrial processes, discrete-time martingales. Mathematical results are precisely stated, interpreted and explained, but formalities of proof are omitted. Staff

231. Introduction to Multivariate Statistics. (4) Three hours of lecture and two hours of laboratory per week. Prerequisites: Consent of instructor. Formerly 231A-231B. Prerequisites: Calculus, matrix algebra, one year of mathematical statistics. Analysis of survival time data. Parametric and nonparametric models for hypothesis testing and model estimation. Regression methods for censored data with covariates. Cox proportional hazards model. Accelerated time models; mixture and semi-Markov models. (F) Malani

240. Engineering Control of Airborne Chemicals. (2) Three hours of lecture per week. Prerequisite: Graduate standing in Environmental Health Sciences or consent of instructor. Principles of hazard evaluation and control of airborne chemicals in industry as it impacts on human health. Particular emphasis placed on industrial ventilation and air pollution control. Emphasis on case studies covering specific situations. (SP) Koshland

241. Industrial Hygiene: Physical Agents. (3) Three hours of lecture per week. Prerequisites: 240 or consent of instructor. Noise and radiation as occupational hazards, including environmental evaluation and related damage-risk criteria. (SP) Spear, Thomas

242. Characterization of Airborne Chemicals. (3) Three hours of lecture per week. Prerequisite: Graduate standing in Environmental Health Sciences or consent of instructor. Survey of the use of air monitoring methods in industry. Topics include: behavior of gases, vapors and aerosols; mechanisms of absorption and elimination of inhaled toxicants; methods of measuring airborne chemicals. Intended primarily for students specializing in industrial hygiene. (SP) Koshland

243. Industrial-Hygiene Laboratory. (3) One hour of laboratory, three hours of laboratory and one hour of discussion per week. Practical experiments designed to provide familiarity with industrial hygiene techniques, nonparametric regression, variance reduction, smoothing, and equiprobability contour estimation methods and other graphical methods. (SP) Tarter

246A-246B. 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 biostatistics research. Topics will vary from term to term depending on student demand and faculty availability. Possible topics are bioassay, meta-analysis, compartmental models, biostatistical consulting, coverage structure models, bootstrap and jackknife methods, artificial intelligence techniques in biostatistics. (F,SP) Staff

250. Ergonomics Case Studies. (2) Two hours of lecture per week. Prerequisites: 249 or consent of instructor. Case studies in ergonomics will be utilized to illustrate topics including mechanical work capacity evaluation, instrumentation issues, occupational biomolecular models and the biomechanics of skeletal muscles, tissues and joints. The course will involve student presentations of course assignments, laboratory reviews of recent publications in the foregoing areas plus design and intervention-related subjects. (SP) Rempel, Gillad

251. Exposure Assessment. (3) Three hours of lecture per week. Prerequisite: 130B (may be taken concurrently). The application of mathematical and statistical methods to the collection and analysis of environmental data relating to the exposure of human populations to toxic or infectious agents. Both the analysis of exposure data as well as exposure forecasting are covered. (F) Spear, Nicas

253. Environmental Toxicology. (3) Three hours of lecture per week. Prerequisite: 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) M. Smith

254. Advanced Toxicology. (2) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: 253. Current topics in toxicology research. Seminar format. (SP) Wes.

255. Chemical Carcinogenesis. (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. 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. Prerequisite: Elementary course in microbiology or consent of instructor. A survey of key infectious diseases associated with water, food, and vectors. Their description, distribution, and control. (F)

257. 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. (F,SP)

259. Epidemiologic Methods. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: 160 or equivalent one semester course in epidemiology: BEHS 130A or concurrent enrollment or consent of instructor. Principles of epidemiology: study design, selection, and definition of cases and controls; sampling, data collection, analysis, and inference. Discussion sessions provide an opportunity to apply methods to problems set and to discuss issues presented in lecture. (F) Wanderstein

261. History, Politics, and Epidemiology: Theories of Disease Causation Across Time. (3) Three hours of seminar per week. Prerequisites: Consent of instructor. This course will focus on social and scientific concepts, content, and implications of theories of disease causation, both past and present. It will consider how these theories shape the questions people ask about and the explanations they offer for patterns of health and disease in different societies. The goal is to use students to develop a historical and critical perspective concerning current theories of disease causation, and to incorporate this perspective into their research projects. (F) Kreiger
263. Epidemiology and Control of Infectious Diseases. (3) Three hours of lecture/discussion per week. Prerequisites: Prior degree or courses in biomedical sciences and consent of instructor. A discussion of major infectious diseases with emphasis on control and prevention programs. Emphasis is on current problems in the health agencies at a state, national and international level. (SP) Reingold, Rutherford, Roberto, Werner

264. Occupational Epidemiology. (2) Two hours of lecture per week. Prerequisites: Consent of Instructor. Principles and methods of epidemiology with a focus on interpreting and critiquing published occupational and environmental epidemiology studies and making conclusions about cause and effect. The course is designed for students with primary interest in occupational and environmental health. (F) Smith

265. Design and Conduct of Clinical Trials. (2) Two hours of lecture/discussion per week. Prerequisites: 304A, 260, or consent of Instructor. Emphasis on epidemiologic and biostatistical principles underlying clinical trials. Organization, design, allocation schemes, sample size, power estimates, operational issues, data management and analysis will be addressed. Trials addressing questions of public health importance will be featured. Case study approach to published trials. (SP)

265A. Practicum in Epidemiologic Methods I. (3) Three hours of lecture per week. Prerequisites: 260; 130B or 223 concurrently; consent of instructor. A two-semester practicum intended for students in the Epidemiology/Biostatistics MPH program and other qualified graduate students.

A. This is a practicum course in research data analysis.

B. Students select a research question and learn practical skills to analyze a large data base in order to answer the research question. Course teaches use of CMS and SAS in performing univariate analyses; students also learn critically to review scientific literature. (SP) Eskenazi

265B. Practicum in Epidemiologic Methods II. (3) Two hours of lecture per week. Prerequisites: 264, 231 concurrently; consent of instructor. A two-semester sequence intended for students in the Epidemiology/Biostatistics MPH program and other qualified graduate students.

A. This is a practicum course in data analysis.

B. Students select a research question and learn practical skills to analyze large data base in order to answer the research question. Course teaches use of CMS and SAS in performing univariate analyses; students also learn critically to review scientific literature. (SP)

266. Social Epidemiology. (3) Three hours of lecture 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 factors that have been studied most extensively with special attention to methodological and research design issues, problems in definition and assessment, and problems of confounding. Detailed attention will also be given to the biological pathways that link psychosocial factors and psychologic function. (SP) Boyce, Satariano

267. Topics in Disease Surveillance. (2) Two hours of session per week. The course will focus on various work in disease surveillance, identification of infectious diseases; how the reasons for doing surveillance determine the system selected; and how to evaluate whether or not a given surveillance is providing the necessary information to meet various goals. The course will also explore the impact of various biases on the conclusions drawn from surveillance data. (F) Reingold

268. Genetic Epidemiology. (2) Two hours of lecture per week. Prerequisites: Upper division or graduate courses in epidemiology, genetics, biostatistics, or human genetics, and statistics or biostatistics; or consent of instructor. Analysis of genetic influences on complex 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 session per week. Prerequisites: 260 or 264. This course covers the epidemiological methods for designing, conducting and interpreting occupational and environmental epidemiology studies. Emphasis on surveillance and prevention programs. Emphasis is on current problems in public health agencies at a state, national and international level. (SP) Reingold, Rutherford, Roberto, Werner

270. Epidemiological Analysis. (3) Three hours of lecture per week. Prerequisites: 260A and 261. This course will emphasize the concepts of an epidemiologist. Advanced treatment of epidemiologic techniques, discussion of bias and power, analysis of cohort data, spatial cluster data and contingency tables; logistic regression; analysis of time dependent data including life tables, Kaplan-Meier estimation and proportional hazard models. (SP) Selvin

271. Outbreak Investigation. (2) One hour of lecture per week. Prerequisites: Instructor approval required. The course will teach students why and how clusters of illnesses are investigated. In the weekly seminar, methods and approaches required for such investigations will be discussed in detail, using published articles from the 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 nearby county health departments and under the supervision of the instructor. (F,SP) Reingold

272. Epidemiology of Neoplastic Diseases. (3) Three hours of lecture per week. Prerequisites: 260 or 160. This course is intended for students who have already acquired a basic understanding of epidemiology, biostatistics, and tumor biology. The objectives of the course are to introduce students to the epidemiology of some major specific cancers, to consider epidemiological approaches to the study of their causation, and to address some current problems in the field. Issues of study design and implementation will be discussed. (SP)

275. Epidemiology and International Health. (2) Course may be repeated for credit with consent of instructor. Two hours of seminar per week. Must be taken on a pass/no pass basis. Prerequisites: Consent of instructor. Open to all students. The major causes of death and disease of the human species. A series of lectures, discussions and seminars on the epidemiology of diseases causing the predominant share of morbidity and mortality throughout the world, with examples on the epidemiology of infectious and health services in countries in Asia, Latin America, and Africa. The course will feature guest speakers with expertise on the epidemiology of specific diseases as well as specific diseases of social nature. (SP) Bragg, Glaxo

281. Advanced Forensic Science: Physical Aspects. (4) Two hours of lecture/discussion and nine hours of laboratory per week. Prerequisites: Consent of instructor. Detailed analysis of advanced procedural and interpretational problems in forensic science. Focus on interpretation of physical nature. (F) Thorner

282. Advanced Forensic Science: Biological Aspects. (4) Two hours of lecture/discussion and nine hours of laboratory per week. Prerequisites: Consent of instructor. A detailed analysis of advanced procedural and interpretational problems in forensic science with a focus on problems of a biological nature. (SP) Sensabaugh

284. Forensic Pathology. (2) Two hours of lecture per week. Must be taken on a satisfactory/un satisfactory basis. Prerequisites: Senior or graduate standing. A discussion of medicolegal investigations, including sudden and unexpected natural death, time of death, characterization of injuries, analysis of medicolegal evidence, post-mortem examination, the medical examiner. Requires attendance at all post-mortem. (SP) Herrmann, Rogers, Van Meter, Sensabaugh

285. Forensic Science Trial Practice. (1) Course may be repeated for credit. One hour of discussion per week. Must be taken on a satisfactory/un satisfactory basis. Prerequisites: 261. Case studies, preparation of evidence in court, mock trial. (F) Sensabaugh

291P. Tumor Virology. (2,3) One hour of lecture and one hour of discussion per week of assigned readings. Prerequisites: Course in basic virology or microbiology. The emphasis will be on viruses causing human cancer. Topics include the molecular biology of tumor viruses; mechanisms of viral carcinogenesis; in vitro vs. in vivo characteristics of virally transformed cells; the epidemiology, pathology, diagnosis, treatment, and prevention of virally caused cancers; problems of proving virally caused cancers. Course is worth 3 units if a grant proposal is written; 2 units without grant proposal. Offered odd-numbered years. (SP)

295N. Seminar. Topics to be announced. (F,SP) Staff

295N. Seminar. Topics to be announced. (F) Staff

296. Special Study. Course may be repeated for credit. Prerequisites: Qualified graduate students in Biomedical and Environmental Health Sciences. Design to permit any qualified graduate students to pursue special study under direction of an instructor. (F,SP)

296Q. Special Study, (i-8) Individual conferences. Prerequisites: Consent of instructor. Design to permit any qualified graduate students to pursue special study under direction of a faculty member. (F,SP)

297. Field Study In Public Health. Prerequisites: Consent of Instructor. Supervised field experience. Regular meetings with faculty and written reports required. (F,SP)

297Q. General Seminar in Biostatistics. (1-12) Course may be repeated for credit. Two hours seminar given once a month. Must be taken on a satisfactory/un satisfactory basis. Prerequisites: Consent of instructor. Round table discussion of current issues and recent developments in the field of biostatistics. Students who do extra work can take the course for one unit.

297S. Field Study. (1-12) Course may be repeated for credit. Individual conferences. Prerequisites: Consent of instructor. Supervised field experience. Regular meetings with faculty required. (F,SP)

298. Group Study. (1-8) Course may be repeated for credit. Prerequisites: Qualified graduate students in Biomedical and Environmental Health Sciences. Designed to permit qualified graduate students to pursue study under direction of a faculty member. (F,SP)

299. Individual Research. (1-12) Course may be repeated for credit. Prerequisites: Qualified graduate students in Biomedical and Environmental Health Sciences. Designed to permit qualified graduate students to pursue research of interest under direction of a faculty member. (F,SP)

601. Individual Study for Master's Students. (1-8) Course may be repeated for credit. Course does not satisfy unit or residence requirements for master's degree. Must be taken on a satisfactory/un satisfactory basis. Individual study for the comprehensive or language requirements in consultation with the field advisor. (F,SP)

602. Individual Study for Doctoral Students. (1-12) Course may be repeated for credit. Course does not satisfy unit or residence requirements for doctoral degree. Must be taken on a satisfactory/un satisfactory basis. Individual 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)

Professional Courses

300. Instructional Techniques in Biostatistics. (2) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/un satisfactory basis. Discussion and practice of teaching techniques as applied to Biostatistics. (F,SP) Staff

On leave, spring
On leave, fall
Interdepartmental Studies Courses

Graduate Course
IDS 221. Ecology and Epidemiology of Arthropod-Borne Zoonoses. (2) Two hours of lecture per week.
Prerequisites: Biomedical and Environmental Health Sciences 201 and Entomology recommended.
This interdisciplinary graduate course will focus on the ecology and epidemiology of zoonotic diseases transmuted to humans by arthropods. Basic principles, procedures for conducting field and laboratory investigations, and current diagnostic and control methodologies will be discussed. Presentation of findings stemming from recent studies concerning mosquito- and tick-borne diseases will be emphasized. Additional topics will include various diseases transmitted by these and other insects will be covered. Students will be required to prepare a term paper, and there will be a final examination (but no midterms). Sponsoring departments: Biomedical and Environmental Health Sciences and Entomology. Offered odd-numbered years.

Group Major in Biological Sciences
This major provides two alternative approaches to the biology of renewable natural resources: an interdisciplinary emphasis on natural resource sciences and an emphasis on the animal sciences. The latter is particularly appropriate for students wishing to meet pre-veterinary requirements.

Plan A: Emphasis on Natural Resources. This emphasis is characterized by the breadth of its requirements, with selection of at least one course from each of six scientific disciplines that bear on natural resource sciences. There is a wide choice of electives in general biology and resource studies. This provides a firm background in pre-med or basic biology and excellent preparation for graduate studies in the biological sciences.

Plan B: Emphasis on Animal Science. This emphasis provides a strong foundation in the scientific disciplines that underlie studies in veterinary medicine. As such, it is a suitable major for students wishing to prepare themselves for any of the professional health sciences: veterinary and human medicine, pharmacy, physical therapy, dentistry, optometry, etc. It also serves as excellent preparation for graduate work in zoology or other animal sciences. Students are encouraged to develop an area of interest within animal sciences or natural resources. Consult the major adviser or the Office of Student Advising for information about specific courses at Berkeley that fulfill pre-veterinary requirements.

Biostatistics
(College of Letters and Science)

Group Major Office: 101 Haviland Hall, 642-5241
(Mailing Address: 140 Wurster Hall, Berkeley, CA 94720-1776)
Co-chairs: Nicholas P. Jewell, Ph.D.; David Brillinger, Ph.D.
Professors:
Lao Breiman, Ph.D. University of California at Berkeley.
Nonparametric inference, asymptotic methods.
California State University at San Francisco.
Nonparametric survival analysis.
University of Pennsylvania.
Statistical inference for露天丽美
Nicholas P. Jewell, Ph.D. University of Edinburgh, Sampling and survey sampling.
Princeton University.
Practical experience with other scientific disciplines.
Karen Koles, Ph.D. University of California at Berkeley.
Data analysis, epidemiological problems.

Preparation for Graduate Study
Minimum entrance requirements consist of two full-year courses in calculus and a one-year course in mathematical statistics or biostatistics. Some entering students will not be adequately prepared in mathematics, statistics, or the subject matter area. 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 campus computing facilities. Research activity of the faculty currently focuses onmethodological areas of biostatistical computing, statistical issues in AIDS research, cancer epidemiology, survival patterns, and computational biology. 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 the following disciplines are available to candidates for either the M.A. or the Ph.D. degree, giving both programs considerable flexibility. Such flexibility allows students in consultation with the graduate adviser to arrange an individualized program. See Biomedical and Environmental Health Sciences and Statistics for some of the course listings.
Buddhist Studies
(College of Letters and Science)

Group Office: 1202 DeWitt Hall, 642-4654
Chair: P.S. Jaini, Ph.D.

Professors:
Robert B. Beal, Ph.D. Harvard University. (Sociology
and Comparative Studies)
James A. Down, Ph.D. University of Michigan. (History of Art)
Robert P. Goldman, Ph.D. University of Pennsylvania. (South
and Southeast Asian Studies)
Padmanabh S. Jaini, Ph.D. University of London. (South
and Southeast Asian Studies)
LlewEl Thomas, Ph.D. University of Wisconsin, (East
Asian Languages)
Kenneth Mali, Ph.D. University of Wisconsin, (Electrical
Engineering and Computer Science)
Eleanor Roeh, Ph.D. Harvard University. (Psychology)
Jeehun Hwang, Ph.D. Harvard University. (History of Art)

Associate Professors:
James E. Bosom, Ph.D. University of Washington. (East
Asian Languages)
Kwong-Li Bhui, Ph.D. Stanford University. (Philosophy)
Barend A van Noah, Ph.D. University of California. (South
and Southeast Asian Studies)

Graduate Adviser: Mr. 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 East Asian Languages, emphasizes the
interaction 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, or a broader emphasis of the
requirements for advancement to candidacy, Is available upon request from the
Business Administration
(Regina A. Haas School of Business)

Office: 350 Barrows Hall, 642-7969
Dean: William A. Hasler, M.B.A.

Professors:
David A. Ackley, Ph.D. Stanford University. (J. Gary Sharran
Chair in Marketing Strategy) Strategy, advertising, market
strategy
Louis P. Bucklin, Ph.D. Northwestern University. Marketing
strategy, distribution systems
James M. Carman. Ph.D. University of Michigan. Marketing
strategies, distribution, service marketing
G. Joseph M. East, Ph.D. Marketing Strategy, management of
innovation systems
Robert E. Cott, Ph.D. University of Illinois, Work
organization, industrial relations, organizational change,
human resource management
Robert H. Eideleban, Ph.D. (Chair in Real Estate
Development) Real estate, housing, urban affairs
Michael Atkinson, Ph.D. Carnegie-Mellon University, Finance
and Public Policy
Robert P. Goldman, Ph.D. University of Pennsylvania. (South
and Southeast Asian Studies)
John R. H. Seidel, Ph.D. Cornell University. (Chair in
Management) Management, strategic planning
Min K. Ahn, Ph.D. University of Pennsylvania. (South
and Southeast Asian Studies)

Graduate Adviser: Mr. Lancaster.

Business Administration
(Walter A. Haas School of Business)

Office: 350 Barrows Hall, 642-7969
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Development) Real estate, housing, urban affairs
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Management) Management, strategic planning
Min K. Ahn, Ph.D. University of Pennsylvania. (South
and Southeast Asian Studies)
Undergraduate and Graduate Programs

For a description of the undergraduate and graduate programs in business administration, see page 88.

Lower Division Courses

1. Introduction to Accounting. (3) Three hours of lecture and two hours of discussion per week. Prerequisites: 101 or 120. An introduction to the basic principles of accounting, measurement, and reporting of the financial effects of economic events on enterprises; the contemporary model and its origins. (F,SP)

10. The Corporation and the International Business Environment. (3) Three hours of lecture and one hour of discussion per week. The course is to be taught in five modules. The modules include an internal look at the structure of business enterprises, financing of the firm, managerial and labor inputs in the organizational structure, output markets on business strategy, and an overview of the external environment of the firm. (F,SP)

24. Freshman Seminars. (1) Course may be repeated for credit as topic varies. One hour of seminar per week; Sections 1-2 to be graded on a letter-grade basis. Sections 3-8 to be graded on a pass/no pass basis. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar format. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP)

39. Freshman/Sophomore Seminar. (2-4) Course may be repeated for credit as topic varies. Seminar for freshmen and sophomores. Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a seminar format. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. (F,SP)

Upper Division Courses

110. Microeconomics 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: 12 or 120, A minimum grade of C in 12A and 12B, or 12C; an introduction to the theoretical foundations of microeconomic behavior and to the analysis of real-world problems. (SP)

111. Macroeconomics 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: 120. 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. (F)

113. Managerial Economics. (3) Three hours of lecture per week. Prerequisites: 110 and 120 or equivalents. Analysis 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,SP)

114. Forecasting for Managerial Decisions. (3) Three hours of lecture per week. Prerequisites: 110 and 111 or equivalents. Theory and 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: 120 or equivalent. An introduction to the study of not-for-profit sectors. Institutional arrangements as they Impinge on the public sector in the public interest. Emphasis on the managerial approaches and tools used in a nonprofit environment. (F)

120. Managerial Accounting. (3) Two hours of lecture and two hours of discussion per week. Prerequisites: 112 or 120. The uses of accounting systems and their outputs in the processes of management of an enterprise. Classification of costs and revenue on several bases for various uses; budgeting and standard cost accounting; analysis of relevant costs and other data for decision making. (F,SP)

121. Financial Accounting I. (4) Three hours of lecture and two hours of discussion per week. Prerequisites: 1 and 120. An intermediate level course in the theory and practice of financial accounting. The measurement and reporting of the economic effect of events involving working capital and long-term plant assets, investment in securities, intangible assets. (Required for those specializing in accounting). (F,SP)

122. Financial Accounting II. (4) Three hours of lecture and two hours of discussion per week. Prerequisites: 121. Continuation of 121. Sources of long term capital; capital structure and capital cost; decision making; capital budgeting. (F,SP)

126. Accounting for Business Decisions. (4) Three hours of lecture and one and one-half hours of discussion per week. Prerequisites: 120. An introduction to accounting, with an emphasis on the information and control functions of the management decision-making process. The COBOL language will be used. (F)

127. Accounting Systems for Management. (4) Three hours of lecture and one and one-half hours of discussion per week. The study of accounting systems, including computerized 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. (4) Three hours of lecture and one and one-half hours of discussion per week. Prerequisites: 122 and 110 or 120. Determination of individual and corporate tax liability; influence of federal taxation on economic activity; tax considerations in business and investment decisions. (F,SP)

128B. Federal Income Taxation II. (4) Three hours of lecture and one and one-half hours of discussion per week. Prerequisites: 120. The federal taxation of corporations, shareholders, partners and 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) Field study course. Prerequisites: 122 or equivalent or consent of instructor. A planned program of exposure to actual accounting practice designed to broaden students' perspective of the concepts and theory of accounting. Assignment to specific corporate, CPA firms, or governmental agencies for orientation and work experience. Research reports based on field study required. (F,SP)

130. Financial Management. (4) Three hours of lecture and one and one-half hours of discussion per week. Prerequisites: 120. An intermediate level course in the analysis and management of the flow of funds through an enterprise. Cash management, source and application of funds, financial planning and objectives, long-term planning. 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, behavior, and management of financial institutions. Markets 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: 130 or consent of instructor. Sources of 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 seminar per week. Prerequisites: 131 and 132 and 133 or consent of instructor. An advanced course in the analysis of financial problems and research. (SP)

140. Introduction to Management Science. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 122 or equivalent. An introduction to management science, an interdisciplinary approach to business and economic problems. Topics covered include linear and integer linear programming, project management, dynamic programming, inventory control, queuing theory, and simulation. (F,SP)

141. Strategic Planning of Production and Operations Management. (3) Three hours of lecture per week. Prerequisites: 122 or equivalent. Survey of the strategic issues in production and operations management and of the concepts and methodologies a manager uses to address them. Topics include production and inventory control, product design, plant configuration, capacity expansion, research and development for new products, and acquisition of new technologies. (F,SP)

142. Production and Operations Management. (3) Three hours of lecture per week. Prerequisites: 140 or equivalent. An introduction to the concepts and methodologies for management control of production and operation systems. Topics include inventory control, material requirements planning, multi-stage production planning, scheduling, and production distribution. (SP)
149. Special Topics in Organizational Behavior. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: BA150 or equivalent or consent of instructor. Analysis of recent literature and developments in the field of organizational behavior, environmental determinants of organization structure and decision making behavior; management of professionals and management in temporary structures; cross-cultural studies of management and organization. (F) (SP)

150. Marketing. (3) Three hours of lecture per week. Prerequisites: 110 or equivalent. The evolution of markets and marketing; market structure; marketing cost and efficiency; public and private regulation; the development of marketing policy; the impact of new decisions involving products, price, promotional distribution. (F, SP)

151. Introduction to Marketing Research. (3) Three hours of lecture per week. Prerequisites: 160. Marketing research objectives; qualitative research, surveys, experiments, sampling, data analysis. (F, SP)

152. Retailing. (2) Two hours of lecture per week. Prerequisites: 160. History of retailing; types of retailing, management and control of retail trade; assortments of goods and services; store management; government regulations. (F, SP)

153. Marketing Policies and Problems. (2) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: 160 or consent of instructor. Special topics in competitive market situations; consumer behavior; product policy, consumerism, and other topics. (F, SP)

154. Business, Government, and Law in the American Political Economy. (3) Three hours of lecture per week. Prerequisites: 175 or 170 recommended. In this course, students examine the complex relationship between business and government; the role of business in a changing social and political environment. Interaction between business and other 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)

155. Business, Government, and Law. (3) Three hours of lecture per week. Prerequisites: 175 and/or 170 recommended. In this course, students examine the complex relationship between business and government; the role of business in a changing social and political environment. Interaction between business and other 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)

156. Legal Aspects of Management. (3) Three hours of lecture per week. Prerequisites: 175 and/or 170 recommended. The law affecting ownership and use of real property; transfers, titles, development rights, and the regulation thereof in the public interest. (SP)

157. Legal Aspects of Business Transactions. (3) Three hours of lecture per week. Prerequisites: 175. A review of the legal implications of certain common business transactions and situations. Includes problems arising in sales, installment buying, inventory financing, and financing and extending credit, negotiable instruments, and insolvency, with emphasis on the Uniform Commercial Code. (SP)

158. Legal Aspects of Real Estate. (3) Three hours of lecture per week. Prerequisites: 175; 180 recommended. The nature of real property; market analysis; construction cycles; mortgage lending; equity investment; metropolitan growth; land utilization; real property valuation; public policies. (F, SP)

159. Valuation of Real Property. (3) Three hours of lecture per week. Prerequisites: 175. Analysis of appraisal concepts and methods; the role of value estimates in private land-use and real estate investment decisions and in the implementation of public policies affecting urban development. (F)

160. The Financial Management of Real Estate. (3) Three hours of lecture per week. Prerequisites: 175. Real estate debt and equity financing; mortgage market structure; effects of credit on demand; equity investment criteria; public policies in real estate finance and urban development. (SP)

161. Introduction to International Business. (3) Three hours of lecture per week. Prerequisites: 160, 170. An overview of the international business environment. Special emphasis is placed on the development of international business organizations, and on the role of the manager in such organizations. (F, SP)

162. Business in the Historical Environment. (3) Three hours of lecture per week. Prerequisites: 175 and/or 170 recommended. In this course, students examine the complex relationship between business and government; the role of business in a changing social and political environment. Interaction between business and other 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)

Graduate Courses

200. Introduction to Data Analysis. (2) Two hours of lecture and one hour of discussion per week. The course objective is to make business managers critical thinkers. Focus is on the use of statistical methods to analyze data, focusing on the use of software packages. Emphasis is placed on traditional introductory courses, theoretical underpinnings and statistical formulas are de-emphasized. This course is not counted toward the 120 credit hour graduation requirement, since the statistical technique is used in other business courses. Key concepts include interpretation of regression, model formation and testing, and diagnostic checking. (F) Staff
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201A. Economic Analysis for Business Decisions I. (5) 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; the roles of the state and competitive environment on business policies. (F,SP)

201B. Macroeconomics in the Global Economy. (3) Three hours of lecture and one hour of optional discussion per week. Prerequisites: 201A or equivalent. This course will cover the determination of long run productivity and growth; short run economic fluctuations (in both closed and open economies); exchange rates and the balance of payments; the natural rate of unemployment; and the causes and consequences of inflation. Examples drawn from a variety of countries are used to illustrate theoretical concepts. (SP) Staff

202A. Financial Reporting. (2) Two hours of lecture and one hour of optional discussion per week. A study of accounting measurements for general purpose financial reports. The object of the course is to provide a working knowledge of and a clearer understanding of the contents of published financial statements. (F) Staff

202B. Managerial Accounting. (3) Three hours of lecture and one hour of optional discussion per week for 10 weeks. Prerequisites: 202A or equivalent. This course will cover financial accounting throughout the planning, operation and control stages of managing an organization. The course is divided into three sections to reflect these three stages of management: 1) Information for planning and decision making; 2) internal control during operations (cost accounting); and 3) information for control and performance evaluation. (SP) Staff

203. Introduction to Finance. (3) Three hours of lecture and one hour of optional discussion per week. This is a broad overview of financial markets and institutions. Topics include: capital markets (short and long-term); financial statements of profit-oriented organizations; balance sheets; income statements; cash flow statements; and ratios. The course will emphasize the role of financial markets and institutions in allocating resources, evaluating investments, and providing a framework for analysis. All functions of financial markets will be examined. (F,SP)

204. Manufacturing and Operations Management. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 200. This course will provide students with an understanding of the basic issues involved in managing a manufacturing-based business and to introduce the tools that are available to deal with these issues. The course will cover the following topics: product and process design; production planning and control; inventory control; quality control; and decision making. The emphasis will be on practical applications of the concepts discussed. (F,SP)

205. Organizational Behavior. (3) Three hours of lecture per week. A survey of knowledge about behavior in and of organizations. Covered will be issues of individual behavior, group functioning, and the actions of organizations in their environments. Problems of work motivation, task design, leadership, communications, and interpersonal relations will be analyzed from multiple theoretical perspectives. Implications for the management of organizations will be illustrated through examples, cases, and exercises. (F,SP)

206. Marketing Organization and Management. (3) Three hours of lecture per week. Prerequisites: 201A or equivalent. Topics include an overview of the marketing system and the marketing concept, buyer behavior, market research, segmentation and marketing decision making, marketing strategies and tactics, and marketing performance in the economy and society. (F,SP)

207. Business and Public Policy. (2) Two hours of lecture per week. Introduction to political economy, the role of government in the economy, business-government relations, the public policy process, regulation of business, corporate political activity and corporate governance. Compares United States corporate governance systems, public policies and political systems in those of Western Europe and Japan. (F,SP) Staff

210. Market Structure and Economics Performance. (3) Three hours of lecture per week. Prerequisites: 200, 201A-201B, 204 or equivalents. Examines optimal production and pricing policies for firms in competitive environments; optimal strategies through time; strategic behavior and learning. How the structure of markets and government policies (including taxation) affect output and pricing decisions. Social welfare implications of decisions by competitive firms are also explored. (F,SP)

211. Market Failures and Boundaries of the Firm. (3) Three hours of lecture per week. Prerequisites: 200, 201A-201B, 204 or equivalents. Efficiency in resource allocation: failure of markets and substitutes for markets, decreasing cost phenomena; public goods and public bads; behavior of firms under regulatory constraints. (F,SP)

212. Managerial Decisions in Regulated Industries. (3) Three hours of lecture per week. Prerequisites: 201A or equivalent. Introduction to administrative law and the regulatory process. Economic principles of administrative regulation of pricing, investment, and service quality. Analysis of critical problems in regulated industries, including transportation, communications, energy, and financial sectors, with emphasis on emerging competition in these industries. Potential regulatory reforms with alternatives to regulation. (F,SP)

213. Statistical and Econometric Methods for Business. (3) Three hours of lecture per week. Prerequisites: 200, 201A-201B, 204 or equivalents. The theory and use of statistical and econometric methods with special emphasis on practical applications. Topics will include regression analysis; special problems in a time series analysis; simultaneous equations estimation; elements of multi-variate analysis. (F,SP)

214. Forecasting Methods for Business. (3) Three hours of lecture per week. Prerequisites: 200, 201A-201B, 204 or equivalents. The theory and use of statistical and econometric methods with special emphasis on practical applications. Topics will include regression analysis; special problems in a time series analysis; simultaneous equations estimation; elements of multi-variate analysis. (F,SP)

215. Management in the Public and Not-For-Profit Sectors. (3) Three hours of lecture per week. Prerequisites: 201A-201B, or equivalents. Planning-production and pricing policies for firms in competitive and non-competitive environments. Including transpprtation, communications, public enterprises, education, health, and welfare. (F,SP)

216. Seminar in Applied Economics. (3) Three hours of lecture per week. Topics will vary with the interests of the instructor. A description of the topics and objectives of the seminar will be available to prospective students each year. (F,SP)

217. Seminar in Applied Economics. (3) Three hours of lecture per week. Topics will vary with the interest of the instructor. A description of the topics and objectives of the seminar will be available to prospective students each year. (F,SP)

218. Financial Accounting I. (4) Three hours of lecture and one and one-half hours of discussion per week. Prerequisites: 201A or consent of instructor. This course is an introduction to general business and accounting principles. The course covers the general problem of financial accounting, including the concepts and methods of financial accounting. (F,SP)

219. Seminar in Accounting Theory. (3) Three hours of seminar per week. Prerequisites: 220A or equivalent. A course in the evolution of accounting theory from ancient times to the present, with an emphasis on the literature of the 30 years dealing with the problems of business and operation of the market system. The institutional structure of the US and international financial markets and the market mechanisms for trading securities. Topics include: capital markets, capital budgeting, behavioral history of asset returns, and dividend policy. Course will cover viva ideas for approaches to solving problems related to accounting and finance. (F,SP)

220. Managerial Accounting. (3) Three hours of lecture per week. Prerequisites: 200A and 201A-201B, or equivalents. The course will cover financial accounting throughout the planning, operation and control stages of managing an organization. The course is divided into three sections to reflect these three stages of management: 1) Information for planning and decision making; 2) internal control during operations (cost accounting); and 3) information for control and performance evaluation. (SP) Staff

221. Seminar in Accounting Theory. (3) Three hours of seminar per week. Prerequisites: 220A or equivalent. A course in the evolution of accounting theory from ancient times to the present, with an emphasis on the literature of the 30 years dealing with the problems of business and operation of the market system. The institutional structure of the US and international financial markets and the market mechanisms for trading securities. Topics include: capital markets, capital budgeting, behavioral history of asset returns, and dividend policy. Course will cover viva ideas for approaches to solving problems related to accounting and finance. (F,SP)

222. Financial Accounting I. (4) Three hours of lecture and one and one-half hours of discussion per week. Prerequisites: 202A or consent of instructor. This course is an introduction to general business and accounting principles. The course covers the general problem of financial accounting, including the concepts and methods of financial accounting. (F,SP)

223A. Doctoral Seminar in Accounting I. (3) Students will receive no credit for taking 228A. Three hours of seminar per week. Prerequisites: 220A or equivalent, 229A and Economics 201A-201B. A critical evaluation of recent accounting literature with emphasis on seminar contributions. Topics covered include research methodology and accounting, the private and social value of information. (SP)

223B. Doctoral Seminar in Accounting II. (1-3) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: 220A or equivalent, 229A and Economics 201A-201B. A critical evaluation of recent accounting literature with emphasis on financial accounting. (SP)

223C. Doctoral Seminar in Accounting III. (2) Two hours of seminar per week. Prerequisites: 220A or equivalent, 229A and Economics 201A-201B. A critical evaluation of recent accounting literature with emphasis on financial accounting. (SP)

223D. Doctoral Seminar in Accounting IV. (2) Two hours of seminar per week. Prerequisites: 220A or equivalent, 229A and Economics 201A-201B. Exploration of issues related to the internal accounting systems of large firms. The first part of the course focuses on the theory of mechanistic design while the second part applies those ideas to a variety of managerial accounting questions. (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 and 202B or equivalent. Seminar in advanced topics in accounting selected from subjects from auditing theory, control aspects, management information systems, and managerial accounting. (SP)

226A. Income Taxation I. (4) Three hours of lecture and one and one-half hours of discussion per week. Prerequisites: 220A and 202B or equivalent. The study of the fundamentals of income taxation relative to individuals and businesses. Students are also introduced to tax research, tax planning, and tax policy. (F,SP)

226B. Income Taxation II. (2) Two hours of lecture per week. Prerequisites: 226A or equivalent. The study of corporation tax problems, partnership tax problems, and chapter 8 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: 226A or equivalent. The study of corporation tax problems, partnership tax problems, and chapter 8 corporations, estate and gift taxation, income taxation of estates and trusts. (F)

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 practices in both public and private organizations. (F)

232. Financial Institutions and Markets. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 200. This course will analyze the role of financial markets and financial institutions in allocating capital. This major focus will be on debt contracts and their evolution, the communication of information in the bond and money markets. The functions of commercial banks, investments banks, and other financial intermediaries will be covered and aspects of the regulation of these institutions will be examined. (F,SP)
233. Investments. (3) Three hours of lecture and one hour of optional discussion per week. Prerequisites: 203. This course will examine four different types of asset markets: equity markets, fixed income markets, futures markets and options markets. It will focus on the valuation of these assets, including an introduction to asset valuation models, and strategies that can be employed to achieve various investment goals. (F,SP)

234. Corporate Finance. (3) Three hours of lecture and one hour of optional discussion per week. Prerequisites: 203. This course will study the principles underlying capital budgeting, financial management, capital structure, dividend policy, capital structure and mergers. (F,SP)

235. Advanced Topics in Financial Institutions and Financial Economics. (2) Three hours of lecture per week. Prerequisites: 223. This course is intended for students with an interest in management of manufacturing and of service facilities. The problems and techniques of planning, construction, scheduling, quality control and others in the manufacturing (and some service) industries are discussed. Case studies are used to examine decision making in the manufacturing environment. (SP)

243. Decision Analysis. (2) Two hours of lecture per week. Prerequisites: 200, 204 or equivalent. Procedures for decision making under uncertainty are considered. Decision trees, 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 business decision making. An emphasis will be placed on the interaction among the decisions of several decision makers; each with different goals and different information. Examples in oil leasing, contract bidding, and labor negotiations. (SP)

246. Advanced Topics in Management Science. (2-3) Three hours of lecture per week. Prerequisites: Consent of instructor. The course will focus on a specific topic in management science and its application to decision making. Different topics will be considered, including possibly integer programming models, network models, stochastic programming, Markov decision models, continuous-time probability models, and management information systems. (F,SP)

247. Simulation for Business Decisions. (2) Two hours of lecture per week. Prerequisites: 200, 204 or equivalents. Uses of computer modeling in business decision making contexts. Structure of simulation models; simulation languages, data structures, techniques, and interaction of the student with the model. Emphasis on hand-on modeling via simulation projects, as well as technique-oriented lectures. (F,SP)

248A. MIS: Data Management. (4) Three hours of lecture and one and one-half hours of discussion per week. Prerequisites: 200 or consent of instructor. Course covers several important topics in business data processing including file and data base systems. The problem of data management in large organizations is analyzed, and the logical data modeling process and its strategic importance are discussed. Other topics include future developments in computer technology and acquiring and managing computer resources. A team project consists of the design and implementation of a data base using a relational database management system package. (F)

248B. MIS: System Analysis and Design. (3) Three hours of lecture per week. Prerequisites: 204. The goal of this course is to provide future general managers and information systems specialists with experience in aspects of utilizing information in decision making. Topics covered include the role of information systems in organizations, systems analysis, trade-offs and economic consideration in systems development, hardware selections and review of technological advancements relevant to modern organizations. (F,SP)

248C. MIS: Managerial and Organizational Issues. (2) Two hours of lecture per week. Prerequisites: 204. This course covers the management and organizational issues associated with the implementation and ownership of computer-based and information systems. A management perspective is maintained throughout and technical issues in networks, databases, and distributed systems are relevant to modern organizations. (F,SP)

49A. Introduction to Manufacturing Information Systems. (2) Two hours of lecture per week. Prerequisites: 202 or equivalent, or consent of instructor. This course is designed for doctoral-level students who wish to learn about the role of information systems in manufacturing functions and the need for efficient information systems to achieve some of these issues. Following a brief introduction to various forms of manufacturing systems and some manufacturing control issues, this course will focus on the use of efficient information systems in manufacturing. (SP)

249B. Models of Manufacturing Systems. (3) Three hours of lecture per week. Prerequisites: IEOR 262A and 263A, or equivalent; 249A or consent of instructor. The purpose of this course is to explore analytical methods used for the analysis and enhancement of information systems. Students are expected to acquire the ability to define critical current problems in the area of information systems, and to model and formulate such problems and provide a comparative analysis. The material presented in the lectures will provide the necessary background and tools for such an analysis. (SP)

250. Organization Design and Change. (3) Three hours of lecture per week. Prerequisites: 205. The 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 management Waterloo— 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. A study of the problems and techniques associated with managing the managerial function. Topics include the processes of recruitment, selection, placement, training, and evaluation of people, and the organization and management of human resources. Emphasis is placed on respect for 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. A study of the negotiations process, including negotiations among buyers and sellers, managers and subordinates, company units, companies and organizational agencies, and management and labor. The theories of negotiation and the principles of conflict resolution are covered. Course work includes reading, lectures, discussion of case material and simulations of real negotiations. Emphasis is placed on the role of third parties in resolving disputes. (F)

253. Public Policy and the Management of Human Resources. (3) Three hours of lecture per week. Prerequisites: 205 and 207, or consent of instructor. This course will analyze government regulation of personnel, including such issues as age, race and gender discrimination, affirmative action, discrimination, the day-to-day operations of the public sector, and the impact of public policy decisions. Emphasis is placed on policy making and the impact of public policies. (SP)

254. Telecommunications and Distributed Processing. (3) Three hours of lecture per week. Prerequisites: 204. This course is intended for students who wish to gain better understanding of one of the most important issues facing management today-efficient interorganizational, interdepartmental, and intercomputer communciation and distributed computer systems. The following topics are covered: a survey of networking technologies; the selection, design and management of telecommunication systems; strategies for distributed data processing; office automation; and management of personal computers in organizations. (F,SP)
254A. Research in Micro-Organizational Behavior. (3) Three hours of seminar per week. Prerequisites: Ph.D. student or consent of instructor. Review of the research literature of micro-organizational behavior, including social psychological and psychological foundations. Topics include: job design, work attitudes, organizational commitment, organizational culture, control and participation in organizations, creativity, personality, stress, leadership, industrial psychology. (SP)

254B. Research in Macro-Organizational Behavior. (3) Three hours of seminar per week. Prerequisites: Ph.D. student or consent of instructor. Review of the research literature of macro-organizational behavior, including social psychological and psychological foundations. Topics include: bureaucracy, authority, power and politics, control, technology, institutional theory, organizational ecology, resource dependency and transaction costs. (F)

25C. Research in Industrial Relations and Labor. (3) 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, government regulation, internal labor markets, and implicit contracts. (F)

25D. Special Research Topics in OBIR. (3) Three hours of seminar per week. Prerequisites: Ph.D. student or consent of instructor. Review of special research topics in behavioral and industrial relations not ordinarily covered in 254 A, B, or C. Possible topics include: history of organizational research; human resource management research; comparative management 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 unemployment. Analyses of wages and salary administration and labor market behavior of occupational groups; production and clerical workers, managerial and professional workers. Problems of wage and income policies of the firm, union, and the national economy. (F)

256. Collective Bargaining. (3) Three hours of lecture per week. Studies of the bargaining process; the legal basis of collective bargaining; administration of collective bargaining agreements and procedures for adjusting contract disputes and arbitration of grievances; processes of disputes settlement; comparative international systems. Includes a simulated bargaining project. (F)

257. Human Behavior in Organizations. (3) Three hours of lecture per week. Prerequisites: 205 or equivalent, or consent of instructor. A study of human behavior in organizations and psychological factors affecting human behavior and performance in work places. Topics include motivation, job design, human information processing, socialization, commitment, and leadership processes in organizations. (SP)

258. Technology, Organization, and Environment. (3) Three hours of lecture per week. Prerequisites: 205 or equivalent, or consent of instructor. A consideration of the various ways environment and technological factors affect the structure and management of organizations. Subjects include organizational growth, structure, control systems, professionalism, and reactions to change and uncertainty. (SP)

259A. Special Topics in Organizational Behavior and Industrial Relations. (2-3) Course may be repeated for credit. Two or three hours of lecture for weeks or four to six hours of lecture for 7/8 weeks. Prerequisites: 205 or equivalent or consent of instructor. Analysis of recent literature and developments related to behavior in organizations, organization development; environmental determinants of organizational behavior, interaction and decision-making behavior; management of professionals, and management in temporary structures; contemporary policies of management organizations, and industrial relation systems and practices are examined. (F,SP)

259B. Organization and Quality Excellence. (3) Three hours of lecture per week. Prerequisites: 205 or equivalent, or consent of instructor. This course is intended to provide a strong introduction to students on contemporary techniques for improving organizational quality. A major premise is that quality competition has moved rapidly to the foreground as a major arena for competitive struggles and those firms which fail to recognize its impact will lose effective organizational responses will fall by the wayside. (F,SP) Cole

260. Consumer Behavior. (2) Two hours of lecture per week. Prerequisites: 206 or equivalent. Examines concepts and theories from behavioral science useful for the understanding and prediction of market place behavior and demand analysis. Emphasizes applications to the development of marketing policy planning and strategy and to various decision areas within marketing. (F)

261A. Marketing Research: Techniques and Data Analysis. (3) Two hours of lecture and one and one-half hours of laboratory per week. Prerequisites: 200 or comparable statistical course. This course develops the skills necessary to plan and implement an effective marketing research study. Topics include research design, psychological measurement, survey methods, experimental, statistical analysis of marketing data, and effective reporting of technical material to management. Students select a client and prepare a market research study during the course. Course intended for students with substantive interests in marketing. (F)

261B. Introduction to Marketing Research. (2) Two hours of lecture and one and one-half hours of laboratory per week. Prerequisites: 200 or equivalent. This course examines the strengths and limitations of marketing research and considers its impact on managerial decision making. It includes selected topics from 261A emphasizing research design and the criticism of marketing studies. Course intended for students with non-marketing concentrations. (SP)

262A. Product Management. (3) Three hours of 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 including product, price, distribution and promotion policies. There is 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,SP) Winer

262B. Services Marketing. (3) Three hours of 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 including product, price, distribution and promotion policies. There is a heavy use of case analysis. Course is designed for those who have a strong interest in marketing programs for services and service companies. (SP) Carmine

263. Management of New Products. (2) Two hours of lecture per week. Prerequisites: 202B, 206, or equivalent. Analysis of methods of new product development and introduction, product portfolio management and pricing tactics in a variety of settings for both new and mature products. (SP) Myers

264. High Technology Marketing Management. (3) Three hours of lecture per week. Prerequisites: 206 or equivalent. Emphasizes the decision-making processes concerning the development of new products and services which is subject to technological change at a pace significantly faster than for most goods in the economy. Under such circumstances, the information base is often invalid by the time the decision is made. Other topics include social/economic issues of advertising by nonprofit organizations. (SP)

265. Advertising Management. (2) Two hours of lecture per week. Prerequisites: 206, or equivalent. Recommended. A specialized course in advertising, focusing on the management and decision-making processes of marketing. Topics include objective-setting, copy decisions, media, A
debates, budgeting, and examination of theories, models, and other research methods appropriate to these decisions. Other topics include social/economic issues of advertising by nonprofit organizations. (SP)

266. Channelling of Distribution. (2) Two hours of lecture per week. Prerequisites: 202B, 206 or equivalent. The success of any marketing program 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, first, through studying the broad economic and social forces which govern the channel evolution. It is the relations, between the examination of tools to select, manage and motivate channel partners. (F,SP)

267. Strategic Marketing Planning. (2) Two hours of seminar per week. Prerequisites: 202B, 205, 206, 207 or equivalent. Strategic planning theory and methods with an emphasis on customer, competitor, industry and environment of the firm. Application to strategy development and choice. (F)

268. Seminar in Marketing Management. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. Advanced selected topics in marketing, intended principally for MBA students. Topics will vary from year to year. (F,SP)

269A. Seminar in Marketing: Buyer Behavior. (2) Two hours of seminar per week. Prerequisites: Consent of instructor. A specialized course in marketing, intended principally for Ph.D. students but open to advanced MBA students. (F)

269B. Seminar in Marketing: Decision Models. (2) Two hours of seminar per week. Prerequisites: Consent of instructor. Advanced topics seminar intended principally for Ph.D. students but open to advanced MBA students. (F)

269C. Seminar in Marketing: Marketing Systems and Policy. (2) Two hours of seminar per week. Prerequisites: Consent of instructor. Formerly 268D. Advanced topics seminar intended principally for Ph.D. students but open to advanced MBA students. This section will focus on marketing theory and the development of marketing thought. (Course offered alternate years.) (F,SP)

269D. Special Research Topics in Marketing. (2) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Ph.D. student or consent of instructor. Review of special research topics in marketing not ordinarily covered in BA 269A, 269B, 269C. Content varies from year to year. (Course offered alternate years.) (F,SP)

270. Corporate Governance and Public Policy. (3) Three hours of seminar per week. Prerequisites: 207 or equivalent. Will consider in depth two or three major issues arising out of the role of the large corporation in modern society. Topics have included social policy and responsibility, implications of social change and corporate control, private versus public corporate governance, and interactions between private economic institutions and the social, political, and legal systems. (SP) Staff

271. Managing the Political Environment of Business. (2-3) Two or three hours of lecture per week. Prerequisites: 207 or equivalent, or consent of instructor. This course examines the methods and strategies by which business enterprises and associations attempt to influence public policies, primarily in the United States, with some comparison to Western Europe and Japan. Uses combination of scholarly articles, current periodicals and case studies to explore the processes of government decision-making and policy implementation and how they affect, and are affected by, business interests and institutions. (F,SP) Staff

272A-272B. Comparative and International Business and Public Policy. (2-3) Two or three hours of lecture per week. Prerequisites: 207 or equivalent, or consent of instructor. Formerly 272. Both courses examine the methods and strategies by which business enterprises and associations attempt to influence public policies, primarily in the United States, with some comparison to Western Europe and Japan. Uses combination of scholarly articles, current periodicals and case studies to explore the processes of government decision-making and policy implementation and how they affect, and are affected by, business interests and institutions. (F,SP) Staff
Economic behavior; growth and decline of urban areas; selected policy issues: housing, transportation, financing, local government, urban redevelopment and neighborhood bolster. (F)

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 fundamentals of real estate financial analysis, including elements of mortgage financing and taxation. The course will apply the standard tools of financial analysis to specialized real estate financing circumstances and real estate evaluation. (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 non-residential development and financing, urban redevelopment, real estate taxation, mortgage market developments, equity investment, valuation, and zoning. (SP)

285. International Finance. (3) Three hours of lecture per week. Prerequisites: 281B. This course introduces students to the institutions and operations of the international financial markets, balance of payments, foreign exchange, and exchange rate determination. (SP)

286. Global Strategy and Multinational Enterprise. (3) Three hours of lecture per week. Prerequisites: All core courses. The course is designed to examine the challenges facing international firms. Attention to business strategies, organizational structures, and the role of governments in the global environment. Special attention is given to the challenges of developing and implementing global new product development strategies when international structures and government policies differ. The course, or part of it, can be repeated for credit. (F,SP)

287. Theory and Institutions of International Trade. (3) Three hours of lecture per week. Prerequisites: 281A. The course focuses on the behavioral and institutional framework for the study of international trade. The course topics include the international trade environment, and the role of governments in the global environment. Special attention is given to the challenges of developing and implementing global new product development strategies when international structures and government policies differ. The course, or part of it, can be repeated for credit. (F,SP)

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

292A. Agricultural Resource Economics. (3) Three hours of lecture per week. Prerequisites: Ph.D. student or consent of instructor. Topics in agricultural resource economics include farm management, agricultural economics, social and political roles; (F)

292B. Research and Theory in Business Administration. (4) Four hours of lecture per week. Prerequisites: All core courses. Identification of the management challenges facing international firms. Attention to business strategies, organizational structures, and the role of governments in the global environment. Special attention is given to the challenges of developing and implementing global new product development strategies when international structures and government policies differ. The course, or part of it, can be repeated for credit. (F,SP)

292D. Research and Theory in Business: Applied. (4) Four hours of lecture per week. Prerequisites: All core courses. Identification of the management challenges facing international firms. Attention to business strategies, organizational structures, and the role of governments in the global environment. Special attention is given to the challenges of developing and implementing global new product development strategies when international structures and government policies differ. The course, or part of it, can be repeated for credit. (F,SP)

296. Special Topics in Business Administration. (3) Three hours of seminar per week. Prerequisites: 291A and 207, or consent of instructor. The course is designed to "capstone" course for second-year MBA students who have an interest in nonprofit organizations, either as potential managers or as members of Board of Trustees, it will start from the basics and build upon course work in all areas of business administration. Topics include, but not limited to: legal issues, fund-raising, volunteers, financial management, leadership, and relationships with government, (SP) Van Loo

275. Managing the Legal and Regulatory Environment of Business. (3) Three hours of seminar per week. Prerequisites: 201A and 207, or consent of instructor. A managerial approach to important legal issues facing the business and a 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 corporations in personal and business affairs, the corporation and society, (SP) Staff

276. Special Topics in Business and Public Policy. (1-3) One to three hours of lecture per week. Prerequisites: 201A and 207, or consent of instructor. A managerial approach to important legal issues facing the business and a 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 corporations in personal and business affairs, the corporation and society, (SP) Staff
Credit and grade to be awarded on completion of sequence. All other sections are offered on a letter-graded basis. 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)

297A-297B. Seminar in Business for MBAs. (2:1) Course may be repeated for credit. Two hours of lecture per week. Credit and grade to be awarded on completion of sequence. Prerequisites: Graduate standing. Various courses in business for graduate students. Topics will be announced at the beginning of each semester. (SP) Staff

298. Research Seminar in Business Administration. (2-4) Two hours of seminar and one hour of discussion per week. Four seminars or two seminars per two weeks for two units. Prerequisites: Admission to Ph.D. program in Business Administration and consent of instructor. A series of seminars at which current students on research administration topics is presented. The theme of a section can be based on the literature of an existing business administration field or on a topic that spans more than one field. Students will attend a one-hour preseminar discussion at which the paper to be presented next will be discussed. (F,SP)

299. Individual Research in Business Problems. (1-12) Course may be repeated for credit. Individual conferences. Sections 1-32 Ph.D. students satisfactory/un satisfactory basis - fixed one unit. Sections 33-100 MBA students letter-grade basis - fixed 3 units. Prerequisites: Graduate standing and consent of instructor. (F,SP) Staff

601. Individual Study for Master's Students. (1-5) Course does not satisfy unit or residence requirements for master's degree. Must be taken on a satisfactory/un satisfactory basis. Prerequisites: Graduate standing. Individuals who wish to pursue the comprehensive examination in consultation with field advisor. (F,SP)

602. Individual Study for Doctoral Students. (1-6) Course may be repeated for a maximum of 16 units. Course does not satisfy unit or residence requirements for doctoral degree. Must be taken on a satisfactory/un satisfactory 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 various examinations required of candidates for the Ph.D. degree. (F,SP)

Interdepartmental Studies Courses

Upper Division Course

IDS 170. Economics of Organization. (3) Three hours of lecture per week. Prerequisites: Economics 100 or 101; Business Administration 110 or equivalent; consent of instructor. This course presents economics concepts which explain why economic activity is organized in firms, why firms are vertically integrated, and why there are limits to the growth of firms. Other forms of economic organization, such as the partnerships, the labor-managed firms, and the cooperatives, will also be considered. Sponsoring departments: Business Administration and Economics. (SP)

Graduate Courses

IDS 270. Workshop in Institutional Analysis. (2) Consent of Instructor. Two hours of lecture per week. Must be taken on a satisfactory/un satisfactory basis. Prerequisites: Doctoral standing or consent of instructor. This seminar features current research faculty from UC Berkeley and elsewhere, and addresses graduate students who are investigating the efficacy of economic and noneconomic forms of organization. An interdisciplinary perspective—combining aspects of law, economics, and organization—is necessary. Prior coursework in economics, political science, and the supporting institutions of law and politics all come under scrutiny. The aspiration is to progressively build towards a new science of organization. Also listed as Economics 225, Williamson

IDS 294. Management of Technology Joint Learning Seminar. (3) One hour of lecture and three hours of laboratory per week. Prerequisites: Business Administration 256 or Engineering 256 or 257, or consent of instructor. Five hours of credit for this interdisciplinary course of two faculty advisors (Bus. Adm. and Engr.) will assist Bay Area corporation in a central issue in the management of technology. Applications of classroom work to the solution of real issues. Will provide an opportunity to further the understanding of the scope and complexity of the technology management process. Comprehensive report and presentation required. Sponsoring departments: Engineering and Business Administration.

IDS 296. Management of Innovation and Policy. (3) Three hours of lecture 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.

Celtic Studies

(College of Letters and Science)

Group Major Office: Division of Undergraduate and Interdisciplinary Studies, 301 Campbell Hall, 642-6944
Dean: Donald A. McClaude, Ph.D.
Faculty Advisory Committee: Daniel Melia, chair (Rhetoric), Gary Holland (Linguistics), Joan Keefe (Celtic Studies), Kathryn Kiar (Celtic Studies), Anne Salafjian (Celtic Studies), Blake Spahr (German), Eve Sweetser (Linguistics), Robert Tracy (English)
Student Affairs Officer: Marty Gajeljins (Undergraduate and Interdisciplinary Studies, 301 Campbell Hall, 642-6944).

Major in Celtic Studies

The program in Celtic studies 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. The program recently has developed an innovative linkage of language and literature—in translation courses intended to allow students maximum flexibility in pursuing their programs. 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, modern languages, music, philosophy, 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 the student affairs officer in the Division of Undergraduate and Interdisciplinary Studies, 301 Campbell Hall, or Professors Eve Sweetser or Gary Holland, Department of Linguistics.

Major Requirements

Lower Division. Celtic Studies 70 plus two semester courses from the following course sequences: 5 and 6, or 7 and 8, or 9 and 10, or 11 and 12. Prerequisite: Subject A or equivalent. Reading and composition course based on works of Celtic writers and their influence on modern English. Staff

Upper Division. Upper division courses totaling at least 32 units including either 128 or 129, 130 or 132, 136 or 139. One class from the following list must be taken: 115A, 116A, 102A, 102B, 105A, 105B, 106A, 106B, 115A, 115B, 116A, and 116B. Students with prior knowledge of a Celtic language may apply for credit by examination.

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 at the University, a minimum 3.5 grade-point average in all courses required for the major, and they must have taken both Celtic Studies 128 and 129 (one of these two classes is required for the major). A thesis is also required, which should normally emanate from H195, the Honors Seminar.

Minor in Celtic Studies

Students in the College of Letters and Science may declare one or more minors on their own choice, normally in a field both academically and administratively distinct from their major.

Lower Division: Celtic Studies 70.

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 taken on a letter-grade basis; at least three of the five courses must be completed at UC Berkeley, and a maximum of all grade-point average of 2.0 is required in the upper division courses applied to the minor.

Students interested in the minor should consult the student affairs officer in the Division of Undergraduate and Interdisciplinary Studies, 301 Campbell Hall, or Professors Eve Sweetser, Department of Linguistics, 2404 Dwinelle 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 topics have been accepted in the departments of Comparative Literature, History, Rhetoric, English, French, and Anthropology, and in the program in Folklore.

Lower Division Courses

4A-4B. Voices of the Celtic World. (4,4) Three hours of lecture and one hour of discussion per week. Prerequisites: Subject A or equivalent. Reading and composition course based on works of Celtic writers and their influence on modern English. 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. Keefe

6. Beginning Modern Welsh. (2) One hour of lecture and one hour of laboratory per week. Formerly 6A. 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. Keefe

70. The World of the Celts. (4) Three hours of lecture per week. An overview of the history of Celtic-speaking peoples from Indo-European times, including linguistic/archaeological evidence for the emergence
75. Modern Irish Level 2. (2) One hour of lecture and one hour of laboratory per week. Formerly 68. The aim of this course will be to increase fluency and vocabulary in spoken and reading skills. Grammar will be studied in more detail, adding to an understanding of language structure and logic. Selected readings from modern contemporary Irish will be discussed. Students with previous knowledge of the language may take the course after consultation with the instructor. Keefe

76. Modern Welsh Level 2. (2) One hour of lecture and one hour of laboratory per week. Formerly 68. This course is a continuation of Celtic 6 (Beginning Modern Welsh). The students will use Cattrarch (as in Celtic 6) and the accompanying language lab tapes. The course aims at increasing facility in basic grammatical patterns. Students will also begin to read appropriately gradated selections of Modern Welsh prose. Klar

99. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Individual conferences. Must be taken on a passed/not passed basis. Staff

Upper Division Courses

102A. Elementary Breton. (4) Three hours of lecture and one optional hour of laboratory per week. A course which will teach students to read, speak, and write modern literary Breton. We will follow the curriculum established by the only good introductory Breton text in English, which I will supplement with exercises and reading materials. Emphasis will be placed on contemporary literature. Students will have covered most of the grammar of Breton by the end of the course. Sweeter

102B. Advanced Breton. (4) Three hours of lecture and one optional hour of discussion per week. Pre-requisites: 102A. Advanced Reading in Breton. This course is a continuation of Celtic Studies 102A. This course will teach students to speak, read, and write modern literary Breton. It will follow the curriculum established by the only good introductory Breton text in English, which I will supplement with exercises and readings from current Breton publications and contemporary literature. Sweeter

105A. Old and Middle Irish. (4) Three hours of lecture and one hour of discussion per week. Pre-requisites: 5 and 75 or consent of instructor. A detailed introduction to the orthography, phonology, and grammar of Old Irish designed to provide the student with the subsequent capacity to read with comprehension and to translate (with the aid of dictionary or glossary) any edited text in Old Irish or Middle Irish. Keefe

105B. Readings In Old and Middle Irish. (4) Course may be repeated for credit. Three hours of lecture per week. Pre-requisites: Successful completion of Celtic Studies 105A or equivalent. Designed to offer students who have already taken the basic grammar course in Old and Middle Irish (105A) further opportunity to work with important texts written in the period A.D. 700-1200 and to refine their knowledge of the language as well as their grasp of the vernacular tradition as a whole. Texts will include both prose and poetry, and major genres such as epic, legend, and genealogy. Keefe

106A. Medieval Welsh. (2) One hour of lecture and three hours of laboratory per week. Formerly Comparative Literature 113A. Middle Welsh pronunciation, grammar, and vocabulary studied in conjunction with the major prose and poetry texts including the Mabinogi. Course may be taken in conjunction with 118A-118B. Staff

106C. Readings in Medieval Welsh. (4) Three hours of lecture and one hour of laboratory per week. Pre-requisites: 64B or equivalent or consent of instructor. The emphasis in this course is on reading Welsh literary prose and poetry, and on furthering oral skills (pronunciation, vocabulary). There will be grammatical review and augmentation, and the main part of the course will be spent in reading aloud (in Welsh) and translation of plays and poetry chosen from the modern Welsh corpus. Staff

115A. Modern Irish Level 3. (2) One hour of lecture and three hours of laboratory per week. Pre-requisites: 75 and 115A or their equivalents. Formerly 106C. The third course in Modern Irish designed for students who have completed 5 and 75. Continued stress on vocabulary building with intensive conversation drill to activate the learned vocabulary. Idiomatic usage will be reinforced in both oral and written exercises. Class will discuss in Irish writing. The class may be paired with 125A-125B. Staff

115B. Advanced Modern Irish. (2) One hour of lecture and one hour of laboratory per week. Pre-requisites: 75 and 115A or their equivalents. Formerly 106C. This course will teach students to speak, read, and write Modern Irish prose. Students will read a selection of Modern Welsh literature drawn from all genres; poetry, short story, essay, journalism, and novel. There will be a grammatical review and emphasis on vocabulary. Idiomatic usage will be reinforced in both oral and written exercises. Class will discuss in Irish conversation. Staff

116A. Modern Welsh Level 3. (2) One hour of lecture and one hour of laboratory per week. Formerly 76. This course is a continuation of 76. (Modern Welsh Level 2). Review of 76 material, then progressively more advanced grammatical concepts and patterns. Intensive oral drill and practice. More difficult materials, including reading aloud and translations. Students will write short compositions and read short stories and poetry. Idioms and dialect variants will be introduced. By the end of the term, students will have a grasp of all major points of Welsh grammar and usage. Klar

116B. Readings In Modern Welsh. (4) Three hours of lecture and one hour of discussion per week. Formerly 76. Three hours of lecture and one hour of discussion per week. Pre-requisites: 6, 76, and 116A or equivalent. Formerly 106B. Students will read a selection of modern Welsh literature. Staff

118A-118B. Medieval Irish Literature. (4;4) Course may be repeated for credit. Three hours of lecture and one hour of discussion per week. A selective study of major surviving works of medieval Irish poetry and prose, with emphasis on the relationship between what we would call "literature" and the history and politics of medieval Ireland. All works for the course will be read in English, but the course will be coordinated with 105A-105B for those who wish to do some of the readings in the original language. Mella

119A-119B. Welsh and Arthurian Literature of the Middle Ages. (4;4) Course may be repeated for credit as topic varies. Three hours of lecture and one hour of discussion per week. A selective study of major surviving works of Welsh prose and poetry of the Middle Ages with emphasis on the development of the legendary history of King Arthur in Europe. All work will be read in English, but course will be coordinated with 106A-106B for those who wish to do some of the readings in Welsh. (F,SP) Staff

125A-125B. Modern Irish Literature in Translation. (4;4) Course may be repeated for credit as topic varies. Three hours of lecture and one hour of discussion per week. A selective study of key themes in modern Irish literature. Texts will include novels, short stories and poetry and will concentrate on translations of works originally written in Irish. All work will be read in English, but the course will be coordinated with 75 or 115A-115B for those who wish to do some of the reading in Irish. Keefe

126A-126B. Modern Welsh Literature. (4;4) Course may be repeated for credit as topic varies. Three hours of lecture and one hour of discussion per week. A selective study of key themes in modern Welsh literature. Texts will include novels, short stories, poetry and historical works, and will concentrate on translations of works originally written in Welsh. All work will be read in English, but the course will be coordinated with 76 or 116A-116B for those who wish to do some of the reading in Welsh. Klar

129. Modern Celtic Cultures and Folklore. (4) Course may be repeated for credit, under different instructor. Three hours of lecture per week. A comparative introduction to modern Celtic cultures: principally Irish, Welsh, Scottish Gaelic and Breton. The development of the distinctive cultures of the Celtic nations without states from 1500 to the present; an examination of the role of minority cultures and modern languages in larger political cultural entities. Themes topics will vary with instructor, but will include folklore, nationalism and linguistic history from time to time. Klar

138. Irish Literature. (4) Three hours of lecture per week. Formerly English 106A. Gaelic literature 700-1800 (in translation). Study of the prose saga-cycles, satire, classical lyric poetry, and bardic poetry; developing the mythological and traditional background of modern Irish literature. Mella

139. Irish Literature. (4) Three hours of lecture per week. Irish literature 1800 to the present. Tracy

168. Celtic Mythology and Oral Tradition. (4) Three hours of lecture per week. The course will introduce students to the pre-christian beliefs of the Celtic and Indo-European worlds, to the historical narratives in which such beliefs are embedded, and to the methodology of investigating ancient and medieval belief systems. Mella

169. Advanced Readings in Celtic Languages. (4) Course may be repeated for credit with consent of instructor. Three hours of seminar per week. Pre-requisites: Advanced standing; consent of instructor. This course will focus on advanced readings in Celtic languages. Staff

195A-195B. Honors Course. (3;3) Independent study. Prerequisites: Open only to honors seniors in the group major in Celtic Studies. 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) Staff

198. Directed Group Study. (1-4) Course may be repeated for credit. Directed group conferences. Must be taken on a passed/not passed basis. Staff

199. Directed independent study and research. (1-4) Course may be repeated for credit. Individual conferences. Must be taken on a passed/not passed basis. Staff

Recipient of Distinguished Teaching Award
Chemical Engineering
(Colleque of Chemistry)

Department Office: 201 Gilman Hall, 642-2291
Chair: Molecular, Process Enginering

Undergraduate Majors Office: 420 Latimer Hall, 642-0473

Professors:
Alexis T. Bell, Sc.D. Massachusetts Institute of Technology.
Maia M. Denne, Ph.D. University of Minnesota.
J. C. Judson King, Sc.D. Massachusetts Institute of Technology.
Egalynsion:
John C. Bond, Ph.D. University of California at Berkeley.
Electrochemistry, energy conversion, thermodynamics
Senior Professor:
Edward A. Green, P.D. (Emeritus) University of California at Berkeley.
Surfactant and colloid chemistry
Charles W. Tobias, Ph.D. (Emeritus) University of Technical Education.
Polymer microelectronics, rheology, membranes
L. A. Bromley, Ph.D. (Emeritus) University of California at Berkeley.
Surfactant and colloid chemistry
Donald N. Haneon, Ph.D. (Emeritus) University of California at Berkeley.
Surface separation processes, nuclear, conservation
William N. Lyd, Ph.D. (Emeritus) University of California at Berkeley.

Graduate Programs:
Eugene E. Pelton, Ph.D. Pennsylvania State University, Catalysis, reaction engineering, deactivation
Philippa C., Ph.D. University of Technical Education, Engineering, Membranes.
Charles R. Wills, Ph.D. University of Wisconsin, Trichome and transport IChemistry.
Michael C. Williams, Ph.D. Pennsylvania University of Wisconsin, Thermolgy, viscomcstility, polymers, 
Molecular thermodynamics, phase equilibria
A. A. Thoma, Ph.D. Pennsylvania University of California at Berkeley.
Physical chemistry, semiconductor science
Dennis H. Hennig, Ph.D. Massachusetts Institute of Technology.

Assistant Professors:
Ange A. bubb, Ph.D. University of Delaware.
Karen P. Keating, Ph.D. University of Michigan.
Joel A. B., Ph.D. University of California at Berkeley.
Biocatalysts, chemical engineering
Susan J. Miller, Ph.D. Massachusetts Institute of Technology.

Lecturers:
Arnold L. Grossberg, M.S. University of Michigan, Process engineering
Heinz Heineg, Ph.D. University of Basel, Switzerland.
R. M. Neumann, Ph.D. University of California at Berkeley.
Chemical engineering processes
Paul B. Plouffe, Ph.D. University of California at Berkeley.
Biocatalysts, chemical engineering
Frederick H. Walls, M.S. Cornell University, Petroleum refining, process engineering

Chemical Engineering Major

The College of Chemistry offers a major in chemical engineering leading to the B.S. degree. The program is designed for professional work in development, design, and operation of chemical processes and of process equipment. Students with high scholastic attainment are well prepared to enter the professional field. The curriculum is accredited by the Accreditation Board for Engineering and Technology.

The requirements for the B.S. degree are: A total of 128 semester units; Mathematics 1A, 1B, 50A, 50B, 53A, 70A, 70B, Chemistry 1A, 1B (or 4A, 4B); 104A, 112A, 120A, 120B, 125; Chemical Engineering 140, 141, 142, 150A, 150B, 152, 154, 160, 162, 185; Engineering 45; and Electrical Engineering and Computer Sciences 100. Additional technical courses are required to complete one of six disciplinary options within the chemical engineering program. Students must satisfy the subject A, the American History and Institutions, and the American cultures breadth requirements. Nineteen units in English composition, humanities, and social sciences are chosen from a list provided by the College of Chemistry. See the Announcement of the College of Chemistry for additional information about the Chemical Engineering Program.

Intercollege Transfers. Transfer applicants are expected to complete, at a minimum, courses equivalent to Chemistry 121-122, Mathematics 50A-50B, and Physics 7A-7B. If the lower division requirements in chemistry, mathematics, and physics must be completed after transfer, delay in completing the required sequences of upper division courses will result.

Undergraduate Research. Students are encouraged to take individual undergraduate research in collaboration with one of the faculty during their junior or senior year. Lists of projects are available each semester from the undergraduate office.

Double Major Programs with the College of Engineering. Three double major curricula involving the College of Chemistry and Chemistry are offered. These are: (1) Chemical Engineering/Materials Science and Engineering; (2) Chemical Engineering/Nuclear Engineering; and (3) Chemical Engineering/Petroleum Engineering. These courses include the core courses in both departments and require slightly more units than the single major degree in chemical engineering. Details on these curricula can be found in the Announcements of the College of Chemistry and the College of Engineering.

Chemical Engineering Minor

A minor in chemical engineering will be awarded to students who have successfully completed five upper division chemical engineering courses as follows: 140, 141 or 142, 150A, 150B. Students must achieve at least a 2.0 grade point in these courses to qualify for the minor.

Graduate Programs

Students interested in graduate study are invited to write to the Department of Chemical Engineering for information.

Lower Division Courses

24. Freshman Seminars. (1) Course may be repeated for credit as topic varies. One hour of seminar per week. Section 1 to be graded on a letter-grade basis. Section 2 to be graded on a pass/fail basis. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP)

98. Introduction to Research and Study in the College of Chemistry. (1) One hour of seminar per week. Must be taken on an individual basis. Prerequisites: 141 or Chemistry 120B or Chemistry 130A or equivalent. Formerly IDS 124. Properties of real fluids and their mixtures. Phase equilibria and chemical engineering 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 encountered in biotechnology.

140. Introduction to Chemical Process Analysis. (4) Three hours of lecture and/or discussion per week. Prerequisites: 141 or Chemistry 120B or Chemistry 130A or equivalent. Formerly IDS 124. Properties of real fluids and their mixtures. Phase equilibria and chemical engineering 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 encountered in biotechnology.

141. Chemical Engineering Thermodynamics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 140 with grade of C- or higher. Thermodynamic behavior of pure substances and mixtures. Properties of solutions, phase equilibria. Thermodynamic cycles. Chemical equilibrium for homogeneous and heterogeneous systems. Use of computers in performing thermodynamic calculations. (F,SP) Soane, Theodorou.

142. Chemical Kinetics and Reaction Engineering. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 141. Analysis and prediction of rates of chemical conversion in flow and nonflow processes involving homogeneous and heterogeneous systems. (F,SP) Iglesia, Bell.

150A. Transport Processes. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 140 with grade of C- or higher. Transport of matter and energy including diffusion, convection, and mass transfer. Flow in porous media. Flow in ducts, around submerged objects, and in porous media. Flow measurement. Heat conduction and radiation; heat-transfer coefficients. (F,SP) Radke, Mueller.

150B. Transport Processes. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 150A with grade of C- or higher. Principles of heat and mass transfer with application to chemical processes. Diffusion. Convective and mass transfer. Transfer in boundary layers, boundary layer flow and mass transfer. Transport and heat-transfer coefficients; correlations. (F,SP) Cams, Kakabrazy.

152. Separation Processes. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 150B with grade of C- or higher. Principles of equilibrium and transport-controlled separations. Design of staged and continuous separation processes including distillation, absorption, stripping, membranes, etc. Applications to chemical processes. (F,SP) Chalker, McCrory.

154. Chemical Engineering Laboratory. (3) Eight hours of laboratory per week. Prerequisites: 150B; which may be taken concurrently; 145 or demonstration of proficiency or equivalent. Experiments in physical measurements, fluid mechanics, heat and mass transfer, kinetics, and separation processes. Emphasis on investigation of basic relationships important in chemical engineering.
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) Staff

162. Dynamics and Control of Chemical Processes. (3) Two hours of lecture, one hour of discussion, and three hours of laboratory per week. Prerequisites: 150B and Math 50B. Analysis of the dynamic behavior of chemical processes and methods and theories of control. Implementation of control systems in laboratory processes and process simulation. (F,SP) Foss, Keating

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) Clark

170L. Biochemical Engineering Laboratory. (1) Three hours of laboratory per week. Prerequisites: 170 (may be taken concurrently), or consent of instructor. Laboratory study of biochemical culture and enzymatic conversion processes. (F) Clark

171. Transport Phenomena. (3) Three hours of lecture per week. Prerequisites: 150B. Study of momentum, energy, and mass transfer in laminar and turbulent flow. (SP) Radke

173. Particle Systems. (3) Three hours of lecture per week. Prerequisites: 150A. Production and separation of particulate systems in force and flow fields. Dust and mist collection, sedimentation, and coagulation processes. (SP) Gore

174. Chemical Reactor Design and Catalysis. (3) Three hours of laboratory and two hours of lecture per week. Prerequisites: 142 or equivalent. Physical and chemical characterization of catalysts, catalytic kinetics, analysis of reaction systems, reactor design, laboratory experiments in catalyst characterization, combustion, homogeneous kinetics, and reactor performance.


178. Polymer Science and Technology. (3) Three hours of lecture per week; in five of the weeks, one hour lecture will be replaced with a three-hour laboratory. Prerequisites: 150A or equivalent fluid mechanics; one semester of organic chemistry and physics required. Introduction to physical and chemical behavior of organic polymers. Properties of solutions, melts, glasses, elastomers, and crystals. Engineering applications, emphasizing processing technology and applications in polymerization and characterization. (F) Muller

179. Process Technology of Solid-State Materials Devices. (3) Three hours of lecture per week. Prerequisites: Engineering 45; one course in electronics circuits required; senior standing. Chemical processes for the preparation of electronic mate rials, processing, growth, and purification. Thin-film technology. Application of chemical processing to the manufacture of semiconductors and solid-state devices. (SP) Graves

185. Technical Communication for Chemical Engineers. (2) Course may be repeated for credit with consent of instructor. Preparation of written reports and oral presentations in technical English commonly used by chemical engineers. (F,SP) Ploffe

H194. Research for Advanced Undergraduates. (2-3) Course may be repeated for credit. Individual conferences. Prerequisites: Honors and senior standing; a minimum GPA of 3.4 overall at Berkeley. Original research for 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.

196. Special Laboratory Study. (2-3) Course may be repeated for credit. Individual conferences. Prerequisites: Consent of instructor. Special laboratory or computational work under direction of one of the members of the staff. (F,SP) Staff

Graduate Courses

230. Mathematical Methods in Chemical Engineering. (3) Three hours of lecture per week. Prerequisites: Math 50A and 50B or equivalent. Open to seniors with consent of instructor. Mathematical formulation and solution of problems drawn from the fields of heat and mass transfer, transport phenomena, reaction engineering, and process dynamics. (F) Goren

240. Thermodynamics for Chemical Product and Process Design. (3) Three hours of lecture per week, Prerequisites: Math 50A-50B or equivalent. Open to seniors with consent of instructor. Principles of thermodynamic equilibrium and the treatment of problems not amenable to analytic solutions. Application of numerical techniques to chemical engineering calculations with emphasis on computer methods. (F) Graves

244. Kinetics and Reaction Engineering. (3) Three hours of lecture per week. Prerequisites: 230. Open to seniors with consent of instructor. Study of modern kinetic methods for treatment of problems of chemical reaction engineering. Interaction of reaction kinetics with reactor design. Analysis of kinetic models and reactor configurations. (F) Prassnitz

245. Catalysis. (3) Three hours of lecture per week. Prerequisites: 244 or Chemistry 223, or consent of instructor. Adsorption and kinetics of surface reactions; catalyst preparation and characterization; poisoning; selectivity, and empirical activity patterns in catalysis; surface chemistry, catalytic mechanisms and modern experimental techniques in catalytic research; detailed examination of industrial catalytic systems. (SP) Iglesia

250. Transport Processes. (3) Three hours of lecture per week. Prerequisites: 250A or equivalent. Open to seniors with consent of instructor. Adsorption and kinetics of surface reactions; catalyst preparation and characterization; poisoning; selectivity, and empirical activity patterns in catalysis; surface chemistry, catalytic mechanisms and modern experimental techniques in catalytic research; detailed examination of industrial catalytic systems. (SP) Ball

263. Chemical Process Economics and Project Evaluation. (3) Three hours of lecture per week. Prerequisites: 263 or consent of instructor. Study of business principles employed by the chemical and petroleum industry to evaluate the commercial worth of processes using accepted economic, marketing, and managerial factors. Practice is offered through the medium of structured and open-ended projects involving group participation and individual efforts.

275. Processing of Advanced Polymeric Materials. (3) Three hours of lecture per week. Prerequisites: 150A or equivalent. Open to seniors with consent of instructor. Fundamentals of polymer science and engineering. (F) Blaschke

280. Advanced Transport Phenomena. (3) Three hours of lecture per week. Prerequisites: 280. Formulation and rigorous analysis of the laws governing the transport of momentum, heat, and mass, with special emphasis on chemical engineering applications. Detailed examination of the transport phenomena involved in the design and operation of processes which are controlled by treatments of turbulent flow systems and hydrodynamic stability.

295. Special Topics in Chemical Engineering. (3) Three hours of laboratory per week. Prerequisites: 246 or consent of instructor. Application of chemical engineering principles to processes in the fields of biological and chemical materials. Design of systems for cultivation of microorganisms and for the separation and purification of biological products.

250. Transport Processes. (3) Three hours of lecture per week. Prerequisites: 150A, 150B, and 230, or consent of instructor. Study of the transport of mass, heat, and momentum for Newtonian and non-Newtonian fluids; exact solutions of Navier-Stokes equations; creeping flow; laminar boundary layers; turbulence; hydrodynamic stability. (SP) Newman

251. Mass Transfer and Separations. (3) Three hours of lecture per week. Prerequisites: 250, or equivalent. Frames of reference in diffusion, concentrations, and velocities in mixtures, fluxes and forces, diffusion coefficients, multi-component diffusion and heat transfer. Mass transfer at a phase boundary. High rates of mass transfer; mass transfer and chemical reaction. Comparison, evaluation, and selection of methods for enhancing separating mixtures. Approaches for selectivity and capacity, reducing energy consumption, and adapting process configurations to separations needs. (F) Blanch

256. Advanced Transport Phenomena. (3) Three hours of lecture per week. Prerequisites: 263 or equivalent. Study of the laws governing the transport of momentum, heat, and mass, with special emphasis on chemical engineering applications. Detailed examination of the transport phenomena involved in the design and operation of processes which are controlled by treatments of turbulent flow systems and hydrodynamic stability.

257. Processing of Advanced Polymeric Materials. (3) Three hours of lecture per week. Prerequisites: 150A or equivalent. Open to seniors with consent of instructor. Fundamentals of polymer science and engineering. (F) Blaschke

262. Computer Control of Chemical Processes. (3) Three hours of lecture per week. Prerequisites: 172, Math 50A and 50B (linear algebra) or equivalent, or consent of instructor. Synthesis and implementation of digital control systems for chemical processes. Control and feedback systems. Control model and identification, multifaceted and adaptive controls. Applications to distillation, combustion, heat exchange, and flow reactors.

263. Chemical Process Economics and Project Evaluation. (3) Three hours of lecture per week. Prerequisites: 263 or consent of instructor. Study of business principles employed by the chemical and petroleum industry to evaluate the commercial worth of processes using accepted economic, marketing, and managerial factors. Practice is offered through the medium of structured 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; exposure to real-life cases involving the synthesis, evaluation, selection, and optimization of processing alternatives. Qualitative and quantitative studies. Criteria for engineering judgment and evaluation. (SP) Stem

295. Special Topics in Chemical Engineering. (3) Three hours of lecture per week. Prerequisites: Open to properly qualified graduate students. Current and advanced study in chemical engineering, primarily for advanced graduate students.

295B. Electrochemical, Hydrodynamic, and Interfacial Phenomena. (3) Course may be repeated for credit. (SP) Stem

295C. Applied Molecular Theoretical Chemistry for Chemical Engineers. (3) Prerequisites: One of the following: Consent of instructor. An introduction to quantum and statistical mechanical theories and computational techniques, with the specific pur-
pose of applying these approaches to problems of intensely chemical nature. Chemical Engineering has grown from Fock molecular orbital theory, density functional theory, equilibrium ensemble theory, nonequilibrium statistical mechanics, transition state theory, and molecular simulation. Chemical Engineering has grown from Fock molecular orbital theory, density functional theory, equilibrium ensemble theory, nonequilibrium statistical mechanics, transition state theory, and molecular simulation.

295D. Engineering Principles Of Emerging Biotechnologies. (2) Prerequisites: Graduate standing or consent of instructor. This course will emphasize the fundamental principles that underlie several new technologies within chemical engineering topics. These technologies include protein engineering, enzyme and microbe immobilization, drug delivery, membrane processes, biosensors, and mathematical models. State-of-the-art techniques will be examined through review of the current literature.

295J. The Solid State. (2) Course may be repeated for credit. Prerequisites: Open to properly qualified graduate students. 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.

295M. Optical Methods in Chemical Engineering Research. (2) An introduction to quantum and statistical mechanical theories and computational techniques, with applications to problems of interest to Chemical Engineers. Elements of Hartree-Fock molecular orbital theory, density functional theory, equilibrium ensemble theory, nonequilibrium statistical mechanics, transition state theory, and molecular simulations are developed and then applied to a wide range of problems. (F) McMorrow

295C. Chemical Engineering Management. (3) Prerequisites: Graduate standing 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, decision-making, and strategic thinking, and communication skills. Objectives of the course are to provide an understanding (1) of what is expected of a new engineer in Industry, (2) of the viewpoint of management (3) of the skills needed for success. (SP) Grossberg

295R. Spectroscopy for Chemical Engineers. (3) Prerequisites: Graduate standing or consent of instructor. This course will review the quantum mechanical principles of spectroscopy, the interaction of radiation with matter, and the use of various spectroscopic techniques to solve problems in chemical engineering research. (SP) Remirer


296. Special Study for Graduate Students in Chemical Engineering. (1-5) Course may be repeated for credit. Individual conferences must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Special laboratory and theoretical studies. (F, SP)

298. Seminar in Chemical Engineering. (1) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Open to properly qualified graduate students with consent of instructor. Lectures, reports, and research do not count toward credit in chemical engineering. Sections are operated independently and directed toward different topics. (F,SP)

299. Research in Chemical Engineering. (1-12) Course may be repeated for credit. Individual conferences. Sections 1-20 to be graded on a satisfactory/unsatisfactory basis. Sections 21-30 to be graded on a letter-grade basis. Prerequisites: Consent of Instructor. Research. (F,SP)

802. Individual Studies for Graduate Students. (1-8) Course may be repeated for credit. Course does not count toward unit or resistance requirements for doctoral degree. Individual conferences must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing in Ph.D. program. Individual study in consultation with the department for field advice for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. (F,SP)

Professional Courses

300. Professional Preparation: Supervised Teaching of Chemical Engineering. (2) Course may be repeated for credit. Individual conferences and participation in teaching activities. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing in Ph.D. program. In-struct or, consent of instructor. Discussion, problem review and development, guidance of large scale laboratory experiments, course development, supervised practice teaching. (F,SP)

Chemistry (College of Chemistry or College of Letters and Science)

Department Office: 419 Latimer Hall, 642-5882 Chair: (To be announced)

Organic and bioorganic chemistry.

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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. General Chemistry. (4) Students will receive no credit for 1A after taking 4A. Two hours of lecture, one hour of discussion, and four hours of laboratory per week. Prerequisites: High school chemistry recommended. Stoichiometry, ideal and real gases, acid-base and solubility equilibrium, oxidation-reduction reactions, thermochemistry, introduction to thermodynamics, nuclear chemistry and radioactivity, atoms and elements, periodic table. (F,SP) Stacy, Hearst

1B. General Chemistry. (4) Courses 3A and 4B will restrict credit if completed before 1B. Two hours of lecture, one hour of discussion, and four hours of laboratory per week. Prerequisites: For nonmajors, 1A or 5A with a score of 3, 4, or 5 on the Chemistry AP test. For majors, 1A or an equivalent, C or higher. (F,SP) denn ett

Chemistry Major in the College of Letters and Science

Major Requirements

Mathematics: 1A, 1B, and 50A.

Physics: 7A, 7B, 7C.

Chemistry: 1A, 1B, and 5 (or 4A, 4B); 104A, 104B, 112A, 112B or 112H, 120A, 120B, and a choice of one of 105, 108, 125. (For students who wish to be certified in General with emphasis in American Chemical Society, this must be 108 and 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 in the overall University; and (b) be recommended by the major advisor—this is normally based upon passing 113 or 122 with a grade of 3.5 or higher, and obtaining a B+ or higher in at least 3 units of H194. Students interested in the honors program should consult with their major advisor 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.

Chemistry Minor in the College of Chemistry

A minor in chemistry will be awarded to students who have successfully completed one year of organic chemistry (3A or 3B or 112A or 112B or equivalent), one year of physical chemistry taken at Berkeley (120A-120B or 130A-130B), and two additional upper division chemistry courses taken at Berkeley (with the exception of courses numbered 190-199). All of the courses taken for the minor must be taken for a letter grade. Students must achieve at least a 2.0 grade-point average in the courses taken, and must achieve at least a C- in each of the following: upper division courses, courses taken at Berkeley, and organic chemistry courses if taken at another institution and accepted by the College of Chemistry. Students interested in the College of Chemistry must consult with the undergraduate coordinator for each of the following: upper division courses, courses taken at Berkeley, and organic chemistry courses if taken at another institution and accepted by the College of Chemistry. For information, contact the chair of the Department of Chemistry, 420 Latimer Hall.
theoretical and spectroscopic and chromatographic techniques as used in research. This special laboratory section is more intensive and time-consuming than the regular laboratory of 112B and involves greater individuality. It is especially recommended for Chemistry majors. (SP) Hawkins

113. Advanced Organic Chemistry. (3) Three hours of lecture per week. Prerequisites: 112B and 122A. Study of advanced topics of organic chemistry including linear free energy relations, orbital symmetry, spectroscopic structural methods, designed as a preparation for experimental research. (F) Hawkins

120A. Physical Chemistry. (3) Course 130B will restrict credit if completed prior to 120A. Three hours of lecture per week. Prerequisites: 1B or 4B, Math 50A, Physics 7C. Quantum mechanics and spectroscopy of atoms and molecules with application to large molecular systems and solids. (FSP) Allvisatos, Whaley

120B. Physical Chemistry. (3) Courses 130A and 130B. Three hours of lecture per week. Three hours of laboratory per week. prerequisites: 120A with a grade of C- or higher. Thermodynamics, statistical mechanics and kinetics with application to complex chemical systems. (FSP) Allvisatos, Phillips

122. Quantum Mechanics and Spectroscopy. (3) Three hours of lecture per week. Prerequisites: 104B and 203. Postulates and methods of quantum mechanics and group theory applied to molecular structure and spectra. (SP) Chen

125. Physical Chemistry Laboratory. (3) One hour of lecture and five hours of laboratory per week. Prerequisites: 120A with a grade of C- or higher. and 122B (may be taken concurrently) with consent of instructor. Experiments in thermodinamics, kinetics, molecular structure, and general physical chemistry. (FSP) Chen, Porter, Myers, Strauss

130A. Biophysical Chemistry. (3) Courses 104A and 120B will restrict credit if completed prior to 130A. Two hours of lecture and one hour of discussion per week. Prerequisites: 1B or 4B or 3A, and at least one semester course in calculus. Intended for students majoring in the biological sciences. The weekly one-hour discussion is problem solving and the application of calculus in physical biochemistry. Bioenergetics, equilibrium and nonequilibrium states, molecular distributions, active and passive transport, reaction rates and enzymatic reaction mechanisms. (FSP) Tiscon, Bauer, Stevens

130B. Biophysical Chemistry. (3) Courses 120A and 120B will restrict credit if completed prior to 130B. Two hours of lecture and one hour of discussion per week. Prerequisites: 130A or consent of instructor. The weekly one-hour discussion is problem solving and the application of calculus in physical biochemistry. Molecular structure, intermolecular forces and interactions, biomolecular spectroscopy, high-resolution structure determinations. (SP Tiscon)

143. Nuclear Chemistry. (2) Two hours of lecture per week. Prerequisites: 101B, or consent of instructor. Radioactivity, fission, nuclear models and reactions, nuclear processes in nature. Computer methods will be introduced. (F) Moretto

144. Chemical Methods in Nuclear Technology. (3) One and one-half hours of lecture and four and one-half hours of laboratory for freshmen. Prerequisites: 143 or Nuclear Engineering 101. Experimental illustrations of the interrelation between chemical and nuclear science and technology; fission process, chemistry of fission products, effects of nuclear radiation; application of radioactivity to study of chemical problems; neutron activation analysis. Also listed as IDS 145 and Nuclear Engineering 106. (SP)

192. Individual Study for Advanced Undergraduates. (1-3) Course may be repeated for credit. Individual

...
The Chicano Studies major offers an interdisciplinary curriculum 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 the increasing contributions of Mexican Americans to society, the Chicano Studies major curriculum includes the study of particular aspects of Chicano 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 interrelationships in the historical background, cultural patterns, and artistic expression of the Chicano community in order to acquire a well-rounded, in-depth understanding of the contemporary interface between Chicano 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. Throughout the interdisciplinary nature of our curriculum, the major is aimed at preparing students for incorporation into the world of work and for a wide range of advanced 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 regarding 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 Students

(for College of Letters and Science breadth 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, Chicano 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 adviser).

Upper Division.
2. Completion of five additional upper division courses in Chicano Studies to include: (a) two courses from 141, 142, 143, 150A, 150B, or 161; (b) two courses from 145, 155, 170, 172, 174, or 176; (c) one elective. It is recommended that majors take at least one upper division Chicano Studies course in Spanish.
3. One course in Ethnic Studies.
4. Four units of senior thesis work will be optional for all majors: 195.

Honors Program. The Chicano Studies Program offers an Honors Program with special 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 adviser in 3410 Dwinelle.

The Minor in Chicano Studies

Required courses: Five upper division courses.
1. Chicano Studies 101. (2) One course from 141, 142, 143, 150A, 150B, or 161. (3) One course from 145, 155, 170, 172, 174, or 176. (4) Two Chicano Studies upper division electives.

Lower Division Courses

1A. English Reading and Composition for Native Speakers of Spanish. (4) 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,SP) Chabrén

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 study of the research paper form of expository discourse. (F,SP) Chabrén

5. Elementary Spanish Language and Latin American Culture. (4) Four hours of lecture per week. Prerequisites: Spanish 1 or two years of high school Spanish. Continuation of Spanish 1 in the area of grammar. Special emphasis on increasing vocabulary and developing functional fluency in understanding, speaking, reading, and writing Spanish. Focus on conversational practice of everyday situations; supplemented by language laboratory work. Further study and discussion of different aspects of Latin American culture. (F,SP) Parra

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 effectively in Spanish through an emphasis on class discussions, weekly compositions, in-class 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 research topics. (F,SP) Parra

6B. Chicano Spanish. (4) Four hours of lecture per week. Prerequisite: 6A. To expand upon the material and concepts covered in 6A. This course is designed to introduce the Chicano student to representative Spanish authors and to critical analyses of a variety of their writings. (F,SP) Parra

20. Introduction to Chicano Culture. (4) Three hours of lecture per week. An introduction to the cultural aspects of Chicano life. Key themes are the symbols and cultural norms created by the historical interaction between Chicanos and American society as expressed in literature, art, music, and folklore. Attention will also be given to change and continuity in Chicano cultural norms on the basis of historical events. (SP) Melville

30. Introduction to Mexican and Chicano Art History. (3) Three hours of lecture per week. An introductory course surveying the Mesoamerican art, the Mexican colonial period, the mural movement, and modern Chicano art. (SP) Alarcón

40. Introduction to Chicano Literature in English. (4) Four hours of lecture per week. The course will introduce students to modern Chicano literature written in English, and will provide necessary background for understanding more specialized courses in the area. (SP) Alarcón
101. Paradigms in Chicano Studies. (4) Three hours of lecture per week. Prerequisites: majors and minors only. A critical assessment of paradigms and intellectual traditions in Chicano Studies. (SP) Curry

135. The U.S. Latino Experience as Seen through Film. (4) Three hours of lecture and one 2-hour laboratory per week. Prerequisites: Sophomore standing. A study of the experience of Latinos in the United States as reflected in the medium of film. The course includes documentary and fiction films dealing with historical and contemporary events. (SP) Barrera

141. Chicana/o Feminist Writers and Discourse. (4) Four hours of lecture per week. Prerequisites: 40. A critical and theoretical analysis of contemporary Chicana and Chicano Feminist Discourse. (F) Alarcón

144. Major Chicano Writers. (4) Three hours of lecture per week. Prerequisites: 40. Critical analysis of the works of major Chicano playwrights, poets and fiction writers. (F) Alarcón

145. Chicano and Latin American Literature. (3) Three hours of lecture per week. Prerequisites: 40 recommended. A study of the relationships and parallels as well as differences between Chicano and Latin American literature. Emphasis on the literature of protest as a criticism of the social integration, and responses to structural barriers of: a) class, racial/ethnic and gender identity; b) political, and economic arrangements related to the impact of these policies in Latin America. (F) Manz

150A. History of the Southwest: Spanish and Mexican Period. (4) Three hours of lecture per week. Prerequisites: 50 recommended. The role of people of Mexican descent in the Southwest from 1800 to 1880. (SP) Saragosa

150B. History of the Southwest: Mexican - United States War to Present. (4) Three hours of lecture per week. Prerequisites: 50 and/or 150A recommended. The relationship between people of Mexican descent and American society from 1880 to the present. (SP) Saragosa

155. Chicana/o Families. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 50 and 150A recommended. Course provides an overview of Chicano/o family structures, using historical, Chicano and feminist perspectives for analysis of familial patterns. Special attention is given to the use of traditional gender roles and household gender relations, extended families, and Chicana/o communities. The relationship of Chicana/o families to economic production, immigration, cultural organizations, and the roles of women are central to this course. (SP) Curry

161. Central American Peoples and Cultures. (4) Three hours of lecture per week. A comparative survey of the peoples and cultures of the seven countries of the Central American latitudes from a historical and contemporary perspective. (F) Manz

162. The U.S. Role in Central America. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 50 recommended. An examination of the political role played by the United States in Central America from the 19th Century to the present. The focus will be on trends in U.S. policy, including an assessment of current policy alternatives in Nicaragua, El Salvador, Guatemala, Honduras, and the impact of those policies in Latinos in the United States. (F) Manz

170. Chicanos and Political Change. (4) Three hours of lecture and one hour of discussion per week. A critical examination of Mexican American social and political movements, organizations, ideologies, and leadership in the context of the historical processes of political change in the United States. (SP) Trujillo

172. Chicanos and the Educational System. (4) Three hours of lecture per week. Prerequisites: 70 recommended. An examination of the historical and contemporary relationship between the educational system and the Mexican 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 Chicanos; the different historical contexts, including alternative schools, bilingual education, school segregation, and higher education. (F) Hernández

174. Chicanos, Law, and Criminal Justice. (4) Three hours of lecture per week. Prerequisites: 70 recommended. An examination of the development and function of the health care delivery system in the United States, and its effects in the Chicano community; response to these institutions by Chicanos. (F) Trujillo

176. Chicanos and Health Care. (3) Three hours of lecture per week. Prerequisites: 70 recommended. Relationship of the health care delivery system of the United States to the Chicano community. To include an examination and understanding of the concept of mental health as defined by Chicanos. Analysis of program alternatives and the Chicano response to health care problems and issues. (SP) Trujillo

180. Topics in Chicano Studies. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. Designed primarily to permit instructors to deal with topics with which they are especially concerned; usually more restricted than the subject matter of a regular lecture course. (SP) Trujillo

190. Advanced Seminar in Chicano Studies. (3) Course may be repeated for credit. Three hours of 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. (SP)

195. Senior Thesis. (4) By arrangement. Prerequisites: Consent of instructor. Writing of a thesis under the direction of the member(s) of the faculty. (F,SP)

197. Field Work in Chicano Studies. (1-3) Course may be repeated for credit. Individual arrangements. Must be taken on a passed/not passed basis. Prerequisites: Upper division standing; consent of instructor. Directed field study Intensively craft in Chicano literature, issues and problems encountered by Chicanos writers and the role of Chicano Studies in Chicano Studies. Regular meetings with faculty sponsor and written reports required. (F,SP)

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Individual arrangements. Must be taken on a passed/not passed basis. 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)

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City and Regional Planning
(Graduate Program in City and Regional Planning)

Department Office: 228 Wurster Hall, 642-4356
Chair: Allan B. Jacob, M.C.P.

Professors:
- Edward Blakely, Ed.D. University of California at Los Angeles. Local economic development, urban development, economic development, biotechnology
- Stephen C. Cohen, Ph.D. London School of Economics. Metropolitan regional development
- Roger Montgomery, M.Arch. Harvard University. Community development
- Michael S. Vlahos, Ph.D. Massachusetts Institute of Technology. Community development
- Edward Dowall, M.U.R.P., Ph.D. University of Colorado, Boulder. Environmental science
- David E. Dowall, M.U.R.P., Ph.D. University of Colorado, Boulder. Environmental science
- Ira Michael Heyman, LLB. Yale Law School. Land use planning
- Leonard J. Duhl, M.D. Albany Medical College. Social policy and programs
- Jon Michael Heiman, LL.B. Yale Law School. Land use planning
- Austin E. Jones, Ph.D. Massachusetts Institute of Technology. Social policy analysis
- Allan B. Jacob, M.C.P. University of Pennsylvania. Urban design and planning
- Roger Montgomery, M.Arch. Harvard University. Community development
- Michael Southworth, Ph.D. Massachusetts Institute of Technology. Urban design, economic development
- Michael B. Tetz, Ph.D. University of Pennsylvania. Urban economics and housing
- Irina Tinker, Ph.D. London School of Economics. Economic development
- David L. Foley, Ph.D. University of California, Los Angeles. Urban regional development
- Peter Hall, Ph.D. (Emeritus) Cambridge University. Metropolitan planning
- Richard L. Molot, Ph.D. (Emeritus) University of California at Los Angeles. Urban development
- Corwin R. Modica, B.S. (Emeritus) University of California at Berkeley. Urban and land use planning
Undergraduate Course Work. There is no undergraduate major offered in the Department of City and Regional Planning. However, a city and regional planning minor is open to all undergraduate majors. The University recognizes this coherently course work by recording the completed minor on the student’s official transcript. Students may obtain information and further information from the College of Environmental Design Undergraduate Dean’s Office, 234 Wurster Hall.

Lower Division Courses

24. Freshman Seminars. (1) Course may be repeated for credit as topic varies. One hour of seminar per week. Sections 1-2 to be graded on a letter-grade basis. Sections 3-4 to be graded on a passed/not passed basis. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from semester to semester. (F,SP)

30. Freshman/Sophomore Seminar. (2-4) Course may be repeated for credit. One to three hours of lecture/discussion per week. Must be taken on a passed/not passed basis. Group studies developed to meet specific needs of students. Enrollment restricted by regulations in the General Catalog. (F,SP) Staff

Upper Division Courses

110. Introduction to City Planning. (3) Three hours of lecture/discussion per week. Prerequisites: Open to majors in all fields. Survey of city planning as it has evolved in the United States since 1800 in response to physical, social, and economic problems; major concepts and procedures used by city planners and local governments to improve the urban environment. (F,SP) Collignon, Christensen

111. Introduction to Housing: An International Survey. (3) Three hours of lecture/discussion per week. Prerequisites: Open to housing majors and to students of the College of Environmental Design as the content of instructor; open to majors in all fields. Housing problems, housing policy, and housing as a field of urban planning practice. Emphasis on critical international issues in the Third World and the United States. (F,SP) Dowall, Alyassad

112A. The Idea of Planning. (3) Three hours of lecture/discussion per week. Prerequisites: Open to all majors in all fields. Formerly 112. Planning is often called for in response to societal crises; thus, nature and critiques of the planning idea, appropriateness of planning, and critical aspects of city planning, and future directions of the planning idea are examined. (F) Cohen

112B. Planning and the Market in United States. (4) Hours of lecture/discussion per week. Prerequisites: 112A or equivalent economic course. Formerly 113B. Survey of the economic aspects of planning in the U.S. from 19th century to present, tracing changing theoretical justifications for government intervention in the economy and highlighting the distinctive aspects of the U.S. experience. (SP) Seinhein

113A. Economic Analysis for Planning. (3) Three hours of lecture/discussion per week. Prerequisites: 112A or equivalent equivalent. Open to all majors in all fields. Formerly 260. Introduction to economic concepts and thinking as used in planning. Both micro- and macro-economic theory are reviewed and critiqued. (F) Teitz

113B. Community and Economic Development. (3) Three hours of lecture/discussion per week. Prerequisites: 112A or equivalent equivalent. Open to all majors in all fields. Formerly 191D. Introduction to political, economic and social issues involved in theory and practice of community economic development. Focus on national economic and social policies, role of local community economic development corporations (CCDCs), resolution of conflicts between private-sector profitability and public sector (community) accountability through critical use of the planning process.

115. Urbanization in Developing Countries. (3) Three hours of lecture/discussion per week. Prerequisites: Upper division standing; 110 or consent of instructor. Examination of how the physical development of cities and urban programs have shaped the lives and social roles of all minority groups and women, and vice-versa. American and Mediterranean alternative future planning policies that are equitable will be explored.

118. The Urban Community. (3) Three hours of lecture per week. Prerequisites: Upper division standing or consent of instructor. Formerly 260. This course will look at the idea of community and the role of the citizen and the city, and at the dynamics of neighborhood formation and politics addressing particularly how these play a central role in planning at the local level. Topics include urban sociology, neighborhood, community, neighborhoods and communities, the political economy of neighborhood and planning and policy for neighborhoods in the city. (SP) Innes

197. Field Studies. (1-3) Course may be repeated for credit. Three hours of field work per week per unit. Must be taken on a passed/not passed basis. Group studies developed to meet specific needs of students. Enrollment restricted by regulations in the General Catalog. (F,SP) Staff

198. Special Group Study. (1-3) Course may be repeated for credit. Three hours of lecture/discussion per week. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor. Supervised experiences in the study of off-campus organizations relevant to specific aspects of city planning. Regular individual meetings with faculty sponsor and written report is required. (F,SP) Staff

199. Special Study for Advanced Undergraduates. (1-3) Course may be repeated for credit. Three hours of lecture/discussion per week. Must be taken on a passed/not passed basis. Group studies developed to meet specific needs of students. Enrollment restricted by regulations in the General Catalog. (F,SP) Staff

Graduate Courses

200. History of City Planning. (3) Three hours of lecture/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) Staff

201. The Urban Planning Process. (1-3) Three hours of lecture/discussion per week. Prerequisites: Entry level majors and students. An advanced survey of City and Regional Planning addressing history of planning process and contemporary practice. The course includes a series of lectures, discussion sessions and problem-solving exercises. (F) Innes
204. Analytic and Research Methods for Planners. Course may be repeated for credit as modules vary. Formerly 204A-204B, 205 and 264. A series of course modules on research design strategies and analytic methods for planners. Each module will run for all or a segment of a semester and will cover a cluster of contemporary terms and qualities of services and facilities. Core-required course. (SP) Staff

205. Planning and the Legal Process. (3) Three hours of lecture/discussion per week. Introduction to the American legal process and legal framework within which public policy and planning problems are addressed. The course stresses legal methodology, the development of legal thinking on the basis of a legal 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. (SP) Heyman

206. City Planning Legislation and Governmental Organization. (3) Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. Duties and role of the physical planning agency in municipal and metropolitan government; major alternative definitions of city planning; relationship of long-range physical plan to urban development agencies; significance of city planning legislation in reorganization of local government. (F) Christiens

207. Management of Change and Planning. (3) 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 and risk, and impacts of organizational change on the planning process. (SP) Bossett

210. Introduction to Studio Laboratory: Plan Preparation. (4) Eight hours of studio and two hours of seminar per week. Prerequisites: City Planning students only. Studio laboratory experience in urban plan preparation, including the use of graphic communication techniques appropriate to city planning and involving individual and collaborative student-group efforts in formulating planning policy and programs for an urban area. (SP) Bosssett

211. Urban Land Economics. (3) Three hours of lecture/discussion per week. Prerequisites: 113A or Economics 100A or equivalent. Use of microeconomics as its platform, course explores the process and pattern of land use decisions. Topics: price perspectives; the neighborhood, the city, and the metropolis. The approach blends real estate, descriptive urban geography, and urban history with economics. (F) Dowall

212. Land Use Controls. (3) Three hours of lecture/discussion per week. Focus on the theory, practice, and impacts of urban land use control. Emphasis on understanding regulatory techniques such as zone squared and linear regression; (iii) advanced multivariate techniques such as multiple regression, logistic analysis, and modeling. (F) Cervero, Landis

213. Transportation and Land Use Planning. (3) Three hours of lecture/discussion per week. Prerequisites: 113A or Economics 100A or equivalent. Examination of the interactions between transportation and land use systems; historical perspectives on transportation and land use; demand estimation; evaluation of system performance; location theory; models of transportation and urban structure; empirical evidence of transportation-land use impacts; case study examinations. (F) Cervero

214. Urban and Regional Physical Infrastructure. (3) Three hours of lecture/seminar per week. Survey of basic knowledge and technology of physical infrastructure systems: transportation, water supply, wastewater, storm water, solid waste management, energy systems, educational facilities, and public facilities. Environmental and energy impacts of infrastructure development; centralized vs. decentralized systems; case studies. (F) Duane

215. Planning and Analysis for Urban Development Projects. (3) Three hours of lecture/discussion per week. Prerequisites: Economics 100A or equivalent. Using case studies, this course acquaints students with the techniques of project feasibility; analysis of project proposals and overall project competitiveness assessment. Case studies will be based on a variety of public and private projects, in central cities and suburban locations. (SP) Landis, Dowall

216. Studio In Project Development. (4) Two hours of lecture/seminar and four hours of studio per week. Prerequisites: 210 or 215 or 212. Formerly 218B. Studio experience in analysis, policy advising, and project design or general plan preparation for urban communities undergoing development. (F) Landis, Deakin

217. Urban Transportation Policy and Planning. (3) Three hours of lecture/persem and four hours of studio per week. Prerequisites: 213 or consent of instructor. Policy issues and dilemmas in urban transportation planning; examination of current transportation topics of policy import, e.g., road pricing, transit, management strategies and their impact on energy and environmental qualities; transportation needs of the elderly and disabled; transit performance and productivity trends; para-transport and innovative services. (SP) Deakin

218. Studio in Community Development. (4) Two hours of lecture/seminar and four hours of studio per week. Prerequisite: 213. Three hours of seminar per week. Prerequisites: 206, 212, and at least one studio. Seminar exploring some current uses and applications of planning theory and California communities, with topics varying from year to year. Efforts to develop remedies are made; student papers are required. (SP) Staff

219. Advanced Seminar on Land Use and General Plan Topics. (3) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: 206, 212, and at least one studio. Seminar exploring some current uses and applications of planning theory and California communities, with topics varying from year to year. Efforts to develop remedies are made; student papers are required. (SP) Staff

220. The Urban and Regional Economy. (3) Three hours of lecture/discussion per week. Prerequisites: 113A or Economics 100A-100B or equivalent. Analysis of the urban, metropolitan, and regional economy. Course focuses on economic and social factors for planning. Economic base and other macro models; impact analysis and projection of changing labor force and industrial structure; economic-demographic interaction; issues in growth, income distribution, planning controls; interregional growth and population distribution issues. (F) Saxenian

221. Rural Area and Small Town Planning and Policy. (3) Three hours of seminar per week and one field session. Prerequisites: Graduate standing. This seminar focuses on the role of rural places and small towns in the 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. Economic Development Planning. (3) Three hours of lecture/discussion per week. Prerequisites: Economics 110A or 200A; 204A-204B or Statistics 131 or equivalent. Strategy and tools for developing employment, investment, infrastructure, and economic growth. Organization of economic development activities. Program and project analysis. (SP) Teitz

223. Location Theory and Spatial Interaction Models. (2) Two hours of lecture per week. Prerequisites: Economics 100A or equivalent; calculus. Density and interpersonal approaches to analysis of spatial distribution; ecological descriptive theories and economic behavioral theories of location and spatial structure. Introduction to static and growth models of residential and industrial location; governmental influences on spatial distribution. (SP) Teitz

224. Advanced Methods of Urban and Regional Analysis. (1-3) Three hours of lecture per week. Prerequisites: 204A-204B; 220 or 231 or 215. Covers regional accounting, economic base analysis, shift share techniques, input-output analysis, linear program approaches, econometric models, and field-proven behavioral and econometric models. (SP) Saxenian

225. Studies In Regional Growth and Development. (3) Three hours of seminar per week. Prerequisites: 220. Intermediate to advanced course focusing on theory and empirical evidence for regional growth and development, using reading and discussion, requiring

226. City and Regional Planning
short paper applying material to a region of the student's choice. (F) Saxenian

228. Research Workshop on Metropolitan Regional Planning. (4) Four hours of studio and two seminars 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, methods, and approaches drawn through student/faculty research papers and class discussion. Designed primarily for Ph.D. students and master's students writing professional reports and theses.

230. Housing Markets and Planning. (3) Three hours of seminar per week. Prerequisites: 113A or an introductory course in micro-economics. Theory 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.

231. Housing Finance and Policy. (3) Three hours of lecture/discussion per week. Prerequisites: 230. Formerly 210 and 243. Survey of housing policy and programs at the local, state, and federal levels, emphasizing financial aspects, such as institutions of housing finance. Topics covered include mortgage structuring, operations of financial intermediaries, forms of ownership, federal subsidy programs, tax policies, and the use of tax-exempt mortgage revenue bonds.

235. City and Regional Planning. (3) Three hours of seminar per week. Prerequisites: 230, 231, or consent of instructor. Discussion, readings, field work, and directed research on housing policies, their history, formulation, implementation, and evaluation.

240. Theories of Urban Form and Design. (3) Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. The history and 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 each period will be developed and applied to case studies of urban design and other environmental plans.

246. Field Observation and Diagnoses of Urban Environment. (2) Fours of seminar/discussion and field work per week. Prerequisites: Graduate student in Environmental Design. The seminars will review the limitations and possibilities of observations for city planning. The field trips, on foot, will look at, measure, record and learn from a variety of urban environments, including physical, social and economic conditions and trends. (F) Jacobs

247. The Educative City. (1-3) Three hours of lecture/discussion per week per unit. Prerequisites: Consent of instructor. The potential role of the urban physical environment in learning and development. Topics include the processes of environmental learning, characteristics of educative environments, techniques for promoting environmental learning, and several case studies. See Departments' posted full course descriptions for clarification of exact coursework required for each unit value. (SP) Southworth

248. Advanced Studio: Urban Design/Environmental Planning. (4) Two hours of seminar and four hours of studio per week. Prerequisites: 210 or 240. Advanced problems in urban design and land use and environmental planning. (SP) Jacobs

250. Planning and Governing. (3) Three hours of lecture/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 inter-

252. Theory and Practice of Implementation for Planners. (3) Three hours of lecture/discussion per week. Planning and implementation within the context of governmental institutions; systems for choice making, the roles of managerial behavior and capacity for change, and processes of intergovernmental relations.

253. Political Economy and Planning. (3) Three hours of seminar per week. A seminar for planning students investigating the interaction of political-economic forces 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) Cohen

259. Advanced Topics in Planning Theory. (3) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: 230, 232, 206 or equivalent; 252 or equivalent. Selected advanced topics in planning theory. (F) Innes

260. Comparative Analysis of Urban Policies. (3) Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. Standing description, analysis, and evaluation of urban policies, including those of social and spatial contexts, with references to state-planned societies. Main topics: national and local public policies in regional development, housing, transportation, urban renewal, housing, zoning, competition, and centralized urban management. (F) Castells

263. Urban Services Planning and Financing. (3) Three hours of lecture per week. Formerly 263A. A survey of planning issues in urban services, with special attention to policy and technology alternatives, municipal budgets, revenue sharing, and decentralized urban management. (F) Castells

266. Program Planning and Evaluation. (4) Four hours of lecture/discussion per week. Prerequisites: 220; 204, 282, or 252, 214, 230, 220 or equivalent. Formerly 266A and 247. Techniques and process of designing, simulating, and evaluating alternative sequences of actions to achieve objectives. Examination of techniques and methods of 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) Collignon

268. Community Development Theory and Practice. (4) Four hours of lecture/discussion per week. Prerequisites: 210, or 260, or 230, or 206. Basic theories and methods of community economic and social development. The course will examine neighborhood/community analysis as well as social change strategies. Requires a substantial amount of field work in local neighborhoods.

269. Seminar in Social Policy and Urban Services. (3) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: 252 or 239 or equivalent 249A-249B 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.

270. Regional and Urban Development Strategies in Third World Countries. (3) Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. Topics to be announced at the beginning of each semester. (F,SP) Castells, Cohen

271. Advanced Urban Planning in Third World Countries. (3) Three hours of lecture/discussion per week. Prerequisites: 203, 270 or equivalent. A course to provide students with a practical understanding of the ways that international and bilateral development assistance, both governmental and non-governmental, affect the function. Actual development projects will be analyzed to see how agencies identify, design, implement, and evaluate various types of projects. For context, the course begins with a critique of major development strategies and their operational and societal focus, and their effectiveness. (SP Dowall)

272. Third World Urban Development Issues and Policy Options. (3) Three hours of lecture and discussion per week. Prerequisites: Consent of instructor. Prior coursework and/or experience in third world planning required. Formerly 263B. This course examines urban development problems and policy responses in a variety of cities throughout the developing world; including housing delivery, urban infrastructure, economic productivity and environment quality. Policy responses of international agencies, national and local governments, and parastatal organizations will be assessed. Students will be required to write and present a case study paper.

273. Introductory Graphics. (1.5) Three hours of studio/discussion per week. Prerequisites: City Planning students must consent of instructor. This is an introduction to graphics for planners having no design background; nor expecting to become urban designers. Half-course.

274. Topics in City and Metropolitan Planning. (1-3) 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 urban and metropolitan planning with emphasis on implications for planning practice and urban policy formation. In some semesters, optional 5-week, 1-unit modules may be offered, taking advantage of guest visitors. Check Department for modules at start of semester. (SP) Cohen

275. Supervised Research in City and Regional Planning. (1-2) Course may be repeated for credit. Regular meeting to be arranged with faculty sponsor. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing in department and consent of adviser and sponsor. Supervised research on research plan in an urban or regional planning. Any combination of 295, 297 courses may be taken for a total of 6 units maximum towards the M.C.P. degree. (F,SP)

276. Supervised Field Study in City and Regional Planning. (1-2) Course may be repeated for credit. Regular meeting to be arranged with faculty sponsor. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing in department and consent of adviser and sponsor. Supervised experience related to specific aspects of practice in city or regional planning. Any combination of 295, 297 courses may be taken for a total of 6 units maximum toward the M.C.P. degree. A maximum of 3 units may be used for degree requirements. (F,SP)

278. Group Studies. (1-3) Course may be repeated for credit. One to three hours of independent study per week. Sections A-L to be graded on a letter-grade basis. Sections M-Z to be graded on a satisfactory/unsatisfactory basis. Section C to be graded on an In-Progress basis only. Prerequisites: Consent of instructor. Topics to be announced at beginning of each semester. No more than 3 units may be taken in one section. (F,SP)

299. Individual Study or Research. (1-12) Course may be repeated for credit. Regular meeting to be arranged with faculty sponsor or consent of instructor and graduate standing. Individual study or research program; must be worked out with instructor in advance of signing up for credits. Maximum number of

* On leave, spring
* On leave, fall
* Recalled to active service
* Recipient of Distinguished Teaching Award
Civil Engineering (College of Engineering)

Department Office: 760 Davis Hall, 642-3261
Chair: Keith C. Crandall, Ph.D. (until May 31, 1995; afterward, to be announced)

Professors:
David B. Ashley, Ph.D. Stanford University. Risk analysis and management
Robert G. Bermudez, Ph.D. University of Florida. Offshore and coastal structures, ocean and coastal engineering
Arik I. Choppa, Ph.D. (Honors, Dorothy and Katherine Johnson Professor) University of California at Berkeley. Dynamics of structures, earthquake engineering
Carlos Daganzo, Ph.D. University of Michigan. Transportation activities
Armen Der Kugel, Ph.D. University of Illinois. Structural risk, reliability analysis
Richard E. Goodwine, Ph.D. University of California at Berkeley. Geotechnical engineering, rock mechanics
Alexander J. Gorniak, Ph.D. University of Dundee, Scotland. Ecology of aquatic systems
David Jenks, Ph.D. University of Durham, England. Water, wastewater chemistry, biological waste treatment
Adolfo Kastanis, Ph.D. (Director, Institute of Transportation Studies) University of California at Berkeley. Transportation, air transport engineering
James M. Kelly, Ph.D. Stanford University. Structural mechanics
Jacob Lubliner, Ph.D. Columbia University. Mechanics of solids
Stephen A. Martin, Ph.D. (Byron and Elvia Nishkan Professor of Civil Engineering) University of California at Berkeley. Structural behavior, earthquake engineering
Jack P. McHale, Ph.D. (Director, Earthquake Engineering Research Center) University of California at Berkeley. Transportation, air transport engineering

Instructor:
S. F. Spera, Ph.D. (Byrce W. Carson Professor of Engineering) 1988-95 University of Illinois. Mechanics of solids, optics
Graham H. Powell, Ph.D. University of Cambridge, NZ. Computational mechanics
Raymond B. Seed, Ph.D. University of California at Berkeley. Geotechnical engineering, soil mechanics
Huo D. Shih, Ph.D. University of California at Berkeley. Fluids hydraulics, sedimentation, floods, water resources
Nicolota Silber, Ph.D. University of California at Berkeley. Geotechnical engineering, engineering geology, groundwater, geomechanics
Ronald J. Sobey, Ph.D. Imperial College, London. Coastal, estuarine, and wetlands hydraulics
William L. Taylor, Ph.D. (Professor and Margaret Lin Professor of Engineering) University of California at Berkeley. Transportation, air transport engineering

Graduate Courses

IDS 223, Citizen Involvement in the City Planning Process. (3) Students will not receive credit for IDS 223 after taking City and Regional Planning 270. Interdepartmental Studies 208 Fall 1990, and Interdepartmental Studies 209 Fall 1991. Three hours of lecture/seminar per week. Examinations of the role of citizens and citizens 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. Sponsoring departments: City and Regional Planning and Landscape Architecture. (F) Blakely, Hester

IDS 233, Environmental Law and Resource Management. (3) Three hours of seminar per week. Prerequisites: Consent of Instructor. Formerly Landscape Architecture 233. 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, common law, administrative law, environmental impact assessment, permitting systems for development control, pollution control, natural resource planning law. Sponsoring departments: Landscape Architecture, and City and Regional Planning. (F) Twiss, Heyman

IDS 241, Research Methods in Environmental Design. (3) Two hours of seminar and three hours of laboratory per week. The components, structure, and management of the earth environment. Environmental problems, attitudes, and criteria. Environmental survey, analysis, and interview techniques. Methods of assessing environmental quality. Environmental simulation, sponsoring departments: City and Regional Planning and Landscape Architecture. (F) Besselmann

IDS 248, Urban Design in Planning. (3) Three hours of seminar per week. Prerequisites: Consent of Instructor. This seminar will focus on urban design in the planning process, the role of environmental surveys, methods of community involvement, problem identification, goal formulation and alternatives generation, environmental media and presentation, design guidelines and review, environmental evaluation and impact assessment. Case studies. Sponsoring departments: City and Regional Planning and Landscape Architecture. (SP) Jacobo

Civil engineering is the planning, analysis, design, and construction of structures such as bridges, buildings, water systems, and other systems that are necessary to support human activity. Civil engineers work in a variety of fields, including transportation, water supply, and waste management. The objective of the program at Berkeley is to provide the needed background for students who wish to pursue civil engineering as a profession and for students who wish to engage in teaching and research. The program is based on the concept that civil engineers must be well grounded in the sciences, broadly educated in humanistic and social studies, cognizant of economic factors, skilled in computer technology and, knowledgeable about the broad principles that underlie the practice of the program. The students either pursue a general civil engineering curriculum or emphasize one of the areas of specialization described below.

The four-year undergraduate curriculum leading to the B.S. degree provides an education that is sufficiently comprehensive for students who wish to embark on a professional career directly after graduation. The curriculum provides a basis of new developments in civil engineering practice. The program also serves as preparation for graduate study in any of the specialized branches of civil engineering.

Civil engineering includes the following major areas of professional specialization:

Construction engineering deals with the management of the contractor's process to plan, bid, and execute construction projects. It is concerned with the fundamental principles that underlie planning, organizing, financing, managing, and operating construction enterprises with estimating the probable performance of construction organizations under specific conditions.

Environmental engineering involves the engineering control of the environment. Primary emphasis is given to the scientific and engineering principles of water quality management (municipal, industrial, and agricultural), environmental contamination, air pollution control, and solid and hazardous waste management.

Geotechnical engineering is concerned with planning, design, and construction on, in, or with soil

Mostafa A. Foda, Sc.D. (Vice Chair) Massachusetts Institute of Technology. Coastal and offshore engineering
Stawomir W. Hernandez, Ph.D. University of Toronto. Biological wastewater treatment
James R. Hunt, Ph.D. California Institute of Technology. Contaminant transport in porous media
C. William Ibbot, Ph.D. University of California at Berkeley. Expert systems, decision support
Paulo Monteiro, Ph.D. University of California at Berkeley. Concrete behavior, structural materials
William N. Mazzotti, Ph.D. California Institute of Technology. Air quality engineering

Assistant Professors:
Lisa Alvarez-Cohen, Ph.D. Stanford University. Hazardous waste treatment processes, groundwater and contaminant aquifer remediation
Jessica D. Bechtel, Ph.D. University of California at Berkeley. Earthquake engineering, geotechnical engineering, numerical modeling of geotechnical systems
Laura A. Denisset, Ph.D. Massachusetts Institute of Technology. Construction automation, human factors
Maury Feld, Ph.D. University of California at Berkeley. Theoretical micromechanics of materials
Mark J. Hanlon, Ph.D. Stanford University at Berkeley. Air transportation, transportation information systems, transportation economics
Robert A. Hanley, Ph.D. (Adjunct) California Institute of Technology. Air quality, environmental control strategies
Noren E. Hall, Ph.D. Tel-Aviv University. Chemical hydrology, stochastic processes, contaminant transport
Christopher R. Toth, Ph.D. University of California at Berkeley. Structural and computer-aided engineering
Feng Wen, Ph.D. Washington State University. Turbulent mixing processes, stratified flows

Adjunct Professors:
Victor E. Cole, B.S.
David W. Gillson, Ph.D.
Darrin V. Halligan, Ph.D.
Eugene M. Herion, M.S.
Richard B. Rainville, Ph.D.
Jerome WesoIowski, Ph.D.

Assistant Adjunct Professor:
Gen hua Shi, Ph.D.
and rock, and with protection and enhancement of the environment. It includes the fields of soil mechanics, foundation engineering, geological engineering, rock mechanics, environmental geo-technics, groundwater, geotechnical aspects of earth-moving engineering, and highway materials engineering.

Hydraulic and coastal engineering deals with the flow of water in all its physical aspects. The conception and design of systems and structures for water-power development, flood control and irrigation projects, river and harbor development, coastal drainage engineering, and hydraulic aspects of water pollution control are among the major technical aspects of hydraulic engineering.

Photogrammetry and surveying embody the sciences concerned with precise measurement of the earth's surface to obtain reliable data for engineering design and location.

Structural engineering is concerned with the analysis and design of all types of structures, including earthquake-resistant design. Some, such as bridges, dams, office buildings, power plants, and harbors, are directly within the field of civil engineering. Other structures, such as aircraft, ships, space vehicles, missiles, and radio telescopes, are in related fields.

Structural mechanics parallels structural engineering for the most part, but strengthens the scientific background of the student. The field employs the disciplines of applied mathematics and the engineering sciences to a wide range of problems in the behavior of structural elements and systems and to investigate the mathematical description of material properties.

Structural materials engineering is concerned with the development of adequate construction mate-rials for engineering projects. Primary emphasis is given to the understanding of basic material properties such as mechanical and thermal response, microstructure behavior, and durability. Structural materials include steel, concrete, aluminum alloys, timber, plastic, and composite materials.

Transportation engineering is concerned with the planning, design, construction, operation, performance, evaluation, maintenance, and rehabilitation of transportation systems and facilities such as highways, railroads, urban transit, air transportation, logistic supply systems and their terminals.

Water resources engineering encompasses a broad approach to the interaction of human activities with the hydrologic cycle. This includes the development of adequate systems of surface and ground water resources through consideration of engineering, economic, and environmental constraints.

In addition, the department now offers a minor in structural engineering, designed particularly for students in the Department of Architecture, but also available to any student who meets the requirements and who is enrolled in a non-civil engineering program. For details, contact the Civil Engineering Academic Affairs office, 750 Davis Hall.

Curriculum for the Bachelor's Degree

The undergraduate curriculum provides a broad general education in civil engineering. Additionally, students can choose to emphasize one of civil engineering's subdisciplines: construction engineering and materials; environmental engineering: geotechnical engineering; hydraulic engineering; structural engineering, mechanics and materials; transportation engineering; or photogrammetry/surveying. Each group comprises a total of 126 units. Each 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 six courses, at least 3 units each, from the social studies, and can choose from a list of approved courses. Please see the "Humanities and Social Studies" section of the Announcement of the College of Engineering.

Other requirements of the curriculum include:

Lower Division. Required: Mathematics 1A-1B and 50A-50B, Chemistry 1A, Physics 7A-7B, Engineering 28, 36, and 77, Civil Engineering 60, 70, and 95, Statistics 25, and a basic science elective (Physics 1C or Chemistry 1B).

Upper Division. Civil Engineering 100, 130, 192, an engineering science elective (Mechanical Engineering 104 or Engineering 115), four of seven courses in the elective core (Civil Engineering 103, 111, 120N, 150 or 151, 167, 175, and 184), a design elective (Civil Engineering 104, 112, 120N, 123, 153, or 177), 15 units of technical electives (upper division courses in civil engineering or other fields of engineering selected from an approved list in consultation with an adviser), plus 12 units of free electives.

Graduate Study

The Department of Civil Engineering comprises the following graduate groups: Construction Engineering and Management; Environmental Resources Engineering; Geotechnical Engineering; Structural Engineering Mechanics and Materials (SEMM); and Transportation Engineering. Within each group, specialized programs, including environmental engineering, ocean engineering, water resources engineering, air quality, and groundwater hydrology, are also available. Students may pursue the academic degree(s) of M.S. in Civil Engineering or the professional degree of M.Eng. and D.Eng. The M.S. program is normally of one year's duration, and the M.Eng. program of two years' duration; the doctoral programs require at least six years' work beyond the baccalaureate degree. All of the above degrees require the thesis or dissertation, except the M.S. in Engineering and Master of Architecture (SEMM and the Department of Architecture), M.S. in Engineering and Master of Public Policy (City Planning (Transportation and the Department of Architecture), and Master of Science in Civil Engineering and Master of Business Administration (M.B.A.) in the School of Business Administration.

For more details, please consult the Announcement of the College of Engineering, or contact the department's Academic Affairs Office in 750 Davis Hall.

60. Structure and Properties of Civil Engineering Materials. (3) Two hours of lecture and three hours of laboratory per week. Introduction to structure and properties of civil engineering materials such as asphalt, cements, concrete, metallic materials (e.g. steel, aluminum, and rock), steel, polymers, and wood. The properties range from elastic, plastic and fracture properties to porosity and thermal and environmental responses. Laboratory texts include evaluation of behavior of these materials under a wide range of conditions. (F,SP) Monteiro, Williamson

70. Engineering Geology, (2) Formerly 170. Three hours of lecture/laboratory demonstrations per week. Prerequisite: Civil Engineering 111, 120N, or consent of instructor. Survey of the fundamental concepts and principles of physical and structural geology; the influence of geological factors important in the design of hydraulic structures, offshore platforms, breakwaters, and coastal protection works. The integrated design, including safety, economics, environmental impacts, will also be covered. (SP) Shen, Hone

86. Plane Surveying. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: Trigonometry. Principles and practice of surveying, including use of tape, theodolite, level, altimeter; calculating heights, lengths, areas, volumes, curves; and plane table mapping. (F) Staff

92. Introduction to Civil Engineering. (1) One hour of lecture per week. Must be taken on a passed/not passed basis. A course designed to familiarize the entering student with the nature and scope of civil engineering and its component specialty areas; to include study of actual projects and a field trip as appropriate. (F) Staff

101. Hydrology Laboratories. (2) One hour of lecture and three hours of laboratory per week. Prerequisites: 100. Experiments in measuring, open channel flow, hydraulic machinery, hydraulic models; special experiments designed by the student. (F,SP) Staff

122. Structural Materials (3) Three hours of lectures per week. Prerequisites: Civil Engineering 104 or 115. Stress-strain relations in brittle and ductile materials; structural designs for earthquakes and environmental conditions; finite element method. (SP) Staff

127. Water Resources Analysis. (3) Not open to freshmen. Prerequisites: Civil Engineering 103, 111, 120N, 150 or 151, 167, 175, and 184, division I technical elective (Civil Engineering 104, 112, 120N, 123, 153, or 177), 15 units of technical electives (upper division courses in civil engineering or other fields of engineering selected from an approved list in consultation with an adviser), plus 12 units of free electives.

124. Advanced Structual Mechanics. (3) Three hours of lectures per week. Prerequisites: Civil Engineering 102, 104, or 112. Stress-strain relations in brittle and ductile materials; structural designs for earthquake conditions; finite element method. (SP) Staff

143. Hydrology. (3) Three hours of lecture per week. Prerequisite: Consent of instructor. Hydrological cycle, aspects of meteorology, circulation of air and water at the earth's surface, interaction between precipitation and runoff, groundwater flow, flood frequency and unit hydrograph analysis; stochastic methods for streamflow data generation, applications of hydrology in engineering design. (SP) Staff

144. Hydraulics. (3) Three hours of lecture per week. Prerequisites: Engineering 106, 107, 143 and 144. Design of fluid systems. Fluid mechanics, fluid flow in pipes and open channels, sediment transport, hydraulic models, flood propagation, flow through porous media, computer applications. (SP) Staff

151. Materials for Engineering Projects. (3) Three hours of lecture per week. Prerequisites: 100, 102, or 122. Stress-strain relations in brittle and ductile materials; composite materials; environmental aspects affecting material selection. (SP) Staff

152. Design of Hydraulic Structures. (3) Three hours of lecture per week. Prerequisites: 100. Discussion of factors important in the design of hydraulic structures, inland and coastal, including: dam layouts, spillways, structural features; the selection and control of values, gates, and other structural elements; offshore platforms, breakwaters, coastal protection works. The integrated design, including safety, economics, environmental impacts, will also be covered. (SP) Shen, Hone

155. Hydrodynamics—Fluid Mechanics of the Water Environment. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: 100, Math 50A, 50B or equivalents. A second course in Civil Engineering fluid mechanics. Fluid dynamics, flow patterns, dynamic forces on objects, turbulence shear flows, diffusion and dispersion. Focus on flow patterns in the water environment. (F) Sobey

156. Water Resources Analysis. (3) Not open to Civil Engineering students. Available to other Engineering students as a free elective. Three hours of lecture per week. Water resources distribution, demands, and issues. Emphasis on basic processes and overview of engineering analysis of water resources problems, including surface runoff, groundwa-

157. Air Pollution. (3) Three hours of lecture per week. Prerequisites: 100, Math 50A, 50B or equivalents. A second course in Civil Engineering fluid mechanics. Fluid dynamics, flow patterns, dynamic forces on objects, turbulence shear flows, diffusion and dispersion. Focus on flow patterns in the water environment. (F) Sobey

158. Air Pollutant Emissions and Control. (3) Three hours of lecture per week. Prerequisites: Engineering 150 or consent of instructor. Survey of key air pollutant emission sources and mechanisms, control system fundamentals and pollutant formation me chanisms. Control of emissions from spark-ignition and other engine types, and from larger utility/industrial boilers. Detailed examination of mobile source emis-

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

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1109. Indoor Air Quality, (3) Three hours of lecture per week. Prerequisites: 111 or consent of instructor. Study of air pollutants in indoor environments such as private residences, offices, schools, and commercial and public buildings. Overview of the factors that govern indoor air quality and control. Building ventilation principles and practice. Detailed exploration of characteristics and control of several pollutant classes, such as radon and its decay products, volatile organic compounds, and combustion byproducts. Elements of a control strategy. (SP) Nazaroff

1111. Environmental Engineering, (3) Three hours of lecture per week. Prerequisites: 100, Quantitative analysis of environmental processes as influenced by human activities. Concepts of hydrologic and contaminant cycling through air, water, and soil systems; air and water chemistry, transport models for contaminants, and physical, chemical, and biological treatment processes. (F,SP) Nazaroff

1112. Environmental Engineering Design, (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: 111, plus two of 103, 105, 113, 167, 173, and 175. Environmental design and project management of environmental quality control systems. Students will complete a design project focused on one of the following systems: wastewater treatment plant, sanitary landfill, municipal waste incinerator, contaminated groundwater remediation, or fossil-fuel-fired power plant. Each student will work in a small design group focusing on environmental optimization, legal and institutional constraints on design, and project management. (SP) Staff

113. Applied Aquatic Ecology, (3) Three hours of lecture per week. Prerequisites: Upper division standing. Introduction to purs and applied aspects of limnology and aquatic ecology. Includes field methods; biological processes in freshwater and marine systems; fish and wildlife population dynamics; and disturbances caused by pollution. (F) Moore, Bearden

114N. Environmental Microbiology, (3) Three hours of lecture per week. Prerequisites: 111, plus two of 14A-1B. The scope of modern environmental engineering requires a fundamental knowledge of microbial processes with specific application to water, wastewater and air pollution control. The course will cover basic microbial physiology, biochemistry, metabolism, growth energetics and kinetics, ecology, pathogenicity, and genetics for application to both engineered and natural environmental systems. (F,SP) Staff

115. Chemistry of Waters, (2) Two hours of lecture per week. Prerequisites: Chemistry 1A. A consideration of the inorganic components in water in terms of water quality. Emphasis is placed on the application of chemical principles to water treatment. Topics covered include: chemical oxygen demand, total carbon, speciation and the determination of major anions, cations, and dissolved gases comprising the inorganic constituents. (F) Hermanowicz

116. Water Chemistry Laboratory, (2) One hour of lecture and three hours of laboratory/demonstration per week. Prerequisites: Chemistry 1A or consent of instructor. Practical laboratory aspects of important chemical measurements used in assessment of water quality and efficiency of water and waste treatment processes. Topics covered include: spectrophotometric and electrochemical measurements. Laboratories on turbidity, coagulation, flocculation, dissolved oxygen, chloride residual, BOD, COD, nitrogen forms, ammonia, cyanide, nitrites, nitrates, sulfides, oxidizable sulfur, fluoride, sulfates, chlorides, and conductivity. (F) Hermanowicz

117. Environmental Organic Chemistry, (2) Two hours of lecture per week. Prerequisites: Chemistry 1A or consent of instructor. Aspects of organic chemistry relevant to environmental effect and fate of chemicals are addressed. Topics selected from: nomenclature; environmentally important reactions and properties of organic compounds and their prediction; photochemical reactions in water and air; production and removal of odoriferous compounds; natural organic matter; natural and synthetic polymers; biochemically important reactions; and the development and application of methods of analysis in environmental samples. (SP) Jenkins

118. Air Quality Management, (1) One hour of lecture per week and three field trips. Prerequisites: 111 or Engineering 150 or consent of instructor. Formerly 150. Overview of indoor and outdoor air quality, health effects, air quality management programs, and physical science principles of various methods for measuring pollutants concentrations. (SP) Wesolowski

119. Solid and Hazardous Waste Disposal, (2) Two hours of lecture per week and two half-day field trips. Prerequisites: 111 or Environmental Engineering 150 or consent of instructor. Analysis and design of solid and hazardous waste management facilities. (SP) Herzen

120N. Structural Engineering, (3) Students will receive 1.5 units of credit for 120N after taking 120 or 140 prior to Fall 1992 and no credit if both courses have been taken. Two hours of lecture and three hours of laboratory per week. Prerequisites: 120N. Formerly 120N. Introduction to design and analysis of structural systems. Loads and load placement, Proportioning of structural members in steel, reinforced concrete, and wood. Structural analysis theory. Hand and computer analysis methods, validation of results from computer analysis. Applications, including bridges, building frames, and long-span cable structures. (F,SP) Mohseni, Fennes

121N. Advanced Structural Analysis, (3) Students who have taken 122 prior to Fall 1992 will receive credit for 121N. Three hours of lecture per week. Prerequisites: 120N. Formerly 120N. Theory and application of structural analysis. Equilibrium and compatibility. Virtual work. Stiffness and flexibility methods, with emphasis on the direct stiffness method. Equilibrium and compatibility. Virtual work. Response of linear and simple nonlinear structures to static loads. Use of computer programs for structural analysis. Modeling of two- and three-dimensional structures. Verification and interpretation of structural response. (F) Fennes, Powell

122N. Design of Steel Structures, (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: 120N, Formerly 141. Behavior and design of structural steel members, including beam-columns, braced frames, and other load-resisting steel structures. (SP) Sweeney, Jackson

123. Design of Reinforced Concrete Structures, (3) Students will receive no credit for 123 after taking 140. Two hours of lecture and three hours of laboratory per week. Prerequisites: 120N. Introduction to materials and methods of reinforced concrete construction; behavior and design of reinforced concrete beams and one-way slabs considering deflections, flexure, shear and anchorage; behavior and design of columns including slenderness effects; design of spread footings; design of lateral load resisting frames and walls for earthquake effects. Laboratory includes experiments and design sessions leading to the development of a structural design project in reinforced concrete. (SP) Mohseni, Fennes

124. Structural Design in Timber, (3) Three hours of lecture per week. Prerequisites: 120 or 120N (may be taken concurrently); or 128 (formerly 144A). Formerly 142. Characteristics and properties of wood as a structural material; design and detailing of structural elements and entire structures of wood. Topics include allowable stresses, design and detailing of solid sawn and glued beams and columns, nailed and bolted connections, plywood diaphragms and shear walls. Case studies. (F) Mahin, Filippou

125. Structural Dynamics and Earthquake Engineering, (3) Students will receive 1 unit for 125 after taking 124 or 125N. Two hours of lecture and two hours of laboratory per week. Prerequisites: 122N or 123 (may be taken concurrently) and 121N. Formerly 121N. Theory and application of structural dynamics for single and multiple degree-of-freedom systems. Spectral analysis and its application to earthquake ground motion. Characteristics of earthquake ground motion and design spectra. Concepts of overall seismic design of buildings, load paths, and proportioning and detailing of members to achieve satisfactory seismic response. (SP) Chopra, Mahin

126. Structural Engineering for Architects, (3) Three hours of lecture per week. Prerequisites: Architectural 150. Formerly 140A. Criteria for the design of structures. Sources of loading, behavior and approximate analyses of beams, columns, trusses, arches, frames, walls and simple buildings. Behavior and design of structural members in timber, steel, re-inforced and prestressed concrete. (F) Filippou, Powell

130. Mechanics of Materials I, (3) Three hours of lecture per week. Prerequisites: Engineering 106. Introduction to the mechanics of deformable solids; elastic and ultimate resistance of materials; stress and deformation analysis; deformation theory of elasticity and combined stresses; energy methods; statically indeterminate systems; stability and buckling. (F,SP) Staff

131N. Advanced Mechanics of Materials, (3) Three hours of lecture per week. Prerequisites: 130 or senior standing. Formerly 131. Mechanics of load-bearing structures; stress and strain-stress relations, work and energy, boundary-value problems. Torsion. Bending of beams and plates: asymmetric bending, thermoelastic bending, thin-wall and sandwich plates. Introduction to plate theory. Buckling of bars. (F) Ferrant, Kelly

150. Transportation Engineering, (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: 154, Statistics 25. General characteristics of transportation systems: streets and highways, rail, transit, air, water. Capacity considerations; time-space diagrams, queueing. Transport system design: horizontal and vertical alignment, crossections, earthwork, drainage, pavements. Economic analyses. Transportation management, optimization, research, technology, environmental considerations. (SP) Daganzo, Montsmith

151. Transportation Planning and Implementation, (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: Statistics 25 and Engineering 77. Planning and investment decisions. Development of urban facilities; modern urban transportation planning. State planning and needs and cost allocation studies. Rail, water, and air transportation planning. Forecasting and new technology. (F) Kafarian

153. Design and Construction of Transportation Facilities, (3) Two hours of lecture and two hours of laboratory per week. Prerequisites: 154 and Engineering 77. Geometric, drainage, and guideway design for, and construction and rehabilitation of, transportation facilities, particularly streets and highways, railroads, and airports. (SP) May, Horner

165N. Concrete Materials and Construction, (3) Students will receive 2 units of credit for 165N after taking 161; 1 unit after taking 165 and no credit if both were taken prior to 1992. Three hours of lecture per week. Prerequisites: 120N. Formerly 164A. Formerly 165A. Formerly 165B. Formerly 165. Consideration of the broad aspects of use of concrete in construction; technical requirements; selection of materials; control of quality; types of concretes and concreting methods; properties of concrete mixtures, airfields, bridges, dams and other hydraulic structures. Laboratory demonstration on concrete testing and evaluation methods, field trip to construction sites. Group and individual projects on concrete construction. (SP) Monteiro
168. **Construction Engineering.** (3) Two hours of lecture and three hours of laboratory or fieldtrip per week. Prerequisites: 167 and 168. Upper-division standing. This course is recommended. Introduction to construction engineering and field operations. The construction industry, construction methods and practices, productivity improvement, equipment operation, surveying, soil engineering, and the needs of society in conceiving projects, balancing the needs of society and the needs of business. Field trips to local construction projects. (F,SP) Demetz

167. **Engineering Project Management.** (3) Students will receive one unit of credit for 167 after taking Engineering 120. Three hours of lecture per week. Prerequisites: Upper-division standing. Principles of economics, decision making, and law applied to company and project management. Business ownership, liability and insurance, cash flow analysis, and financial management. Project selection, design-construction interfaces, contract, estimates, scheduling, costing control. (F,SP) Ashley

168N. **Fire Protection Engineering.** (3) Students will receive 2 units of credit for 168N after taking 168; 1 unit after taking 168B and no credit for both if taken prior to Fall 1992. Three hours of lecture per week. Prerequisites: 60. Formerly 168A. An introduction to fire protection engineering, providing the framework for solving fire problems. Model building codes, with emphasis on fire safety regulations. Relationship between codes and fire protection; fire resistance, fire rating and evaluation of plastics and polymers for fire-safe usage. (F,SP) Williamson

171. **Introduction to Geological Engineering.** (3) Three hours of lecture per week. Prerequisites: 70 or an introductory course in physical geology and upper division standing in Engineering. Geological and geophysical exploration for structures in rock; properties and behavior of rock masses; rock slope stability; geological engineering of underground openings; evaluation of ore occurrences, including diamonds. No final examination. (SP) Goodman

172. **Introduction to Rock Mechanics.** (3) Two 1½-hour lectures per week with demonstrations. Prerequisites: Upper-division standing in engineering or science. Formerly Engineering 172. Introduction to analysis of stress and strain and its application to fracture, deformation, and failure of rocks in all kinds of applications in mining and civil engineering involving design of underground openings in competent, layered and plastic rocks, slopes cut in jointed rock, and foundations on weak material. Formerly listed as Mineral Engineering 172. (F) Cook, Goodman

173. **Groundwater and Seepage.** (3) Three hours of lecture per week. Prerequisites: Senior standing in engineering or science, 100 recommended. Introduction to principles of groundwater flow, including steady and transient flow, flow line, numerical solution, pumping tests, groundwater geochemistry, contaminant transport, and design of waste containment systems. (F,SP) Rubin; Sitar

175. **Soil and Foundation Engineering.** (3) Two hours of lecture and three hours of discussion/laboratory-demonstration period per week. Prerequisites: 110, 120, or 120B, and 175 or equivalent courses. Computer methods and techniques. (F) Modern construction and geotechnical design project. Supervised laboratory tests and field trips provide data required for the project, and all results are shared by the class. Each student is responsible for his or her own section of the geotechnical design project. (F,SP) Seed, Sitar

177. **Geotechnical Engineering Design.** (3) Two hours of lecture and two hours of laboratory per week, two weekend field trips, and a semester long design project. Prerequisites: 100, 120 or 120B, and 175 or equivalent courses. Supervised laboratory tests and field trips provide data required for the project, and all results are shared by the class. Each student is responsible for his or her own section of the geotechnical design project. Supervised laboratory tests and field trips provide data required for the project, and all results are shared by the class. Each student is responsible for his or her own section of the geotechnical design project. (F,SP) Seed

179. **Asphalt and Asphalt Mixtures.** (2) One hour of lecture and three hours of laboratory per week. Prerequisites: Upper-division standing. Physical and chemical properties of asphalts, aggregates, and their combinations; principles and practices in the design and construction of asphalt paving mixtures; laboratory tests for asphalts, aggregates, and mixture design. (F) Moninger

180. **Design, Construction, and Maintenance of Marine Structures.** (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 130 or Mineral Engineering 106; Senior standing; Naval Architecture 151 recommended. Equipment, procedures, and considerations for design and construction of structures to be included: construction, maintenance, and decommissioning of coastal and offshore structures including piers, fixed and mobile platforms. Corrosion prevention. Underwater inspection. Design, constraints, and criteria for steel and concrete structures. Also listed as Naval Architecture 156. (SP, F,SP) Bea

184. **Surveying and Engineering Measurements.** (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: 135 or 205A. Statistics 25. Formally SL 192. Introduction to level, transit, theodolite, surveying, mapping, measurement of distance, elevation, angles; systematic and random error analysis; adjustment of measurements; weighting of measured values; survey data analysis; geodetic surveying; Topographic Map and Global Positioning Systems (GPS). (F) Staff

185. **Control Surveys.** (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: 184 or 66 with consent of instructor. Vertical control, precise leveling; horizontal control, triangulation, trilateration, traverse; position by Global Positioning System (GPS); electronic distance measurements; least squares adjustment of control survey observations; state coordinate system; astronomical observations for azimuth. Staff

186. **Elementary Photogrammetry.** (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: 185 or consent of instructor. The principles and methods of photography measurement, precision cameras, geometry of photography, ground control, flight planning, stereoscopic and parallel radial line triangulation, map revision, mosaic, oblique photography, stereoscopic plotting instruments, orthophotos. (F,SP) Staff

187. **Route Surveying.** (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: 184 or equivalent. Simple, compound, reverse, and transition horizontal curves; vertical parabolic curves; reconnaissance, preliminary, and location surveys; computations of traverses and related quantities; alignment studies. (SP) Staff

188. **Airphoto Analysis and Interpretation.** (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: Senior standing in engineering, geography, or biology. Principles of photo reading, analysis, and interpretation applied to soils, slopes, geological forms, and structures; selection of materials for engineering construction. (F,SP) Staff

192. **The Art and Science of Civil Engineering Practice.** (1) One hour of lecture per week. Prerequisites: Senior standing in Civil Engineering. A series of lectures by distinguished civil engineers designed to provide an appreciation of the role of science, technology, and 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, F,SP) Staff

195. **Engineering Risk Analysis.** (3) Three hours of lecture per week. Prerequisites: Upper-division standing. Applications of probability theory and statistics in planning, analysis, and design of civil engineering systems. Development of probabilistic models for risk and reliability evaluation. One-semester course only. Formerly 245. (F) Staff

198. **Directed Group Study for Advanced Undergraduates.** (1-4) Course may be repeated for credit. (F,SP) Staff

199. **Supervised Independent Study.** (1-4) Course may be repeated for a maximum of four units per quarter. Individual students may write a thesis or pass an examination. (F,SP) Staff

Graduate Courses

200. **Coastal Mechanics.** (3) Students will receive no credit for 200 if 205A was completed prior to fall 1991. Three hours of lecture per week. Prerequisites: 100; Math 50A-50B or equivalents (105 recommended). Formerly 205A. An introduction to the mechanics of the coastal environment: linear wave theory, kinematics, dispersion, mass transport, radiation stress, energy flux, current, shoaling, refraction, diffraction; salinity; water waves; wave climate; wave loading; tides and tidal circulation; storm tides; wave experiments. (F) Sobey

201. **Physical Oceanography.** (2) Two hours of lecture per week. Prerequisites: 100. Applied fluid mechanics of the oceans, with emphasis on large scale waves and currents on the continental shelf and the deep ocean. Topics include hydrostatic stability, barotropic and baroclinic motions, free and forced low gravity wave, geostrophic effects, Ekman transport, atmospheric tides, storm surges, ocean tides, and continental shelf waves, ocean circulation and Western boundary currents. (F) Foda

203. **Surface Water Hydrology.** (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Occurrence and movement of water over the earth's surface, precipitation and storage, meteorological and physical processes, frequency analysis of precipitation and runoff, relationship between rainfall and runoff, flood routing, time series analysis, and stochastic data generation models. (F,SP) Staff

204. **Wave Hydrodynamics.** (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 transformations, higher-order theories, wave spectra and wave generation. (SP) Staff

205A. **Coastal Processes.** (3) No credit for 205A if 205B was completed prior to Spring 1991. Three hours of lecture per week. Prerequisites: 200 (105 recommended). Formerly 205B. Breakers and surf, breakwaters, surf-zone dynamics, coastal sediment transport, shore protection measures, submarine pipelines. (SP) Foda

205B. **Wind and Wave Forces on Marine Structures.** (3) Three hours of lecture per week. Prerequisites: Naval Architecture 214A-214B concurrently or 205A. Determination of wind and wave forces on coastal structures, pipelines, fixed and mobile offshore platforms. Evaluation of nominal and extreme loadings, local and global forces, and static and dynamic load effects. Time and frequency domain characteristics of wind and wave loadings. Examines physical and analytical models based on field and laboratory data. Also listed as IDS 205 and Naval Architecture 205B. (SP) Bea

206. **Computational Methods in Open Channel Flow.** (3) Three hours of lecture per week. Prerequisites: Mathematics 50A or equivalent. Numerical methods applied to nonsteady flows in rivers and estuaries, flood wave propagation, automatic control of water supply systems. Computer applications. (F) Staff

207. **Transportation Systems.** (3) Three hours of lecture per week. Prerequisites: 102 or consent of instructor. Development and analysis of linear and non-linear systems. Applications to transport systems, flood routing, and reservoirs. (SP) Staff

209A. **Hydrologic Mixing Processes.** (3) Three hours of lecture per week. Concepts of hydrological dif-
fusion and transport; turbulent mixing; mixing in rivers, reservoirs, and estuaries. (SP) Wen

208B. Hydrologic Mixing Processes. (2) Two hours of lecture per week. Prerequisites: 208A. Numerical and field techniques of laboratory processes of all trophic levels. Course is part of a sequence of CE 113, CE 213, Forestry 178 and Forestry 278. (SP) Horne

210. Advanced Applied Limnology and Oceanography. (2) Two hours of lecture per week. Prerequisites: 113 or Forestry 178, or consent of instructor. Lectures and group discussions on an interdisciplinary topic of current interest in lakes, reservoir, estuary, river or ocean. Emphasis will be given in global comparisons of all trophic levels. Course is part of a sequence of CE 113, CE 213, Forestry 178 and Forestry 278. (SP) Horne

211. Water Treatment Engineering. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 111 and 115 (both may be taken concurrently) or six hours of laboratory per week. Pre-requisites: 111 or consent of instructor. Laboratory and field experience with the major environmental tests which form the basis for the regulation of water quality. Inferences in limnology, chronology and acute fish and algae toxicity. 111 is the prerequisite for 212. (SP) Hermanowicz

212. Wastewater Treatment Engineering II. (3) Three hours of lecture per week. Prerequisites: 111 and 115. Wastewater discharge and receiving water standards. Primary, secondary and tertiary waste treatment processes. Sludge treatment and disposal fundamentals and design. Included are primary treatment, microbial kinetics of biological processes, activated sludge, fixed film reactors, anaerobic digestion, and nutrient removal. (SP) Hermanowicz

213. Applied Ecology Laboratory. (2) One hour of laboratory per week. Prerequisites: 113 or consent of instructor. The application of equilibrium and kinetic models and physical, chemical, and biological principles applied to the description of the composition of natural water systems. Examination of wastewater treatment processes, and water pollution control problems. A qualitative description of the circulation of important elements in natural water systems and their significance in water quality. (F) Jenkins

215. Process Engineering Laboratory. (3) One hour of laboratory per week. Prerequisites: 116, 211, 212 (may be taken concurrently) or consent of instructor. Unit operations and processes for water and wastewater treatment. Lectures and laboratory on tracers, filtration, aeration, ion exchange, chemical treatment of wastewater, biological filters, activated sludge, and anaerobic digestion. (SP) Hermanowicz

216. Hazardous and Industrial Waste Treatment. (3) Three hours of lecture per week. Prerequisites: 211 and 212 (taken concurrently). Sources and characteristics of hazardous and industrial wastes in the context of current regulations. Theory and design of common- and highly innovative treatment technologies applicable to a range of specific hazardous and industrial wastes. State-of-the-art approaches and experimental testing are applied to sanitary/environmental engineering processes. Packed and fluidized bed reactors, biological reactors. (SP) Hermanowicz

218A. Air Quality Engineering. (3) Three hours of lecture per week. Prerequisites: Engineering 150 or consent of instructor. Fundamental quantitative description of atmospheric physics and chemistry of air pollutants. Pollutant generation in combustion systems, atmospheric photochemistry, transport and dispersion of pollutants, pollutant rates, model development, 115 recommended. The fate of contaminants in the environment is controlled by transport processes within a single medium and between media. The similarities in contaminant dispersion within air, surface water, and ground water will be emphasized. Interphase transport processes such as volatilization and adsorption will be considered. (F) Nazaroff

218B. Air Quality Engineering. (3) No credit for 218B if taken after 218C prior to Spring 1990. Three hours of lecture per week. Prerequisites: Engineering 150 or graduate standing. Formerly 218C. 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 particulates, visibility, and regional and global transport of pollutants. Approaches to air pollution monitoring and control. Indoor air quality. (SP) Nazaroff

219. Contaminant Transport Processes. (3) Three hours of lecture per week. Prerequisites: 100 and 111 (173 recommended). The fate of contaminants in the environment is controlled by transport processes within a single medium and between media. The similarities in contaminant dispersion within air, surface water, and groundwater will be emphasized. Interphase transport processes such as volatilization and adsorption will then be considered. (F) Nazaroff


221H. Nonlinear Structural Analysis. (3) Students will receive no credit for 221H after taking 223B before Fall 1993. Three hours of lecture per week. Prerequisites: 211. Formerly 223B. Theory, modeling, and computer analysis for computation of structures with material and geometric nonlinearities. Sources of nonlinearity. Solution strategies for static and dynamic loads. Modeling of inelastic materials and members. P-delta and large deformation theory. Analysis of stability. Practical applications. (SP) Powell, Filipovic

222. Finite Element Methods. (3) Three hours of lecture per week. Formerly 221P. Three hours after taking 223B or 231 or 231N. Formerly 221P. Formerly 221. Approximation theory for analysis of deformation and stress in solids. Finite element formulations for plane, frame stress/strain, axisymmetrical, and three-dimensional structural problems. The isoparametric formulation and implementation of Plate and shell elements. Finite element modeling of structural systems. (SP) Fenves, Powell

224N. Advanced Computational Mechanics. (3) Three hours of lecture per week. Formerly 290C. Advanced methods for computer-aided engineering, with emphasis on structural design and analysis. Data abstraction methods for engineering systems. Database models and systems. Fundamentals of geometric modeling and computer graphics. Engineer-computer interfaces and the design of computer-aided engineering systems. Offered odd-numbered years. (F) Fenves, Thewalt, Powell

225. Dynamics of Structures. (3) Three hours of lecture per week. Prerequisites: 220 (may be taken concurrently) or equivalent. Evaluation of deformations and forces in structures, idealized as single-degree of freedom or discrete-parameter multi-degree of freedom systems, due to dynamic forces. Evaluation of earth- and structure- generated forces or it structures by linear response history analysis; estimation of maximum response by response spectrum analysis; effects of inelastic behavior. Laboratory demonstrations. (F) Chopra, Fenves


232N. Structural Reliability. (3) Students will receive no credit for 229N after taking 249B before Fall 1993. Three hours of lecture per week. Prerequisites: Introduction to probability theory. Formulation of reliability for structural components and systems. Exact solutions, first- and second-order reliability methods, simulation and Monte Carlo methods, and Bayesian reliability methods. Stochastic load models and load combinations, bases for probabilistic design codes. Time-variant and finite element reliability methods. (SP) DerKiureghian


234A. Thermomechanics of Deformable Bodies I. (3) Three hours of lecture per week. Prerequisites: 231A. Mathematical preliminaries (normed vector spaces, differentiations, vector and tensor fields); kinematics and physics of deformable bodies (balance principle). Offered according to student demand and faculty availability.

234B. Thermomechanics of Deformable Bodies II. (3) Three hours of lecture per week. Prerequisites: 234A. Equilibrium statistical mechanics and thermomechanics (ensemble theory, Carnot theory, rubber elasticity); non-equilibrium thermomechanics, constitutive theory (viscosity and heat conduction, internal variables models with memory, viscoelasticity, plasticity). Advanced mathematical techniques. Offered according to student demand and faculty availability.

235. Advanced Solid and Structural Mechanics. Three hours of lecture per week. Prerequisites: Consent of instructor. Topics of current interest in solid and structural mechanics. To be offered depending on student demand and faculty availability.

235A. Advanced Computational Mechanics. (3) 235B. Plasticity. (3)
235C. Viscoelasticity. (3)
235D. Stability. (3)
235E. Fracture Mechanics. (3)
235F. Mechanics of Composites. (3)
235G. Shell Theory. (3)
235H. Three-Dimensional Elasticity. (3)
235I. Wave Propagation. (3)
236. Microstructured Materials. (3) Three hours of lecture per week. Prerequisites: Consent of Instructor. Thermomechanical behavior of inhomogeneous materials (polycrystals, composites, porous and damaged media) and structures. The homogenization and the microstructured continuous approaches. Effect of phase boundaries. Microstructural aspects in the structural re-structured and functional miniaturized mechanical devices. Also listed as Materials Science and Mineral Engineering 214. (F) Ferrari

240. Civil Engineering Materials. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: An undergraduate course in civil engineering materials. Microstructures of concrete, wood, and steel. Differences and similarities in response to loading and environmental effects on these materials, with emphasis on strength, elastic properties, creep, shrinkage, durability, and failure mechanisms. (F) Monteiro, Williamson

241. Concrete Technology. (3) Three hours of lecture per week. Prerequisites: 165N or equivalent. Properties of fresh and hardened concrete: strength, elastic behavior, creep, shrinkage, and durability to chemical and physical environment. New concrete-making materials. Recent advancements in concrete technology: high-strength, high-workability, and high-performance concrete; fiber-reinforced concrete, and roller-compacted concrete. (SP) Monteiro

242. Concrete Behavior. (3) One hour of lecture and three hours of laboratory per week. Prerequisites: 160 or equivalent. Relationship between concrete microstructure and mechanical properties. Composite materials theory for concrete. Viscoelasticity; plasticity; fracture mechanics; thermal behavior and durability of concrete. Use of instrumentation, data acquisition, and modern experimental techniques employed in concrete research. (SP) Monteiro

244. Reinforced Concrete Structures. (3) Three hours of lecture per week. Prerequisites: 123 and 220 or equivalent. Design of concrete beams and columns for flexure, shear, axial load, torsion, and anchorage; behavior and design of two-way slabs using the direct design method, equivalent frame method, and moment distribution method and design of reinforced concrete frame and frame-wall structures for gravity and lateral loads. (F) Mohiel, Filipou

245N. Behavior of Reinforced Concrete. (3) Three hours of lecture per week. Prerequisites: 123 and 220. Formerly 244A-244B. Advanced topics in reinforced concrete construction, including inelastic flexural behavior; applications of plastic analysis to reinforced concrete framed structures; seismic design and reinforced design of reinforced concrete frame and wall structures for gravity and lateral loads. (SP) Mohiel, Filipou

246N. Prestressed Concrete Structures. (3) Three hours of lecture per week. Prerequisites: 244 or consent of instructor. Formerly 245. Behavior and design of statically determinate prestressed concrete structures under bending moment, clear, torsion and axial load effects. Design of continuous prestressed concrete beams, frames, slabs, and shells. Time-dependent effects, including non-deformational prestressed concrete structures. Applications to the design and construction of bridges and buildings. (SP) Filipou, Mohiel

247N. Design of Steel and Composite Structures. (3) Students will receive no credit for 247N after taking 257 prior to Fall 1993. Three hours of lecture per week. Prerequisites: Consent of instructor. Behavior and design of steel plate girders and shear walls. Design of bracings for stability. Design of members subjected to torsion. Design of composite beams, columns, and beam-columns. Behavior and design of shear, semi-rigid and moment connections. Concepts used in design of gusset plates and base plates. Selection and design of steel and composite systems. (SP) Aziz, Mahin, Thewalt

249N. Experimental Methods in Structural Engineering. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: 225. Formerly 229. Experimental methods for identifying static and dynamic characteristics of structural systems and parametric techniques for structural condition assessment. Instrumentation for measurement. Computer data acquisition and control. Dimensional analysis and model theory. Offered odd number years. (F) Thewalt, Mahin

250. Transportation Policy and Planning and Deployment. (2) Two hours of lecture per week. The evolution of the U.S. transportation system. Growth and decline of the railroads and mass transportation. The development of highway transportation and aviation. Issues in the regulation, financing, and planning of transportation. Policy analysis and program evaluation. (SP) Garrison, Hansen

251. Operation of Transportation Facilities. (2) Two hours of lecture per week. Prerequisites: Graduate standing or consent of Instructor. Route, network, and bottleneck-capacity analysis; development and capacity procedures; data collection methods; queueing theory; technology: Planning, implementation, and operation of control technologies. (F) Daganzo

252. Systems Analysis in Transportation. (2) Three hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. The systems approach to planning and control of transportation systems. The systems analysis techniques including optimization, evaluation, and systems modeling. (F) Hansen, Kanaifar

252L. Computer Application in Transportation Analysis. (1) Three hours of laboratory per week. An introduction to current and future computer use in transportation: professional software and recent developments in areas such as computer graphics, census data systems, simulation, networking, and artificial intelligence. OE 251 and 252 may be taken concurrently. Prior experience with computers and probability and statistics is required. This course does not satisfy the laboratory course requirement for the M.S. Degree in transportation. Staff

253. Principles of Transportation System Design. (3) Two hours of lecture per week. Prerequisites: 251, and 252 or equivalent. Design parameters, including human factors and environmental constraints. Design of system components; consideration of system safety and failure in design; design for operations flexibility and for maintenance. (F) Hansen

254. Transportation Economics. (3) Students with credit in 261 receive only 2 units. Three hours of lecture per week. Prerequisites: 252 or consent of instructor. Application of micro- and macro-economic concepts to transportation systems. Urban and inter-regional travels. Traffic analysis. Freight demand, Project and program evaluation. Social welfare theory. Analysis of social cost, Investment analysis and pricing theory. Economic impact analysis. Role of economic analysis in decision making. (SP) Hansen, Kanaifar

254L. Transportation Planning Applications. (2) Three hours of laboratory and three hours to be arranged per week. Prerequisites: Consent of instructor. The analysis, development, and implementation of transportation models. The use of transportation demand models in urban transportation planning. The forecasting of demand, and the design and evaluation of multimodal transportation systems. Use of computer in transportation planning and analysis. (SP) Hansen

255. Highway Traffic Operations. (3) Three hours of lecture per week. Prerequisites: 251 or consent of instructor. Operational planning and management of the highway transportation system. The highway system is presented as a set of operating environments with each having its unique analytical framework. Major topics to be covered include policy and institutional issues, selection of strategies and systems, evaluation of objec- tives and measures of effectiveness. (SP) Staff

255L. Highway Traffic Operations Laboratory. (1) Three hours of 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 255. Laboratory emphasis will be given to field studies, mathematical analyses, and model applications. (SP) Staff

256. Transportation Planning. (3) Three hours of lecture per week. Determination of traffic characteristics and models. Application of heuristics and heuristics to transportation planning. (SP) Gussio, Sturiale, etc. Stochastic models, Poisson arrivals, light traffic and diffusion approximations. (SP) Newell

257. Applications of Queuing Theory to Transportation. (2) Two hours of lecture per week. Analysis of the performance characteristics of the freight transportation modes. Railway and road traffic modes are examined and compared with other modes. Next, rail equipment is examined and equipment guideway interaction is considered and compared with other modes. Systems are examined by extending the system by including railroad signals and control. Performance characteristics are defined by modal systems interrelationships and measured by comparisons across modes. Current research, technology, and policy. (SP) Staff

258. Public Transportation Systems. (3) Two hours of lecture per week. Prerequisites: 255, 255A, 255B, 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) Staff

259L. Public Transportation Systems Laboratory, (1) Three hours of laboratory per week. Prerequisites: 259 (may be taken concurrently). Design and evaluation of a public transportation facility. (SP) Staff

260. Air Transportation. (3) Three hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. Nature of civil aviation; structure of the air-line industry; aircraft characteristics and performance; aircraft noise; navigation and air traffic control; airport planning and design; airport systems integration and evaluation. (SP) Hansen, Kanaifar

260L. Air Transportation Planning. (1) Three hours of studio per week. Prerequisites: 260 (may be taken concurrently). Studio course in air transportation planning. Problems in airport planning and design; airline planning and systems planning. (SP) Hansen, Kanaifar

262. Analysis of Transportation Data. (2) Two hours of session per week. Prerequisites: Statistics 134 or equivalent. Consent of instructor. The use of field data in transportation. Data gathering techniques, sources of errors, considerations of sample size. Experimental design for demand forecasting and transportation opera- tions analyses. Analysis techniques. (SP) Daganzo

263. Operations of Transportation Terminals. (3) Three hours of session per week. Prerequisites: Graduate standing or consent of instructor. Characteristics of facilities at transportation terminals (e.g.: rail yards, airports, parking lots, etc.) Methodologies used to study terminal operations and the management of congestion. (Chromographs, input-output diagrams, and simulation). Selected case studies, introduction to the methodologies for different modes. (SP) Daganzo

264. Transportation Networks. (1-2) The course consists of two parts: 264A for 1 semester; followed by 264B and/or 264C. Part A treats mathematical mod-
264A. Graphs, Matrices, and Routing. (2) Four hours of lecture for seven and one-half weeks. Mathematical characterization of networks, graph theory, shortest paths, continuum approximations, vehicle routing. (F) Daganzo

264B. Network Flows and Traffic Assignment. (1) Two hours of lecture for seven and one-half weeks. Prerequisites: 264A. Stationary vehicle flows on networks, conservation equations, traffic assignment; heuristics for traffic networks; independent flows through bottlenecks. (F) Newell

264C. Logistics. (1) Two hours of lecture for seven and one-half weeks. Prerequisites: 264A. Transportation/inventory/production cost interrelationships, physical distribution networks, many-to-many networks, the role of transshipment and terminals in logistics operations, system design. (F) Daganzo

265. Pavement Design and Rehabilitation. (3) Three hours of lecture per week. Prerequisites: Graduate standing in engineering, architecture, or business school. Business development by engineers and contractors with emphasis on the international market. Development of skills in communication, contract and negotiations. Management of international projects, including investigation, planning, procurement, logistics, personnel and management of special problems of adverse environments. (SP) Gerwick

267A. Advanced Foundation and Mass Concrete Construction. (3) Three hours of lecture per week. Prerequisites: 122N and 123. Evaluation of geotechnical, structural, and construction aspects of deep foundations for buildings, power plants, and underground structures such as subways. Excavation, bulkheading and shoring, piling, drilled shafts, dewatering, heavy construction equipment, injection grouting, integrated engineering and construction practice in urban environments. (Staff)

267B. Advanced Concrete Construction. (3) Three hours of lecture per week. Prerequisites: 123. Utilization of concrete for construction: lightweight, high-strength, or special properties concretes. Uses of mixtures and processes for resolving problems associated with field processing of concrete. Application to buildings, bridges, pressure vessels, and pollution control structures. (SP) Staff

267C. Construction of Harbor, Coastal, and Ocean Structures. (3) Three hours of lecture per week. Prerequisites: 122N and 123. Construction methods and equipment for construction of cofferdams, caissons, wharves, marine 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) Staff

267D. Advanced Construction Field Techniques. (3) Three hours of lecture per week. Three hours of laboratory approximately every two weeks in lieu of lecture. Prerequisites: 123 or consent of instructor. Advanced techniques for construction of bridges, high-rise office buildings, and structures in adverse environments. Production and handling of high-strength concretes, erection of complex structural steel structures, placement of high-performance concretes under water and aluminas, and field repair of damaged structures. Lecture, laboratory, and field visitations. In laboratory sessions, students perform selected techniques and evaluate their performance. (SP) Staff

267E. Automation in Construction. (3) Three hours of lecture per week. Prerequisites: 168 or equivalent. A survey of recent advances in automation of construction processes. Emphasis on the combination of human, mechanical, and electronic resources to carry out construction work. Topics include human factors, office automation, precast-concrete construction, construction automation, and non-destructive evaluation. Approximately two-thirds of the lectures review available technology and applications to date; the remainder are devoted to emerging technology. (SP) Demsetz

268A. Advanced Construction Estimating. (3) Three hours of lecture per week. Prerequisites: 166. Estimates used by heavy, engineering, building, and specialty contractors. Preparation of cost estimates including planning, purchasing, and cost control with emphasis on management optimization techniques from an applications perspective. (SP) Beam

268B. Essentials of Construction Project Control. (3) Three hours of lecture per week. Prerequisites: 268A and 268C (concurrently) or consent of instructor. Principles of engineering and construction project control; scheduling and control issues addressed separately and as integrated systems. Scientific risk analysis considerations are introduced throughout the course. (SP) Ibea

268E. Computer Applications in Construction. (3) Three hours of lecture per week. Formerly 291J. Specific construction management problems 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 hardware, software, and cost and schedule control problems, and quality assurance techniques. (SP) Ibea

268F. Project Risk Management. (3) Three hours of lecture per week. Prerequisites: Graduate Civil Engineering standing or consent of instructor. This subject will emphasize project risk management and decision analysis techniques, the subject will develop state-of-the-art tools and strategies for project risk management. (F) Ashley

268G. Project Evaluation and Financing. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. This course emphasizes concepts and current issues surrounding construction project evaluation and financing. Principles of financial management and project feasibility focus on project risk assessment and management. Quantitative financial decision-making processes for both construction projects and firms involved in construction. Each of the four principal topics will include relevant theory and methodology as well as emphasis on risk and decision analysis techniques, the subject will develop state-of-the-art tools and strategies for project risk management. (F) Ashley

270A. Asphalt Paving Mixtures. (3) Three hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. Advanced course concerned with asphalt paving especially for highway and airport pavements; emphasis on physical properties of asphalts, evaluation of properties of highway and airport pavements, and design of new asphalt mixtures. (SP) Smithson

270B. Advanced Foundation Engineering. (3) Three hours of lecture per week. Prerequisites: 264A or consent of instructor. Advanced treatment of topics in foundation engineering, including earth pressure theories, design of earth retaining structures, bearing capacity, ground improvement for foundation support, design of deep and shallow foundations. (SP) Mitchell

270L. Advanced Soil Mechanics Laboratory. (3) One and one-half hours of lecture and three hours of laboratory per week. Prerequisites: 270A, 270B (concurrently), or consent of instructor. Lectures and experimental studies of advanced aspects of soil mechanics with emphasis on analysis and design. Consolidation testing by load control and Janbu’s method, static and cyclic triaxial and simple shear testing under stress and strain control with pore pressure measurements, undrained sampling and sample handling, in-situ field testing, and related topics including advanced instrumentation, data acquisition, and measurement techniques. (SP) Seed

273. Soil Behavior. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: Graduate standing or consent of instructor. Soil formation, soil structure, influence of geological factors on properties; colloidal phenomena in soils; soil structure; analysis of conduction phenomena; compressibility, strength, and deformation properties; stress-strain-time effects. (F) Mitchell

275. Geotechnical Earthquake Engineering. (3) Three hours of lecture per week. Prerequisites: 273. Emphasis on the effects of earthquakes on structures. Topics include earthquake engineering and the effects of earthquakes on structures, site response, soil liquefaction and its consequences, seismic code provisions and practices, seismic earth pressures, seismic slopes stability and deformation analysis, seismic safety of embankments and cut slopes, offshore structures and pipelines, and earthquake response of foundations, and additional current topics. (SP) Seed

276. Earth Structures. (3) Three hours of lecture per week. Prerequisites: 175 or equivalent. Soil compaction and soil stabilization using admixtures for use in embankments, dams, highways and airfields, and lined waste repositories. In-situ ground improvement; placement of concrete; construction, including siting, seepage control, stability evaluation, rockfill dams. (SP) Mitchell, Seed

280. Rock Mechanics. (3) Three hours of lecture per week. Prerequisites: 172. Engineering in discontinuous rocks; geological description and exploration; joint network analysis; geophysical and geotechnical testing; stability analysis; numerical analysis. (SP) Goodman

281. Engineering Geology. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: A course in physical geology. Influence of geologic origin and history on the engineering characteristics of soils and rocks. Application of geology in exploration, design, and construction of engineering works. (F) Goodman, Sitar

293. Geological Engineering of Underground Openings. (3) Three hours of lecture 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, softrock, and soil tunneling; monitoring instrumentation; large openings for special purposes; case histories. (SP) Staff

287. Adjustment Computations. (4) Four hours of lecture per week. Prerequisite: Statistics 25 or equivalent. Formerly 289 and part of 287A. Review of matrix algebra and computer programming; Introduction to probability and variance and covariance propagation; derivation of the normal equations; treatment of large numbers of parameters; introduction to problems in surveying; coordinate transformations with applications to coordinate refinement in analytical photogrammetry.
289. Analytical Photochemistry. (4) Four hours of lecture per week. Prerequisites: 185 or equivalent; 287 or equivalent. Concepts of equilibrium thermodynamics; analytical solutions for strips and blocks using cophinany and collinearity concepts; constraints using auxiliary sensors; use of added parameters in the classical context.

289. Stereorestitution and Adjustment. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: 185. Design of stereorestitution instruments; interior, relative, and absolute orientation; map compilation; control extension by independent methods; overall control; analysis of systematic and random errors.

290A. Design Criteria for Marine Structures. (3) Three hours of lecture per week. Development of criteria for design and requalification of marine structures (platforms, coastal facilities). Reliability and decision analysis. Evaluations of uncertainties. Loading and structural design criteria for full-scale, life cycle design of structures. Roles of human and organizational error. Determination and communication of acceptable reliability criteria. Also offered as IDS 293 and Naval Architecture 290C. (SP) Bea

290D. Earthquake Hazard Mitigation. (3) Three hours of lecture per week. Prerequisites: 225; 131N or 291. Conceptual basis for seismic isolation and energy absorbing technologies. Design rules for seismic isolation and energy absorption devices. Characteristic of frictional, metallic and polymeric energy absorbing devices. Guidelines for use of isolation systems and devices and impact of code requirements. Offered odd-numbered years. (F) Kelley, Mahin

290E. Design, Construction, and Maintenance of Marine Structures. (3) Three hours of lecture per week. Equipment, procedures, and considerations associated with the construction, maintenance, and decommissioning of coastal and offshore structures including breakwaters, piers, fixed and mobile platforms. Corrosion prevention. Underwater inspection and repairs. Design, constraints, and criteria for steel and concrete structures, piles and mat foundations. Also offered as IDS 283 and Naval Architecture 290E. (BE)

290M. Improving Performance in Engineering and Construction. (3) Three hours of lecture per week. Prerequisites: Graduate standing in Civil Engineering. Students will understand the potential for, and obstacles to, improving performance. Will learn which data provoke and support positive change; how to collect that data. What is the appropriate adoption will be that of the consultant. (F) Ballard

290N. Advanced Construction Engineering. (3) This course will cover the art and science of applying engineering and construction expertise from the working task level. Actual projects will be studied in terms of planning, design, construction, and site development. (SP) Halligan

290P. Strategic Issues of the Engineering Construction Industry. (3) Three hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. Strategic issues of engineering and construction in the present highly competitive market. Advantages and disadvantages of complex phases of activities starting with concept development, through engineering design, procurement, construction and operational startup. Project economics and finance are discussed. (F) Horn

290R. Advanced Topics in Geophysical Engineering. (1-2) Course may be repeated for credit. Seminars, meetings each week. Prerequisites: Consent of instructor. Recent applications or research in geophysical engineering and rock mechanics. Topics vary each term. (SP) Goodwin

290S. Advanced Groundwater. (3) Three hours of lecture per week. Prerequisites: 173 or consent of instructor. Theory and application of deterministic and stochastic methods for numerical modeling of groundwater flow and contaminant transport. Recent developments and advances in the analysis of groundwater flow and contaminant transport. (SP) Rubin, Stair

290T. Advanced Topics in Transportation Theory. (2) Two hours of lecture per week. Prerequisites: Consent of instructor. The technique for, and the problems encountered in, conducting transportation planning studies in developing regions. Discussion of economic development, and the role played by transportation. Case studies of transportation planning in selected regions. (F,SP) Staff

290U. Transportation Planning for Developing Regions. (2) Two hours of lecture per week; Prerequisites: Consent of instructor. The technique for, and the problems encountered in, conducting transportation planning studies in developing regions. Discussion of economic development, and the role played by transportation. Case studies of transportation planning in selected regions. Staff

290V. Selected Topics in Air Transportation. (2) Two hours of lecture per week. Prerequisites: 290 (may be taken concurrently). Current developments in air transportation. Topics of current interest, including methods of systems operations analysis, airport and airline planning, and issues of air transportation policy. Staff

291A. Numerical Methods in Hydraulic and Coastal Engineering. (3) Three hours of lecture/demonstration per week. Prerequisites: 105, Mathematics 504A and 50B. Introduction to numerical methods in hydraulic and earthquake engineering. Time series analysis, multidimensional implicit equation systems, boundary value problems (elliptic parabolic differential equations), and initial boundary value problems (parabolic and hyperbolic partial differential equations), applications in hydraulic and coastal engineering. (F,SP) Søyney

291C. Advanced Hydromechanics. (3) Three hours of lecture 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 layers, turbulence entrainment, wakes and plumes, open channel flows. Foda

291D. Environmental River Mechanics and River Engineering. (3) Three hours of lecture per week and some field trips. Prerequisites: 297. Major topics are: mechanics of river formation and development, stable 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

296. 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 through special seminars on annually selected topics, 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 Research. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing. Research on the investigation in selected advanced subjects. (F,SP) Staff

301. Workshop for Future Civil Engineering Teachers. (1-3) Course may be repeated for credit. Two hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Teaching assistant or graduate student status. The course will include supervised teaching of laboratory sections of civil engineering courses, group analysis of videotapes, reported classroom visitations, and an individual project. (F,SP) Staff

Classics

(College of Letters and Science)

Department Office: 5302 DeWolf Hall, 642-4216 Chair: (To be announced)

Professors:

William S. Anderson, Ph.D. Yale University. Latin literature, philosophy, linguistics. (F)

Joyce P. Safford, Ph.D. University of California at Berkeley. Greek literature, mythology. (SP)

C. David Coates, Ph.D. University of Chicago. Ancient Near Eastern languages and civilizations. (F,SP)

Catherine J. Currey, Ph.D. Rice University. Latin literature, linguistics. (SP)

Associate Professors:

Nancy L. Trotter, Ph.D. Harvard University. Greek epigraphy, literature. (F)

Barbara R. Wroth, Ph.D. University of Cambridge. Classical literature, linguistics. (SP)

Assistant Professors:

E.L. Appel, Ph.D. Stanford University. Classical literature. (F)

E. E. N. Fairbank, M.A., F.S.A. (Brunei) (F)

M. A. Goldschmidt, Ph.D. Boston University. Latin literature. (SP)

Linda P. Roberts, Ph.D. New York University. Latin literature. (F)

Graduate Advisers: (Classics) Mr. Mastronarde, Classical Archaeology Mr. Miller.

The Department of Classics offers a complete undergraduate program in Greek and Latin languages, literature, and civilization. It includes courses of instruction under the headings of Greek, Latin, and Classics. The object of the Greek and Latin courses is to teach undergraduates to read major works of ancient literature in their original languages and to give a general understanding of the achievements of classical civilization. The purpose of the undergraduate courses called Classics is to provide instruction in Greek and Latin literature. It includes courses of instruction in aspects of literature (read in translation); philosophy, mythology, religion, social and political life and archaeology. The latter courses require no knowledge of Greek and Latin. The graduate courses, all of which are designated Classics, are advanced courses in Greek, Latin, and classical archaeology, all requiring knowledge of one or both of the languages.

The Majors

The Department of Classics offers four undergraduate majors: Greek, Latin, Classical Languages, and Classical Civilization.

On leave, spring, fall, spring

On leave, fall

*Recipient of Distinguished Teaching Award
Major in Greek. Elementary Greek (either Greek 1-2 or Greek 10 or the Greek Workshop, offered during Summer Session); Latin 100, 101, and 102; four courses chosen from Greek 115-123, Latin 100A and 10B (under exceptional circumstances, the undergraduate adviser may authorize substitution of Classics 100A for 10A, or 100B for 10B); one course from the list of recommended courses (see below).

Major in Latin. Elementary Latin (either Latin 1-2 or Latin 10 or the Latin Workshop, offered during Summer Session); Latin 100 (to be completed as early as possible; may be taken concurrently with upper division courses); Latin 100, 101, and 102; four courses chosen from Latin 115-123, Latin 100A and 10B (under exceptional circumstances, the undergraduate adviser may authorize substitution of Classics 100A for 10A, or 100B for 10B); one course from the list of recommended courses (see below).

Major in Classical Languages. Elementary Greek (either Greek 1-2 or Greek 10 or the Greek Workshop, offered during Summer Session); Elementary Latin (either Latin 1-2 or Latin 10 or the Latin Workshop, offered during Summer Session); either Greek 40 or Latin 40 (to be completed as early as possible; may be taken concurrently with upper division courses); Greek 100, 101, and 102; four courses chosen from Greek 115-123, Latin 115-123, Classics 10A and 10B. Majors are encouraged to take additional courses from the list of recommended upper division courses.

Major in Classical Civilization. An area of concentration must be chosen in either Greek or Roman Civilization. Greek Civilization: elementary Greek (either Greek 1-2 or Greek 10 or the Greek Workshop, offered during Summer Session); Greek 100, 101, and 102. Roman Civilization: elementary Latin (either Latin 1-2 or Latin 10 or the Latin Workshop, offered during Summer Session); Latin 100, 101, and 102. Both concentrations: three additional lower division courses in Classics, Greek, or Latin (of which two will normally be Classics 10A-10B, to be completed, if possible, by the end of junior year; under exceptional circumstances, the undergraduate adviser may authorize substitution of Classics 100A for 10A, or 100B for 10B); any four additional upper division courses in Classics, Greek, or Latin and two courses in related fields (from the list of recommended courses).

Recommended upper division courses for majors: additional courses in Greek and Latin; courses in Classics; Sanskrit (see South and Southeast Asian Studies, Ancient Greece and Rome, and Ancient Egypt); Art History 214 (Studies in Greek Art); Art History 215 (Studies in Roman Art and Architecture); Classical Antiquity in Film; Philosophy 161 (Aristotle, Political Science 112A (History of Political Theory); Rhetoric 100 (Rhetorical Tradition); Rhetoric 130 (Political Oratory); Rhetoric 139 (Roman Literature and Rhetoric); courses are also urged to enroll in Greek or Latin Advanced Prose Composition, Classics 250 (Greek), 260 (Latin), and count units from these courses as elective or additional upper division units within their major program.

Substitutions. Under exceptional circumstances the undergraduate adviser is empowered to authorize substitution of a more advanced reading course for any required, reading course numbered 101-106. If such substitution is deemed necessary and advisable.

Honors Program. Restricted to majors with an overall University GPA of at least 3.3 and a GPA in Greek of at least 3.3 in the major. Consists of (a) one of the major programs, with the addition of or including at least one Senior Reading course in Greek or Latin poetry and one Senior Reading course in Greek or Latin prose composition (either Greek 115 or Latin 115); (b) two semesters of H195 (Greek 195 for Greek majors, Latin 195 for Latin majors, either course for Classical Languages or Classical Civilization majors), to be taken in the last two semesters preceding graduation. H195 consists of largely independent study over two semesters, including the writing of a thesis, which will be evaluated on a letter grade basis and included in the student's cumulative average. The written thesis is due on Monday of the 13th week of the second semester and the committee will agree upon the level of Honors (Honors, High Honors, or Highest Honors) and the grade to be awarded no later than the Monday of examination week.

The Minors

The Department of Classics offers three undergraduate minors: Greek, Latin, and Classical Civilization.

Minor in Greek. Five courses from Greek 100, 101, 102, 115-123.

Minor in Latin. Five courses from Latin 100, 101, 115-123, 140, 155.


Intercollegiate Center for Classical Studies in Rome. There will be an opportunity for some Classics majors to attend the Intercollegiate Classical Center in Rome. This is an intercollegiate program for undergraduates in Classics. All students interested in this program should consult the major adviser.

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, the corresponding major in Greek or Latin may suffice, but some preparation in the other language is normally necessary. These programs should be regarded as minimum requirements. Students are urged to supplement the requirements for the major in Classical Languages with some additional reading courses (Greek 115-123, Latin 115-123). They are strongly advised also to have an adequate reading knowledge of French and German, since they must often be used as a means of study 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.

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 Classical Languages, Classical Archaeology, or Classics. 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. Students are advised to 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 encouraged to enter courses in epigraphy, comparative grammar, and Greek dialectics (where these are not included in the interval between offerings of each is at least three years. The graduate course offerings are 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 for either 4 units (for a letter grade) or 2 units (on a satisfactory/unsatisfactory basis), subject to some restrictions. For details of the M.A. and Ph.D. programs, consult the graduate adviser.

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 hours of lecture and one hour of 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 hours of lecture and one hour of 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) Knapp

17A. Introduction to the Archaeology of the Greek World. (4) Three hours of lecture and one hour of discussion per week. The physical remains of the Greek world from the Bronze Age to 323 B.C. will be studied, with emphasis on its artistic triumphs, as a means of understanding the culture of ancient Greece. (F) Miller

17B. Introduction to the Archaeology of the Roman World. (4) Three hours of lecture and one hour of discussion per week. The physical remains of the Roman world from 323 B.C. to the advent of Christianity will be studied as a means of understanding the culture of ancient Rome. (SP) Greenewalt

24. Freshman Seminars. (1) Course may be repeated to credit as topic varies. Sections 1-8 to be graded on a letter-grade basis. Sections 9-16 to be graded on a pass/not passed basis. The Berkeley Seminar Program has been developed to provide freshmen with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP)

28. The Classic Myths. (4) Three hours of lecture and one hour of 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. (SP) Bulloch

34. Epic Poetry: Homer and Vergil. (4) Three hours of lecture and one hour of discussion per week. Greek and Roman epics with reading of the Iliad, Odyssey, Aeneid. (F) Verdugo

35. Greek Tragedy. (3) Three hours of lecture per week. Introduction to the plays of Aeschylus, Sophocles, and Euripides. (SP)

36. Greek Philosophy. (3) Three hours of lecture per week. Introductory course in the thought of the Stoics, Epicureans, and Platonic and Aristotelian Schools. (SP)

39. Freshman/Sophomore Seminar, (2-4) Course may be repeated for credit as topic varies. Seminar format. Prerequisites: Priority given to freshmen and
sophomores. Freshman and Sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. (SP) Ferrali

98. Directed Group Study for Freshmen and Sophomores. (1-4) Must be taken on a passed/not passed basis. Prerequisites: Restricted to freshmen and sophomores; consent of instructor; 3.3 overall GPA. (F,SP)

99. Supervised Independent Study and Research. (1-4) Must be taken on a passed/not passed basis. Prerequisites: Restricted to freshmen and sophomores; consent of instructor; 3.3 overall GPA. (F,SP)

Upper Division Courses

100A. Greek Literature. (4) Three hours of lecture per week. Readings in Greek writers at the upper division level. (F)

100B. Latin Literature. (4) Three hours of lecture per week. Readings in Latin writers at the upper division level. (F)

110. Ancient Metrics. (2) Two hours of lecture per week. Prerequisites: Greek 2 or 10. The principles of ancient metre of all types.

121. Greek and Roman Religion. (4) Three hours of lecture per week. Formerly Classics 122. Study of the worship of the gods in the ancient Greek world; cult practices and religion, History and development of Roman religion. (F; Bullock)

130. Topics in Archaic Greek and Roman Culture. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Upper division status. Topic to vary from year to year. No knowledge of Greek or Latin required; but provision will be made for students who wish to learn some of the reading in the original language. Enrollment limited. (F,SP)

155A-155B. Late Antiquity. (4/3) Three hours of lecture per week. A. Society and the Supernatural from Marcus Aurelius to Symeon Stylianis. B. The strains of empire. The Roman world 200-550 A.D.

170. Classical Archaeology. Three hours of lecture per week.

170A. Greek Vase Painting. (4) (SP) Greenewalt

170B. Greek Sculpture to 300 B.C. (4) (F) Greenewalt

170C. Greek Architecture. (4)

170D. Roman Art and Architecture. (4)

175. Topography and Monuments. Three hours of lecture per week.

175A. Athens. (4) (F) Miller

175B. Rome. (4) (SP) Miller

175C. Sanctuaries of Greece. (4) (SP)

175D. Pompeii and Herculanum. (4)

175E. The Western Roman Provinces. (4)

175F. Roman Wall Painting. (4)

178. Mythology. (4) Three hours of lecture per week. Investigations into the significance of myths, based on Greek and Roman texts and selected Near Eastern and Indo-European parallels.

180. Ancient Athletics. (4) Three hours of lecture and one hour of discussion per week. Study of ancient athletics and athletes including athletic training, facilities, competitions, and the role of athletics in Greek and Roman society. (SP; Miller)

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)

Greek

Courses in this group are designated Greek 1, 2, etc.

Lower Division Courses

1. Elementary Greek. (4) Three hours of lecture per week. Beginners' course. Throttle and Staff (F; Staff (SP)

2. Elementary Greek. (4) Three hours of lecture per week. Prerequisites: 1 or equivalent. Beginners' course. Staff (F; Throttle (SP)

10. Intensive Elementary Greek. (8) Five hours of lecture per week. Beginners' course (Intensive); equivalent to Greek 1-2. (SP)

40. Intermediate Greek Prose Composition. (4) Three hours of lecture per week. Prerequisites: 2, 10, or 15. Formerly Greek 40A. Development of skills in writing Attic prose and sight reading; grammar review. (F)

99. 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)

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. (F, Griffith and Staff)

2. Elementary Latin. (4) Three hours of lecture per week. Prerequisites: 1, 14, or equivalent. Beginners' course. (F,SP) Griffith and Staff

10. Intensive Elementary Latin. (8) Five hours of lecture and one hour of discussion per week. Beginners' course (Intensive); equivalent to Latin 1-2. (F,SP)

14. Beginning Latin (Self-paced). (1-4) For credit information see "Self-Paced Courses" in the Appendix. Material covered is same as that of Latin 1.

40. Intermediate Latin Prose Composition. (4) Three hours of lecture per week. Prerequisites: 2, 10, or 15. Formerly Latin 40A. Development of skills in writing Latin prose and sight reading; review of grammar. (SP)

99. Supervised Independent Study and Research. (1-4) Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor; 3.3 overall GPA; restricted to freshmen and sophomores. (F,SP)

Upper Division Courses

100. Republican Prose. (4) Three hours of lecture per week. Prerequisites: 2, 10, or 15. Selected readings in Caesar, Sallust, and Cicero; some review of grammar. Knapp (F); Staff (SP)

101. Vergil. (4) Three hours of lecture per week. Prerequisites: 101. Selected readings from Vergil. Murgia (F); Bantish (SP)

102. Lyric and Society. (4) Three hours of lecture per week. Prerequisites: 101. Reading in Catullus and Horace, and of short selections from prose literature of their periods. (SP) Verdugo

115. Roman Drama. (4) Course may be repeated for credit with consent of instructor. Three hours of lecture per week. Prerequisites: 101 and 102. Readings in comedy (Plautus and/or Terence) and tragedy (Seneca). (F)

116. Lucullus, Vergil's Georgics. (4) Course may be repeated for credit with consent of Instructor. Three hours of lecture per week. Prerequisites: Greek 100 and either 101 or 102 or 105. Readings in oratory, (SP) Ferrali

123. Plato and Aristotle. (4) Course may be repeated for credit with consent of instructor. Three hours of lecture per week. Prerequisites: Greek 100 and either 101 or 102 or 105. Readings in Plato and Aristotle. (SP)

H195A-H195B. Honors Course in Greek. (3-5) Credit and grade to be awarded on completion of sequence. Prerequisites: Appropriate language preparation and eligibility for admission to the honors program. Largely independent study over two semesters, including the writing of a thesis, to be evaluated by an Honors Committee of three members. Written thesis due Monday of the 13th week of the second semester. (F,SP)

198. Directed Group Study for Advanced Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: Restricted to senior 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)

On leave, spring, fall

On leave, spring

Recipient of Distinguished Teaching Award
117. Elegiac Poetry. (4) Course may be repeated for credit with consent of instructor. Three hours of lecture per week. Prerequisites: 101 or 102. Readings in De Rerum Natura and the Georgics.

118. Satire. (4) Course may be repeated for credit with consent of instructor. Three hours of lecture per week. Prerequisites: 101 or 102. Readings in Propertius, Tibullus, and Ovid. (SP) Murgia

119. Latin Epic. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 101 or 102. Readings in Latin epic poetry.

120. Livy. (4) Course may be repeated for credit with consent of instructor. Three hours of lecture per week. Prerequisites: 100 and either 101 or 102 or 140. Readings in Livy. (SP) Knapp

121. Tacitus. (4) Course may be repeated for credit with consent of instructor. Three hours of lecture per week. Prerequisites: 100 and either 101 or 102 or 140. Readings in Tacitus.

122. Post-Augustan Prose. (4) Course may be repeated for credit with consent of instructor. Three hours of lecture per week. Prerequisites: 100 and either 101 or 102 or 140. Readings in Seneca, the young Pliny, and other writers.

123. Petronius and Apuleius. (4) Course may be repeated for credit with consent of instructor. Three hours of lecture per week. Prerequisites: 100 and either 101 or 102 or 140. Readings in Petronius and Apuleius.

149. Medieval Latin. (4) Three hours of lecture per week. Prerequisites: 100. Introduction to medieval Latin: readings in prose and poetry from Cassiodorus to the Italian Renaissance, with emphasis on certain periods.

150A-150B. Latin of the Fourth and Fifth Centuries. (4) Three hours of lecture per week. Prerequisites: 100 or consent of instructor. Three hours of lecture per week. Prerequisites: 100 and either 101 or 102 or 140. Readings in Seneca, the young Pliny, and other writers.

198A-198B. Honors Course in Latin. (3,3) Credit and grade to be awarded on completion of sequence. Prerequisites: Appropriate language preparation and eligibility for admission to the honors program. Largely independent study over two semesters, including the writing of a thesis, to be evaluated by Honors Committee of three members. Written thesis due Monday of the 13th week of the second semester. (F,SP)

197. Field Studies. (2-4) 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)

198. Directed Group Study for Advanced Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: Restricted to senior honors students. (F,SP)

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: Restricted to senior honors students. (F,SP)

Graduate Courses

Classics

The proseman (Classics 200) is prerequisite to all graduate seminars; this requirement does not apply to graduate courses that are not seminars programmed in Tyl. Classics 210A-210B, 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.

200. Pro-Seminar. (4) Three hours of seminar per week. An introduction to the general literature of classical philology, to methods of research, and to textual criticism. (F) Mastronarde

201A-201B. Survey of Greek Literature. (4,4) Three hours of lectures of seminars. A sequence of readings of lectures on Greek literature. Thetassa (F); Griffith (SP)


203. Approaches to Classical Literature. (4) Three hours of seminar per week. Prerequisites: 200 or consent of instructor. Introduction to basic methods of literary analysis and interpretation, and study of particular critical approaches of significance for the understanding of Classical literature. Close reading of selected passages of Greek and Latin will be emphasized. The critical approaches that are to be studied may vary from year to year. The course will be team taught. (SP) Griffith

210. Greek Hexameter Poetry. (2,4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Two units to be graded on a satisfactory/unsatisfactory basis. Prerequisites: 200. Formerly 210A-B. Homer, Hesiod, or other topics in hexameter poetry.

211. Archilochian Greek Poetry. (2,4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Two units to be graded on a satisfactory/unsatisfactory basis. Prerequisites: 200. Formerly 211C-D. Topics in Greek lyric, elegiac and lyric poets from Archilochus to Pindar.

213. Hellenistic Poetry. (2,4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Two units to be graded on a satisfactory/unsatisfactory basis. Four units to be graded on a letter-grade basis. Prerequisites: 200. Formerly 213A-E. Study of Aeschylus, Sophocles, Euripides, Aristophanes, Menander, and other topics in Hellenistic poetry and dramatic theory. (F) Bullock

214. Greek Drama. (2,4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Two units to be graded on a satisfactory/unsatisfactory basis. Four units to be graded on a letter-grade basis. Prerequisites: 200. Formerly 214A-E. Study of Euripides, Sophocles, Aeschylus, Aristophanes, Menander, and other topics in Greek literature. Close reading of selected passages of Greek and Latin will be emphasized. The critical approaches that are to be studied may vary from year to year. The course will be team taught. (SP) Griffith

216. Greek Historians. (2,4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Two units to be graded on a satisfactory/unsatisfactory basis. Four units to be graded on a letter-grade basis. Prerequisites: 200. Topics in the orators and the Greek rhetorical tradition.

217. Greek Oratory and Rhetoric. (2,4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Two units to be graded on a satisfactory/unsatisfactory basis. Four units to be graded on a letter-grade basis. Prerequisites: 200. Topics in the orators and the Greek rhetorical tradition.

218. Greek Philosophers. (2,4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Two units to be graded on a satisfactory/unsatisfactory basis. Four units to be graded on a letter-grade basis. Prerequisites: 200. Formerly 218A-D. Study of ProSo- cratics, Plato, Aristotle, Hellenistic Philosophy, or other topics in ancient Greek philosophy through Plotinus.

219. Ancient Novel. (2,4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Two units to be graded on a satisfactory/unsatisfactory basis. Four units to be graded on a letter-grade basis. Prerequisites: 200. Study of Greek novels, Petronius, Apuleius, or other topics in Greek-Roman romance or novel.

220A-220B. Greek and Latin Epigraphy. (2,2;4,4) Three hours of lectures per week. Two units to be graded on a satisfactory/unsatisfactory basis. Four units to be graded on a letter-grade basis. Prerequisites: 200.
Cognitive Science / 161

Cognitive Science (College of Letters and Science)

Group Major Office: Division of Undergraduate and Interdisciplinary Studies, 311 Campbell Hall, 642-5640

Faculty Members: Steve Palmer, director (Psychology), Alison Gopnik, major adviser (Psychology); Andrea diSessa (Educational Studies), Hubert Dreyfus (Philosophy), Susan Ervin-Tripp (Psychology), Jeremy Feldman (Computer Science), Charles Fillmore (Linguistics), Richard Ivry (Psychology), Daniel Kahneman (Psychology), Paul Kay (Linguistics), George Lakoff (Linguistics), Sam McChoumbi (Linguistics), Johanna Nichols (Slavic Languages and Literatures), John Chula (Linguistics), Peter Pickroll (Education), Michael Rangan (Educational Studies), Saralynn Runyan (Mathematics), Stephen Shank (Psychology), Jitendra Malik (Computer Science), Sam McChoumbi (Linguistics), Johanna Nichols (Slavic Languages and Literatures), John Chula (Linguistics), Peter Pickroll (Education), Michael Rangan (Educational Studies), Saralynn Shank (Psychology), Jitendra Malik (Computer Science).

Group Major in Cognitive Science

Cognitive science is the cross-disciplinary study of the structure and processes of human cognition and their computational simulation or modeling. This interdisciplinary major requires students an understanding of questions dealing with human cognition, such as concept formation, visual perception, the acquisition and processing of natural language, and human reasoning and problem solving. The program draws on relevant courses found within the fields of anthropology, biology, computer science, education, linguistics, philosophy, psychology, and the arts as well as specially designed lower and upper division courses in Cognitive Science. The structure of the major follows:

Prerequisites for the Major: Cognitive Science 1, Computer Science 60A, Linguistics 5, Mathematics 1A.

Major Requirements: Cognitive Science 100 and 101, Computer Science 185, Psychology 110.

Cognitive Psychology Requirement: At least one of the following: Education 229A, Psychology 122A, 123, 124, 126, 142, 143.

LINGUISTICS REQUIREMENT: At least one of the following: Linguistics 100, 110, 120.

PHILOSOPHY REQUIREMENT: At least one of the following: Philosophy 132, 133, 135.

In addition to the above courses required of all majors, students need to take two more courses, selected by consultation with one of the Cognitive Science advisers, leading to an emphasis in some topic in cognitive science. Examples of such emphases are language acquisition, language and thought, culture and view, brain and language, computational processing of natural language, perception and conceptual structure, conceptual structure across cognitive domains, and topology in science in consultation with the major adviser for a comprehensive list of elective courses.

Honor Program. Cognitive science majors who wish to graduate with honors must have an overall grade-point average of 3.00 or higher in all work completed in the University, and a 3.30 grade-point average or higher in the major program at the time of their graduation. In addition, they must complete a thesis of high quality, based upon independent student research, and submit a member of the Cognitive Science faculty and marked by satisfactory completion of at least 3 units of course H195A-H195B or 199.

Students interested in the major should consult the Division of Undergraduate and Interdisciplinary Studies, 311 Campbell Hall, 642-5640.

Lower Division Courses

1. Introduction to Cognitive Science. (3) Two hours of lecture and three hours of laboratory per week. This course is an introduction to the interdisciplinary field of cognitive science. Lectures and readings will survey research from artificial intelligence, psychology, linguistics, philosophy, neuroscience, and will cover topics such as the nature of knowledge, thinking and judgment, vision, imagery, language, and consciousness. Sections will demonstrate some of the major methodologies. Also listed as Education in Mathematics, Science, and Technology 1 and IDS 2. (F)

99. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: permission of instructor. Restricted to freshmen and sophomores; consent of instructor. Independent study and research by arrangement with faculty. (F,SP,STU)

Upper Division Courses

100. Basic Issues in Cognitive Science. (4) Students will receive no credit for 100 after taking Psychology 120A. Three hours of lecture and one hour of discussion per week. Theoretical foundations and current topics in cognitive science. Survey of research from the perspectives of philosophy, psychology, computer science, and physiology. Prerequisites: completion of upper division courses in psychology, computer science, and mathematics. (F)

101. The Mind and Language. (4) Three hours of lecture and one hour of discussion per week. This course is an introduction to the interdisciplinary field of cognitive science. How language gives insight into conceptual structure, reasoning, category-formation, and metaphorical understanding. This course will introduce students to the conceptual systems and language from the perspective of cognitive science. This course will be taught in consultation with one of the Cognitive Science faculty. Students will be required to read a text(s) and to present their reading. (F)

102. Scientific Approaches to Consciousness. (4) Two hours of lecture and one hour of discussion per week. This course will examine the nature of human consciousness from the interdisciplinary perspective of cognitive science. It will cover topics from the philosophy of mind, cognitive science, psychophysics, psychology, computer science, and psychoanalytical models. Also listed as Psychology 129 and 124.

LINGUISTICS REQUIREMENT: At least one of the following: Linguistics 100, 110, 120.

PHILOSOPHY REQUIREMENT: At least one of the following: Philosophy 132, 133, 135.

In addition to the above courses required of all majors, students need to take two more courses, selected by consultation with one of the Cognitive Science advisers, leading to an emphasis in some topic in cognitive science. Examples of such emphases are language acquisition, language and thought, culture and view, brain and language, computational processing of natural language, perception and conceptual structure, conceptual structure across cognitive domains, and topology in science in consultation with the major adviser for a comprehensive list of elective courses.

Honor Program. Cognitive science majors who wish to graduate with honors must have an overall grade-point average of 3.00 or higher in all work completed in the University, and a 3.30 grade-point average or higher in the major program at the time of their graduation. In addition, they must complete a thesis of high quality, based upon independent student research, and submit a member of the Cognitive Science faculty and marked by satisfactory completion of at least 3 units of course H195A-H195B or 199.

Students interested in the major should consult the Division of Undergraduate and Interdisciplinary Studies, 311 Campbell Hall, 642-5640.
non-native speakers of English. This course is intended to serve as an intensive preliminary course for College Writing Programs. Students who are non-native speakers of English and who wish to work on the idiomaticity of their English before enrolling in College Writing 1A. The purpose of the course is to develop students' ability to edit their own writing and to identify high frequency non-idiomatic English. Intensive, individualized practice will be provided for students from different language backgrounds.

Graduate Courses

200. Graduate Issues in Cognitive Science. (3) Three hours of seminar per week. Prerequisites: Graduate standing in psychology or consent of instructor. This course will consist of an introduction to cognitive science at the graduate level. The class will include consideration of topics in perception, reasoning, decision-making, and learning, from the perspectives of different disciplines. Also listed as IDS 222 and Psychology 220F.

201. Graduate Seminar on the Mind and Language. (4) Four hours of seminar per week. Prerequisites: Graduate standing or consent of instructor. Thought appears to be grounded in the sensorimotor system, and grows out of the nature of the physical brain and body; human reason also makes extensive and fundamental use of imaginative mechanisms such as metaphor and metonymy. The readings in this course reviews evidence, much of which comes from the study of how people recognize and reason using categories. The course will include both discussions and research projects appropriate to students in each of the disciplines. (SP) Sweetser

223A-223B. Cognitive Science Graduate Seminar. (1-2) One hour of seminar per week. Must be taken on a pass/no pass basis. Prerequisites: Consent of Instructor. Weekly presentations by local and visiting researchers on a range of topics in Cognitive Science, with ensuing discussion. (F,SP) Palmer

College Writing Programs

College Writing Programs (College of Letters and Science)

Office: 216 Dwinelle Annex, 642-6570
Director: Arthur J. Quinlan, Ph.D.

Lecturers:

Yueh-Sou D. Chiang, Ph.D. (Biochemistry)
Melinda B. Ericksen, M.A.
Candice Franchi, M.A.
Manuel J. Pineda, M.A.
Jana Jones, M.A.
Gail Offen-Brown, M.A.
Armold S. Robinson, M.Div.
Marleen Said-Radnoh, M.A.
Sargam Shah, M.A.
Margaret E. Solloch, Ph.D.
Stephen K. Tol TOUCHMAN, M.A.

College Writing Programs, a newly created unit within the Division of Undergraduate and Interdisciplinary Studies in the College of Letters and Science, has as its overall instructional aim to help undergraduates to establish fluency and control over their own writing and reading skills, to foster a sense of community and shared purpose within the College Writing Program, and to develop essential writing and reading skills.

In addition to the College Writing 1A and 1B courses, College Writing Programs offer a range of courses that focus on improving writing and reading skills, as well as courses that focus on particular genres, such as technical writing, literature, and creative writing.

Comparative Biochemistry (College of Natural Resources, Interdepartmental Graduate Groups)

Office: 148 Morgan Hall, 642-2879
Chair: Nancy A. Ames, Ph.D.

Professors:

Nina M. Agabian, Ph.D. (Biomedical and Environmental Sciences)
Bruce N. Ames, Ph.D. (Molecular and Cell Biology)
Giovanna Feroz-Luzi, Ph.D. (Molecular and Cell Biology)
George A. Brooks, Ph.D. (Physical Education)
Bob D. Buchanon, Ph.D. (Plant Biology)
John E. Castilla, Ph.D. (Entomological Sciences)
Peter Stabens, Ph.D. (Molecular and Cell Biology)
Alexander N. Glazer, Ph.D. (Molecular and Cell Biology)
Sung-Hou Kim, Ph.D. (Molecular and Cell Biology)
J. F. Knobler, Ph.D. (Molecular and Cell Biology)
Daniel Koshland, Ph.D. (Molecular and Cell Biology)
Martin E. Linn, Ph.D. (Entomological Sciences)
Anastasia Mella, Ph.D. (Plant Biology)
Hirotomo Nikaido, Ph.D. (Molecular and Cell Biology)
Luther Packard, Ph.D. (Molecular and Cell Biology)
Kenneth Sauer, Ph.D. (Chemistry)

Howard K. Schachman, Ph.D. (Molecular and Cell Biology)
Peter G. Schultz, Ph.D. (Molecular and Cell Biology)
George F. Sandsbaugh, O.Crm. (Biomedical and Environmental Health Sciences)
Brent C. Parker, Ph.D. (Nutritional Sciences)
Melvin Calvin, Ph.D. (Chemistry and Lawrence Berkeley Laboratory)
Thomas H. Jukes, Ph.D. (Molecular and Cell Biology and Lawrence Berkeley Laboratory) (Emeritus)

Affiliated Faculty:

James C. Bartholomey, Ph.D. (Lawrence Berkeley Laboratory)
Meli Andrew, Ph.D. (Lawrence Berkeley Laboratory)
Judith Campbell, Ph.D. (Lawrence Berkeley Laboratory)
Trudy Fore, Ph.D. (Lawrence Berkeley Laboratory)

Graduate Advisers: Mr. Sandsbaugh, Mr. Shana.

The interdisciplinary Graduate Group in Comparative Biochemistry administers the Ph.D. and M.A. degrees for students interested in a biochemical and molecular approach to problems in the biological sciences. Students work under the supervision of faculty from disciplines including Molecular and Cell Biology, Nutritional Sciences, Molecular Plant Biology, Chemistry, Entomological Sciences, Biomedical and Environmental Health Sciences, and research units such as the Chemical and Biological Laboratories and Lawrence Berkeley Laboratory.

Comparative Literature (College of Letters and Science)

Department Office: 4008 Dwinelle Hall, 642-1202
Chair: Francine Massie, Ph.D.

Professors:

Paul J. Alpert, Ph.D. (English)
Robert Aller, Ph.D. (Hebrew)
William S. Anderson, Ph.D. (Latin)
Michael Andre Barnstein, Ph.D. (English)
Anthony J. Cassetti, Ph.D. (Spanish)
Louise George Claudio, Ph.D. (L.H.D. (Italian)
Joseph J. Duggan, Ph.D. (Hebrew)
Robert P. Hughes, Ph.D. (Slavic)
Francois J. Pons, Ph.D. (French)
James T. Monroe, Ph.D. (Arabic)
Cyril Birch, Ph.D. (Chinese) (Emeritus)
Philip W. Damon, Ph.D. (Comparative Literature) (Emeritus)
David C. Johnson, Ph.D. (Classics) (Emeritus)
Michael N. Nagler, Ph.D. (Classics) (Emeritus)
Joseph A. Pappas, Ph.D. (Classics) (Emeritus)
Blake L. Sparr, Ph.D. (German) (Emeritus)

Associate Professors:

Chana Koenfeld, Ph.D. (Hebrew)
William Kestnagel, Ph.D. (English)
Avital Ronell, Ph.D. (Comparative Literature)
Florence Verdugo, Ph.D. (Latin)
Paul M. Bertrand August, Ph.D. (French) (Emeritus)

Assistant Professors:

Leslie V. Korre, Ph.D. (Greek)
Lydia He Lii, Ph.D. (Chinese)
Michael Loycey, Ph.D. (French)
Eric Naiman, Ph.D. (German)
Nancy Rüttenburg, Ph.D. (English)

The Department of Comparative Literature offers students an opportunity to develop their ability to read literary texts responsibly and critically, to study historical development in literature and in another selective field; 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 arts, and to acquaint themselves with some of the significant writings in the theory of literature; and to prepare themselves for methodological investigation of issues involving more than one literature.

Students must have fulfilled the requirement in Subject A before taking any course in 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 and cultural phenomena rather than on specialized skills, although some specialized courses are among the options open to students. Recent graduates have entered graduate schools to undertake a study project 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. Students are expected to undertake a study project involving several literary traditions. The requirements for the A.B. with a major in Comparative Literature are listed below.

Requirements: Upper Division. A minimum of 30 approved upper division units in literature, including (1) 100 in the senior year, a section of CL 190 in the senior year, and one Comparative Literature upper division course (the 115-116 series), the course to be chosen to fit the period of the student's work in the minor literature, (2) at least four courses totaling not fewer than 12 units of one literature and one course in a classical language or in the original from Greek, Latin, Biblical Hebrew, Sanskrit, or Classical Chinese. Note that literature courses in these examples (English-French) are required for the A.B. degree, adequately prepared students, especially those contemplating graduate studies, may find it advantageous to work in three literatures.

Requirements: Honors. Students who have attained major standing may be admitted to the honors program if they (1) have accumulated at least an overall 3.3 grade-point average and at least a 3.55 grade-point average in the major, and at the time of graduation have accumulated at least a 3.65 grade-point average in the major and a 3.4 average in all work completed at the University; (2) have completed at least 8 upper division units in literature, including Comparative Literature 100 or the equivalent, and (3) are prepared to do upper division work in one vernacular foreign literature or one classical literature.

In addition to the requirements for the regular program outlined above, candidates for the A.B. with honors in Comparative Literature must (1) demonstrate preparation equivalent to that of the Berkeley M.A. in comparative literature, (2) satisfy the requirements for the minor in the major and at least one minor literature. These are intended to help prepare students for the Ph.D. written and oral qualifying examinations, which examine the three literatures in a comparative context according to diachronic and synchronic lines. They are based on reading lists and a statement of interest drawn up by the student in consultation with an advisor. Students expected to complete these examinations not later than the fourth year of study and to devote the following two years to the development of a prospectus and the completion of a doctoral dissertation. 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 hours of lecture per week plus individual conferences. Prerequisites: None. Course work is equivalent to English 1A-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 hours of discussion per week, and individual conferences. Prerequisites: (a) Subject A examination, (b) a 3.5 grade-point average in English 1A-1B or equivalent, and (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. (F,SP)

2A-2B. English Composition in Connection with Reading of World Literature. (6-6) Five hours of lecture per week. Prerequisites: Three years of high school French or two years with an A plus average. Expository writing done in connection with the reading of selected masterpieces of ancient and modern literature and the study of selected French texts read in the original. Course will prepare students for more advanced work in French. (F,SP)

25A-25B. Introduction to Film History. (4-4) Two 2-hour lectures and one 2-hour screening per week. The development of cinema as a dominant form of representation in contemporary culture. A study of major aspects of the cinematographic apparatus illustrated by a survey of the early cinema and the development of major film genres.

A. World cinema from 1880 to 1934.

B. Major types of filmic discourse from 1930 to 1970.

30A-30B. Seminar in World Literature. (4-4) Three hours of discussion per week. Prerequisites: Consent of the instructor. Exploration, in seminar format, of a topic in World literature with round-table discussions and individual assignments. Limited to 15 students with freshmans standing. (F,SP)

31. Sentimentality of Race in the Literature of the American Cultures. (4) Three hours of lecture per week. This course will introduce students to a wide selection of American literature, much of it written by writers of color. This course will examine the problems of stereotypes and race in the creation of fiction which deals with race, ethnicity, social origin and class differences. This course satisfies the American cultures requirement. (F,SP) Weisinger

34. The Contemporan American Novel and Social Critique. (4) Three hours of lecture per week. An investigation of some recent American novels that have used innovation in form and narrative structure to probe novels which deal with the social and political implications of prevailing categories of thought. How do the innovations of these novels challenge ways of thinking the categories of race, ethnicity, class, gender, sexuality? How can novelistic representations challenge social institutions? (F,SP) (W)

36. Cultures of the City. (4) Three hours of lecture/discussion per week. This course introduces students to literature and cultures of the city. Topics include racial and ethnic diversity, the intersection of myth with everyday reality, segregation and cultural geography, local and universal identities. (F,SP) Wheeler

36AC. Cultures of the City. (4) Three hours of lecture/discussion per week. This course introduces students to literature and cultures of the city. Topics include racial and ethnic diversity, the intersection of myth with everyday reality, segregation and cultural geography, local and universal identities. This course satisfies the American cultures requirement. (F,SP) Wheeler

39. Sexuality and Culture. (4) Course may be repeated once for credit with different topic. Three hours of lecture per week. A study of sexuality as articulated in literature and visual culture. Topics include texts selected from novels, plays, films, visual cultures. (F,SP) Wheeler

40. Women and Literature. (4) Course may be repeated once for credit if topic varies. Three hours of lecture per week. A study of women as portrayed in lit-
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Literature, and of women writers. Selected readings on a topic which varies from semester to semester, with detailed examination of both literary techniques and the problems of women. (F,SP)

41. Introduction to Literary Forms. Three hours of lecture per week. Comparative study of masterpieces of world literature.

41A. Forms of the Epic. (4)

41B. Forms of the Lyric. (4)

41C. Forms of the Novel. (4)

41D. Forms of the Drama. (4)

41E. Forms of the Cinema. (4)

50. Gender, Race, and Ethnicity in U.S. Literature and Culture. A course in the analysis of literature written by women or members of racial or ethnic minority groups. It includes a study of one or two minorities and the major works written by them. Prerequisites: Upper division standing or consent of instructor. Graduate students wishing to enroll must know at least one foreign language relevant to the materials studied. (F,SP) Lucey

51. Race and Identity. Three hours of lecture per week. Course will focus on race and identity in American literature. It will look at texts dealing with minorities who "pass" (or choose not to "pass") for white, problems of identity, and questions concerning assimilation. Readings include novels, short stories, and essays by African-Americans, Native Americans, and Asian-Americans. This course satisfies the American Literature requirement. (F,SP) Matiasio

56. Money, Property and Respectability in American Cultures. Three hours of lecture/discussion per week. An investigation of the standards of material and social success formulated by various ethnic groups in the United States. Course work will combine an analysis of literary texts with a study of the history of immigration and of consumer culture. Lectures and discussions will focus on the borders of racism and classism. This course satisfies the American cultures requirement. (F,SP) Davis

Upper Division Courses

100. Introduction to Comparative Literature. (4) Course readings included with consent of instructor. Three hours of lecture per week. Prerequisites: Upper division standing or consent of instructor. Graduate students wishing to enroll must know at least one foreign language relevant to the materials studied. (F,SP) Lucey

112A-112B. Modern Greek Language and Modern Greek Composition. (4-6) Three hours of lecture and one hour of discussion per week. Modern Greek pronunciation, vocabulary, grammar and syntax studied. The forms of writing (prose, poetry, drama) and the reading of literary texts as auxiliary to the acquisition of compositional skills. (F,SP) Kotzamanidou

120. The Biblical Tradition in Western Literature. Three hours of lecture per week. A survey of the major concepts in the philosophy of mysticism and their expression in literature. Examples drawn from at least one Eastern and one Western tradition. Prerequisites: Upper division standing or consent of instructor. (F,SP) Kotzamanidou

125. The Mystical Tradition in Literature. Three hours of lecture per week. A survey of the major mystical concepts in literature. Examples drawn from at least one Eastern and one Western tradition. Prerequisites: Upper division standing or consent of instructor. (F,SP) Kotzamanidou

130. Gender, Sexuality, and Culture. Three hours of lecture per week. A survey of the major concepts in literature. Examples drawn from at least one Eastern and one Western tradition. Prerequisites: Upper division standing or consent of instructor. (F,SP) Kotzamanidou

180. Senior Seminar. Three hours of lecture per week. A survey of the major concepts in literature. Examples drawn from at least one Eastern and one Western tradition. Prerequisites: Senior standing; 100 and one course from the 151-155 series (the latter may be taken simultaneously). Seminar-styled meeting with emphasis on critical analysis. An independent study. Prerequisite: Senior standing. (F,SP) Lucey

198. Independent Study. Three hours of lecture/discussion per week. Prerequisites: Admission to independent study. A course of study arranged with the consent of the instructor. (F,SP) Staff

Graduate Courses

The following graduate courses numbered 200 through 299 are available each semester of the five-year period of effort, including time spent in classes and in outside reading and preparation.

200. Approaches to Comparative Literature. Three hours of lecture/discussion per week. Prerequisites: Admission to graduate standing in Comparative Literature. Lectures on literary theory, on the study of criticism, and on the methods of comparative literary theory. (F,SP) Lucey

202. Approaches to Genre. Three hours of lecture/discussion per week. Prerequisites: Admission to graduate standing in Comparative Literature. An exploration of the major genres of literature. (F,SP) Lucey

203. Asian Literature. Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. A survey of the literature of Asia. (F,SP) Lucey

205. African Literature and Culture. Three hours of lecture per week. Prerequisites: Consent of instructor. A survey of the literature of Africa. (F,SP) Lucey

206. Latin American Literature. Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. A survey of the literature of Latin America. (F,SP) Lucey

208. Comparative Literature. Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. A survey of the literature of the world. (F,SP) Lucey

209. The Renaissance. Three hours of lecture 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. (F,SP) Lucey

210. The Middle Ages. Three hours of lecture per week. Prerequisites: Upper division standing or consent of instructor. Graduate students wishing to enroll must know at least one foreign language relevant to the materials studied. (F,SP) Lucey

215. Studies in Renaissance Literature. Three hours of lecture 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. (F,SP) Lucey

220. Studies in Neoclassical Literature. Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. A survey of the literature of the early modern period. (FSP) Lucey

221. Studies in Eighteenth-Century Literature. Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. A survey of the literature of the eighteenth century. (F,SP) Lucey

223. Studies in the Nineteenth Century. Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. A survey of the literature of the nineteenth century. (F,SP) Lucey

225. Studies in Symbolist and Modern Literature. Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. A survey of the literature of the Symbolist and Modern periods. (FSP) Lucey

227. Studies in Contemporary Literature. Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. A survey of the literature of the contemporary period. (F,SP) Lucey
Computer Science Major In the College of Letters and Science

The major in computer science encompasses computer software, architecture, theory, and applications. It prepares students for employment or for further study in computer science at the graduate level.

Because of large demand and limited resources, the major of computer science majors is restricted. In order to gain admission to the major it is usually necessary to achieve a grade-point average of 3.0 in the lower division requirements. Students should apply to the Computer Science Advising Office, 467 Evans Hall.

Transfer students admitted to Berkeley must, in addition, apply separately to the computer science major. Not all transfer students meet the stringent criteria. It is desired for admission to the major. Therefore, we strongly recommend that if necessary, transfer students be willing to pursue an alternative major at Berkeley. For further information, contact the Advising Office, 642-7214.

Requirements for the Major

Lower Division Requirements: The following lower division courses are required for admission to the major:

1. College-level calculus and linear algebra (Math 1A-1B, 53B or Math 2A-2B);
2. Discrete mathematics (Math 55);
3. Electronics (EE 42 or, alternatively, EE 40 or 40I). It is strongly recommended that EE 42 be a 1-unit laboratory course, be taken concurrently with EE 42.
4. Computer science (CS 60A-60B-60C).

All of the above courses must be graded; none may be taken passed/not passed.

Upper Division Requirements: A total of 27 units of upper division courses including:

1. Core courses (CS 150, and either CS 162 or 164, and CS 170);
2. Breadth courses from two of the following areas:
   a. Hardware (CS 152, or EE 140 and EE 145M);
   b. Software (CS 162 or CS 164, or a course different from that taken to satisfy the core requirement);
   c. Theory (CS 172 or CS 174);
3. An upper division mathematics or statistics course (Math 180 and Math 181A, 191A, or 135B are not acceptable; Engineering 118 may be used to satisfy this requirement);
4. Technical electives, subject to the approval of a faculty adviser. A list of technical electives for which approval will be routinely granted is available at the Advising Office.

Minimum Scholarship: All courses taken in satisfaction of the major requirements must be graded; none may be taken passed/not passed. A GPA of 2.0 in the upper division 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: Requirements for graduation with honors are:

1. A GPA of 3.5 in the major, and overall;
2. A breadth course in all three areas (hardware, software, theory);
3. Completion of an honors project under the direction of a regular computer science faculty member. The project may be carried out in the Honors Seminar, CS 195A, or with an individual faculty member for CS 199 credit.

For graduation with high honors or highest honors, see the Announcement of the College of Letters and Science.
Minor In Computer Science
A minor in computer science is available to all undergraduate students at Berkeley, except CS and EECS majors, through the College of Engineering. Requirements for the minor are Math 53, CS 61A, 61B, 61C, 66, and any three upper division courses in computer science. These courses must be completed with a 3.0 GPA. Further details are available from the Advising Office, 467 Evans Hall.

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 education in systems, 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 Glannini Hall, 642-6730 Chair: David L. Wood, Ph.D.
Professors:
Field, C. Cobb, Jr., Ph.D. Pennsylvania State University. Forest pathology
Donald L. Daithlen, Ph.D. University of California at Berkeley. Forest entomology, insect pathogenesis
Edwin W. Franka, Ph.D. University of California at Berkeley. Urban entomology, pest management
Joseph H. Hancock, Ph.D. Cornell University. Microbial ecology, environmental education
Carolyn Marshalt, Ph.D. University of Wisconsin. Environmental history, philosophy, ethics
Robert D. Reaser, Ph.D. University of Wisconsin. Fungal ecology, ornithological pathology
David C. Huisman, Ph.D. University of California at Berkeley. Forest pathology. Insect pathogenesis
Angela G. Little, Ph.D. (Emeritus) University of California at Berkeley. Pests to food
John R. Parmeter, Jr., Ph.D. (Emeritus) University of Wisconsin. Animal pathology
Event I. Schilling, Ph.D. (Emeritus) University of California at Davis. Systematics and ecosystem entomology
Arnold M. Schultz, Ph.D. (Emeritus) University of Nebraska. Systems ecology

Associate Professors:
Miguel A. Altei, Ph.D. University of Florida. Biological control, agro-ecology
Clasidio J. Carr, Ph.D. University of Chicago. International and comparative anthropology
Dennis C. Huisman, Ph.D. University of California at Davis. Forest pathology

Assistant Professors:
Thomas D. Bruna, Ph.D. University of Michigan. Fungal molecular ecology
Nicholas J. Kretz, Ph.D. University of East Anglia, Norwich. Biological control

Lecturers:
Richard Gagne, Ph.D. University of California at Berkeley. Biological control, entomology
Allan S. Miller, U.Min. San Francisco Theological Seminary. Graduate Theological Union. Environmental science, bioethics

Undergraduate Program
Note: The College of Natural Resources is presently reorganizing its course offerings. Please consult the copydistribution of the College in the Colleges and Schools section at the front of this catalog for a brief description of programs proposed for the college in the future. For current information about program requirements and course offerings, please consult the departmental office listed above or the Dean's Office, 101-112 of Student Affairs, 106 Glannini Hall, 642-0542.

The Conservation and Resource Studies major is an interdisciplinary program designed for those who are interested in environmental issues and areas of interaction among natural resources, population, energy, technology, societal institutions, and cultural values. Students draw on the course offerings of the entire campus and appropriate community resources in the development of individual programs of study. The major's orientation is toward flexibility and an individualized educational experience. The development of course and dynamic functions of complex environmental 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 limited to 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, 100, and 194. In the freshman and sophomore years, students will be expected to take two courses each in two of the following areas: physical sciences, humanities, analytical reasoning; and two courses preparatory to the individual areas of interest. In the junior and senior years, students will concentrate in one of the areas of interest. A more detailed statement of major requirements is available from the department office.

Admission to the CRS major is limited. Applications for on-campus transfers from other majors are reviewed once each semester. Deadlines are early September for students entering and early February for fall semester (check with department for exact dates).

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 must average a minimum of 2.0 GPA. Further details are available from the department office.

Graduate Studies
CRS has no graduate major under its own administration. However, the department offers a limited number of upper division courses that, on an ad hoc basis, may facilitate admission of students to appropriate majors within other departments to pursue graduate studies 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 the Department of Conservation and Resource Studies.

Lower Division Courses
10. Environmental Issues. (4) Three hours of lecture and one and one-half hours of discussion per week. Relationship between human society and the natural environment; case studies of socio-system maintenance and disruption, issues of economic development, population, energy, resources, technology, and alternative systems. (F,SP,STaut)

10L. Environmental Issues: Special Projects. (1) Course may be repeated for credit. One and one-half hours of discussion per week. Prerequisites: 10 (to be taken concurrently) or consent of instructor. Group projects related to the 10 lecture series. (F,SP,STaut)

40. Environmental Chemistry. (2-3) Students will receive 2 units of credit for 40 after taking Chemistry 1A or equivalent. Two hours of lecture per week; additional two hour discussion for those students enrolling for three units. Physical and chemical properties of the environment; how they relate to pollution and environmental degradation. Students with weak backgrounds are encouraged to enroll for three units instead of two. (SP) Huisman

60. Environmental Biology. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: One course in introductory college biology is recommended. Intended for nonmajors. Basic biological and ecological principles discussed 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 ecosystem models and implementing strategies for their solution. (F) Dahitten

90. Introduction to Conservation and Resource Studies. (1) Two hours of seminar every other week. Must be taken on a pass/no pass basis. 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,SP,Staff)

98. Directed Group Study in CRS. (1-3) Course may be repeated for credit. Individual meetings. Must be taken on a pass/no pass basis. Prerequisites: Lower division standing (3.4 GPA or better), 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 courses, or in good standing who 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) Three hours of lecture and three hours discussion/demonstration per week. Prerequisites: One course in ecology; one course in mathematics or statistics; one course in a social science or humanities. Analysis and interest; An approach that integrates 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) Staff

101. Urban Garden Ecosystems. (4) Three hours of lecture and three hours of discussion per week. Study of urban garden and recreation ecosystems, with emphasis on basic ecological concepts and techniques for managing plant and animal systems. Average of two hours/week field work in garden. (SP) Rashe

101L. Urban Garden Ecosystems Laboratory. (1) Three hours of supervised laboratory project per week. Must be taken on a pass/no pass basis. Prerequisites: Consent of Instructor. (SP) Staff

102. Agricultural Ecology. (3) Three hours of lecture per week. Prerequisites: Consent of Instructor. Examinations in a holistic framework fundamental biological, technical, socio-economic and political processes that govern agrosystem productivity and stability. Management, productivity and sustainability of land management practices that sustain longterm production is emphasized. One Saturday field trip and one optional field trip. (SP) Attiari

106. Fire, Insects, and Diseases in Forest Ecosystems. (3) Two hours of lecture per week and four one-hour problem sections per week. An introduction to fire, insects, and disease as factors in the development of insect control, agroecology, ornamental pathology, Pavlik Systematics and ecosystem entomology, Biological control, agro-ecology, genetics, and pest management. One course in introductory college biology is recommended. Intended for nonmajors. Basic biological and ecological principles discussed 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 ecosystem models and implementing strategies for their solution. (F) Dahitten

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 education in systems, 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.
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these interactions due to modern human policies of preservation and management and exploitation. (F) Wood

110. Ecosystematology. (4) Three hours of lecture and one and one-half hours of discussion per week. Pre-requisites: 100 or any ecology course or consent of instructor. Conceptual tools for studying large, complex ecological systems. Dependent upon instructor. An emphasis on the role of planning agents, indifferent observers; how to deal with complexity; the systems approach to problem solving; determining systems boundaries; ecological concepts; ecosystems and the systems concept. A weekend field trip is required. (SP) Schultz

115. Environmental Philosophy and Ethics. (3) Two hours of lecture and one hour of discussion per week. Pre-requisites: 100 or consent of instructor. A critical analysis of human environments as physical, social, technological, and cultural ecosystems. Emphasis on the role of ideas, beliefs, attitudes, and behavior. An examination of contemporary environmental literature and the philosophies embodied therein. (F) Merchant

116. Bioethics. (3) Two hours of lecture and one hour of discussion per week. Exploration of the ethical dilemmas arising from recent advances in the biological sciences: genetic engineering, socio-biology, health care delivery, behavior modification, patients’ rights, social or private control of research. (SP) Miller

130. Environmental Policy, Administration, and Law. (4) Three hours of lecture and one hour of discussion per week. Pre-requisites: 130 or consent of instructor. An introduction to the legal concepts of environmental law. Discussion of the scientific and legal requirements for determining the boundaries of the environment. Special emphasis on the U.S. policy regarding energy and agricultural development, considered within the global context. (F) Staff

131. Legal Aspects of Resource and Environmental Management. (3) Two hours of lecture and one and one-half hours of discussion per week. Pre-requisites: 130 and upper division standing. Introduces legal concepts which structure public resource discussions. Review of history and institutional setting, discuss constitutional principles (property, federalism). Focus on selected resources: Forests, wildlife, water, energy and non-energy minerals. Evaluate strengths and limits of legal concepts. (SP) Staff

132. Environmental Analysis. (4) Three hours of lecture, one hour of discussion, and two hour project group meetings. Pre-requisites: 130 or consent of instructor. Methodologies for describing and assessing human-induced changes on environmental systems. Provides skills in the collection and evaluation of data on physical, economic, and social impacts they relate to environmental planning and problem solving. Includes group environmental impact report writing. One required field trip. (SP) Staff

140. Environmental Health and Development. (3) Three hours of lecture per week. 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 mitigation measures. Systematize infrastructure and social systems that relate to environmental planning and problem solving. Includes group environmental impact report writing. One required field trip. (SP) Staff

150. American Environmental and Cultural History. (3) Two hours of lecture and one hour of discussion per week. History of the American environment and the ways in which different cultural groups have perceived and conserved it from colonial times to the present. Cultures include American Indians and European and African Americans. Natural resources development includes gathering-hunting-fishing; mining; ranching; forestry, and urbanization. Changes in attitudes and behaviors toward nature and past and present conservation and environmental movements are also examined. This course satisfies the American cultures requirement. (F) Merchant

151. U.S. Agricultural Development in the 20th Century. (4) Three hours of lecture and one hour of discussion per week. An examination of economic and political forces that have shaped U.S. agriculture since 1920 with special reference to policies on food, water and energy resource development and on the environment, particularly in California. (SP) LeVeen

163. International Rural Development: Comparative Systems. (4) Three hours of lecture and one hour of discussion per week. Comparative analysis of rural development policies and their potential solutions within the present political system. Special emphasis on U.S. policy regarding energy and agricultural development, considered within the global context. (F) Staff

166. Political Ecology. (4) Three hours of lecture and one hour of discussion per week. Analysis of ecological problems in the U.S. from the standpoint of their roots in contemporary political and economic processes. Focus on selected resources: Forests, wildlife, water, energy and non-energy minerals. Evaluate strengths and limits of legal concepts. (SP) Staff

168. Natural Resource Policy and Indigenous Peoples. (4) Three hours of lecture and one hour of discussion per week. Pre-requisites: 168 or consent of instructor. An examination of specific issues of political economy of natural resource management and their potential solutions within the present political system. Special emphasis on U.S. policy regarding energy and agricultural development, considered within the global context. (F) Staff

173. Seminar in Environmental Issues. (3) Course may be repeated for credit. Three hours of lecture per week. Pre-requisites: Upper division standing and consent of instructor. Interdisciplinary study of issues for advanced students. Topics may be considered in critical analysis of specific issues. Different topics will be available each semester reflecting faculty and student interest. Major research project required. (F,SP) Staff

174. Senior Seminar in Conservation and Resource Studies. (2) Two hours of seminar per week. Pre-requisites: Senior standing in CRS. Seminar in which students synthesize their knowledge, skills, and interests into a holistic perspective. A one-hour oral presentation in the Area of Interest and a senior thesis synthesizing the Area of Interest. Required final semester for all CRS majors. (F,SP) Staff

175. Senior Thesis. (3-4) Students who have successfully completed 195 may petition for exemption from 194. Three hours of laboratory/research work per week per unit. Pre-requisites: Senior standing in CRS: 3.0 GPA. Subject must be approved by faculty sponsor for advanced students. Must be taken on a passed/not passed basis. Must be taken during final semester of the junior year and course initiated in the first semester of the senior year. (F,SP) Staff

194A. Internship in CRS—Field Module. (2-3) Fifteen to forty hours per week at placement location for 10 weeks. Pre-requisites: Upper division standing; consent of advisor, faculty sponsor, and CRS department; satisfactory academic progress. Required final semester for all CRS majors. (F,SP) Staff

194A. Internship in CRS—Field Module. (2-3) Fifteen to forty hours per week at placement location for 10 weeks. Pre-requisites: Upper division standing; consent of advisor, faculty sponsor, and CRS department; satisfactory academic progress. Required final semester for all CRS majors. (F,SP) Staff

194B. Internship in CRS—Research/ Seminar Module. (2-5) Two hours of seminar per week; variable hours research/work for five weeks. Pre-requisites: Upper division standing; consent of advisor, faculty sponsor, and CRS department; completion of 194A. A five-week period for the student's analysis of his/her internship experience, preparation of internship report (under the supervision of chair of the intern's committee), and participation in a weekly seminar required of all returning interns. (F,SP) Staff

197. Field Study In CRS. (1-3) Course may be repeated for credit. Approximately three hours of field study per week per unit. Must be taken on a passed/not passed basis. Pre-requisites: Consent of instructor.

199. Supervised Independent Study and Research. (1-3) Course may be repeated for credit. Approximately three hours of laboratory per week per unit. Must be taken on a passed/not passed basis. Pre-requisites: 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) Staff

200. Environmental History, Philosophy, and Ethics. (3) Three hours of lecture/discussion per week. Pre-requisites: Upper division course in history or 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 included in the course may include environmental historiography, theories of environmental history, and the relationships between environmental history, philosophy, ethics, ecology, and policy. (F) Merchant

260. International Rural Development Policy. (3) Three hours of lecture/discussion per week. Pre-requisites: Upper division course in history or 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 included in the course may include environmental historiography, theories of environmental history, and the relationships between environmental history, philosophy, ethics, ecology, and policy. (F) Merchant

Graduate Courses

250. Environmental History, Philosophy, and Ethics. (3) Three hours of lecture/discussion per week. Pre-requisites: Upper division course in history or 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 included in the course may include environmental historiography, theories of environmental history, and the relationships between environmental history, philosophy, ethics, ecology, and policy. (F) Merchant

260. International Rural Development Policy. (3) Three hours of lecture/discussion per week. Pre-requisites: Upper division course in history or 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 included in the course may include environmental historiography, theories of environmental history, and the relationships between environmental history, philosophy, ethics, ecology, and policy. (F) Merchant

Interdepartmental Studies Courses

Lower Division Course

IDS 80. Environmental Physics. (3) Three hours of lecture and one hour of discussion per week. Elementary concepts of physics with application to problems of environment, energy, pollution, biology, geology. Specific examples of the role of physics in contemporary social issues. Sponsoring departments: Conservation and Resource Studies and Physics. (F) Staff

Upper Division Courses

IDS 121A-121B. Environmental Education. (3-3) Five and one-half hours of lecture/discussion and six hours of fieldwork per week. Pre-requisites: 121A is prerequisite to 121B; consent of instructor. Theory and practice of teaching environmental education. Focus on translating 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. Hurst

*On leave, spring
*On leave, fall
*Recalled to active service
†Recipient of Distinguished Teaching Award
Dance
(College of Letters and Science)
Office: Dramatic Art Department, 101 Dwinelle Annex, 642-1677
For information about dance courses and curricula, see information listed under the Department of Dramatic Art.

Demography
(College of Letters and Science)
Department Office: 2232 Piedmont Avenue, Berkeley
Chair: Eugene Hammel, Ph.D.
Professors:
Ronald Lee, Ph.D. (Demography and Economic Demography; Historical Demography)
Keneth Wechsler, Ph.D. (Demography and Statistics)
Eugene Hammel, Ph.D. (Demography and Anthropology; Historical Demography; Biomathematical Demography; Mortality; Demographic Modelling)
Jan De Vlue, Ph.D. (Demography and Economics)
G. Harding, Ph.D. (Demography and Economics)
Michael Hout, Ph.D. (Sociology)
Jane Trumoff, Ph.D. (Demography and Economics)
Michael Tarlov, Ph.D. (Biomedical and Environmental Health Studies)
Russell Thornton, Ph.D. (Sociology)

Graduate Adviser: Mr. Wilmeth.

The regional Graduate Group in Demography includes faculty at Berkeley, Davis, Stanford, and appropriate courses may be taken at any of them. The graduate degree programs in demography, as such, are located only at Berkeley, where the department 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. The emphasis is placed on the interactions between population structure and change and on the social, cultural, 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 the applied level, or in demography. The second degree is 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 be permitted by the intercampus exchange arrangement. Seniors are admissible to the graduate courses by consent of the instructor. Applicants who are not undergraduate majors, the Department of Demography offers an undergraduate minor in demography. The minor is open to all students on the Berkeley campus.

Minor in Demography
UC students may complete one or more minor programs, normally in a field both academically and administratively distinct from their major. For the minor in demography, students must complete, in addition to those requirements, a minor program with a total of five upper division courses. All courses applied to the minor must be taken on a letter-grade basis. At least three of the five upper division courses must be completed at Berkeley.

Requirements: One general introductory course in population, consisting of one of the following: Anthropolgy 189A, Demography 100, Sociology 126, or Economics 175; one course in demographic methods: Demography 110; one course in statistical analysis of social data; and one of the following: Public Health 121, Public Health 122, Statistics 131A, Statistics 131B, Statistics 131F, or Statistics 134; two courses in social science dealing with demographic factors, consisting of one of the following: Economics 105, Economics 112, Economics 113, Economics 175, History 139B, History 158, Demography 105, Sociology 112, 126.

The faculty in demography may allow additions to or substitutions within the subfields, depending on the courses available on the campus. With the permission of the faculty, subfields may include graduate-level courses covering the same area that qualified seniors may choose to take.

Lower Division Courses
40. Freshman Seminars. (1) Course may be repeated for credit as topic varies. One hour of seminar per week. Sections 1-2 to be graded on a passed/not passed basis. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member. In a small seminar, the students are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP) Staff

Upper Division Courses
100. Introduction to Population Theory. (3) Three hours of lecture per week. Population structure and change in developed and developing countries, and in the past. Social and economic consequences for development and family planning. Emphasis on topics in population and social security, etc. The influence on fertility, mortality and migration, of social, economic, technological and policy factors. (F) Staff

110. Introduction to Demographic Analysis. (3) Three hours of lecture per week. Measures and methods of Demography, including fertility, mortality and fertility analysis, with emphasis on application to as wide a range of fertility data. Exercises will give students an opportunity to explore an intellectual topic with a faculty member. In a small seminar, the students are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP) Staff

130. Causes and Consequences of Population Aging. (3) Three hours of lecture per week. Prerequisites: One course on demography, such as Economics 175, or Anthropolgy 189A; or a course on aging, or consent of Instructor. In this course, we will examine the causes and consequences of population aging from a demographic perspective, with emphasis on social, economic, and political factors. (F) Staff

140. Human Migration. (3) Two hours of lecture per week. The course is a one-semester introduction to the study of human migration, designed for upper-level undergraduate students majoring in demography and for graduate students in demography. In this course, students will (1) gain a working knowledge of historical and contemporary migration patterns, both between and within nations, (2) learn about the central issues in the measurement and analysis of migration data from standard surveys; (3) analyze theoretical and empirical studies of the economic causes of internal migration; and (4) complete an individual project in which they analyze migration data for a selected area. (F) Staff

Graduate Courses
200. Sociological Theories of Population. (2) Two hours of seminar per week. Prerequisites: Consent of instructor and prior or concurrent enrollment in Population Studies 100 or Sociology 126 or Anthropology 189A. Required of graduate students in the M.A. or Ph.D. program in Demography. (F) Staff

201. Economic Theories of Population. (2) Two hours of seminar per week. Prerequisites: Consent of instructor and prior or concurrent enrollment in Economics 175. Required of graduate students in the M.A. or Ph.D. program in Demography. (F,SP) Lue

210. Demographic Methods: Rates and Structures. (2) One 2-hour lecture/ seminar per week. Prerequisites: Consent of instructor and prior or concurrent enrollment in Population Studies 110 or consent of instructor. Stable population theory, demographic measurement, and estimation procedures for flawed and incomplete data. Sensitivity testing of demographic measurement using microsimulation. (SP) Wilmeth

211. Advanced Demographic Analysis. (4) Three hours of lecture per week. Prerequisites: 210, Population Studies 110, or consent of instructor. Stable population theory, demographic measurement, and estimation procedures for flawed and incomplete data. Sensitivity testing of demographic measurement using microsimulation. (SP) Wilmeth

212. Advanced Demographic Methods. (4) Three hours of seminar per week. Prerequisites: 210. Statistical analysis of demographic data, sensitivity testing of standard methods, refinement of analytic techniques, microsimulation. (SP) Watcher

213. Practical Computer Applications for Demographic Analysis. (1) Three hours of demonstration and laboratory per week. Staff

220. Human Fertility. (4) Three hours of lecture per week. Theoretical models and empirical measures of fertility; comparative analysis of social, economic, and demographic factors influencing reproductive trends and differentials; population and family planning policies in industrialized and developing areas in historical and contemporary perspective. (SP) Wilmeth

221. Demographic Analysis of Fertility Data. (4) Three hours of lecture per week. Course will give the student experience in using tools of demographic analysis to make population data speak to various issues and problems in the study of human fertility. First part will focus on learning to use the various tools of fertility analysis, with emphasis on application to wide range of actual fertility data. Exercises may involve computer work with U.S. fertility data. Second part of the course will focus on applications to the study of particular issues and problems.

230. Human Mortality. (4) Three hours of lecture per week. Prerequisites: 210 or consent of instructor. Measurement of mortality by age and cause. Traditional, transitional, and contemporary approaches to measuring mortality in industrial and non-European areas. Current trends and differentials by age, sex, race, occupation and marital status. Consequences of mortality declines for fertility change and development. (SP) Staff

240. Migration. (4) Three hours of lecture per week. Humn population analyzed from the standpoints of the demographic consequences of migration; on rural-urban migration, metropolitan structure, interregional movement, and demographic aspects of land-use, the collection and analysis of immigration and emigration statistics, and immigration policy. (F,SP) Staff
259. Mathematical Demography. (4) Three hours of lecture per week. Systematic development of the mathematization of population structure, deterministic and stochastic models of population growth, stable population theory, demographic feedback models, approach to stability, ergodic theorems. (SP) Wachter

265. Chinese Demography. (2) Three hours of lecture per week. Causes and consequences of population growth in late Imperial and Republican China up to 1949, and the people's Republic. Links between economic and institutional change and fertility, urbanization, migration, and social mobility; contrasts between the Chinese case and European experiences.

270. Topics in the History of Population. (4) Three hours of seminar per week. Selected pivotal topics in historical demography. Emphasis particularly on Western Europe and America. Family reconstitution and aggregate analysis, household composition, and historical critique of the theory of demographic transition. Wachter

276. Population and Development. (4) Three hours of lectures/seminar per week. Prerequisites: Consent of instructor. This course will examine some of the major interrelations of population and development in Third World countries. It will devote a certain amount of time to more descriptive aspects of the demography of different regions, but the main focus will be on the interrelations of demographic behavior with development, interactions involving demography both as cause and consequence.

293. Advanced Research Seminar. (3) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Consent of instructor. Problems in the coupling of theory and methods. Required of graduate students in the Ph.D. program in Demography. (P) Staff

295. Research Design. (4) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Consent of instructor. Problems in the coupling of theory and methods. Required of graduate students in the Ph.D. program in Demography. (P) Lee

296. Advanced Research Techniques. (4) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: 295 and consent of instructor. Problems in data acquisition, analysis, and presentation of technical demographic research. Required of graduate students in the Ph.D. program in Demography. (P) Lee

298. Directed Reading. (1-12) Course may be repeated for credit. Prerequisites: Consent of instructor. Intended to provide directed reading in the preparation of an original research paper or dissertation. (F,SP) Staff

601. Individual Study. (1-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing, individual study, in consultation with the graduate advisor, in the department, in specific areas of interest. Students may be required to prepare themselves for language examinations, and the comprehensive examination. (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 faculty advisor, 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

Economics 75. World Population and Economics. (4)

Economics 175. Economic Demography. (4)

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 232. Theory of the Life Table and Competing Risks and Their Applications. (4)

Sociology 126. 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)

Development Studies

(Compact of Letters and Science)

Group Major Office: International and Area Studies, 207 Moses Hall, 924-4688

Major Advisers: Irma Adelman (Agriculture and Resource Economics); Miguel A. Altieri (Entomological Sciences); James N. Anderson (Anthropology); Franab K. Bardhan (Economics); David Collier (Political Science); Jyothish Das Gupta (Political Science); Alain de Janvry (Agriculture and Resource Economics); Lowell Dittmer (Political Science); Louise Fortmann (Forestry and Resource Management); Thomas B. Gold (Sociology); Gillian Hart (City and Regional Planning); Ira M. Lapidus (History); David Leonard (Political Science); Thomas R. Metcalf (History); Robert R. Reed (Geography); Jeff Romm (Forestry and Resource Management); Z. I. Sabry (Public Health/Nutrition); Irene Tinker (City and Regional Planning); Michael J. Watts (Geography).

Program in Development Studies

The Program in Development Studies offers an opportunity for a systematic study of the problems, processes, and prospects for development of the human and material resources of the less developed areas of the world. The problems of development are urgent, massive, enormously complex, and transcendent in scope. Students who wish to participate in the program are aided in organizing an undergraduate plan of study by students already in the Development Studies Program Office, participating faculty members from several departments and programs, the faculty coordinator of the group major, and teaching associates working in the program.

The Group Major

Declaring a major in development studies follows guidelines established by the College of Letters and Science. Students wishing to declare a group major in development studies (1) must have completed at least 30 semester units of university work before applying to the program, (2) must have completed at least two semester courses in development studies, (3) must have completed at least two semester courses of college-level foreign language or the equivalent, and (4) should declare the major no later than the semester in which their 61st unit. Junior transfer students should contact the Group Major Office concerning their eligibility. Students are reminded that (1) no course work for the major may be taken on a passed/not passed basis, and (2) that courses may be used to satisfy more than one major requirement. Minor. There is no minor program in development studies.

Double Majors. Double majors must be approved by the dean of the College of Letters and Science and cannot use more than two upper division courses to satisfy major requirements in both majors.

Course Outside the College of Letters and Science. No more than three courses outside the College of Letters and Science may be used to fulfill major requirements.

Honors Program. To graduate with honors from the Group Major in Development Studies, students must meet the general requirements of the College of Letters and Science. In addition, students must (1) complete the major requirements, (2) take at least one course designated as an honors course, and (3) achieve a grade point average of 3.3 or better in the major. In the spring of the senior year, a thesis committee consisting of at least one other faculty member who is selected by the student in consultation with the thesis instructor, Eligibility for participating in the Honors Program may be checked in the Group Major Office. Students who do not meet the honors criteria but who wish to participate in the program are encouraged to speak with their faculty advisers and honors seminar instructor.

Semester Program. This is an optional program within the major which encourages students to pursue systematically an advanced research project through seminars specifically focused on development topics. Students may elect special topics courses taught by Development Studies faculty. Other course work in this category may be approved by a faculty adviser.

Course Plan

There is considerable flexibility within the development studies major which permits and encourages students to construct a program appropriate to their specific intellectual and geographic interests. The overarching structure of the major presumes, however, that each student has a thematic program. First, a series of lower division courses, in which DS 10, Introduction to Develop-
Development Studies, is central and provides a basic theoretical and methodological grounding for development studies. Second, a series of upper division classes including the required DS 100, History of Development and Underdevelopment, and four other courses in one strong disciplinary and development focus (economics, public health, geography, political economy, sociology, etc.). And third, a three-course sequence focusing on a geographic region (Latin America, South Asia, Northeast Asia, Africa, etc.) through which students build a working knowledge of the culture, history, and political economy of one part of the developing world. In addition to the requirements outlined above, all DS majors must demonstrate proficiency in a single modern foreign language, other than English, equivalent to four college-level semesters.

Lower Division

There are five required courses at the lower division level. DS 10 is a critical course since it provides the essential background for DS 100. Students may find the DS 100 course too demanding without having first enrolled in DS 10. Lower division requirements may be satisfied with equivalent upper division classes with prior consent from a faculty adviser. Several options are listed below.

GenEd Group Major Office for information on current acceptable substitutions.

Required Courses

Anthropology 3, Introduction to Social and Cultural Anthropology; Development Studies 10, Introduction to Development Studies; Economics 1, Introduction to Economics; Political Science 2, Introduction to Comparative Politics; Statistics 2, Introduction to Statistics, or Statistics 20, Introduction to Probability and Statistics.

Note: With prior written consent from a faculty adviser, students may make the following substitutions: Anthropology 3: Anthropology 17, 73, or 144; Economics 1: Political Economy of Natural Resources 1; Political Science 2: Political Science 158A, 158B, 158C, or 159C.

Foreign Language Requirement

Demonstrated proficiency in any single modern foreign language equivalent to four college-level semesters is required of all DS majors. Two semesters must be completed for admission to the major. The remaining two semesters may be completed at any time before graduation. Course work may consist of any combination of high school, college, summer, extension, or college-level study abroad program. This requirement may be satisfied by a proficiency examination or by the completion of appropriate course work with a grade of C- or better. Completion of a one-semester course abroad in a language other than English may be regarded as the equivalent of three semesters of the foreign language requirement. Please consult with a faculty adviser for the program office for current acceptable equivalency exams or course work.

Upper Division

Required Courses

No less than 30 units in upper division courses, including five core courses, a minimum of one course in research methods, and a minimum of three upper division area courses. In fulfilling the major, required courses outlined above, students should choose course work from at least two different disciplines in addition to the required course work for development studies. Specifically, the requirements are as follows:

I. Core Courses. Minimum of five courses. Development Studies 100 is required; plus a minimum of two courses from section B and a minimum of two courses from section C. These core courses are meant to provide a systematic background for students in two critical domains: (1) a discipline of their choosing and (2) development theory. Each DS major should endeavor to build up a strong command of one social science discipline (for example, economics, politics, geography) through two courses which provide critical concepts and methods for the study of developing countries. Course selections listed in section B provide numerous options. In addition, each student should choose a minimum of two development-focused courses from section C. These courses address a variety of historical, cultural, and political-economics concerns in the developing world and supplement the core disciplinary courses.

A. Development Studies 100, History of Development and Underdevelopment.

B. Disciplinary Courses. Minimum of two courses selected from the following list. Both courses should be from the same discipline.

Anthropology: 114A, 141, 143 (Note: This is a specialized course; consult with the instructor and your adviser before enrolling), 144, 147, 148, 169B.


Geography: 100, 110, 116, 130.

History: 101, 103.

Political Economy: Economics 106, 109; Geography 110; PEB 100, 101; Political Science 115B, 125A, 125B, 169B.

Political Science of Natural Resources: 100, 101, 151.


C. Development Courses: Minimum of two courses selected from the following list.

Anthropology: 115, 116, 144, 145, 146, 150, 153, 156A, 156B, 157, 158, 166, 189A.

Business Administration: 188.

City and Regional Planning: 110, 111, 115, 116.

Conservation and Resource Studies: 151, 163, 168.

Development Studies: 130, 140, 150, 194, 197, 198, 199.


Energy and Resources: 100, 151.

Ethnic Studies: 147, *149, *190.*

*Requires prior written approval from a faculty adviser.


Interdepartmental Studies (IDS) 250.

Military Affairs: 170.

Political Economy of Natural Resources: 152.

Political Science: 121, 131, 139A, 139B, 139C, 182, 208.

Population Studies: 100.

Public Policy: 166, 181, 184, 185, 187.

Rhetoric: 150, 155.

Social and Administrative Health Sciences: 150, 176, 206, 207.

Social Welfare: 100.

Sociology: 110; 112, 113, 114, 126, 131B, 132, 144, 170.

II. Methodology. Minimum of one course. The methodology requirement is designed to give each DS major a set of methodological skills appropriate to the disciplinary and core focus of each student's program. The methods course may be drawn from any of two broad categories and the selection of the appropriate category for each student should be undertaken in close consultation with an adviser. The first category focuses on advanced statistical methods and computer-assisted data analysis upon the skills acquired in the lower division statistics requirement. The second category focuses on research design and field methods. It is oriented to questions of survey design, interviews, qualitative data gathering, and approaches to research design. One course should be selected from either of the following lists. A course is strongly recommended.

Statistical Methods: Anthropology 120A, 120B; Behavioral and Environmental Health Sciences 122; Economics 141; Industrial Engineering 162, 167, 171, 172; Political Economy of Natural Resources 118; Political Science 123A-123B.

Population Studies 110; Public Policy 177; Statistics 131A.

Note: (1) Students wishing to complete the research methods in the Department of Economics must also take Economics 100A-100B (Econometrics Analysis) and Statistics 2 before enrolling in Economics 141. (2) Political Science 123A-123B are sequential courses. Grade and credit are awarded upon completion of both courses.

Research Design: Anthropology 169, 169A, 169B; Behavioral and Environmental Health Sciences 138; City and Regional Planning 204B; Ethnic Studies 184, *185; Political Science 136B; Sociology 105, 106.*

*Requires prior written approval from a faculty adviser.

III. Area Courses. Minimum of three courses, selected in consultation with an adviser. For the entire list see area course list. Students must focus on a geographic area building up a substantive expertise in the cultural, political, economic, and historical development of one particular part of the developing world. Students are encouraged to take courses from more than one discipline.

Area Course List. The following list of area courses is not comprehensive or exhaustive, but merely representative courses that have been officially approved by the College of Letters and Science for use in the group major in development studies. It is possible that you will decide later on other or other courses in development departments which, depending on the context, may have a strong area focus and are relevant to your own program and interests in development studies. Similarly, some of the development group major courses (Section C) may have strong regional biases and hence may be used as regional area requirements. For these reasons, please discuss your choice of area courses with your adviser.


Anthropology: 170, 171, 176, 177, 179, 180, 181, 183, 184, 185, 186, 188 (for 188, students must have prior approval).

Asian American Studies: 125, 130.

Chicano Studies: 161, 162.

City and Regional Planning: 270.

Development Studies: 130, 140, 150, 197, 198, 199.

Economics: 111A, 111B, 113, 131, 155, 156, 161, 162.

Education: 265B.

Energy and Resources Management: 117.

Geography: 154, 155, 156, 158, 162, 163, 165, 166, 167.


Latin American Studies: 130, 140, 150.
Middle Eastern Studies: 130, 140, 150.
Military Affairs: 171.
Sociology: 183.
Recommended Courses (Lower and Upper Division)
Listed below are classes which development studies majors have found particularly relevant and helpful in providing an interdisciplinary approach to the study of international development and comparative development, and in providing a basic introduction for methodology courses:
Anthropology 193, Practical Computer Use and Laboratory; Anthropology 193B, Advanced Computer Techniques; Conservation and Resource Studies 10, Environmental Issues; Environmental Design 4, People and Environment; Geography 4, Introduction to Cultural Geography; Geography 7, The Local and the Global (Economic) Geography; Mathematics 18A, Analytical Geometry and Calculus.

Lower Division Courses
10. Introduction to Development, (4) Three hours of lecture and one hour of discussion per week. This course is designed as an introduction to comparative development studies. The course will be a general service course, as well as a prerequisite for the upper division 100 series. It is assumed that students enrolled in 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. (F) Hirsz

Upper Division Courses
100. History of Development and Underdevelopment, (4) Three hours of lecture and one-half hour of discussion per week. History review of the development of world economic systems and the impact of these developments on underdeveloped countries. Course objective is to provide background against which to understand and assess theoretical interpretations of development and underdevelopment. (F) deJamny, Watts

130. Cross Listed Topics. (1-4) Course may be repeated up to four hours of optional lecture every other week. Prerequisites: Consent of instructor. This course is designed to accomodate cross-listed courses offered through other departments, the content of which is applicable to Development Studies majors. Content and unit values vary from course to course. (F,SP) Staff

140. Special Topics. (2) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. A short course designed to provide a vehicle to take advantage of short-term visitors coming to campus who have considerable expertise in areas of interest to Development Studies. Topics will vary semester to semester. (F,SP) Staff

150. Advanced Studies in Development Studies. (4) Course may be repeated for credit with consent of instructor. This course is designed to provide four hours of optional lecture per week. 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. Topics change each semester. (F,SP) Staff

197. Field Studies, (1-4) Course may be repeated for credit. Individual meetings. Must be taken on a pass/not pass basis. 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. Required. (F,SP) Staff

198. Directed Group Study, (1-4) Course may be repeated for credit. Group meetings to be announced. Must be taken on a pass/not pass basis. Prerequisites: Upper division standing and consent of instructor. Directed group study. (upper division). (F,SP) Staff

199. Supervised Independent Study and Research for Undergraduates, (1-4) Course may be repeated for credit. Individual meetings. Must be taken on a pass/not pass basis. Prerequisites: Written proposal must be approved by a faculty advisor. Enrollment is restricted by regulations of the College. (F,SP) Staff

Dramatic Art (College of Letters and Science)
Department Office: 101 Dwinelle Annex, 642-1677
Chair: Lorne Buchanan, Ph.D.
Professors:
Mel Gordon, Ph.D. New York University. Stanislavsky, directing, acting
Dunbar H. Ogden, III, Ph.D. Yale University. Theater history, classical drama
Marn Thomas Wood, B.A, Sarah Lawrence College. Dance, choreography, dance History
Travis Bogard, Ph.D. (Emeritus) Princeton University. British-American drama, directing
Fred Clair Harris, M.F.A. (Emeritus) University of Washington. Directing, acting
Henry May, B.A. (Emeritus) University of Illinois. Sceneography
William C. Cook, Ph.D. (Emeritus) Cornell University. Directing, acting, Spanish theater
Morin Rosenberg, Ph.D. (Emeritus) University of California. Shakespeare, playwriting
Associate Professor:
Lorne M. Buchanan, Ph.D. Stanford University. Shakespeare, directing, directing theater
Assistant Professors:
David McCandless, Ph.D. Stanford University. Shakespeare, acting, directorial theater
Carol Mirota, M.A. University of Hawaii. Dance, choreography

Lecturers:
Martin Berman, Acting
Barbara Codd, M.A. Theater production/design
Luisa Dolea, M.A. Theater education, acting
Christoph Hoff, B.A. Dance
Kate Edmunds, M.F.A. Set design
Carol Egan, B.A. Costume, costume design
David Elliott, B.A. Lighting design
Jennifer Johnson, B.A. Properties
Deborah Sussel, B.A. Acting
Anthony Tagliaferri, M.A. Directing
Teresa Marone, B.A. (Emeritus) Dance, dance music

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, 129; six units chosen from courses 122, 123, 124, 125, 126, 127, 130, 151A-151B; six units chosen from courses 110A-110B, 111, 139, 162, 163, 172, 173A-173B, 174A-174B, 175A-175B; four units chosen from courses 170, 171, two units of which must be in 170.

No course in Dramatic Art offered in satisfaction of undergraduate major requirements may be taken on a pass/not pass basis except Dramatic Art 40A-40B, 141A-141B, 142A-142B, 143A-143B, 170, and 171.

Dramatic Art—Dance
(Students are required to take a dance technique course each semester.)

Lower Division. Dramatic Art 10, 40A-40B, 41, 45A or 45B.

Upper Division. Thirty units of upper division courses in the Department of Dramatic Art including 144, 145, 148A, 152AC, 153; 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 pass/not pass basis except Dramatic Art 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 at the end of the student's junior year. Students accepted in the honors program will include in their program 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 in Dramatic Art would probably include courses in the Department of Dramatic Art at Berkeley. Applicants for admission who need extensive preparatory work either in dramatic literature or in performance may be required to take the necessary courses while enrolling in limited status in the College of Letters and Science (admission to the limited status program, however, is not automatic). In some instances a one-year course of study for a second bachelor's degree may be in order (admission to the second bachelor's degree program, however, is not automatic). Students who seek admission to the limited status program or to the second bachelor's degree program in the College of Letters and Science may obtain information on these programs from the College Office (133 Campbell Hall).

Advising and Evaluation of Student Program. Faculty advisors will assist each graduate student in developing a program of study. At the end of each academic year the faculty as a whole evaluates individually the work of each student. Evaluations in the program requirements of each graduate student and of the entire program will be considered together. Students are advised to take courses covering material in a variety of disciplines as well as to make certain that the program does not include too many courses in any of the major fields of study. Academic standards for the program overall, rather than each course, will be established in the Ph.D. qualifying examination.
Dramatic Art

Upper Division Courses

141A-141B. Intermediate Modern Dance Technique. (1;1) Course may be repeated for credit. Seven and one-half hours of studio per week. Must be taken on a passed/not passed basis. Prerequisites: 142A-142B, auditon, or consent of instructor. Exploration of existing styles and forms of movement and their musical relationship using both individual and group awareness. (F,SP) M. Wood

142A-142B. Advanced Modern Dance Technique. (1;1) Course may be repeated for credit. Seven and one-half hours of studio per week. Must be taken on a passed/not passed basis. Prerequisites: 41A-41B, audition, or consent of instructor. Refinement of movement techniques and qualitative analysis of movement with regard to rhythm, dynamics, and style. (F,SP)

143A-143B. Company Class. (1;1) Course may be repeated for credit. Seven and one-half hours of studio per week. Must be taken on a passed/not passed basis. 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. (F,SP) Egan

144. Sources of Movement. (3) Four and one-half hours of lecture/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 fundamen-tals as a means of extending natural movement in rhythm, energy, and space with emphasis on style and qualitative analysis. (SP) Egan

145. Music Resources for Dancers. (2) Three hours of lecture/studio per week. Prerequisites: 144 or consent of instructor. An historical overview of the different periods of dance, methods of research, analysis of choreographic values of music, and experimentation in their usage. (F,SP)

146A-146B. Choreography. (3-3) Four and one-half hours of lecture/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)

147. Dance Analyses. (3) Four and one-half hours of lecture/studio per week. Prerequisites: 142A-142B and 144, or consent of instructor. Formerly 147A-147B Instruction in the methods and principles of class construc-tion with emphasis placed on movement development. (F) Murota

148. Introduction to Movement Improvisation. (1) Three hours of studio per week. Must be taken on a passed/not passed basis. Prerequisites: Consent of In-structor. Study and analysis of stage movement through non-verbal approaches. (F)

149. Repertory and Production. (3-3) Course may be repeated for credit. Variable studio (1-8 unit credit) 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 and their utilization in the study of other dance. (F,SP) Egan Murota

152AC. Dance History. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Formerly 150A. Working with the premise that the context, content, and form of any dance event serves as a window into the society associated with American Indians, Jewish Americans, and African Americans. This course satisfies the American cultures requirement. (F) Johnson

153. Dance History. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Formerly 150B. The history of modern dance (ballet and modern) from the first dance to the present. (SP) Johnson

Dramatic Art—Undergraduate Courses

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) Graduate Courses

162. Fundamentals of Stage Directing. (3) Four hours of lecture/discussion per week plus preparation and rehearsals to be arranged. Prerequisites: 10, 45A, 55A, 143A-143B, 146A-146B, 148, and one year of graduate work. In-depth study and presentation of choreography and styles of theatre. (Opera, drama, musical, environmental, avant-garde, post-modern.)

Graduate Courses

246A-246B. Advanced Choreography. (4-4) Seven and one-half hours of lecture/studio per week. Prerequisites: 143A-143B, 146A-146B, and one year of graduate work. In-depth study and presentation of choreography and styles of theatre. (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/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.
Honors Courses

Upper Division Courses

H195A. Honors Course. (4) Hours to be arranged. Prerequisites: Honors status in the Department of Dramatic Art. Independent study and conferences with faculty. May involve preparation of a major research paper on a single aspect of dramatic art or dance. (F,SP)

H195B. Honors Course. (4) Hours to be arranged. Prerequisites: Honors status in the Department of Dramatic Art; successful completion of H195A and consent of instructor. May involve preparation of a major research paper in the area of a single aspect of dramatic art or dance. (F,SP)

Literature

Lower Division Courses

1A-1B. Introduction to Dramatic Literature. (4-4) Three hours of lecture/discussion per week. Prerequisites: Subject A, completion of 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. (3-2) Three hours of lecture per week. Prerequisites: Consent of instructor. A. Aeschylus to Shakespeare
B. Shakespeare to Beckett (F) Cigden

24. Freshman Seminar. (1) Course may be repeated for credit as topic varies. One hour of seminar per week. Section 2 to be graded on a passed/not passed basis. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP)

39. Freshman/Sophomore Seminar. (5) Course may be repeated for credit as topic varies. Seminar format. Prerequisites: Priority given to freshmen and sophomores. Freshman and sophomore seminators offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. (F,SP) Staff

50A-50B. Theatre on Film. (3-3) One hour of lecture, two hours of laboratory, and one hour of discussion per week. The study of live theatre in all of its aspects through the use of film. Included will be plays, operas and dances on film and films about these disciplines. The focus of the course will range from issues of cultural significance prevalent in the making of theatre and the adaptive process of turning theatre into film, to the theory of film-making technique.

Upper Division Courses

120. Dramatic Theory. (3) Three hours of lecture per week. Prerequisites: 1A-1B and 20A-20B, or consent of instructor. Study of major documents in dramatic theory and criticism, to focus on: Aristotle, Cornelle, Lessing, Artaud, Brecht, and modern performance. The lectures are based on the analysis of the primary theatrical form of styles chosen by black theatre practitioners and focusing on the black experience in theatre. Emphasis on predominant themes, structural tendencies, socio-historical context. Also listed as African American Studies 151A and Interdepartmental Studies 131A. (F) Wilkerson

121B. Contemporary African American Drama. (4) Hours of lecture per week. Prerequisites: 151A or consent of instructor. Survey of contemporary plays by African American writers and the portrayal of the black experience in American theatre. Emphasis on predominant themes, structural tendencies, socio-historical context. Also listed as African American Studies 151B and Interdepartmental Studies 131B. (SP) Wilkerson

122. Drama and Theatre in Ancient Greece and Rome. (3) Three hours of lecture per week. Prerequisites: 1A-1B and 20A-20B, or consent of instructor. Development of the styles of ancient Greece and Rome. (F) McCandless

123. Drama and Theatre in Europe: Middle Ages to 1600; British to 1642. (3) Three hours of lecture per week. Prerequisites: 1A-1B and 20A-20B, or consent of instructor. Dramatic literature of England and Europe from church drama to the High Renaissance. (F) McCandless

124. Drama and Theatre in 17th Century Europe, Including Spanish Golden Age. (3) Three hours of lecture per week. Prerequisites: Dramatic Art 1A-1B, 20A-20B, or consent of instructor. English and continental drama, 1600-1700.

125. Drama and Theatre in Europe: 1700-1850. (3) Three hours of lecture per week. Prerequisites: Dramatic Art 1A-1B, 20A-20B, or consent of instructor. Eighteenth-century comedy and tragedy; Romantic drama; drama of the Victorian age; the early classic modern period.

126. Drama and Theatre in Europe and United States: 1850-1918. (3) Three hours of lecture per week. Prerequisites: 120, senior standing, or consent of instructor; enrollment is restricted to 15. Studies of the works of a major playwright, choreographer, or designer, or a major period of artistic activity in the theatre. (SP)

127. Drama and Theatre: 1918 to Present. (3) Three hours of lecture per week. Prerequisites: Dramatic Art 1A-1B, 20A-20B, or consent of instructor. Contemporary drama.

129. Senior Proseminar. (3) Course may be repeated for credit subject to acceptance of petition. Three hours of lecture per week. Prerequisites: 120, senior standing, or consent of instructor; enrollment is restricted to 15. Studies of the nature and function of amateur Chinese traditional theatre clubs piaofung in China, and an understanding of how these clubs function today as a means of cultural identity and pride. Chinese community students. Will begin to understand and evaluate performances of Chinese traditional theatre xiqu in the way a Chinese theatre goer does. (F,SP) Pertzl-Jain

131A. African American Plays from 1858 to 1959. (4) Three hours of lecture per week. Prerequisites: Reading and composition requirement. Historical survey of plays by African American writers and the portrayal of the black experience in theatre. Emphasis on predominant themes, structural tendencies, socio-historical context. Also listed as African American Studies 151A and Interdepartmental Studies 131A. (F) Wilkerson

131B. Traditional Theatre of Africa. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Study of African theatre as a whole embodies the nature and function of amateur Chinese traditional theatre. Also listed as African American Studies 151B and Interdepartmental Studies 131B. (SP) Wilkerson

132. African American Dramatic Literature: Forms and Styles. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Study of contemporary plays by African American writers and the portrayal of the black experience in American theatre. Emphasis on predominant themes, structural tendencies, socio-historical context. Also listed as African American Studies 152C and Interdepartmental Studies 132. (F) Wilkerson

133A. African American Literature. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Development of performance skills as a way of knowing and understanding the oral traditions of Africa. Selections and assignments include poetry, essays, and excerpts from plays. Also listed as African American Studies 143A and Interdepartmental Studies 143A. (F) Wilkerson

135. Performance of African American Drama. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Study of production techniques and procedures related to production management, stage management, theatre administration, and theatre design. (F,SP) Codd

136. Performance of African American Drama. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Development of performance skills as a way of knowing and understanding the oral traditions of Africa. Selections and assignments include poetry, essays, and excerpts from plays. Also listed as African American Studies 143A and Interdepartmental Studies 143B. (F) Wilkerson

137. Performance of African American Drama. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Development of performance skills as a way of knowing and understanding the oral traditions of Africa. Selections and assignments include poetry, essays, and excerpts from plays. Also listed as African American Studies 143A and Interdepartmental Studies 143C. (SP) Wilkerson

138. Performance of African American Literature. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Development of performance skills as a way of knowing and understanding the oral traditions of Africa. Selections and assignments include poetry, essays, and excerpts from plays. Also listed as African American Studies 143A and Interdepartmental Studies 143B. (F) Wilkerson

139. Playwriting. (3) Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. Writing and production of plays; emphasis on form, structure, style and dramatic composition. Group readings and discussion of written work. (F)

Production

Lower Division Courses

45A-45B. Theatre in Production: Beginning Study. (3-3) Three hours of lecture per week and laboratory to be arranged. Prerequisites: Consent of instructor. 45A. Basics of stagecraft and production management, including set design and construction, props, makeup, sound, stage management, theatre operations. Related to department's productions. 45B. Basics of production concept. A study of the roles of the producer, director, costume designer, and designer in the making of a theatrical production. Related to department's productions. (F,SP) Codd

Upper Division Courses

170. Theatre Laboratory. (1-3) Course may be repeated for credit. Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor. Non-performing participation in the University Theatre to include: Stage management, crew assistance in lighting, sound, properties, costumes, make-up, backstage; technical assistance in scene or costume shop. (F,SP)

171. Theatre Performance. (1) Course may be repeated for credit. Six hours of lecture and twelve hours of laboratory per week. Prerequisites: Development of a concept of the production process. Introduction to the design and construction of a theatric production. Related to department's productions. (F,SP)

172. Advanced Production Study. (3) Course may be repeated for credit. Three hours of lecture per week and laboratory to be arranged. Prerequisites: 45A-45B or consent of instructor. Formerly 17A-17B. Study of production techniques and procedures related to production management, stage management, theatre administration, and theatre design. (F,SP) Codd

181. Theatrical Realization of Dramatic Texts. (3) Course may be repeated for credit. Six hours of lecture and twelve hours of laboratory per week. Prerequisites: Development of a concept of the production process. Introduction to the design and construction of a theatric production. Related to department's productions. (F,SP)

183A. Performance of African American Literature. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Development of performance skills as a way of knowing and understanding the oral traditions of Africa. Selections and assignments include poetry, essays, and excerpts from plays. Also listed as African American Studies 143A and Interdepartmental Studies 143A. (F) Wilkerson

183B. Performance of African American Drama. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Development of performance skills as a way of knowing and understanding the oral traditions of Africa. Selections and assignments include poetry, essays, and excerpts from plays. Also listed as African American Studies 143B and Interdepartmental Studies 143B. (F) Wilkerson

183C. Black Theatre Workshop. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. Study and production of a play by an African American writer. The play will be studied within its social and historical context. Students will be introduced to the various aspects of theatre production. Also listed as African American Studies 143C and Interdepartmental Studies 143C. (SP) Wilkerson

196. University Theatre Workshop. (4) Hours to be arranged. Prerequisites: Senior standing; 162 and 163 or equivalent and consent of production chairman. Individual directing projects to include research, auditioning, casting and rehearsal; culminating in public performances as scheduled by the department. (F,SP)
Scenography and Design

Upper Division Courses

173A-173B. Scenography: Scenario Design for the Stage. (5) Three hours of lecture and three hours of laboratory per week. Prerequisites: 173A is the prerequisite. (F,SP)

174A-174B. Scenography: Costume Design for the Theatre. (5) Three hours of lecture and three hours of laboratory per week. Prerequisites: Consent of instructor. (F,SP)

175A-175B. Scenography: Lighting Design for the Theatre. (4,4) Three hours of lecture per week and laboratory. Prerequisites: Consent of instructor; restricted enrollment of 18. An introduction to theatrical lighting, including practical application through Dramatic Art production. (F,SP)

177. Visual Arts In Theatre. (3) Three hours of lecture and three hours of laboratory per week. Prerequisites: Consent of instructor. Survey of visual arts as components of style in theatre.

178. History of Costume. (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)

Special Studies

Lower Division Courses

96. Directed Group Study. (1-6) Course may be repeated for credit. Hours to be arranged. Must be taken on a passed/not passed basis. Group study of a topic not included in the regular department curriculum. Topics may be initiated by students. (F,SP) Staff

99. Independent Study. (1-5) Course may be repeated for credit. Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Open to sophomore students with an overall grade point average of 3.3. Study of a topic not included in the regular department curriculum. (F,SP) Staff

Upper Division Courses

197. Field Studies in Technical Theatre. (1-4) Course may be repeated for credit. Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: 454-458 and consent of instructor. Supervised experience, in conjunction with theatrical production in field of scenic-construction; costume construction and conservation; theatrical lighting; stage management; publicity; theatre management; production management.

198. Directed Group Study for Undergraduates. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Enrollment restrictions apply. Supervised group study of special topics, subject to approval by the chair. (F,SP)

199. Supervised Independent Study and Research. (1-6) Course may be repeated for credit. Individual study. Must be taken on a passed/not passed basis. Prerequisites: Eight or more units in the Department of Dramatic Art, with an average grade of B. Restricted to honors students. Prerequisites apply. 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 Theatre. (3) Three hours of lecture per week. Prerequisites: Specially designed for non-majors. Consent of instructor. Survey of the characteristic forms of the major contemporary theatrical modes; topics may include dance, film, television, opera, and others.

Upper Division Courses

151A-151B. Theatre History. (2,3) Three hours of lecture per week. Prerequisites: Consent of instructor. The development of theatrical production in its cultural contexts, including theatre architecture, the stage, scenery and scene design, costume, acting, and directing.

A. Classical Greece to the Renaissance
B. The Renaissance to the Present (F) Ogden

Graduate Courses

222. Studies In Classical Theatre. (4) Three hours of seminar per week. Prerequisites: Graduate standing. Drama of Greece and Rome. Ogden

223. Studies in Tudor and Stuart Theatre. (4) Three hours of seminar per week. Prerequisites: Graduate standing. British drama 1550-1642. McCandless

224. Studies In Continental Theatre. (4) Three hours of seminar per week. Prerequisites: Graduate standing. Seventeenth, Eighteenth, and early Nineteenth century European drama. (F)

225. Studies In Twentieth Century Theatre. (4) Three hours of seminar per week. Prerequisites: Graduate standing. European and American dramatic since 1900. (SP)

226. History of Dramatic Theory and Criticism. (4) Three hours of lecture per week. Prerequisites: Graduate standing. Formerly Dramatic Art 226B. Study of major areas of thought in the history of dramatic theory and criticism from Classical Greece to the 19th century.

227. Contemporary Dramatic Theory and Criticism. (4) Three hours of lecture per week. Prerequisites: Graduate standing. Formerly Dramatic Art 226A. Study of major documents of 20th century dramatic theory and criticism. (F)

239. Advanced Playwriting. (4) Four and one-half hours of lecture/discussion per week. Prerequisites: 139 or consent of instructor.

260A-260B. Directing. (6,6) Six hours of lecture/discussion and laboratory to be arranged per week. Prerequisites: Graduate standing and consent of instructor. Directing for first-year graduate students. (F,SP) Gordon

261A-261B. Advanced Directing. (6,6) Six hours of lecture/discussion per week and laboratory to be arranged. Prerequisites: 260A-260B, and consent of instructor. Directing for second-year graduate students. (F,SP) Gordon

Graduate Special Courses

270. Theatre Laboratory. (1) Course may be repeated for credit. Hours to be arranged. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing and consent of instructor. Practice in acting, dance, theatre design, lighting and stage production in faculty-directed productions.

273A-273B. Scenography: Advanced Stage, Costume, and Lighting Design. (4,4) Three hours of lecture and three hours of laboratory per week. Prerequisites: 173, 174, 175, submission of portfolio, and consent of instructor. Instruction in stage, costume, and lighting design for the advanced student. (F,SP)

274. Theory of Technique of Play Production. (4) Six hours of lecture per week. Prerequisites: Graduate standing in Dramatic Art and consent of instructor. Study in relation to production concepts expressive of theme, mood and character and their relationship to production elements, ground plans and scenic metaphors.

277. Special Studies In Directing. (1-4) Course may be repeated for credit. Hours to be arranged. Prerequisites: Advancement to candidacy for the Ph.D. and consent of instructor. Advanced practice in play direction. (F,SP)

294. Directed Research. (1-12) A maximum of 12 units may be earned among several instructors during a semester. Prerequisites: Graduate standing in Dramatic Art and consent of instructor. Meetings to be arranged, either individually or as a group to explore fields not covered in courses listed elsewhere in Dramatic Art's offerings. May be taken by students engaged in writing dissertations. (F,SP)

Dutch Studies

(College of Letters and Science)

Group Major Office: 175 Dwainelle Hall, 642-2941; FAX 642-0984

Professors:
Svetlana Alpers, Ph.D. (History of Art)
Alan S. Curtis, Ph.D. (Music)
Dunbar Ogston, Ph.D. (Dramatic Art)
Johan P. Snapper, Ph.D. (German, Queen Beatrix Professor)
Jan de Vries, Ph.D. (History)
William J. Bouwsma, Ph.D. (Sather Professor, History)
Carlos De Vries, Ph.D. (History of Art)
Blake Lee Spahr, Ph.D. (German, Comparative Literature)
J. Frits Staal, Ph.D. (South and Southeast Asian Studies)

Associate Professors:
Thomas F. Shannon, Ph.D. (German)
Sylvia C. Twinn, Ph.D. (South and Southeast Asian Studies)

Lecturer:
Jeanne van Oosten, Ph.D.

Peter Paul Rubens Professors:
Reginald de Scharny, Ph.D. (Leuven, 1982)
Walter Prevenier, Ph.D. (Ghent, 1965)
Roland Willemin, Ph.D. (Brussels, 1984)
Carlos Thidemans, Ph.D. (Antwerp, 1985)
Marcel Jacobsen, Ph.D. (Leuven, 1986)
Ferdinand J. de Hert, Ph.D. (Ghent, 1967)
Hugo Barna Stebeerman, Ph.D. (Brussels, 1988)
Adriaan E. Verhulst, Ph.D. (Ghent, 1989)
Eugene Ricoms, Ph.D. (Leuven, 1990)
Herman Patron, Ph.D. (Antwerp, 1991)
Dina Hellenkamp, Ph.D. (Brussels, 1992)
Elis de Bree, Ph.D. (Ghent, 1993)

Adviser: Mr. Snapper.

Group Major in Dutch Studies

The major in Dutch studies is designed to present a balanced curriculum of language, literature, history, and culture of The Netherlands. Since the program is both specialized (in dealing with one country) and broad (in many-sided approach to the subject), it is recommended that the student also prepare a strong related discipline so that the group major in Dutch studies may constitute the focal point to a larger area of interest. Suggested related fields of concentration are Comparative Literature, German, History, History of Art, Linguistics, and South and Southeast Asian Studies (e.g., Indonesian).

See Department of German for a list of courses.

The Major

Lower Division. Dutch 1, 2, 3, or equivalent.

Upper Division. The student is expected to complete a minimum of 30 upper division units, but no more than 36 from those courses listed below. Of these the following are required:

Language courses: Dutch 107, 110 and 130. Literature courses: Dutch 150 plus 3 units in either

Additional courses are to be selected from the following:

- Dutch 125 (Advanced Composition); Dutch 127 (Culture and Institutions)
- 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 Asian Languages
(College of Letters and Science)

Department Office: 104 Durant Hall, 642-5480
Chair: Jeffrey Riegel, Ph.D.

Professors:

- Haruo Aoki (Emeritus), Ph.D. University of California. Japanese literature.

Associate Professors:

- Frank Motulsky (Emeritus), Ph.D. Stanford University. Japanese drama, modern literature and film.

Assistant Professors:


Professor-In-Residence:

- Donald H. Shih (Emeritus), Ph.D. Harvard University. Japanese literature and history.

Lecturers:

- Hirokui Arakawa, M.A. 
- Yasutaka Komori Baker I-Han U. B.A. 
- Sze-Yun Liu, B.A. 
- Key Romanda, M.A. 
- Kikko Sakatani, M.A. 
- Emiko Sawamoto, B.A. 
- Lin Shih, B.A. 
- Yuko Takeku, M.A. 
- Clare You, M.A.

Undergraduate and Graduate Advisers: Consult department office.

The Undergraduate Majors

The Department of East Asian Languages at Berkeley offers a thorough training in the classical and modern languages and literatures of Eastern Asia. Students select one language in the undergraduate major program: Chinese, Japanese, or Alacian. Students proceed from the acquisition of facility in the spoken language to a reading knowledge of both modern and classical forms of the language. Upper division courses stress the philological, linguistic, or literary study of East Asian cultures.

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 (C161, C163, C165, C167; or C169); 4 units of modern Chinese (C150, C158); 8 units of classical Chinese (chosen from among C120, C122, C130, C132, C134, C136, C140, or C142); 4 additional units of department courses in Chinese or in department lecture courses on Chinese subjects.

Total units required: 62.

Japanese

Lower Division. Japanese 1A-1B (5-5); Japanese 10A-10B (5-5); Linguistics 5 (4) may be taken on a passed/not passed basis.

Upper Division. Japanese 100A-100B (5-5): Japanese 120 (4); 4 additional units of classical Japanese (J130, J132, J134, J140, J142, or J144); Japanese 162 (4); Japanese 182A-182B (4-4); 4 additional units in department courses in Japanese.

Total units required: 56.

Alacian 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. Alacian 150A-150B (4-4); Alacian 154A-154B (4-4) and other relevant courses designated by the advisor (e.g., Alacian 158A-158B (4-4); Korean 100A-100B (5-5); Turkish 101A-101B (5-5) and Near Eastern Studies 170A-170B (3-3)).

Total units required: 57.

Honors Program

A senior undergraduate student who has completed 12 units of upper division language courses in the department, and who has a grade-point average of 3.5 in those courses and an overall average of 3.0 may apply for admission to the honors program. If accepted, the student will enroll in an honors course (any H195 course) for two consecutive semesters leading to the completion of an honors thesis. Admission must be submitted at least two weeks before the end of the semester in which the student expects to graduate. While enrolled in the honors program, the student will undertake independent advanced study under the guidance of the student's honors thesis advisor. Upon completion of the program, a faculty committee will determine the degree of honors to be awarded (Honors, High Honors, Highest Honors), taking into consideration both the quality of the thesis and overall performance in the department. Honors will not be granted to a student who does not achieve a minimum cumulative grade-point average of 3.3 in all undergraduate work in the University.

Graduate Programs

M.A. and Ph.D. programs are offered in Chinese Language and Literature and in Japanese Language and Literature. The M.A. degree is offered in Alacian Language and Literature with emphasis on Mongolian. Within any of those areas of specialization, students may focus on literary criticism, comparative studies, cultural history; linguistics, a specified period, or the like, but in every case students will be expected to acquire a solid grounding in the classical and modern versions of the primary language.

The primary purpose of our degree training is to prepare students to become scholars and teachers of advanced courses at the university level. Persons with a solely academic background teaching will not find the program suited to their needs.

Information about the graduate program can be obtained from the department office.

Chinese

Instructor approval is required for enrollment in language courses.

Courses numbered 180-189 and lecture courses given in English.

Lower Division Courses

1A-1B. Elementary Chinese. (5-5) Five hours of lecture per week. Prerequisites: A is prerequisite to B. (F,SP) Staff

1A-2A, 1A-2B. Introduction to Classical Chinese. (4-4) Three hours of lecture per week. Prerequisites: A is prerequisite to B. (F,SP) Alacian

1A-10B, Intermediate Chinese. (5-5) Five hours of lecture per week. Prerequisites: 1B, 10A is prerequisite to 10B. (F,SP) Chu

24. Berkeley Seminar. (1) Course may be repeated for credit as topic varies. One hour of seminar per week. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty mentor and a group of peers in a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP) Staff

39. Freshmen/Sophomore Seminar. (2-4) Course may be repeated for credit as topic varies. Seminar format. Prerequisites: Priority given to freshmen and sophomores. Freshmen and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty mentor and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. (F,SP) Staff

98. Directed Group Study for Lower Division Students. (1-4) Hours to be arranged: Must be taken on

*On leave, spring

Recalled to active service

Recipient of Distinguished Teaching Award
a passed/not passed basis. Prerequisites: Lower di-
vision standing, 3.5 GPA. Formerly Oriental Lan-
guages 98. Small group instruction in topics not cov-
ered by regularly scheduled courses. (F,SP) Staff

96. Independent Study for Lower Division Stu-
dents. (1-4) Hours to be arranged. Must be taken on a
passed/not passed basis. Prerequisites: Lower di-
vision standing, 3.5 GPA. Formerly Oriental Lan-
guages 99. Independent study in topics not covered by
regularly scheduled courses. (F,SP) Staff

Upper Division Courses

100A-100B. Advanced Chinese. (6) Five hours of
lecture per week. Prerequisites: 100A; 100B is pre-
requisite to 100B. Reading and discussion, in Chinese,
of modern Chinese texts, literary, political and general,
in a variety of styles. Assignments to develop oral and
written skills. Three hours of lecture per week. Prereq-
quisites: Lower division standing, 3.5 GPA. Formerly
Oriental Languages 100. Formerly independent study in
topics not covered by regularly scheduled courses. (F,SP) Staff

101. Fourth-Year Readings—Literature. (4) Course
may be repeated for credit. Three hours of lecture per
week. Prerequisites: 100B or consent of instructor.
This course is designed to elevate abilities in speaking,
reading, listening, and writing. Students will read the
works of famous Chinese writers. Movie adaptations of
these writings are also used. Students' writings will be
circulated and students will act in plays they write. (F)
Staff

102. Fourth-Year Readings: Social Sciences and
History. (4) Course may be repeated for credit. Three
hours of lecture per week. Prerequisites: 100B. This
course is designed to elevate abilities in speaking,
reading, listening, and writing. Students will read the
People's Daily and other sources of social, political,
and historical writings. Film documentation will support the
written materials. Students will circulate their works as part of the class
requirements. (F,SP) Staff

120. Ancient Chinese Prose. (4) Three hours of lec-
ture per week. Prerequisites: 2A, 150. Readings in
historical, religious, and philosophical texts of the
Three Dynasties and Sung periods, to reveal how their in-
fluences are reflected in modern Chinese fiction. (SP) Che-
ung

152A. Pre-Han. (4) Three hours of lecture per week.
Prerequisites: 100A. Classical texts of Confucius, (F) Chen

152B. Wei-Jin Through Tang. (4) Staff

152C. Song-Yuan. (4) Staff

152D. Ming-Qing. (4) Staff

156. Readings in Vernacular Chinese Literature:
Drama. (4) Three hours of lecture per week. Prereq-
ultes: 100B. Yuan-Ming drama, readings at fourth year
level. (F,SP) Staff

158. Modern Chinese Literature. (4) Three hours of
lecture per week. Prerequisites: 100B. Texts vary ac-
cording to interests of students. (SP) Liu

161. Structure of the Chinese Language. (4) Three
hours of lecture per week. Prerequisites: 100A, Lin-
guistics 5 or 100. Chinese dialects, Mandarin phonol-
ogy, and Mandarin grammar. (F) Ting

163. Cantonese Linguistics. (4) Three hours of lec-
ture per week. Prerequisites: 100A and Linguistics 5. 4-
lingual analysis of Chinese with emphasis on phonological and grammatical differences from Man-
darin. (SP) Cheung

165. History of the Chinese Language. (4) Three
hours of lecture per week. Prerequisites: 100A, Lin-
guistics 5 or 100. Writing system, early dictionaries,
history of Chinese phonology, and the history of Chinese
script. (SP) Ting

167. Chinese Dialectology. (4) Three hours of lec-
ture per week. Prerequisites: 161 and Linguistics 5 or
100. An introductory survey of Chinese dialects. Some
topics emphasized are: classification criteria, tonal de-
velopment across dialects, dialectal interaction. Train-
ing in the discrimination and transcription of the sounds
of several dialects. (SP) Ting

169. The History of Chinese Philology. (4) Three
hours of lecture per week. Prerequisites: 2A or 100A.
This course will examine Chinese philosophy from a his-
torical point of view. Traditional studies on Chinese philosophy, including Confucian, Taois-
mic, and legalistic thought will be introduced. Major works in philosophy will also be dis-
cussed in depth. (SP) Ting

181A. Chinese Literature in Translation. (4) Three
hours of lecture per week, Formerly Oriental Langu-
guages 131A. Lectures on principal genres, authors,
and individual works of Chinese literature from the be-
ginnings to the fourteenth century. (SP) Wang

181B. Chinese Literature in Translation. (4) Three
hours of lecture per week. Formerly Oriental Langu-
guages 131B. Lectures on principal genres, authors,
and individual works of Chinese literature from the be-
ginnings to the fourteenth century. (SP) Wang

183. The Classics of Chinese Philosophy. (4) Three
hours of lecture per week. Formerly Oriental Langu-
guages 116. The course will cover the "Golden Age" of
Chinese thought covering the Analects of Confucius,
Mencius, Han Fei Tzu, and other impor-
tant Taoist, Confucian, and Legalist works as well as
lesser known tracts on early Chinese aesthetics,
ethics, political philosophy, mysticism, logic, cosmol-
ogy, and the philosophy of science. (SP) Riegel

185. Introduction to Chinese Philosophy. (4) Three
hours of lecture per week. Formerly Oriental Langu-
guages 167. A survey of the history of Chinese phi-
losophy from late Chou times through the Ch'ing dy-
nasty. Treated in some depth are a number of major
Chinese philosophers including Confucius, Mencius, Han
Fei 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 the role of language in
moral education. Also listed as Interdepartmental Stud-
ies 167 and Philosophy 167. (SP) Riegel

H150A-H150B. Honors Courses. (2-5) Hours to be ar-
ranged. Credit and grade to be awarded on completion
of sequence. Prerequisites: Senior honors standing in
East Asian Languages, 3.5 GPA in major; 3.3 overall.
Formerly Oriental Languages H150A-H150B. Directed
independent study and preparation of senior honors the-
ors thesis to be submitted. Limited to senior honors candidates in East Asian Languages (for description of Honors Program, see Index). (F,SP) Staff

198. Directed Group Study. (1-4) Hours to be ar-
ranged. Must be taken on a passed/not passed basis.
Prerequisites: Junior standing. Formerly Oriental Lan-
guages 198. Small group instruction in topics not cov-
ered by regularly scheduled courses. (F,SP) Staff

199. Independent Study. (1-4) Hours to be arranged.
Must be taken on a passed/not passed basis. Pre-
requisites: Junior standing. Formerly Oriental Lan-
guages 199. Independent study in topics not covered by
regularly scheduled courses. (F,SP) Staff

Graduate Courses

220. Seminar in Philological Analysis of Ancient
Chinese Texts. (4) Three hours of seminar per week.
Prerequisites: 150 or 151. Formerly Oriental Language-
guages 211. Analysis of classical texts and inscriptions. (SP) Riegel

230. Seminar in Chinese Literary History. (4) Three
hours of seminar per week. Formerly Oriental Lan-
guages 212. Textual and aesthetic criticism. (F) Staff

232. Historical Documents. (4) Three hours of sem-
nar per week; Prerequisites: Consent of Instructor.
Formerly Oriental Languages 275. Course concentrates
on the late Nebel-chao through Five Dynasties period.
Topics vary from semester to semester and include
poetry, biography, historiography and external rela-
tions. (F) Staff

234. Texts on the Civilization of Medieval China. (4)
Three hours of seminar per week. Formerly Oriental Lan-
guages 216. Course content varies with interests of
students. (SP) Wang
Japanese

Instructor approval is required for enrollment in language courses.

Courses numbered 180-189 are lecture courses given in English.

Lower Division Courses

1A-1B. Elementary Japanese. (5,5) Five hours of lecture per week. Prerequisites: 1A is prerequisite to 1B. (F,SP) Staff

B1A-B1B. Elementary Japanese. (5,5) Students will not receive credit for B1A-B1B after taking 1A-1B, 8, or 8BE. Five hours of lecture per week. Prerequisites: B1A is prerequisite for B1B. This course covers the same material as 1A-1B but will stress the terms necessary for business and technical communications. (F,SP) Staff

10A-10B. Intermediate Japanese. (5,5) Five hours of lecture per week. Prerequisites: 1B; 10A is prerequisite to 10B. (F,SP) Staff

B1A-B10B. Intermediate Japanese. (5,5) Students will not receive credit for B1A-B10B after taking 10A-10B, 5B, or 5BE. Five hours of lecture per week. Prerequisites: B1B; 10A is prerequisite for B10B. This course covers the same materials as 1A-1B but will stress the terms necessary for business and technical communications. (F,SP) Staff

24. Berkeley Seminar. (1) Course may be repeated for credit as topic varies. One hour of seminar per week. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP)

39. Freshman/Sophomore Seminar. (2-4) Course may be repeated for credit as topic varies. Seminar format in English is offered to women and sophomores. Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. (F,SP) Staff

98. Directed Group Study for Lower Division Students. (1-4) Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Lower division standing, 3.5 GPA. Formerly Oriental Languages 98. Small group instruction in topics not covered by regularly scheduled courses. (F,SP) Staff

99. Independent Study for Lower Division Students. (1-4) Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Lower division standing, 3.5 GPA. Formerly Oriental Languages 99. Independent study in topics not covered by regularly scheduled courses. (F,SP) Staff

Upper Division Courses

100A-100B. Advanced Japanese. (5,5) Five hours of lecture per week. Prerequisites: 10B; 100A is prerequisite to 100B. Readings in modern Japanese. Experiences in small seminars in English. (F,SP) Staff

B10A-B10B. Advanced Japanese. (5,5) Students will not receive credit for B10A-B10B after taking 100A-100B, 30, or 30BE. Five hours of lecture per week. Prerequisites: B10B; 100A is prerequisite to B100B. This course covers the same materials as 100A-100B but will stress the terms necessary for business and technical communication. (F,SP) Staff

100S. Japanese for Sinologists. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Graduate standing; 108 and Chinese 100B or equivalents. Students will be trained to read, analyze, and translate modern Japanese scholarship on Chinese subjects. A course of this type is to prepare students to take reading examinations in Japanese. The topics of scholarship will be arranged at the discretion of the instructor. Five hours of lecture per week. Formerly Oriental Languages 100S. A survey history of Japanese literature from 700 A.D. to 1700. Major works of poetry, belles-lettres, fiction, and drama will be read and analyzed. (F,SP) Ortahuh

22. Survey of Japanese Literature in Translation. (4) Three hours of lecture per week. Formerly Oriental Languages 123A. A survey of Japanese literature from 700 A.D. to 1700. Major works of poetry, belles-lettres, fiction, and drama will be read and analyzed. (F,SP) Staff

23. Seminar in Classical Women Writers of Japan. (4) Three hours of seminar per week. Prerequisites: 122A or consent of instructor. Formerly Oriental Languages 123B. A survey history of Japanese literature from 700 A.D. to 1700. Major works of poetry, belles-lettres, fiction, and drama will be read and analyzed. (F,SP) Staff

233A. Independent Study in topics not covered by regularly scheduled courses. (F,SP) Staff

East Asian Languages / 197

and Linguistics 5 or 100. Studies in the structure and history of the Japanese language. (SP) Staff

164. Japanese Grammar. (4) Three hours of lecture per week. Prerequisites: 100A. Formerly 163. Studies in the structure and history of the Japanese language. (F) Staff

162A. Survey of Japanese Literature in Translation. (4) Three hours of lecture per week. Formerly Oriental Languages 123A. A survey history of Japanese literature from 700 A.D. to 1700. Major works of poetry, belles-lettres, fiction, and drama will be read and analyzed. (F,SP) Ortahuh

162B. Survey of Japanese Literature in Translation. (4) Three hours of lecture per week. Formerly Oriental Languages 123B. A survey history of Japanese literature from 700 A.D. to 1700. Major works of poetry, belles-lettres, fiction, and drama will be read and analyzed. (F,SP) Staff

164. Seminar In Classical Women Writers of Japan. (4) Three hours of seminar per week. Prerequisites: 122A or consent of instructor. Formerly Oriental Languages 123B. A survey history of Japanese literature from 700 A.D. to 1700. Major works of poetry, belles-lettres, fiction, and drama will be read and analyzed. (F,SP) Staff

195A-H195B. Honors Courses. (2-5) Hours to be arranged. Credit and grade to be awarded on completion of sequence. Prerequisites: Senior honors standing in English and a GPA of 3.5 overall. Formerly Oriental Languages H195A-H195B. Directed independent study and preparation of senior honors thesis. 'Limited to senior honors candidates in East Asian Languages for description of Honors Program, see Index." (F,SP) Staff

196. Directed Group Study. (1-4) Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Junior standing. Formerly Oriental Languages 196. Small group instruction in topics not covered by regularly scheduled courses. (F,SP) Staff

Graduate Courses

230. Seminar In Classical Japanese Poetry. (4) Three hours of seminar per week. Prerequisites: 130. Formerly Oriental Languages 299. A graduate seminar intended to provide an opportunity for advanced study in the area of the title. Content may be changed from year to year. (SP) Horton


234. Seminar In Classical Japanese Drama. (4) Three hours of seminar per week. Prerequisites: 130, 130, 134 or 140. Formerly Oriental Languages 260. Analysis and discussion of major plays from the no and joruri theatres. Selections from the works of Zeami and Chikamatsu will be made in alternate years. (SP) Staff

244. Seminar In Classical Japanese Texts: Helen Prose. (4) Three hours of seminar per week. Formerly Oriental Languages 229. (F) Horton

255. Seminar In Prowar Japanese Literature. (4) Three hours of seminar per week. Prerequisites: Graduate standing and permission of instructor. Formerly Oriental Languages 249A. Reading and critical evalu-
utation of selected texts in prewar (1868-1940) Japanese fiction, drama, or poetry. (SP) Orbaugh

259. Seminar in Postwar Japanese Literature. (4) Three hours of seminar per week. Prerequisites: Graduate standing and permission of instructor. Formerly Oriental Languages 121. Reading and one evaluation of selected texts in postwar (1940-present) Japanese fiction, drama, or poetry. (F) Staff

269. Seminar in Japanese Linguistics. (3) Three hours of seminar per week. Prerequisites: 182 or consent of instructor. Formerly Oriental Languages 259. The vocabulary of the Japanese language with the participants: dialectology, phonology, or syntax and semantics. (SP) Staff

298. Directed Study for Graduate Students. (1-6) Hours to be arranged. Formerly Oriental Languages 299. Special tutorial or seminar on selected topics not covered by available courses or seminars. (F,SP) Staff

299. Thesis Preparation and Related Research. (1-6) Hours to be arranged. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of thesis supervisor and graduate adviser. Formerly Oriental Languages 299. (F,SP) Staff

601. Individual Study for Master's Students. (1-6) Hours to be arranged. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of graduate adviser. Formerly Oriental Languages 601. Individual study in consultation with the graduate adviser. Units may not be used to meet either unit or residence requirements for a master's degree. (F,SP) Staff

602. Individual Study for Doctoral Students. (1-6) Hours to be arranged. Must be taken on a satisfactory/unsatisfactory basis. Formerly Oriental Languages 602. Individual study in consultation with the major field adviser. Intended to provide an opportunity for qualified students to prepare for various examinations required of candidates for the Ph.D. (F,SP) Staff

Altaic

Instructor approval is required for enrollment in language courses.

Courses numbered 180-189 are lecture courses given in English.

Lower Division Courses

24. Berkeley Seminar. (1) Course may be repeated for credit. One hour of seminar per week. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP)

39. Seminars for Lower Division Students. (3) Three hours of seminar per week. Formerly Oriental Languages 39. Seminars designed to introduce beginning undergraduates to various areas of East Asian literature, thought, and culture. (F,SP) Staff

98. Directed Group Study for Lower Division Students. (1-4) Hours to be arranged. Formerly Oriental Languages 98. Directed study in consultation with the major field adviser. Intended to provide an opportunity for qualified students to prepare for various examinations required of candidates for the Ph.D. (F,SP) Staff

Upper Division Courses

150A-150B. Introduction to Mongolian. (4A,4B) Three hours of lecture per week. Formerly 144A-144B. An introduction to the official language of the Mongolians People's Republic (Khalkha). Graded readings in literary and expository texts. (F,SP) Bosson

154A-154B. Intermediate Mongolian. (4A,4B) Three hours of lecture per week. Prerequisites: 150B. Continued reading and exercises in Khalkha, together with an introduction to the orthography and grammar of literary Mongolian. Formerly Oriental Languages 154A-154B. (SP) Staff

154A-155B. Introduction to Modern Uighur. (4A,4B) Three hours of lecture per week. An introduction to Modern Uighur in its spoken and written forms. The written language will be presented in Latin transcription and in the official modified Arabic script. Lectures will be given on the grammatical structure of the language accompanied by practical exercises in conversation based on graded dialogues. (F,SP) Bosson

155A-155B. Manchu. (4A,4B) Three hours of lecture per week. Prerequisites: Junior standing. Formerly 177A-177B. An introduction to literary Manchu; selected prose texts. (F,SP) Bosson

H195A-H195B. Honors Course. (2-5) Hours to be arranged. Credit and grade to be awarded on completion of sequence. Prerequisites: Senior honors standing in East Asian Languages, 3.5 GPA in major, 3.5 overall. Formerly Oriental Languages H195A-H195B. Directed independent study and preparation of senior honors thesis. Limited to senior honors candidates in East Asian Languages. Formerly Honors Program (see Index). (F,SP) Staff

198. Directed Group Study. (1-4) Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Junior standing. Formerly Oriental Languages 198. Small group instruction in topics not covered by regularly scheduled courses. (F,SP) Staff

199. Independent Study. (1-4) Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Lower division standing, 3.5 GPA. Formerly Oriental Languages 199. Independent study in topics not covered by regularly scheduled courses. (F,SP) Staff

Graduate Courses

224. Reading in Altaic Texts. (4) Three hours of seminar per week. Formerly Oriental Languages 224. Ancient and medieval prose. (F) Bosson

298. Directed Study for Graduate Students. (1-6) Hours to be arranged. Formerly Oriental Languages 298. Special tutorial or seminar on selected topics not covered by available courses or seminars. (F,SP) Staff

299. Thesis Preparation and Related Research. (1-6) Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Junior standing. Formerly Oriental Languages 299. Special tutorial or seminar on selected topics not covered by available courses or seminars. (F,SP) Staff

Buddhism

Instructor approval is required for enrollment in language courses.

Courses numbered 180-189 are lecture courses given in English.

Lower Division Courses

24. Berkeley Seminar. (1) Course may be repeated for credit. One hour of seminar per week. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP) Staff

39. Seminars for Lower Division Students. (1-4) Hours to be arranged. Formerly Oriental Languages 39. Seminars designed to introduce beginning undergraduates to various areas of East Asian literature, thought, and culture. (F,SP) Staff

801. Individual Study for Master's Students. (1-8) Hours to be arranged. Formerly Oriental Languages 801. Individual study in consultation with the major field adviser. Intended to provide an opportunity for qualified students to prepare for various examinations required of candidates for the Ph.D. (F,SP) Staff

198. Directed Group Study. (1-4) Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Junior standing. Formerly Oriental Languages 198. Small group instruction in topics not covered by regularly scheduled courses. (F,SP) Staff

199. Independent Study. (1-4) Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Lower division standing, 3.5 GPA. Formerly Oriental Languages 199. Independent study in topics not covered by regularly scheduled courses. (F,SP) Staff

Upper Division Courses

181. Development of Buddhism in East and Inner Asia. (4) Three hours of lecture per week. Formerly Oriental Languages 121. Introduction of Buddhism from India into Central Asia and China, and its subsequent spread to Korea and Japan. The separate tradition of Tibetan Buddhism is included. (F) Lancaster

182. Buddhism and Contemporary Society. (4) Three hours of lecture per week. Formerly Oriental Languages 122. A study of the Buddhist tradition as it is found in contemporary life. The course will focus on China, Korea, Japan, Singapore, Taiwan, and China (Tibet). Students will be asked to explore the relationship that exists between Buddhism and other religious traditions, as well as political and social factors which are influencing its development. (F) Lancaster

H195A-H195B. Honors Course. (2-5) Hours to be arranged. Credit and grade to be awarded on completion of sequence. Prerequisites: Senior honors standing in East Asian Languages, 3.5 GPA in major, 3.5 overall. Formerly Oriental Languages H195A-H195B. Directed independent study and preparation of senior honors thesis. Limited to senior honors candidates in East Asian Languages. Formerly Honors Program (see Index). (F,SP) Staff

198. Directed Group Study. (1-4) Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Junior standing. Formerly Oriental Languages 198. Small group instruction in topics not covered by regularly scheduled courses. (F,SP) Staff

199. Independent Study. (1-4) Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Junior standing. Formerly Oriental Languages 199. Independent study in topics not covered by regularly scheduled courses. (F,SP) Staff

Graduate Courses

220. Seminar in Buddhism and Buddhist Texts. (4) Three hours of seminar per week. Formerly Oriental Languages 220. Content varies with student interests. (F) Lancaster

224. Reading in Buddhist Texts. (4) Three hours of seminar per week. Formerly Oriental Languages 224. Ancient and medieval prose. (F) Bosson

298. Special tutorial or seminar on selected topics not covered by available courses or seminars. (F,SP) Staff

299. Thesis Preparation and Related Research. (1-6) Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Lower division standing, 3.5 GPA. Formerly Oriental Languages 299. Special tutorial or seminar on selected topics not covered by available courses or seminars. (F,SP) Staff
Korean

Instructor approval is required for enrollment in language courses.

Courses numbered 180-189 are lecture courses given in English.

Lower Division Courses

1A-1B. Elementary Korean. (5-5) Five hours of lecture per week. Prerequisites: 1A is prerequisite to 1B. (F,SP) Richards, You

10A-10B. Intermediate Korean. (5-5) Five hours of lecture per week. Prerequisites: 1A; 1B is prerequisite to 10A. (F,SP) Richards, You

24. Berkeley Seminar. (1) Course may be repeated for credit as topic varies. One hour of seminar per week. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP)

39. Seminars for Lower Division Students. (4) Three hours of seminar per week. Formerly Oriental Languages 39. Seminars designed to introduce beginning undergraduates to various areas of East Asian literature, thought, and culture. (F,SP) Staff

98. Directed Group Study for Lower Division Students. (1-4) Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Senior standing, 3.5 GPA. Formerly Oriental Languages 98. Small-group instruction in topics not covered by regularly scheduled courses. (F,SP) Staff

198. Directed Group Study. (1-4) Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Junior standing, Formerly Oriental Languages 198. Small group instruction in topics not covered by regularly scheduled courses. (F,SP) Staff

199. Independent Study. (1-4) Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Consent of graduate adviser. Formerly Oriental Languages 199. Independent study in topics not covered by regularly scheduled courses. (F,SP) Staff

Graduate Courses

298. Directed Study for Graduate Students. (1-4) Hours to be arranged. Formerly Oriental Languages 298. Special tutorial or seminar on selected topics not covered by available courses or seminars. (F,SP) Staff

299. Thesis Preparation and Related Research. (1-8) Hours to be arranged. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of thesis supervisor and graduate adviser. Formerly Oriental Languages 299. (F,SP) Staff

Upper Division Courses

100A-100B. Advanced Korean. (4-4) Three hours of lecture per week. Prerequisites: 100B; 100A is prerequisite to 100B. (F,SP) Richards, You

150. Modern Korean Poetry. (4) Three hours of lecture per week. Prerequisites: 100B. In this course, we will read poetry in Korean from various periods (Koryo dynasty, Yi dynasty) and modern poetry. Some works of contemporary Korean literary criticism will also be read and discussed. (F) Staff

155. Modern Korean Prose. (4) Three hours of lecture per week. Prerequisites: 100B. In this course, we will read prose written in the modern period by O Chongshik, Yuh Hunghil, Pak Wansoo, Yi Muyol and Cho Shehul. Students will translate and discuss texts in class, and submit written translations. (SP) Staff

187A-187B. Korean Literature in Translation. (4-4) Three hours of lecture per week. Formerly Oriental Languages 125A-125B. Readings include mythology, folklore, drama, poetry, and fiction.

Tibetan

Instructor approval is required for enrollment in language courses.

Courses numbered 180-189 are lecture courses given in English.

Lower Division Courses

1A-1B. Elementary Spoken Tibetan. (5-5) Five hours of lecture per week. Prerequisites: 1A is prerequisite to 1B. An introduction to standard Central Tibetan (Lhasa). (F,SP) Staff

10A-10B. Intermediate Spoken Tibetan. (4-4) Three hours of lecture per week. Prerequisites: 1B and 120B or consent of instructor. Formerly 100A-100B. Reading exercises with practice in comprehension and oral proficiency. Emphasis on retelling. Translation of texts from phonetic transcription into written Tibetan. Practice in original composition. Class discussion of grammar as appropriate. (F,SP) Staff

24. Berkeley Seminar. (1) Course may be repeated for credit as topic varies. One hour of seminar per week. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP)

On leave, spring, fall

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39. Seminars for Lower Division Students. (4) Three hours of seminar per week. Formerly Oriental Languages 39. Seminars designed to introduce beginning undergraduates to various areas of East Asian literature, thought, and culture. (F,SP) Staff

98. Directed Group Study for Lower Division Students. (1-4) Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Lower division standing, 3.5 GPA. Formerly Oriental Languages 98. Small group instruction in topics not covered by regularly scheduled courses. (F,SP) Staff

198. Directed Group Study. (1-4) Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Junior standing. Formerly Oriental Languages 198. Small group instruction in topics not covered by regularly scheduled courses. (F,SP) Staff

Upper Division Courses

120A-120B. Elementary Literary Tibetan. (4-4) Three hours of lecture per week. Formerly 164A-164B. Introduction to the grammar of standard literary Tibetan; graded readings in Tibetan prose from literary and historical sources. (F,SP) Bosson

124. Intermediate Literary Tibetan. (4-4) Three hours of lecture per week. Prerequisites: 120B, Formerly 174. Emphasis on doctrinal Buddhist texts. (SP) Lancaster

128A-128B. Advanced Tibetan. (4-4) Three hours of lecture per week. Prerequisites: 120B or consent of instructor. Formerly 164A-164B. Extensive reading in historical and literary texts. (F,SP) Bosson

150A-150B. Elementary Modern Literary Tibetan. (4-4) Three hours of lecture per week. Prerequisites: 150A or 120B. Formerly 165A-165B. Introduction to the essentials of modern Tibetan. Selected readings in modern publications and popular literature. (F,SP) Bosson

167. Tibetan Linguistics. (4) Three hours of lecture per week. Prerequisites: Linguistics 5 or 100. Course deals mainly with modern Tibetan phonology and grammar. (F) Staff

H195A-H195B. Honors Course, (2-5) Hours to be arranged. Credit and grade to be awarded on completion of sequence. Prerequisites: Senior honors standing in East Asian Languages, 3.5 GPA in major, 3.5 overall. Formerly Oriental Languages H195A-H195B. Directed independent study and preparation of senior honors thesis. Limited to senior honors candidates in East Asian Languages (for description of Honors Program, see Index). (F,SP) Staff

198. Directed Group Study. (1-4) Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Junior standing. Formerly Oriental Languages 198. Small group instruction in topics not covered by regularly scheduled courses. (F,SP) Staff

199. Independent Study. (1-4) Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Consent of graduate adviser. Formerly Oriental Languages 199. Independent study in topics not covered by regularly scheduled courses. (F,SP) Staff

Graduate Courses

298. Directed Study for Graduate Students. (1-4) Hours to be arranged. Formerly OrientaL Languages 298. Special tutorial or seminar on selected topics not covered by available courses or seminars. (F,SP) Staff

299. Thesis Preparation and Related Research. (1-8) Hours to be arranged. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of thesis supervisor and graduate adviser. Formerly Oriental Languages 299. (F,SP) Staff

601. Individual Study for Master's Students. (1-8) Hours to be arranged. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of graduate adviser. Formerly Oriental Languages 601. Individual study for the comprehensive or language requirement in consultation with the graduate adviser. Units may not be used to meet either unit or residence requirements for a master's degree. (F,SP) Staff

On leave, spring, fall

Recipient of Distinguished Teaching Award
East European Studies

(College of Letters and Science)

Office: Slavic Languages and Literatures, 5414 Dwinelle Hall, 642-2978

The Department of Slavic Languages and Literatures offers concentration in General 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 have included Hungarian, Lithuanian, Armenian, and Georgian as staffing permits. For further information, see East European Studies course listings following Slavic Languages and Literatures.

Economics

(College of Letters and Science)

Department Office: 787 Evans Hall, 642-6822
Chair: Christina Shinn, Ph.D.

Professor Emeriti: Gerald Debrau, Sc.D. University of Paris. (Class of 1968) Mathematical economics

Professors: Irina Afanas’eva, Ph.D. University of California, Development Economics
George A. Akerlof, Ph.D. M.I.T. Macroeconomics
Robert M. Anderson, Ph.D. Yale University. Mathematical economics
Pnienko S. Andrian, Ph.D. University of Maryland, Labor economics
John DeVinney, Ph.D. Yale University. Economic history
Barry Eichengreen, Ph.D. Yale University. Economic history
Joseph P. Fetter, Ph.D. Oxford University. Microeconomics
R. Glenn Brown, Ph.D. University of Maryland, Labor economics
Dennis C. Bresnahan, Ph.D. University of Chicago. International economics
Richard J. Gilbert, Ph.D. Stanford University. Industrial organization
Steven C. Goldman, Ph.D. Stanford University. Economic history
Michael Katz, Ph.D. Oxford University. Industrial organization
Theodore E. Keeler, Ph.D. M.I.T. Industrial organization
Ronald D. Lee, Ph.D. Harvard University. Development Economics
Daniel S. Gorodetsky, Ph.D. University of Minnesota. Economic theory
Maurice Obstfeld, Ph.D. M.I.T. International economics
James M. Orszag, Ph.D. University of Chicago. Monetary economics
John Cooley, Ph.D. Harvard University. Public policy
Michael Reich, Ph.D. Harvard University. Political economics
Kenneth S. Rogoff, Ph.D. M.I.T. International economics

Graduate Program in Economics

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 of the Department of Economics.

Although 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 M.A. degree in economics by special application. The requirements for an M.A. are: (1) course work in economics equivalent to Economics 101A-101B, 200A-200B, or 201A, 202A; (2) completion of 24 units of approved coursework 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. In four years, a well-prepared student can receive both degrees and complete the pre-thesis requirements for the Ph.D. Further information may be obtained from the graduate assistant of the Department of Economics.

Lower Division Courses

1. Introduction to Economics. (4) Students will receive 2 units of credit for 1 after taking 3 or Political Economy of Natural Resources 1. Two hours of lecture and two hours of discussion per week. A survey of economics designed to give an overview of the field. (F.S.P.)

2. Introduction to Economic Policy of Natural Resources. (4) Students will receive 2 units of credit for 3 after taking 1 and no credit after Political Economy of Natural Resources 1. Three hours of lecture and one hour of discussion per week. Introduction to microeconomics with emphasis on resource, agricultural, and environmental issues. (F.S.P.)

3. Introduction to Political Economy of Natural Resources. (4) Students will receive two units of credit for 3 after taking 1 and no credit after Political Economy of Natural Resources 1. Three hours of lecture per week. Prerequisites: 1. An analysis of the law and the legal process, emphasizing the impact of law on natural resources and economic institutions.

4. World Population and Economics. (3) Three hours of lecture per week. Prerequisites: 1. An introductory 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.

5. Freshman Seminar. (3) Three hours of seminar per week. Prerequisites: Consent of instructor. Topics, experimental in nature, will vary from year to year.

6. Philosophy of Science. (3) Three hours of seminar per week. Prerequisites: Consent of instructor. Topics, experimental in nature, will vary from year to year.

7. Directed Group Study. (1-4) Course may be repeated for credit. Hours to be arranged. Must be taken on a pass/no pass basis. Written proposal must be approved by Department Chairperson. Seminars for the group study of selected topics, which will vary from year to year. Topics may be initiated by students. Staff

Upper Division Courses

100A. Economic Analysis. (4) Students will not receive credit for 100A after taking 101A. Three hours of lecture and two hours of discussion per week. Prerequisites: 1 or 3 or Political Economy of Natural Resources 1. Resource allocation and price determination. (F.S.P.)

100B. Economic Analysis—Macro. (4) Students will not receive credit for 100B after taking 101B. Three hours of lecture and two hours of discussion per week. Prerequisites: 100A. Graduate students may, with the approval of the Department Chairperson, take 100, 101, 102, 103, 104, and 105 for additional credit. (F.S.P.)

8. Advanced Departmental Seminar. (1-4) Course may be repeated for credit. Hours to be arranged. Must be taken on a pass/no pass basis. Written proposal must be approved by Department Chairperson. Students planning to do graduate work in economics are urged to take more quantitative courses in economics.
hours of lecture and two hours of discussion per week. Prerequisites: 1 or 3 or Political Economy of Natural Resource 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)

101A. Economic Theory—Micro. (4) Students will not receive credit for 101A after taking 100A. Three hours of lecture and two hours of discussion per week. Prerequisites: One semester of calculus in addition to 1, 3, or Political Economy of Natural Resource 1. Basic economic theory with emphasis on microeconomic principles. (F,SP) Staff

101B. Economic Theory—Macro. (4) Students will not receive credit for 101B after taking 100B. Three hours of lecture and two hours of discussion per week. Prerequisites: One semester of calculus in addition to 1, 3, or Political Economy of Natural Resource 1. A study of theories of the determination of national income, employment, and price levels, with attention to the effects of monetary and fiscal policy. Staff

102. Aggregate Economic Theory and Policy. (3) Three hours of lecture per week. Prerequisites: 100B or 101B. Advanced topics in macroeconomics. In the past, the course has covered such topics as theoretical challenges to the Keynesian model and determinants of productivity growth.

103. Introduction to Mathematical Economics. (3) Three hours of lecture per week. Prerequisites: Math 50A, 50B, and 50C. Advanced mathematical 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 majors with adequate mathematical preparation. No economic background is required. Also, listed as IDS 103 and Math 103. (Debreu)

104. Advanced Microeconomic Theory. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 101A or consent of instructor. This course explores some issues in advanced microeconomic theory, with special emphasis on game-theoretic models and the theory of choice under uncertainty. Specific applications will vary from year to year, but will generally include topics from information economics and models of strategic interaction. Staff

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.

106. Economics of Marxism. (3) Three hours of lecture per week. Prerequisites: 102 or 136. Economic topics illustrating the application of economics to the study of noncapitalist economic systems. Grossman

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. A seminar paper is required.

108. Critique of Modern Economic Theory. (1.5) One and one-half hours of lecture per week. Prerequisites: 100A-100B or 101A-101B. A critical analysis of contemporary economic theory with emphasis on normative/behavioral approaches to economics.

109. Introduction to Political Economy. (3) Three hours of lecture per week. Prerequisites: 100A-100B or 101A-101B. A survey of major issues involving the relationship between power and the economy.

110. Game Theory in the Social Sciences. (4) Students will receive no credit for 110 after taking 104. Three hours of lecture and one hour of discussion per week. A non-technical introduction to game theory. Basic principle, and models of interaction among players, with a strong emphasis on applications to political science, economics, and other social sciences. Also listed as Political Science 135, Political Economy of Industrial Societies 135, and Interdepartmental Studies 133. Rablin, Deke-Tabak, Powell

111A. European Economy from the Fall of the Roman Empire to the Industrial Revolution. (3) Three hours of lecture per week. Prerequisites: 111A or 136A. Survey of economic and political changes in Europe from 500 A.D. to 1750 A.D. Staff

111B. The Industrial Revolution and the Origin of the Modern Economic System. (3) This course is equivalent to 105B; students will not receive credit for both courses. Three hours of lecture per week. Prerequisites: 1. The rise of the European economy to world dominance in the period from 1750-1914. Staff

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. Staff

113. American Economic History. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 1. A survey of trends in the American economy; emphasis on factors explaining economic growth and on the changing distribution of the gains and losses associated with growth. This course is equivalent to History 135; students will not receive credit for both courses. Staff

114. American Economic History Seminar. (4) Three hours of seminar per week. Prerequisites: 113 and consent of instructor. Seminar paper is required. Staff

115. The World Economy in the Twentieth Century. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 1. Development of the world economic system with particular reference to worldwide trading relationships. This course is equivalent to History 146; students will not receive credit for both courses. Staff

121. Industrial Organization and Public Policy. (4) Three hours of lecture and one hour of discussion 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. Staff

122. Industrial Organization Seminar. (4) Three hours of seminar per week. Prerequisites: 121 and consent of instructor. Seminar on problems in the field of industrial organization. Seminar paper is required. Staff

123. Government Regulation of Industry. (3) Three hours of lecture per week. Prerequisites: 121. Problems of public policy in the field of industrial organization. Analysis of regulatory consequences with particular attention to the automobile industry. Staff

124. 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. Staff

125. 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.

131. Public Sector Microeconomics. (3) Three hours of lecture per week. Prerequisites: 100A-100B or 101A-101B. The economic and policy analysis of government expenditures, taxes, and intergovernmental and fiscal relations. Staff

132. Seminar in Public Sector Economics. (4) Three hours of seminar per week. Prerequisites: 131 and consent of instructor. Enrollment will be limited. A seminar paper is required.

135. Monetary Theory and the Banking System. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 100A-100B or 101A-101B. Survey of monetary theory and policy, including interest and income theories. Depository institutions, other financial institutions, the Federal Reserve System and the supply of money. Staff

137. Aggregate Economics Seminar. (4) Three hours of seminar per week. Prerequisites: 102 or 136 and consent of instructor. Enrollment will be limited. A seminar paper is required. Staff

141. Economic Statistics and Econometrics. (4) Two hours of lecture and one and one-half 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 economics through the study of the theory and application of linear normal regression model, critical evaluation of selected examples of empirical economic research and exercises in applied econometrics. Staff

151. Economics of Trade Unionism and Collective Bargaining. (3) Three hours of lecture per week. Prerequisites: 100A-100B or 101A-101B or consent of instructor. The social and economic background of labor legislation and the economics of collective bargaining. Staff

152. Wage Theory and Policy. (3) Three hours of lecture per week. Prerequisites: 100A-100B or 101A-101B. The theory and the determination of wages and employment. Application of the theory to policy analysis. Staff

153. Labor Economics Seminar. (4) Three hours of seminar per week. Prerequisites: 151 or 152 and consent of instructor. Topics in labor economics. Seminar paper required. Staff

154. Women in the Labor Force. (3) Three hours of lecture per week. Prerequisites: 100A-100B or 101A-101B. An analysis of the changing role of women in the U.S. economy. Staff

155. Urban Economics. (3) Three hours of lecture per week. Prerequisites: 100A or 101A. Application of economic theory to urban problems. Topics covered: location theory, housing, transportation, and the fiscal problems of city government.

156. Urban Economics Seminar. (4) Three hours of seminar per week. Prerequisites: 155 and consent of instructor. Seminar on problems of the urban economy. A seminar paper is required.

157. Health Economics. (3) Three hours of lecture per week. Prerequisites: 1. An economic analysis of policy and institutions in the U.S. health care sector. Topics covered include the supply and demand for health services, conceptual and policy issues relating to the provision of health insurance, and economic analysis of efficient regulatory policies toward the health care sector. Staff

161. Economic Systems. (3) Three hours of lecture per week. Prerequisites: 1. Economic organizations and institutions, and their impact on economic variables. Models of economic systems; studies of actual economies. Staff

162. Economics of the Soviet Union. (3) Three hours of lecture per week. Prerequisites: 1. Recommended: 161 or 162. As announced in the department course descriptions.

164. Economic Systems Seminar. (4) Three hours of seminar per week. Prerequisites: 161 or 162 or 165 and consent of instructor. A seminar paper will be required.

171. Economic Development. (3) Three hours of lecture per week. Prerequisites: 100A-100B or 101A-101B. Problems of underdevelopment and poverty, policy issues and development strategy. Staff

172. Case Studies in Economic Development. (3) Course may be repeated for credit with consent of instructor. Prerequisites: 1. A detailed study of the problems of development in a selected geographic area in Asia or Latin America. Staff

173. Economic Development Seminar. (4) Three hours of seminar per week. Prerequisites: 171 or 172 and consent of instructor. A seminar paper will be required.
175. Economic Demography, (3) Three hours of lecture per week. Prerequisites: 1. A general introduction to economic demography, emphasizing the economic determinants of mortality, fertility, and labor force participation, the impact of demographic factors on economic growth, and the role of demographic changes in economic development. Students with strong background in economics and mathematics should enroll in 210A-210B and 202A-202B rather than 200A-200B. Microeconomics—behaviors of firms and households and the determination of prices and resource allocation in a market economy.

200B. Fundamentals of Economic Theory, (2) Two hours of lecture per week. Prerequisites: Primarily for graduate students outside the Department of Economics. Students with strong background in economics and mathematics should enroll in 210A-210B and 202A-202B rather than 200A-200B. Macroeconomics—determination of national income, employment, price level, growth and distribution.

201A-201B. Economic Theory, (4-4) Three hours of lecture and two hours of discussion per week. Prerequisites: 201A or 101A or equivalent. Basic preparation for the Ph.D. program including theory of the firm and the consumer, general equilibrium, capital theory, and welfare economics.

201C. Linear Economic Models, (3) Two hours of lecture and two hours of discussion per week. Prerequisites: 201A-201B or 101A-101B or equivalent. Mathematics 50A or 50B or equivalent. Staff

202A-202B. Macroeconomic Theory, (4-4) Three hours of lecture and two hours of discussion per week. Prerequisites: 102A-102B 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, saving, investment, disequilibrium theory, dynamic systems, and international considerations.

198. Directed Study. (1-4) Hours to be arranged. Staff

199. Supervised Independent Study and Research, (1-4) Hours to be arranged. Must be taken on a pass/no pass basis. Staff

202. History of Economic Thought, (3) Two hours of lecture per week. Prerequisites: Consent of Instructor. Staff

203. Advanced Topics in Economic Theory, (3) Two hours of lecture per week. Prerequisites: Consent of Instructor. See department course description each semester.

204. Mathematical Tools for Economics, (4) Three and one-half hours of lecture and one and one-half hours of discussion per week. Prerequisites: To be taken concurrently with 201A or consent of instructor. Staff

205. History of Economic Thought, (3) Two hours of lecture per week. Topics in the history of economic analysis.

206. Mechanism Design and Agency Theory, (3) Two hours of lecture per week. Prerequisites: 201B and 209A or consent of instructor. Formerly 209B. This course will study the optimal design of mechanisms in the presence of incomplete information and imperfect observability. The course will begin with the “classical” 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 “imperfect design” of mechanisms, the informational and monitoring, mechanism design with limited contracts.

211. Seminar in Economic History, (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in American economic history.

212. Seminar in Economic History, (3) Two hours of lecture per week. Staff

220A. Industrial Organization, (3) Two hours of lecture per week. Prerequisites: 210A. Market structure, conduct and performance in the regulated sector of the American economy. Public policies related to the promotion or restriction of competition.

220B. Industrial Organization, (3) Two hours of lecture per week. Prerequisites: 220A. Continuation of characteristics of regulated industries and the consequences of regulation for economic performance.

220C. Special Topics in Industrial Organization, (3) Two hours of lecture per week. Prerequisites: See course announcement. See course announcement for credit.

221. Seminar in Industrial Organization: Regulation and Public Enterprise, (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of Instructor. Staff

222. Economics of Institutions, (3) Two hours of lecture per week. This course develops the proposition that institutions have pervasive ramifications for understanding economic behavior. A comparative institutional approach is employed whereby the action is made the basic unit of analysis and alternative models of organization are assessed with respect to their comparative contracting properties. Required of all graduate students.

225. Doctoral Seminar in Institutional Analysis, (2) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Doctoral standing or consent of instructor. Staff

226. 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. Staff

227. Mathematical Economics, (3) Two hours of lecture per week. Twelve hours per week including class time and preparation. 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 problems as the student's interests indicate. Topics include preference, utility, demand, personal probability, game theory, market equilibrium and general equilibrium. Also listed as IDS 213A-213B and Math 213A-213B.

228. Theory and Application of Non-Cooperative Games, (3) Two hours of lecture per week. Prerequisites: Consent of Instructor. This course will study both pure game theory and its application to such problems as oligopoly pricing, non-cooperative bargaining, predatory pricing, and optimal auctions. The focus will be on game theory as a modeling process as well as a tool for the analysis of economic behavior. Required of all graduate students.

229A. Theory and Application of Non-Cooperative Games, (3) Two hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: 229A or consent of instructor. Staff

230. Theory and Application of Non-Cooperative Games, (3) Two hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: 229A or consent of instructor. Staff

231. Seminar in Economic History, (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in American economic history.

232. Seminar in Economic History, (3) Two hours of lecture per week. Staff

233. Seminar in Economic History, (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in American economic history.

234. Economics of Institutions, (3) Two hours of lecture per week. This course develops the proposition that institutions have pervasive ramifications for understanding economic behavior. A comparative institutional approach is employed whereby the action is made the basic unit of analysis and alternative models of organization are assessed with respect to their comparative contracting properties. Required of all graduate students.

235. Advanced Topics in Institutional Analysis, (3) Two hours of lecture per week. Prerequisites: See course announcement. See course announcement for credit.

236. Seminar in Economic History, (3) Two hours of lecture per week. Staff

237. Seminar in Economic History, (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in American economic history.

238. Seminar in Economic History, (3) Two hours of lecture per week. Staff

239. Seminar in Economic History, (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in American economic history.

240. Seminar in Economic History, (3) Two hours of lecture per week. Staff

241. Seminar in Economic History, (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in American economic history.

242. Seminar in Economic History, (3) Two hours of lecture per week. Staff

243. Seminar in Economic History, (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in American economic history.

244. Seminar in Economic History, (3) Two hours of lecture per week. Staff

245. Seminar in Economic History, (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in American economic history.

246. Seminar in Economic History, (3) Two hours of lecture per week. Staff

247. Seminar in Economic History, (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in American economic history.

248. Seminar in Economic History, (3) Two hours of lecture per week. Staff

249. Seminar in Economic History, (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in American economic history.

250. Seminar in Economic History, (3) Two hours of lecture per week. Staff

251. Seminar in Economic History, (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in American economic history.

252. Seminar in Economic History, (3) Two hours of lecture per week. Staff

253. Seminar in Economic History, (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in American economic history.

254. Seminar in Economic History, (3) Two hours of lecture per week. Staff

255. Seminar in Economic History, (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in American economic history.

256. Seminar in Economic History, (3) Two hours of lecture per week. Staff

257. Seminar in Economic History, (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in American economic history.

258. Seminar in Economic History, (3) Two hours of lecture per week. Staff

259. Seminar in Economic History, (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in American economic history.

260. Seminar in Economic History, (3) Two hours of lecture per week. Staff

261. Seminar in Economic History, (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in American economic history.

262. Seminar in Economic History, (3) Two hours of lecture per week. Staff

263. Seminar in Economic History, (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in American economic history.

264. Seminar in Economic History, (3) Two hours of lecture per week. Staff

265. Seminar in Economic History, (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in American economic history.

266. Seminar in Economic History, (3) Two hours of lecture per week. Staff

267. Seminar in Economic History, (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in American economic history.

268. Seminar in Economic History, (3) Two hours of lecture per week. Staff

269. Seminar in Economic History, (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in American economic history.

270. Seminar in Economic History, (3) Two hours of lecture per week. Staff

271. Seminar in Economic History, (3) Two hours of lecture per week. Prerequisites: 210A. A survey of some central themes in American economic history.
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 230B. Staff

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 five-week segments covering (1) welfare economics of government finance, (2) the property tax and other local revenue sources, and (3) analysis of local government expenditures. Students may take any or all of the individual segments, with one unit credit for each. (F,SP) Staff

230C. Public Sector Microeconomics. (3) Two hours of lecture per week. The economic and policy analysis of government expenditures, taxes, and intergovernmental fiscal relations.

231. Seminar in Public Sector Economics. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of Instructor. Staff

236A-236B. Aggregate Economics. (3) Two hours of lecture per week. Prerequisites: For 236A: 201A-201B. Formerly 236. For 236B: 236A. Macroeconomic models; theory and practice of aggregate econometrics; rational expectations models; finance theory integrated with macro. Staff

237. Seminar in Advanced Macroeconomics and Money. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of Instructor. Staff

240A. Introductory Statistics and Econometrics. (4) Three hours of lecture and one and one-half hours of laboratory per week. Prerequisites: 204 or equivalent. Formerly 240. This is the first course in a two-semester sequence introducing graduate students to basic techniques of statistical analysis, including the classical linear regression model. Emphasis is given to computing estimators using simulated and actual data sets. There is a focus on analyzing data from non-controlled experiments. Staff

240B. Introduction to Statistics and Econometrics. (4) Three hours of lecture and one and one-half hours of laboratory per week. Prerequisites: 240A or equivalent. Econometric models and applications, including nonlinear regression, simultaneous equations, limited dependent variable analysis, analysis of nonparametric methods. (F) Staff

241A. Econometrics. (4) Three hours of lecture per week. Prerequisites: Statistics 200A-200B or equivalent and a course in linear algebra. Recommended: Math 112. Intended for students specializing in econometrics. Econometric models and applications, regression and mathematical background. Linear and nonlinear statistical models and their applications in economics. Special problems in analyzing data from non-controlled experiments. (SP) Staff

241B. Econometrics. (4) Three hours of lecture per week. Prerequisites: 241A. Simultaneous equations and time-series models. Staff

242. Seminar in Econometrics. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of Instructor. Staff

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. Staff

244. Applied Econometrics. (3) Three hours of lecture per week. Prerequisites: Methods of applied econometrics, with emphasis on alternative modelling strategies and problems met in practice. Intended for doctoral students conducting empirical research.

250A-250B. Labor Economics. (3) Two hours of lecture per week. Prerequisites: 250A is prerequisite to 250B. Consent of Instructor. Analysis of labor market behavior. Staff

250C. Labor Economics. (3) Two hours of lecture per week. Prerequisites: 250B. Analysis of labor market behavior. Staff

251. Seminar in Labor Economics. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of Instructor. Seminar for students at the doctoral dissertation level. Staff

255A. Urban Economics. (3) Two hours of lecture per week. Prerequisites: Formerly 255A. Application of economic theory to study of activity and residence in cities. Staff

255B. 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 workshops. Staff

260A-260B. Economic Systems. (3-3) Two hours of lecture per week. Prerequisites: 240A is prerequisite to 260B. Methods and problems of comparing economic systems; their institutions, ideologies, performance, and problems. Staff

260C. Economic Systems. (3) Two hours of lecture per week. Case studies of the Soviet Union and other non-market economies. Staff

261. Seminar in Economic Systems. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of Instructor. Staff

270A-270B. Analysis of Economic Development and Planning. (3-3) Two hours of lecture per week. Problems of underdevelopment and poverty, policy issues and development strategies. Staff

270C. Analysis of Economic Development and Planning. (3) Two hours of lecture per week. Prerequisites: Consent of instructor. Seminar for third-year doctoral students. Staff

275A. Economic Demography. (3) Two hours of lecture per week. Prerequisites: 204A or equivalent. Economic demography, stability, and problems of underdevelopment and development in countries including capital formation, labor markets, transfers, urbanization, economic determinants of fertility, mortality and migration. Staff

275B. Selected Topics in Economic Demography. (3) Two hours of lecture per week. Prerequisites: 204A or equivalent. Staff

280A. International Economics. (3) Two hours of lecture per week. The world economy as a general equilibrium system. The theory of international economics, trade policy. Staff

280B. International Economics. (3) Two hours of lecture per week. Prerequisites: 280A. This course develops basic theoretical models for studying issues in open-economy macroeconomics. The current account and the trade balance, international financial markets, exchange rates, country debt problems, the real exchange rate, fiscal policy in the open economy, and international policy coordination. Staff

280C. International Economics. (3) Two hours of lecture per week. Prerequisites: 280B. This course focuses on applications of the theory of international economics and finance. Topics include trade elasticities, the determination of the trade balance and income under fixed and floating exchange rates, purchasing power parity, devaluation in small open economies, quantifying the degree of international capital mobility, implications for the effectiveness of monetary and fiscal policy, international interdependence and coordination, models of exchange rate determination. (SP) Staff

280D. Special Topics in International Economics. (3) Two hours of lecture per week. Topics to vary. See departmental course announcement for current topics and prerequisites. Staff

281. Seminar in International Trade and Finance. (3) Course may be repeated for credit. Two hours of seminar per week. Staff

286. Doctoral Thesis Workshop. (4) Course may be repeated for credit. Two hours of seminar and one hour of consultation per week. Prerequisites: Consent of instructor. Seminar for third-year doctoral students in the early stages of thesis research. Staff

290. Doctoral Thesis Workshop. (4) Course may be repeated for credit. Two hours of seminar and one hour of consultation per week. Prerequisites: Consent of instructor. Seminar for third-year doctoral students in the early stages of thesis research. Staff

295. Survey of Research in Economics. (1) Two hours of seminar per week. Must be taken on a pass/no pass basis. Presentations by department faculty of new research directions in different subfields of economics. Staff

296. Special Topics in Economics. (3) Two hours of lecture per week. Prerequisites: Consent of Instructor. Topics of different sections to be announced annually. Staff

298. Directed Group Study for Graduates. (1-4) Hours to be arranged. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of Instructor. Staff

299. Supervised Independent Study and Research. (1-6) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Open to candidates for the Ph.D. degree who have passed the qualifying examination and who are engaged in research for the thesis, and in special cases, with consent of the instructor in charge, to graduate students who desire to do special work in a particular field. Staff

602. Individual Study for Doctoral Students. (1-6) Course may be repeated for credit. Course does not satisfy unit or residence requirements for doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. Individual study in consultation with the major field advisor, intended to provide an opportunity for qualified graduate students to prepare themselves for the preliminary examination. Staff

Professional Courses

501. GSI Practicum. (6) Two hours of seminar per week. Prerequisites: Economics consent of instructor in department, consent of graduate advisor. Course credit for experience gained in academic teaching through employment as a graduate student instructor. Staff

Interdepartmental Studies Courses

Upper Division Courses

IDS 133. Game Theory in the Social Sciences. (4) Students will receive no credit for 133 after Economics 104. Three hours of lecture and one hour of discussion per week. A non-technical introduction to game theory. Basic concepts and methods are introduced to players, with a strong emphasis on applications to political science, economics, and other social sciences. Also listed under Political Science 135, Economics 110 and Political Economy of Industrial Societies 135. (SP) Staff

IDS 170. Economics of Organization. (3) Three hours of lecture per week. Prerequisites: Economics 100 or 101; Business Administration 110 or equivalent; or consent of instructor. This course presents economic concepts which explain why economic activity is organized in firms, why firms are vertically integrated, and why there are limits to the growth of firms.

On leave, spring
On leave, summer
On leave, fall
On leave, fall
Recipient of Distinguished Teaching Award
Education

(Graduate School of Education)

Office: 1891 Tolman Hall, 984-5782
Dean: William D. Rohwer, Jr., Ph.D.

Faculty:
Paul R. Ammon, Ph.D. Cornell University. Education and economics.
Ann L. Brown, Ph.D. University of London. Developmental psychology, cognition and instruction.
John C. Crandall, Ph.D. University of Connecticut. Developmental psychology, special education.
Geraldine J. Cylke, Ph.D. University of Michigan. History of education, women's studies.
Delia Peretti, Ph.D. (Developmental Teacher Education).
Andrea A. Delisea, Ph.D. Massachusetts Institute of Technology. Psychology of instruction.
Sarah W. Freedman, Ph.D. Stanford University. Developmental psychology, learning and organization.
Nina H. Ghabko, Ed.D. University of California at Berkeley; Graduate School of Education.
Leo F. Cain, Ph.D. (San Francisco State University).
Mark R. Wilson, Ph.D. University of Illinois at Chicago. Literacy education, language, technology and education, adult literacy.
Barbara Y. White, Ph.D. Massachusetts Institute of Technology. Psychology, computer interface, psychometrics.

Senior Lecturers:

Adjunct Professors:
Lecturers:
Frank J. Abbott, Ed.D. University of Southern California.
Mary K. Healy, Ph.D. New York University. Teaching writing.
A.B. Babcock, Ph.D. University of California at Berkeley.
L. Bentley Edwards, Ph.D. (Emeritus)
Mary C. Coburn, Ph.D. Stanford University. Policy analysis, school finance, administration, program accountability.

Supervisor:
Delta Perkins, Ph.D. (Developmental Teacher Education). University of California at Berkeley.

Undergraduate Program

The undergraduate minor in education requires the completion of five courses in the Department of Education. Three courses are selected in consultation with an advisor in the department to satisfy the individual's own particular interests in the field of education. Required courses include

Education 190 (Current Issues in Education) and Fieldwork in Education.

For more information regarding this program, please see the undergraduate minor assistant in 1600 Tolman Hall.

Graduate Program

For a description of the graduate program in education, see page 91.

Education

Lower Division Courses

24. Freshman Seminars. (1) Course may be repeated for credit as topic varies. One hour of lecture per week. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP) Staff

39. Freshman/Sophomore Seminar. (2-4) Course may be repeated for credit as topic varies. Seminar format. Staff.

40. Exploring Education: Race and Ethnicity In/ Side Schools. (4) Three hours of lecture and one hour of discussion per week. Racial and ethnic minorities in American schools and colleges through case studies of Native Americans, Italian Americans, and Mexican Americans. Policies, practices, ideologies, experiences, outcomes from the perspective of both the dominant and minority groups. (F,SP) Clifford, Noguera

60. Preparation for Leadership. (2) Two hours of lecture per week. Must be taken on a passed/not passed basis. 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 UC Berkeley and will assist students to prepare to take on leadership positions. (F,SP) Staff

Field Studies

1-4 Course may be repeated for credit. Field study. Must be taken on a passed/not passed basis. Prerequisites: Restricted to freshmen and sophomores. Consent of instructor. University organized and supervised field programs involving experiences in schools and school-related activities. (F,SP) Staff

Directed Group Study. (1-4) Course may be repeated for credit. Group meetings to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor. Staff

Supervised Independent Study. (1-4) Course may be repeated for credit as topic varies. Tutorial. Must be based on a passed/not passed basis. Prerequisites: Consent of instructor. Staff.

Upper Division Courses

122. Women in the University: Gender and Higher Education. (3) Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. The situation and experiences of women in higher education in the United States, employing both historical perspectives and data covering the contemporary scene. Students bring to the class prior knowledge of the history of American education that is not presumed. Also listed as Women's Studies 126. Clifford.
180. Minorities in Higher Education. (3) Three hours of lecture/discussion per week. An examination of the current participation of US minority groups in our systems of higher education. Explores the history of minority participation within these institutions. Comparative examination of the efforts of minority groups to develop reforms within the higher education systems. Current issues raised by the increased population of minorities will also be addressed. Students will study case histories of individual college experiences of minority students. Hernández

182. Educational Bureaucracies and Remedies. (3) Course may be repeated for credit. Three hours of lecture per week. Educational organizations and their gradual bureaucratization. The role of parents, students, teachers, professors, and administrators. Consequences and remedies. Planning, participation, and professionalization in education. Bemmelstein

190. Current Issues in Education. (4) Three hours of lecture and one and one-half hours of discussion per week. Through lecture and discussion, students will examine current issues in education. Coursework will begin with a critical history of education. Students will also examine different educational philosophies, purposes, and methods. Students will use this information as an aid in analyzing several problem areas. Areas addressed are not limited to, but will include: democracy and education, testing and assessment, politics of educational policy, and social inequality. Noguera, Gutierrez

192. Fieldwork Seminar for Education Minor. (3) Three hours of seminar per week. The purpose of this course is to engage students in analyzing their fieldwork experience in Education. Students are expected to be participating in fieldwork concurrently with this seminar. The fieldwork placement may be arranged through Education 197, in which case students will also receive credit for Education 197. However, this seminar is separate and has its own reading and writing requirements.

195. Special Topics in the Foundations of Teaching. Course may be repeated for credit. Prerequisites: Consent of Instructor. Topics to vary from semester to semester and section to section.

195A. Special Topics in the Foundations of Teaching. (1-4) School administration. Staff

195B. Special Topics in the Foundations of Teaching. (1-4) Reading and language arts. Staff

195C. Special Topics in the Foundations of Teaching. (1-4) Mathematics and science. Staff

195D. Special Topics in the Foundations of Teaching. (1-4) Philosophy of teaching. Staff

195E. Special Topics in the Foundations of Teaching. (1-4) Social studies. Staff

196. Teaching One-on-One: Principles of Tutoring. (2) Two hours of lecture per week. A course for prospective tutors desiring to prepare for placement in local elementary and secondary schools. It introduces tutors to basic skills in tutoring within two overlapping categories: instructional and interpersonal. The instructional dimension introduces practical strategies for helping elementary and secondary school students overcome learning difficulties. The interpersonal dimension introduces approaches for improving communication and building trust in the tutoring relationship. Staff

197. Field Studies. (1-4) Course may be repeated for credit. Field study. Must be taken on a pass/credit/not pass basis. Prerequisites: Consent of instructor. University organized and supervised field programs involving experiences in schools and school-related activities. Staff

198. Directed Group Study. (1-3) Course may be repeated for credit as topic varies. Must be taken on a pass/credit/not pass basis. Prerequisites: Consent of instructor, upper division standing. Group discussion, research, and reporting on selected topics. Search initiation in choice of subjects is solicited and welcomed. Staff

199. Supervised Independent Study and Research for Undergraduates. (1-4) Course may be repeated for credit. Independent study. Must be taken on a pass/credit/not pass basis. Prerequisites: Consent of Instructor. (F,S) Staff

Graduate Courses

288A. Research on Teachers and Teaching. (3) Three hours of lecture/discussion per week. Introduction to the research on teaching and pedagogy and a variety of social and behavioral science disciplines. Intended to acquaint school professionals and prospective researchers with examples of important recent work and the issues of methodological approaches being pursued. Considers such issues as teaching effectiveness, classroom interactions, continuity and change in teaching, and students' learning from classroom teachers.

290. Special Topics Seminars. Course may be repeated for credit. Prerequisites: Consent of instructor. Topics to vary from semester to semester and section to section.

290A. Educational Administration. (1-4) Staff

290B. Education in Language and Literacy. (1-4) Staff

290C. Education in Mathematics, Science, and Technology. (1-4) Staff

290D. Educational Psychology. (1-4) Staff

290E. Social and Cultural Studies in Education. (1-4) Staff

291A. The Educational System of the United States. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Graduate standing. Historical development and contemporary status of principal features of American schooling, and the purposes and values of our public education practice. The course will focus primarily upon public elementary and secondary schools. The course will stress relationships between education and other sectors of society. Grubb

291B. Education as an Institution. (3) Course may be repeated for credit. Three hours of lecture/discussion per week. The environment and structure of formal education systems. Constraints surrounding schools and colleges. Impact of family, class and mass media. Opportunities for employment and development of society. The bureaucratization of education and the professionalization of teaching. The role of universities to improve education.

291C. Cognition, Learning, and Instruction: Ages 12 and up. (3) Three hours of lecture/discussion per week. Explores the various aspects of thinking and knowing, of learning, and the implications of those theoretical views on instruction. The perspective taken and elaborated on is basically constructivist, examining students' development of knowledge frameworks, and what shapes them; compare and contrast learning and thinking in different domains; and ways in which schooling can enhance or inhibit learning. Various methodologies designed to gather other information about these issues are also explored. Frederickson, White

291D. Cognition, Learning, and Instruction: Childhood and Adolescence. (3) Three hours of lecture per week. Examines a variety of theoretical perspectives on the nature and acquisition of knowledge, together with their implications for instruction. While a constructivist developmental perspective is emphasized, other approaches considered include behavioralism, social constructionism, and artificial intelligence.

292A. Perspectives on the Education of Linguistic Minorities. (3) Three hours of lecture/discussion per week. The social, political, linguistic and pedagogical issues associated with educating students who do not speak the societal language, how educators, as they relate to the American experience, in relation to the experiences in other societies. Bilingual education, as an instructional approach to solving such problems in the United States will be examined. Václavík

292B. The Logic and Politics of Curriculum. (3) Three hours of lecture/discussion per week. An examination of selected curriculum trends in America. Examination of the "logic" (and epistemology) underlying decisions about what to teach and why, and of the "politics" (social, political, religious) that shapes such decisions. Case studies will examine critically the rationales for prescribed and elective curricula and treat various other curriculum "reforms," the interest groups supporting them, and the responses of school professionals to the perspective of the school as a social system. Clifford

293A. Data Analysis in Education Research. (4) Four hours of lecture per week. Prerequisites: Consent of instructor. Introduces students to quantitative statistical methods for educational research. Emphasizes parameter estimation and hypothesis testing, in particular of group differences based on means, medians, proportions and correlation coefficients. Section 1 takes a conceptual and heuristic approach and introduces the general linear model. Section 2 takes an algebraic approach and includes a module on multiple regression. High school algebra is strongly recommended for section 2. Staff

293B. Sample Surveys in Education and the Social Sciences. (3) Three hours of lecture per week. Prerequisites: 293A or equivalent. Sample survey methods and their application to research in education and other social science settings. Topics include four types of survey designs (simple random, stratified, systematic, and clustered), and various indicators of sample design. Applications to educational problems and other social science problems will be emphasized throughout. Students will be required to design a survey and write a survey report. Wilson

293L. Educational Data Analysis Laboratory. (1) Two hours of laboratory per week. Prerequisites: Must be taken concurrently with 293A. Exercises and computer programs are presented and discussed. Staff

299. Special Study and Research. (1-12) Course may be repeated for credit. Prerequisites: Consent of instructor. Individual study. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Special study or research under direction of a faculty member. One unit of credit for every four hours of conference and independent research time per week. Staff

601. Individual Study for Master's Students. (1-8) Course may be repeated for a maximum of 15 units. Course does not satisfy unit or residence requirements for master's degree. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of Instructor. Individual study for the master's examination in consultation with a faculty adviser. One unit of credit for every four hours of conference and independent research time per week. Staff

602. Individual Study for Doctoral Students. (1-8) Course may be repeated for a maximum of 16 units. Course does not satisfy unit or residence requirements for doctoral degree. Individual conference and independent study. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of Instructor. Individual study in preparation for the doctoral qualifying examination. One unit of credit for each four hours of conference and independent research time per week. Staff

Professional Courses

380. Teaching Assistants Practicum. (1-6) Course may be repeated for credit. One 1/2-hour lecture, one 1/2-hour conference and 5 hours of independent practice per week. Must be taken on a satisfactory/unsatisfactory basis. Staff

390. Practicum in Teaching. (1-6) Course may be repeated for credit. One 1/2-hour lecture, one 1/2-hour conference and 5 hours of independent practice per week. Must be taken on a satisfactory/unsatisfactory basis. Staff

*On leave, spring

On leave, fall

Recalled to active service

Recipient of Distinguished Teaching Award
factoy basis. Consultation and analysis for teaching assistants. *Hanssen*

480. Research Assistant Practicum. (1-6) Course may be repeated for credit. One 1/4-hour lecture, one 3/4-hour discussion and one hour of field work per unit per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisite: Consent of instructor. Consultation and analysis for research assistants.

Social and Cultural Studies in Education

Upper Division Courses

180. Logic of Inquiry. (3) Three hours of lecture 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. *Jarrett*

181. Television as Educator: Schools, the New Media and Cultural Change. (4) Two hours of lecture and two hours of discussion per week. This course concentrates on the influences of commercial and public television on human learning and development. Particular attention is given to research and theory relating television to changes in orientations to classroom lessons, levels of learning, roles and relationships in the classroom, social identity and cultural understandings. Potential influences of the emerging "New Media"—the video-computer satellite nexus—will be considered. *Hanssen*

182. Going to School in America. (3) Three hours of lecture per week. This course explores: the meaning of schooling in the lives of culturally diverse communities of learners and current debates about the social and political consequences of schooling; how schooling contributes to the reproduction of structured inequality with examples drawn from ethnographies, novels and autobiographies of African, Asian, Hispanic, Anglo, and Native Americans; and visions for changing the future. *Hansen*

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 the nature and function of schools and education. Prerequisites: Consent of instructor. Reform movements and their effects. *Hansen*

184. Philosophical Foundations of Education. (3) Three hours of lecture per week. Systematic survey of educational thought and its uses in the epistemological, logical and ethical foundations of the major philosophies of education. (F) *Jarrett*

185. Democracy and Education. (4) Four hours of lectures per week. Prerequisites: Junior standing or consent of instructor. Education as a vehicle for furthering the 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. *Hurst*

Graduate Courses

280A-280D. Proseminar: Sociocultural Critique of Education. (3) Three hours of seminar per week. Prerequisites: Consent of Instructor. These interdisciplinary seminars address a series of questions in a research proposal to be carried out by the end of the semester. Students spend about 50 hours on the field research.

280D. Research Apprenticeship Seminar II. (3) Three hours of seminar per week. Prerequisites: 280C or consent of instructor. This is the second in a sequence of courses on the practice of research. In the first semester students work with faculty mentors and in the seminar to carry out a field research project. Continuing both apprenticeship and seminar, this semester is devoted to analysis and writing a field materials and preparing a paper on the research.

280F. Dissertation Seminar. (3) Course may be repeated for credit. Three hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Recommended for doctoral students preparing dissertation proposals and dissertations.

281. Social Foundations of Education for Teachers. (1) Two hours of lecture/discussion per week for ten weeks. Prerequisites: Admission to a teacher education program. Relations of the American educational system to the society and culture and considerations affecting the roles of the teacher. Considerable reference to the needs of teachers in training. The first meeting will be in the sixth week of the semester. *Noguera*

282A. Families, Classrooms, and Social Change. (3) Three hours of seminar per week. Influences of social structure, process and change on classroom learning in contemporary society. Examination of the role of research and theory relating classroom learning to socialization and opportunity structures, cultural and community processes and family-classroom articulation and the reproduction of inequality. *Hansen*

283A. Social Theory: On Schooling. (3) Three hours of seminar per week. Social theorists have devoted extensive attention to the institution of schooling—as a functioning part of a social system, as an institutionalized means for reproducing the social order and for resisting it, and as an arena for the generation and distribution of cultural capital. We will read and discuss the work of functionalist, Marxist, phenomenological and poststructuralist theorists who argue these and other positions.

283B. Issues in Education: Historical Perspectives. (3) Three hours of lecture per week. Historical perspectives on various current issues in education. Examples of issues to be analyzed are the integration of ethnic groups, the political-economy of schooling, educational policies and their social, structural, and political consequences. *Hansen*

283C. Seminar in the Historiography of Education—Selected Topics. (3) Three hours of seminar per week. In depth study of one or more topics in the history of education with emphasis upon original research by students in independent study and shared discussions and critiques in the seminar. Considerable attention given to methods of historical inquiry. *Hurst*

283D. Popular Education. (3) Four hours of lecture per week. The empowerment of adults through democratic, critically reflective and participatory research—will be examined using case studies and theoretical works. Our principal method will be dialogue. *Hurst*

283E. Poverty and Education. (3) Three hours of seminar per week. An examination of power and poverty from the vantage point of four comparative perspectives that shape social policy discourse, including the voices and assumptions of (1) policy makers, (2) researchers, (3) social workers, and (4) academic and ethnic minorities themselves. The epistemological basis of research assumptions, and the interplay between socially constructed forms of hierarchy and difference and the practice of education.

283F. Urban Education. (3) Three hours of seminar per week. This course will explore the relationship between macroeconomic and political trends and public education in inner city schools. The impact of these large scale phenomena on inner city schools and classroom climate, teacher morale and academic achievement will be investigated through a combination of reading and field research in Oakland and Berkeley schools. An examination and evaluation of current proposals for reform of urban schools will also be included. *Noguerra*

284A. Philosophy of Education. (3) Three hours of lecture per week. Philosophical analysis applied to current educational problems and key concepts. *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. *Jarrett*

284C. Signs, Symbols, and Language. (3) Three hours of lecture per week. A study of the processes of education considered as the development of the ability to employ and interpret symbols—linguistic and non-linguistic, metaphorical and literal—to serve expressive and communicative needs. *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' professional identity and career development. *Hansen*

286B. The Occupation of Teaching and the Education of Teachers. (3) Three hours of lecture/discussion per week. A critical examination of the issues surrounding the professionalization of the teaching occupation and the educational policies that inform it. The evolution of professionalized occupations and the consequences of professionalization for individuals, institutions, and the society at large; the status and character of the teacher-workforce; the formal enterprise of teacher education and the informal socialization of teachers; and various mechanisms of control over teachers and teaching. *Little*

287A. Theories of the Self: Freud and Jung. (3) Three hours of lecture/discussion per week. Prerequisites: Graduate status. 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 notice of their main predecessors in the discovery of the unconscious and an examination of a few of their successors. *Jarrett*

287B. Theories of the Self: Existentialism and Phenomenology. (3) Three hours of lecture/discussion per week. Prerequisites: Graduate status. Philosophical and psychological theories of the nature of human nature and their implications for education and human development. Following brief examination of Dostoevsky, Kierkegaard, Nietzsche, and Husserl, attention will center on Heidegger, Ortega y Gasset, and Ricoeur. *Jarrett*

288A. Theory and Traditions of Interpretive Research. (3) Three hours of lecture/discussion per week. An introduction to and overview of the logic and origins of interpretive research. The general character of interpretation will be examined, together with the associated notions of subjectivity, perspective, and voice. Different schools of interpretive analysis will be examined. (SP) *Packard*

288B. Theory and Methods in Interpretive Research. (3) Three hours of lecture/discussion per week. An introduction to the tradition and methods of interpretive research, including special ethical considerations of this kind of research, entry into the research setting, establishing an appropriate relationship with research assistants, and the process of analyzing interview transcripts, observing, and video-
monitoring, classroom autonomy regarding curriculum and instruction, performance evaluation, and opportunities for professional development. This course is a requirement for Educational Administration students and those students completing the Professional Administration Services Credential. It is open to all other interested students. (Cross listed as EDC 268A.)

282A. Legal Issues in Educational Practice. (1-3) Two hours of lecture per week. Five weeks per unit. Legal structures and practices in Education for teachers and counselors. Teacher, pupil, counselor rights and responsibilities.

283C. Concepts in Education Law. (3) Three hours of lecture per week. Emphasis on the evolution and constitutions of local, state and federal governmental arrangements for social agencies. A review of the effects of current higher education, via a critical appraisal of recent developments, Innovations, functional inter-relationships, and changing issues and problems. Cross listed as EDC 268A.

286D. Higher Education Organization. (3) Three hours of seminar per week. Organizational analysis of higher education. The structures, environments, and satisfactions of higher education institutions. Cross listed as EDC 268A.

286E. Seminar in the History of American College and University. (5) Three hours of lecture per week. A reading and seminar approach to the social and intellectual history of American higher education. Addressing European antecedents, institutional development, social and practical applications of evaluation principles to educational evaluation. Includes basic concepts and procedures for evaluating educational planning, economic principles of innovation. Grubb.

285B. Economic Development and Education in the Third World. (3) Course may be repeated for credit. Three hours of lecture per week. Directed research on special topics related to politics and governance of education. Topics include: political consequences of foreign aid, effectiveness of intergovernmental relations, formation of political reform networks in education. Emphasis on the evolution and constitutions of local, state and federal governmental arrangements for social agencies. A review of the effects of current higher education, via a critical appraisal of recent developments, Innovations, functional inter-relationships, and changing issues and problems. Cross listed as EDC 268A.

285A. Economics of Education and Other Social Services. (3) Three hours of lecture per week. Emphasis on the evolution and constitutions of local, state and federal governmental arrangements for social agencies. A review of the effects of current higher education, via a critical appraisal of recent developments, Innovations, functional inter-relationships, and changing issues and problems. Cross listed as EDC 268A.

285D. Higher Education Organization. (3) Three hours of seminar per week. Organizational analysis of higher education. The structures, environments, and satisfactions of higher education institutions. Cross listed as EDC 268A.

286C. Financial Management of Postsecondary Education. (3) Hours of lecture per week. Alternate methods of developing unit costs, management information systems, and budget formulas for operations and capital facilities. Strategies for effecting program plans for budgeting systems. Sources of funds and financing research, public service instruction and buildings. Staff.

287A. Curriculum and Instructional Foundations. (3) One hour of lecture and two hours of discussion per week. Essentials of curriculum and instruction, planning, child development, social development, use of textbooks and models, variables affecting instructional effectiveness, and approaches to evaluation in curriculum and instructional activity. (F) Stone.

287B. Curriculum Planning: Theories, Principles and Practices of Instruction. (3) One hour of lecture and two hours of discussion per week. Theories of instruction, models of teaching, research paradigms, and findings related to teaching effectiveness. Students are required to observe and analyze the teaching act and to conduct micro-teaching exercises.

288A. The Role of Community Colleges in Higher Education. (3) Three hours of lecture per week. This course is designed for all students of higher education, both professional and interested in the development and management of community colleges. The emphasis will be on the role of open-admissions in society. Missions of community college will be related to the types of students served, curriculum, instruction, governance, and mechanisms of control and support. Cross listed as EDC 268A.

288B. Leadership in American Higher Education. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. An exploration, through reading, analysis, self-examination, reflection and writing, of issues related to leadership in American higher education, with special reference to community colleges. Staff.

288C. Seminar in Contemporary Higher Education Development, Issues, Changes. (3) Three hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. A seminar on issues related to higher education, via a critical appraisal of recent developments, Innovations, functional inter-relationships, and changing issues and problems. Cross listed as EDC 268A.

286B. Seminar in the History of American College and University. (3) Three hours of lecture per week. A reading and seminar approach to the social and intellectual history of American higher education. Addressing European antecedents, institutional development, and practical applications of evaluation principles to educational evaluation. Includes basic concepts and procedures for evaluating educational planning, economic principles of innovation. Grubb.

287A. Curriculum and Instructional Foundations. (3) One hour of lecture and two hours of discussion per week. Essentials of curriculum and instruction, planning, child development, social development, use of textbooks and models, variables affecting instructional effectiveness, and approaches to evaluation in curriculum and instructional activity. (F) Stone.

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288B. Leadership in American Higher Education. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. An exploration, through reading, analysis, self-examination, reflection and writing, of issues related to leadership in American higher education, with special reference to community colleges. Staff.

288C. Seminar in Contemporary Higher Education Development, Issues, Changes. (3) Three hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. A seminar on issues related to higher education, via a critical appraisal of recent developments, Innovations, functional inter-relationships, and changing issues and problems. Cross listed as EDC 268A.
Professional Courses

450A. Practicum in School Site Management I. (3) Three hours of lecture and field work per week. Prerequisites: Consent of instructor. This course will involve students in learning, applying, and conducting orientations and model workshops that demonstrate effective practices in language instruction. Connections will be made between research, theory, and practice. Hull

450B. Practicum in School Site Management II. (3) Three hours of seminar and three hours of field work per week. Prerequisites: Consent of instructor. This course will involve students in learning, applying, and conducting orientations and model workshops that demonstrate effective practices in language instruction. Connections will be made between research, theory, and practice. Hull

460A. Research Practicum in Administration. (2) Two hours of lecture/discussion per week. Prerequisites: EDPSYCH 256A-B or equivalent and consent of instructor. This course will involve students in collecting and analyzing data on efforts to improve educational practices or solve important problems in school systems. Stark

460B. Field Based Practicum: Internship in Educational Administration II. (3) Six hours of field work per week and one three-hour seminar will be scheduled during each semester. Prerequisites: Consent of instructor. This course will involve students in learning, applying, and conducting orientations and model workshops that demonstrate effective practices in language instruction. Connections will be made between research, theory, and practice. Hull

460C-460D. Graduate Practicum in Administration. (2) Two hours of lecture/discussion per week. Prerequisites: Consent of instructor. This course will involve students in learning, applying, and conducting orientations and model workshops that demonstrate effective practices in language instruction. Connections will be made between research, theory, and practice. Hull

241. Issues in Reading Instruction. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. This course will involve students in learning, applying, and conducting orientations and model workshops that demonstrate effective practices in language instruction. Connections will be made between research, theory, and practice. Hull

242. Theoretical Issues in the Study of Literacy. (3) Three hours of seminar per week. Students will review theoretical history of literacy. Connections will be made between research, theory, and practice. Hull

243A. Approaches in Teaching English as a Second Language. (3) Three hours of lecture per week plus field work assignment. Prerequisites: Applied Linguistics course or a course in second language acquisition. This course is primarily concerned with methods of teaching English as a second language (ESL) to K-12 students and adults. Traditional methods emphasizing the development of structural knowledge, and new methods focused on the development of communicative skills will be examined. Topics include teaching English through content instruction, structured English Immersion, syllabus and curriculum design, second language reading, and language testing for placement and evaluation.

243C. Teaching Linguistic and Cultural Minority Students. (1-3) One to three hours of lecture/discussion per week. Prerequisites: Consent of instructor. This course is primarily concerned with methods of teaching English as a second language (ESL) to K-12 students and adults. Traditional methods emphasizing the development of structural knowledge, and new methods focused on the development of communicative skills will be examined. Topics include teaching English through content instruction, structured English Immersion, syllabus and curriculum design, second language reading, and language testing for placement and evaluation.

244A. Staff Development: Reading and Language Instruction. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Emphasis is placed on design, articulation, and implementation of reading-language curricula for primary grades through college community. Dynamics of personal leadership basic to successful curricula implementation is stressed.

244B. Issues in Language Arts Instruction. (3) Three hours of seminar per week. Students will examine current models of staff development and cooperative universes as a primary research site. Connections will be made between research, theory, and practice. Hull

244C. Issues in Staff Development. (3) Three hours of seminar per week. Students will examine current models of staff development and cooperative universes as a primary research site. Connections will be made between research, theory, and practice. Hull

2450. Issues in Secondary and Post-Secondary Language Instruction. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. The focus of this course will be on the theoretical and instructional issues surrounding instruction in reading for secondary and post-secondary students. Emphasis will be on the acquisition of foundational and content area knowledge, comprehension of literary text, comprehension of expository text, self-directed learning strategies, role of writing in the comprehension process, and approaches to curriculum organization.
Examination of educational problems encountered by second language learners.

245C. Issues In First and Second Language Acquisition. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. This course deals with issues related to language learning and development in school-age children. How do they acquire the language of the classroom? Does early success predict academic development? How do children make the transition from home to school language use? How do children learn a second language? What happens when learning a second language results in the loss of the first language? We will consider the educational, social and cognitive implications of these issues.

255. Literacy Problems and Language Differences. (3) Three hours of lecture/discussion per week. An examination of the role of language differences on the problems of learning to read and write. 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.

256A. Research on Early Literacy Development. (3) Three hours of seminar per week. Prerequisites: 254B, 244B, or 242B; or consent of instructor. This course is designed for advanced graduate students interested in both the social and cognitive aspects of literacy development. Emphasis will be given to early writing. Emphasis will be given both to children's early experiences in the home and to their initial school experiences.

256B. Qualitative Research in Language/Literacy Education. (3) Three hours of lecture per week. Prerequisites: 245B or 244B or consent of instructor. Focuses on students' and teachers' use of language from a variety of interpersonal perspectives, particularly developmental, sociolinguistic, and ethnographic. Designed to provide students with context for studies in classroom settings in order to acquire an understanding of the goals and nature of qualitative, observational study of language life in classrooms, including basic research design.

256C. Interpreting Research in Language and Literacy. (3) Three hours of seminar per week. Direct practice in analysis and interpretation of published educational research in language and literacy. Students conduct small-scale studies in classroom settings as a unique setting whose aims are fostered or rendered problematic by the nature of language use. Students conduct small-scale studies in classroom settings. Dyson

259. Foundations in Reading (Learning from Text) for Secondary School Teachers. One lecture and one hour of fieldwork per week. Prerequisites: Admission to a teaching credential program or consent of instructor. Formerly 259A-259B. Orientation to reading, writing, and study skills instruction in secondary school settings, basic literacy skills, instructional materials and approaches, and assessment procedures appropriate for use in secondary content area courses. Learning from text theory to practice. Staff

264. Thesiss Seminar. (1-6) Course may be repeated for credit. One to three hours of seminar per week. Four hours of research for each additional unit. Prerequisites: Consent of instructor. Recommended for students working on seminar papers, qualifying papers, theses, and dissertation proposals in language and literacy studies.

Section 1: Recommended for Ed.D. students and M.A. students working on curriculum projects.

Section 2: Recommended for Ph.D. students and M.A. students working on research projects. Staff

266. Group Study for Graduate Students. (1-3) Course may be repeated for credit. One hour of lecture/seminar per week per unit. Section 1 to be graded on a letter-grade basis. Sections 2-10 to be graded on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Research on special problems and topics not covered by courses or seminars. Staff

Professional Courses

340A. Foundations for Secondary School English. (2) Two hours of lecture per week. Credit and grade to be awarded on completion of sequence. Prerequisites: Admission to English Credential Program of Advanced Reading- Language Leadership Program. Lectures and workshops on teaching the secondary school English curriculum, with emphasis on the teaching of composition. Staff

342. Teaching Writing in Secondary School. (3) Course may be repeated for credit. Three hours of lecture per week. Attendance during semester break is required.Staff

390A. Directed Study. (1-6) Course may be repeated for credit. One hour of credit per week. Consent of instructor. Consent of instructor. Consent of instructor. Consent of instructor. Staff

400. Seminar for ARLLP Program Field Work and Master of Arts Thesis (Plan II). (5-6) Course may be repeated for credit. Two to twenty-five hours of fieldwork per week. Thesis consultation to be arranged as needed. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Admission to Advanced Reading-Language Leadership Program. Individual meetings with the instructor include the discussion and development of the masters project (Plan II) in coordination with a seminar faculty member. Field work with theoretical, practical, and supervised implementation and evaluation of reading language in individual classrooms and school districts. Two all-day field visits to exemplary reading/language programs in the Bay Area to be arranged with instructor. Dyer

441. Program Assessment in the Language Arts. (3) Course may be repeated for credit. Two hours of lecture and six to ten hours of fieldwork per week. Prerequisites: Consent of instructor. An introduction to program assessment in the Language Arts. Readings and class discussions will address the complexity inherent in learning, and methodological issues associated with program assessment. Concepts developed in this course will then be applied to specific issues in Language Arts assessment. Staff

Education in Mathematics, Science, and Technology

Lower Division Courses

1. Introduction to Cognitive Science. (3) Two hours of lecture and three hours of laboratory per week. This course is an introduction to the interdisciplinary field of cognitive science. Lectures and laboratory sessions will explore the cognitive science from artificial intelligence, psychology, linguistics, philosophy, neuroscience, and will cover topics such as the nature of knowledge, thinking, remembering, vision, imagination, language and artifici

2. Recital of Distinguished Teaching Award
Upper Division Courses

121A. Teaching Science in the Non-School Setting. (3) Three hours of lecture per week. A series of workshops conducted in demonstration classrooms at the Lawrence Hall of Science focusing on special techniques for teaching in a non-school setting. The course is designed to develop skills for persons working in museums and youth organizations as well as to introduce students considering it as a professional career. Selected topics in Science, Mathematics, and Computing provide the central but not exclusive context for instruction. Miller

123. Word Processing for Scientific Writing. (1) Self-paced with tutors including periodic group meetings. Prerequisites: Consent of instructor. Conceptual overview of scientific paper writing using the word processor with emphasis on educational implications of the technology. Students will use the UNIX system to facilitate feedback, share annotated bibliographies, write, edit, and format papers in accordance with professional journal guidelines. Use of the Apple Macintosh and IBM PCs will also be introduced. Woodson

124. Gender, Mathematics and Science. (3) Three hours of lecture per week. Topics include common asked questions concerning gender, mathematics, and science. We will discuss whether these are appropriate questions and examine evidence related to the questions. This course will also consider whether various differences and gender literature in mathematics, and science should be changed and, if so, identify some of the steps that could be taken to improve the current situation. Lynn

Graduate Courses

220. Artificial Intelligence for Cognitive Scientists. (3) Two hours of lecture and three hours of laboratory per week. The goal in this course is to provide students in cognitive science with programming skills in artificial intelligence, modeling learning and reasoning. The course is specifically aimed at students with no prior programming experience. In the labs, students will make use of an intelligent tutoring system to teach essential Lisp programming and later provide instruction in basic AI programming techniques. Pirillo

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 and accompanying instructional programs in the United States that is conducted under the impact of social, educational, and technological trends, cultural influences, national and international events, and legislative decisions. Examination of the more successful programs will be made from various learning theories, perspectives and research studies. Lawery

222A. Programming and Problem Solving. (3) Three hours of lecture per week. This course will analyze how experts and novices solve programming problems, examine recent investigations of programming and relate these investigations to recent research on learning and instruction. Using these insights, current programming instruction will be examined. Other topics include: programming environments such as Macintosh II and UNIX, use of computers to augment lectures, and student behavior when solving programming problems. Lynn

222B. Design of Computer-Based Instruction. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Consent of instructor. The study of educational and psychological literature related to the design of effective computer-based instruction; development of students' abilities to critically review educational software; and application of design principles in writing computer-based instructional materials. Sessa

223A. Advanced Topics in Mathematics, Science, and Technology Education. (3) Courses may be repeated for credit. Three hours of lecture and one hour of discussion per week. Prerequisites: 220A or 222A or consent of instructor. Problem solving, ethnography, etc. Subject matter changes from offering to offering. Sessa

223B. Special Problems in Mathematics, Science, and Technology Education. (3) Three hours of lecture per week. May be repeated for credit. Consent of instructor required. Two to six hours of lecture/discussion per week. Study of special problems and issues in education related to mathematics, science, and technology education. Sections may vary from semester to semester. Staff

224A. Mathematical Thinking and Problem Solving. (3) Three hours of lecture per week. This course explores contemporary research on mathematical cognition, with a particular emphasis on "higher order thinking skills" and problem solving. We discuss various frameworks for characterizing mathematical behavior and various methodologies for examining it. As an "action-orientated" course in the EMST (Educational, Mathematical, Science, and Technology) program, the research course project. In their project, students engage in research incorporating the main ideas studied in the course.

224B. How People Learn Computer Science. (4) Four hours of lecture per week. In this course students will be introduced to a variety of research paradigms in the field of human-computer interaction. The course explores fundamental research issues and explores well-known research paradigms in the field, as well as the relationship between research and practice.

225A. Introduction to Intelligent Computer Assisted Instruction. (2) Two hours of lecture per week. An introduction to research on computer-based learning environments augmented with intelligent programs that act as a tutor, coach, or consultant. Staff

225B. Programming Intelligent Computer Assisted Instruction. (4) Two hours of lecture and six hours of laboratory per week. The aim of this course is to have students the facility to create intelligent computer assisted instruction (ICAI) systems. A programming-intensive course that will require significant LISP experience. Staff

226C. Cognitive Approaches to Computer System Design. (2) Two hours of lecture per week. This course, based largely on reading and critical analysis, focuses on issues involved in understanding and operating computer systems (i.e. text editing, operation of calculators and user interface to computer systems, activity structures involving multiple operation tools and programming) as well as cognitive constructs being developed to understand performance. Requirements include three analytical papers. Sessa

226D. Computer System Design Project Laboratory. (1) One hour of lecture per week. Prerequisites: Consent of Instructor. The system design project laboratory is an ancillary offering intended to put the ideas from 226C—Cognitive Approaches to Computer Systems Design—into practice. The principle requirement will be a written report. With Instructor's consent, the project laboratory may be taken simultaneously or sequentially with 226C. In cases of extraordinary preparation, the laboratory requirement may be waived. Sessa

226. Constructive Epistemology. (3) Three hours of lecture per week. Many approaches to education take the knowledge to be taught as fixed, and the manipulable objects to be things like methods. By focusing on the role of knowledge, what is it; how it organized and encoded in humans, we are led to questions about what should be taught, based on principles of learning, etc., rather than just "effective methods." This tactic is valuable in view of the radical changes in information technology which may have on what we need to teach and what general areas are teachable.

227. Metacognition. (3) Three hours of lecture per week. Major approaches to metacognition (metacognitive knowledge, effective control and self-regulation in problem solving, belief systems and naive epistemologies) will be surveyed from the following points of view: metacognition's relation to knowledge, evidence that humans have such knowledge, what knowledge is de-
229F. Conceptual Change. (3) Three hours of lecture per week. "Conceptual change" concerns broad and deep changes in a person's knowledge about a domain. The course explores the rationales for these concepts and skill acquisition. The course emphasizes recent cognitive science-oriented approaches to: defining "broad and deep" learning; understanding its properties; the role of imitation in intelligent behavior; theoretical approaches including developmental psychology; analogies to the history of science; "misconceptions"; computational and epistemological approaches. Staff

229G. Seminar in Social and Personality Development. (1) Three hours of seminar per week. Prerequisites: Consent of instructor. A seminar, organized by the instructor and interested graduate students, on topics related to social and personality development. May be repeated for credit. Staff

230. Group Studies, Seminars, or Group Research. (1-4) Course may be repeated for credit. One to four hours of lecture/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 the research area in which the group is working. Staff

Professional Courses

300. Supervised Teaching. (2-6) Course may be repeated for credit. Two hours of lecture and two to ten hours of fieldwork per week. Prerequisites: Admission to credential program. Formerly 390A-390B. Fieldwork involves diagnosing and teaching children with reading problems. May begin with the opening of the public schools in the fall and extend through the spring semester. (F,S) Staff

Educational Psychology

Upper Division Courses

100. Educational Psychology for Teachers. (2) Two hours of lecture and one hour of discussion per week. Prerequisites: Admission to 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. Staff

101. Learning and Memory Development in Education. (3) Two hours of lecture and one hour of 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.

114A. Early Development and Education. (4) Three hours of lecture and two hours of fieldwork per week. Theory and research on psychological development from birth through childhood with special attention to relations between developmental theory and educational practice. Directed field observation of developmental phenomena and educational practices. Starkey

114B. Seminar in Early Development and Education. (2) Course may be repeated once for credit. Two hours of lecture and one hour of fieldwork per week. Topics include criteria for identification, psychological and social factors, neurological and genetic factors, verbal factors, visual and perceptual factors, perceptual tests and remediation. Optional field work involves diagnosing and teaching children with reading problems and preparing written case studies. Starkey

200A. Cognitive Development. (3) Three hours of seminar per week. Prerequisites: Consent of instructor. Development of cognition from birth to maturity. Piagetian and information processing theories and research. Vygotsky's theory. Primary emphasis on normal human development: special emphasis on a typi
cal and animal cognition. Infant perception and cognition, early childhood competencies, memory and problem solving in middle childhood and adolescence. Cognitive and affective domain, social domain, and academic domain. Staff

200B. Social Development. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. An examination of theory and research on social development in childhood and adolescence. Review of different theoretical orientations to social cognition, morality, psychosexual development, and the role of social-environmental factors. Turkel

200C. Learning and Memory Development. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. A seminar, organized by the instructor and interested graduate students, on topics related to learning and memory development. May be repeated for credit. Staff

200D. Theories of Intelligence. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. A seminar, organized by the instructor and interested graduate students, on topics related to intelligence. May be repeated for credit. Staff

201A. Psychology of Reading. (3) Three hours of lecture per week. Comparison and analysis of the psychological and linguistic evidence underlying whole language and skills methods of reading instruction. Topics include screening, reading readiness, emergent literacy, beginning English, spelling system and decoding, vocabulary development, models of reading, individual differences, and comprehension and schema theory. Simons

201B. Seminars in Intellectual Development. (2) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Relevant courses from the 200 sequence and consent of instructor. Intensive examination of advanced topics, which will vary from year to year in the areas denoted by the titles of the following sections:

1. Cognitive Development
2. Learning and Memory Development
3. Language. Ammon, Starkey

201C. Seminar on Reading Disability. (3-5) Three hours of seminar per week. Eight hours of fieldwork per week needed for an additional two units of credit. Eight hours of fieldwork per week needed for an additional two units of credit. Examination of theories and analysis of reading disability. Topics include criteria for identification, psychological and social factors, neurological and genetic factors, verbal factors, visual and perceptual factors, perceptual tests and remediation. Optional field work involves diagnosing and teaching children with reading problems and preparing written case studies. Simons

201D. Seminar on Reading Disability. (3-5). For an additional 8 hours of field work per week, an additional of 2 units of credit will be awarded. Three hours of seminar per week. Examination and analysis of basic issues in reading disability. Topics include criteria for identification, psychological and social factors, neurological and genetic factors, verbal factors, visual and perceptual factors, perceptual tests and remediation. Optional field work involves diagnosing and teaching children with reading problems and preparing written case studies. Simons

202D. Seminars in Social and Personality Development. (2) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. Advanced 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. Turkel

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

On leave, spring
Recalled to active service
Recipient of Distinguished Teaching Award
203A. Individual Differences: Behavioral Genetic Analysis of Human Abilities. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Two courses in statistics including correlation and analysis of variance. A consideration of the application of quantitative genetics methods to the study of human variability in education and psychology, with emphasis on problem-solving 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 development. Staff

204A. Logic of Theoretical Inquiry. (2) Two hours of 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 background of logic is helpful, although the course is not concerned with statistical calculations as such.

204B. Critical Analysis of Empirical Inquiry. (2) Three hours of lecture per week. Prerequisites: 204A-204B and consent of instructor. Critical review and discussion of articles in empirical inquiry. The development of analytic tools for reading and evaluating scientific writing on content but on method, logic, and appropriateness of inference as represented in the research examined.

204C. Research Seminars: Inquiry in Educational Psychology. (3) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Consent of instructor. The seminar is designed to provide experience in conducting research. 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 development. Staff

205. Instruction and Development. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Examination of cognitive developmental approaches to instruction and development. Staff

206. Human and Machine Learning. (2) Two hours of lecture per week plus two hours of fieldwork per week. Prerequisites: Consent of instructor. This course examines the nature of learning by comparing human learning and machine learning: Theoretical constructs and experimental evidence are integrated. Staff

207A. Standard Tests in Education. (2) Two hours of lecture plus two hours of fieldwork per week. Staff

207B. Individual Appraisal of Intelligence. (4) Three hours of lecture and six hours of fieldwork per week. Prerequisites: Consent of instructor. Staff

207C. Diagnosis of Human Handicaps. (4) Three hours of lecture and six hours of fieldwork per week. Staff

208A. Educational Measurement I. (4) Four hours of lecture 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. Wilson

208B. Educational Measurement II. (4) Four hours of lecture 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 techniques to a practical measurement situation will be studied. Topics such as test bias, computerized and polytomous response models will be discussed. Wilson

208C. Research Seminar in Measurement. (4) Course may be repeated for credit. Four hours of seminar per week. Prerequisites: 208A or equivalent. The seminar will address the current research issue in the area of educational and psychological measurement. Wilson

208D. Multidimensional Measurement. (4) Four hours of lecture per week. Exploratory factor analysis, confirmatory factor analysis, and multidimensional item response theory. Wilson

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. Staff

209A. and 209B. Nonparametric Procedures. (4) Four hours of lecture per week. Prerequisites: 208A or 209A, and 209B. Nonparametric correlation and association, higher order contingency tables, logistic regression and analysis of variance, and regression. Staff

209L. Educational Data Analysis Laboratory. (1) Course may be repeated for credit. Two hours of laboratory per week. Prerequisites: Must be taken concurrently with 209B. Exercises and computer problems are presented and discussed. Outside assignments of 10-15 hours per week. Staff

210A. Nonparametric Procedures. (4) Four hours of lecture per week. Prerequisites: Education 293A or 209A, and 209B. Nonparametric correlation and association, higher order contingency tables, logistic regression and analysis of variance, and regression. Staff

210B. Multivariate Procedures. (4) Four hours of lecture per week. Prerequisites: Educ. 209A or 209B. Simple, multiple and canonical correlation and regression, discriminant analysis and multivariate analysis of variance; principle components; contingency tables; and exploratory factor analysis. Staff

210F. Proseminar in Educational Data Analysis. (1) Course may be repeated for credit. One hour of seminar per week. Prerequisites: Consent of instructor. Current research and publications on educational data analysis by faculty, students, and others is examined and critiqued.

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.

211A-211B. Human Development and Education. (3-5) Three hours of lecture/discussion per week. Prerequisites: Admission to Developmental Teacher Education Program or consent of instructor. An introduction to theories of human development and their application to elementary and preschool education. Topics include cognitive development, language development, social-emotional development, language acquisition, psycho-social perspectives on social-emotional development and a developmental analysis of classroom organization. Ammon, Lambert, Turner

211C-211D. Advanced Human Development and Education. (3-5) Three hours of 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. Ammon, Black

211L. Laboratory for Human Development and Education. (1) Three hours of fieldwork per week. Supervised child study, individual and small group tutoring, field experiences. Must be taken concurrently with 211A or 211B. Staff

212A. Advanced Topics on Exceptional Children. (3) Three hours of lecture and one hour of fieldwork per week. Prerequisites: Consent of instructor. Topics will include problems in mainstreaming mildly handicapped children and social psychological perspectives on the education of exceptional children. Staff

212C. Conceptual Bases for School Psychology. (3) Three hours of lecture and six hours of fieldwork per week. Historical and contemporary overview of the professional specialty of school psychology. Staff

212B. Theoretical and Scientific Bases for School Psychology Practice. (3) Three hours of lecture per week. Staff

213A. Advanced Topics on Exceptional Children. (3) Three hours of lecture and one hour of fieldwork per week. Prerequisites: Consent of instructor. Topics will include problems in mainstreaming mildly handicapped children and social psychological perspectives on the education of exceptional children. Staff

213C. School-Based Consultation. (3) Three hours of lecture per week. Staff

213D. Educational Interventions for the School Psychologist. (3) Three hours of lecture per week. Staff

213L. Laboratory for School Psychology. (1) One hour of discussion and six hours of fieldwork per week. Staff


218C. 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. Staff

2131. Laboratory for School Psychology. (1) One hour of discussion and six hours of fieldwork per week. Staff

219B. Multivariate Procedures. (4) Four hours of lecture per week. Prerequisites: Educ. 209A or 209B. Simple, multiple and canonical correlation and regression, discriminant analysis and multivariate analysis of variance; principle components; contingency tables; and exploratory factor analysis. Staff

210F. Proseminar in Educational Data Analysis. (1) Course may be repeated for credit. One hour of seminar per week. Prerequisites: Consent of instructor. Current research and publications on educational data analysis by faculty, students, and others is examined and critiqued.

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.

211A-211B. Human Development and Education. (3-5) Three hours of 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, language development, social-emotional development, language acquisition, psycho-social perspectives on social-emotional development and a developmental analysis of classroom organization. Ammon, Lambert, Turner

211C-211D. Advanced Human Development and Education. (3-5) Three hours of 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. Ammon, Black

211L. Laboratory for Human Development and Education. (1) Three hours of fieldwork per week. Supervised child study, individual and small group tutoring, field experiences. Must be taken concurrently with 211A or 211B. Staff

212A. Advanced Topics on Exceptional Children. (3) Three hours of lecture and one hour of fieldwork per week. Prerequisites: Consent of instructor. Topics will include problems in mainstreaming mildly handicapped children and social psychological perspectives on the education of exceptional children. Staff

212C. Conceptual Bases for School Psychology. (3) Three hours of lecture and six hours of fieldwork per week. Staff

212B. Theoretical and Scientific Bases for School Psychology Practice. (3) Three hours of lecture per week. Staff

213A. Advanced Topics on Exceptional Children. (3) Three hours of lecture and one hour of fieldwork per week. Prerequisites: Consent of instructor. Topics will include problems in mainstreaming mildly handicapped children and social psychological perspectives on the education of exceptional children. Staff

213C. School-Based Consultation. (3) Three hours of lecture per week. Staff

213D. Educational Interventions for the School Psychologist. (3) Three hours of lecture per week. Staff

213L. Laboratory for School Psychology. (1) Staff


218C. 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. Staff

2131. Laboratory for School Psychology. (1) Staff

219B. Multivariate Procedures. (4) Four hours of lecture per week. Prerequisites: Educ. 209A or 209B. Simple, multiple and canonical correlation and regression, discriminant analysis and multivariate analysis of variance; principle components; contingency tables; and exploratory factor analysis. Staff

210F. Proseminar in Educational Data Analysis. (1) Course may be repeated for credit. One hour of seminar per week. Prerequisites: Consent of instructor. Current research and publications on educational data analysis by faculty, students, and others is examined and critiqued.

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.
IDS 191. Public Health and Nuclear War. (2) One
hour of lecture and one hour of discussion per week.
The course will examine the effects of nuclear war on
the current arms race and the threat of nuclear war.
Topics to be considered include lecture, discussion,
and directed readings including the physical and medi-
cal effects of nuclear war, as well as the eco-
nomic, psychological, and health dimensions of de-
struction from preparation for detonation. Conflict
resolution and other preventive measures will be
explored. Sponsoring departments: Public Health
and PACS.

Graduate Course
IDS 271. Seminar In Neuropsychology. (3) Course
may be repeated for credit. Three hours of lecture
and two hours of laboratory per week. Lectures at a case
of individual and group presentations in neuropsychology.
Discussion of problems of cognitive and information
processing manifested in cases of aphasia, dementia
stroke, traumatic injury, and other neurological damage.
Cases presentations of patients alternate with discussions
of research strategies for evaluation of cognitive func-
tioning. Presentation of neuropsychological populations
as opportunities for the study of cognitive functioning.
Sponsoring departments: Education and Psychology.

Related Courses In Other Departments
Mass Communications 10. Mass Communications
In America: An Introduction. (4) See listing under
Mass Communications for complete course descrip-
tion.

Public Policy 282. Organizational Decline and
Cutback Management. (4) See listing under Public
Policy for complete course description.

Electrical Engineering and Computer Sciences
(College of Engineering)

Department Office: 231 Cory Hall, 642-3214
Chair: Paul R. Gray, Ph.D.

University Professor:
John R. Whinnery, Ph.D. (Emeritus) University at Berkeley.
Communications applications of lasers.

Professors:
Jeffrey Bolier, Ph.D. Stanford University. Nanodevices
Robert K Brayton, Ph.D. University of California at Berkeley.
Technology: Nonlinear circuit theory, stability theory
Robert W. Brodersen, Ph.D. Massachusetts Institute of Technology.
IC design problems.

Nathan Chueh, Ph.D. California Institute of Technology.
Electrical Engineering: Nanodevices (Electronics
Leon Chou, Ph.D., Ph.D. (hon.) University of Illinois.
Device modeling, network analysis
Paul R. Gray, Ph.D. (Edward L. and Harriet H. Butler
Professor in Electrical Engineering) University at Arizona.
Integrated circuits

T. Kenneth Gustafson, Ph.D. Massachusetts Institute of Technology.
Quantum and nonlinear optical processes.

David A. Hughes, Ph.D. (Roy W. Carlson Professor of
Engineering) University at California at Berkeley.

Chenming Hu, Ph.D. University at California at Berkeley.
IC devices and materials

Edward L. Keller, Ph.D. Johns Hopkins University.
Neuropsychophysics of ocular motor systems

Ping K. Ko, Ph.D. MIT. Computer integrated manufacturing

Korn Y. Lau, Ph.D. California Institute of Technology.
Optoelectronics

Edward R. Lewis, Ph.D. Stanford University.
Transmission and signal processing in the ear, eye, and ear.

Michael A. Lieberman, Ph.D. (Director, Electronics
Research Laboratory) Massachusetts Institute of
Technology. Microelectronics

Kenneth M. Meizel, Ph.D. University of Wisconsin, Madison.
Magnetohydrodynamics

Stefan E. Schwartz, Ph.D. Princeton University. R&D.

Joseph Kahn, Ph.D. University at California at Berkeley.

Communication studies

Manuel Blum, Ph.D. (Emeritus) Massachusetts Institute of Technology.
Symbolic and algebraic computation

Joan W. Strickland, Ph.D. University of California at Berkeley.

Stephan Whiteley, Ph.D. (Associate Adjunct)

Computer Science Division

Division Office: 571 Evans Hall, 642-1042
Associate Chair: David A. Patterson, Ph.D.

Professors:
Brian Partridge, Ph.D. University at Utah. Graphics,
visualization in scientific computing

Ewn Ry. Berkespah, Ph.D. Massachusetts Institute of
Technology. Fast Emotional function theory

Frank G. H. M. De Jonge, Ph.D. (Emeritus) University at
California at Berkeley, Symbolic and algebraic computation

James W. Demmel, Ph.D. University at California at
Berkeley, Symbolic and algebraic computation

Richard J. Pateman, Ph.D. Harvard University. Symbolic
and algebraic computation

Artificial Intelligence

Donald F. Cerino, Ph.D. Polytechnic Institute of Milan.
Computer system performance evaluation

Stuart F. Shostak, Ph.D. Stanford University. Programming
languages

Michael A. Hanson, Ph.D. University at Michigan. Fast
paradigm languages

William Kahn, Ph.D. University at Toronto. Automated
programming systems

Richard M. Karp, Ph.D. (Class of 39 Professor) Harvard
University, Artificial intelligence

Randy H. Katz, Ph.D. University at Berkeley. Artificial
intelligence

Eugene L. Lawler, Ph.D. (Vice Chair) Harvard University.
Computer theory, optimization theory

*On leave, spring, fall

Recall to active service

Recipient of distinguished Teaching Award
214 / Electrical Engineering and Computer Sciences

John K. Ousterhout, Ph.D. Carnegie-Mellon University. VLSI Design Laboratory.


David A. Patterson, Ph.D. (E.H. and M. E. Pardee Professor) University of California, Los Angeles. VLSI computer architecture.

Lawrence A. Rowe, Ph.D. University of California, Irvine. VLSI computer architecture.

Alan S. Lam, Ph.D. Stanford University. Operating systems, computer performance analysis.

Michael S. Garey, Ph.D. University of Michigan. Database management.

Robert J. Wilhelm, Ph.D. Yale University. Artificial Intelligence.


Associate Professors:

John F. Carny, Ph.D. Massachusetts Institute of Technology. Robotics.


Jihoon J. Yoon, Ph.D. Stanford University. Artificial Intelligence.

Stuart Russell, Ph.D. Stanford University. Artificial Intelligence.

Raimund Seidel, Ph.D. Ocmell University. Computational geometry.


Assistant Professors:


David E. Cutler, Ph.D. Massachusetts Institute of Technology. VLSI technology.

Abhiram. N. Ramani, Ph.D. Yale University. Parallel algorithms, architectures and languages.

John G. Graybeal, Ph.D. California Institute of Technology. Parallel compiliation, VLSI design, signal processing.

Katherine Yallop, Ph.D. Massachusetts Institute of Technology. Programming languages, methodologies.

Affiliated Professors:

Barbara Y. White, Ph.D.

Lenore C. Blu, Ph.D.

Michael G. Luby, Ph.D.

Luis F. Cabrera, Ph.D.

Senior Lecturer:

Michael J. Ciancy, M.S.

With rapid growth in technology, electrical engineering now encompasses solid-state devices, integrated circuits, microwave electronics, quantum and optical electronics, bioelectronics, radiation and propagation, plasmas, power systems, control systems, computer architecture, machine organization, computer graphics, data base management systems, formal languages and automata theory, information theory, numerical analysis, compiler compilation and parallel computing, performance analysis, programming languages and compilers, operating systems, and symbolic algebraic manipulation.

Beyond satisfaction of the minimum requirements for the B.S. degree in EECS, students follow one of the following: general and modern computer science or in their major program. They may select the General Elective Engineering and Computer Sciences Program in which they will receive an introduction to a large number of the areas outlined above. Alternatively, they may emphasize particular subject areas by choosing a specific major program. (See the Department of Electrical Engineering and Computer Sciences: electronics, systems, computer sciences, and bioelectronics). Or they may plan an individual program and suit their special needs and 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 programs are electives in a selection of courses in selected areas, computer graphics, electronics, systems analysis, electromagnetic fields, communication and control theory, computer systems and programming, dynamics, thermodynamics, and bioelectronics. Details about the curriculum can be found in the announcement of the College of Engineering. Students should also consult the Undergraduate Information Handbook of the Electrical Engineering and Computer Science Department.

Programs, A General Program is for students who wish to elect a broad program and are not yet ready to select a particular area of emphasis.

In order to provide a choice of well-integrated programs for students who have a clearly defined interest in one of the major areas of electrical engineering and computer science, the department offers programs of study in the following general areas:

1. The Electronics program is for students interested in (Program A1) the area of integrated circuits, including fabrication technology, solid state devices, digital and analog design and analysis, and design, VLSI design, and computer-aided design and manufacturing and (Program A2) the areas of microwave, acoustic, optoelectronics, plasmas, cryoelectronics, polymer microwave circuits, antennas, and propagation.

2. Circuits and Systems (Program B) is for students with interests in networks, control, robotics, digital and analog communications, computer networks, signal processing, systems design and optimization, and power systems planning and operations.

3. Computer Sciences (Program C) is for students interested in all aspects of computer science and engineering, including machine architecture and logical design, operating systems, programming systems and languages, digital devices and circuits, design and analysis of algorithms, complexity theory, artificial intelligence, computer graphics, database systems.

4. Bioelectronics (Program D) is for students with an interest in biology or medicine as well as electrical engineering. Areas include biological sensors and signals, signal and image processing, and analysis and modeling of biological systems.

In addition, the department offers double major programs designed to help students qualify for employment in either of two major fields of engineering, or for positions where competence in both fields is required. Both majors are listed on the student's transcript. Two such double majors are currently established:

EECS/Material Science and Engineering: For students interested in materials and devices, a double major in EECS/MSE can be valuable. The program combines the study of materials from a broad perspective, as taught in MSE, with the study of their electronic and optical applications and electronic devices and circuits, as taught in EECS.

EECS/Nuclear Engineering: The EECS/NIE double major combines the traditional EE program with one in the nuclear sciences. Nuclear engineering shares with EE a concern for electrical power generation, automatic control, computer sciences, and plasmas.

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 six designated as engineering design. Students who have completed fewer than 30 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 Information Handbook.

(b) EECS 40 or EECS 401 or EECS 411; E45; and CS 60A, 60B. (Note: Students may petition to substitute Biology 1A-1B, Molecular and Cell Biology 32, or CS 60C for Engin 45. In the cases of Biology 1A-1B and MCB 32, the units will not be counted as engineering units, but as elective units. In the case of Biology 1A-1B, the entire sequence must be taken to satisfy the E 45 requirement. Substitutions must be approved by the adviser, study list representative, and the undergraduate dean, except that in program C, the substitution of CS 60C is automatic. For students not in program C, substitution of CS 60C will be approved primarily when special circumstances make it unfeasible to take Engin 45.)

(c) 20 upper division units in EECS, not including EECS 100.

(d) Three upper division laboratory courses in EECS.

(e) Five units of engineering not in EECS or CS. Among IDS courses, only 180 satisfies this requirement.

(f) For students in the General, the Electronics, and the Systems Programs: any four courses chosen from the following list: EECS 104; EECS 117A; EECS 120; EECST 30; CS 150 or CS 150B; CS 170. For students in the Bioelectronics Program, the requirement is the same, except that Biology 1A may be substituted for one of the five courses listed above. The units for Biology 1A will not be counted as engineering units, but as elective units. Students in the Computer Science program are expected to include 16 units of upper division computer science course work in their programs.

2. 16 units of physical or biological science, including Chemistry 1A and Biology 7A-7B.

3. 16 units of mathematics or statistics from the current list of acceptable courses, including Mathematics 1A-1B, 11A-11B, 3, or 8 units of Mathematics 15. For students in Program C, the 16 units must also include Mathematics 55.

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 10 units of Course 199 (independent study and/or research) may be counted toward the degree. Six courses of at least 3 units each in humanities and social studies selected from an approved list of courses will be required of single major students. Students who have completed fewer than 60 semester units by June 1988 must include at least one course chosen from the list of selected courses in Literature and Values, and two must be upper division courses. The English composition course and either the course in History and Culture or that in Literature and Values must be taken for a letter grade. A minimum of two courses, at least one of which is in the upper division, must be taken from a single department. It is expected that
Electrical Engineering

Lower Division Courses

1. EECS: The First Course. (2) One hour of lecture and two hours of laboratory per week. Introduction to electrical engineering and computer sciences in general, and to forefront topics in electrical engineering and computer sciences in particular, involving hands-on experimentation, lectures, demonstrations, readings, and practice with written and oral communication. Course intended for first-year undergraduates. (F,SP) White

2. Engineering and Law. (1) One hour of seminar per week. Exploration of the role of an expert witness in litigation: advice, depositions, and testimony. (F,SP) Graham

40. Introduction to Electrical Engineering. (4) Students will receive no credit for 40 after taking 401, 401 or 100. Three hours of lecture and one hour of discussion per week. Prerequisites: Mathematics 1B and Physics 7B. Passive circuit analysis, analog building blocks and analog systems, digital building blocks and digital systems, semiconductor devices, electronic circuits. (F,SP) Staff

401. Introduction to Electrical Engineering (self-study). (4) Four hours of discussion per week. Prerequisites: Mathematics 1B and Physics 7B. Passive circuit analysis, analog building blocks and analog systems, digital building blocks and digital systems, semiconductor devices, electronic circuits. (F,SP) White

411. Introduction to Electrical Engineering (self-study). (2) Two hours of discussion per week. Prerequisites: A course in analysis of passive circuits. (F,SP) White

412. Electrical Transformers and Machines. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: 104 or 104M. 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 control. Short circuit analysis. (F,SP) Staff

112. 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 static electric and magnetic fields and applications; Maxwell's equations; plane waves; propagation and reflection of plane waves; introduction to guided waves. Minilabs on statics, transmission lines, and waves. (F,SP) Staff

117A. Electromagnetic Fields and Waves—II. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 112. The propagation of electromagnetic waves through waveguides; resonant systems; electromagnetic materials; radiation and diffraction. (SP) Staff

13. Power Electronics. (3) Three hours of lecture per week. Prerequisites: 104. Power semiconductor devices including thyristors. Magnetic components. Power conversion circuits and techniques. Applications to motor control, switching power supplies, and power systems. (SP) Staff

114. Power Systems Analysis. (3) Three hours of lecture per week. Prerequisites: Mathematics 1B and Physics 7B. Review of static electric and magnetic fields and applications; Maxwell's equations; plane waves; propagation and reflection of plane waves; introduction to guided waves. Minilabs on statics, transmission lines, and waves. (F,SP) Staff

115. Introduction to Optical Communications Systems. (3) Three hours of lecture per week. Prerequisites: 112. Introduction to optical communications systems, emphasis on principles of optical components and optical information processing systems, emphasis on principles of optical links, including the transmitter, optical fiber propagation, and the receiver, and the optical properties of the major components such as laser sources, detectors, transimpedance amplification and limitations due to noise. Coherent and Incoherent communication systems. (F,SP) Staff

120. Signals and Systems. (4) Four hours of lecture and one hour of recitation per week. Prerequisites: 104; Mathematics 50B. Continuous and discrete-time signals.

Note: None of the 77 units in requirements 1, 2, and 3 may be taken on a passed/not passed basis except CS 9, CS 9D, or (1d) 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 programs are available in the Announcements of the College of Engineering and in the Electrical and Computer Sciences Undergraduate Information Handbook.

Graduate Program

To prepare the graduate student for work in the rapidly developing fields of electrical engineering and computer sciences, the department offers a wide selection of courses, seminars, and flexibility in meeting degree requirements. Since no single sequence of courses is required, students are free to design programs to suit their particular needs and interests, in consultation with a faculty advisor in their field.

Graduate degree programs are available as preparation for research and teaching (Master of Science and Doctor of Philosophy), and for careers in design, development, and management (Master of Business Administration). The Master of Science program requires two-three semesters of study. Students normally complete the Doctor of Philosophy program in five years. 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 non-technical subject such as law, business administration, etc. The Doctor of Philosophy 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 M.S. degree interested in study 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 77, 77S, CS 3, and CS 9A-9B-9C-9D-9E 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 on credit toward graduation apply to the current set of service courses:

Students get full credit toward graduation for the first computing service course successfully completed and 1 unit toward graduation for any subsequent nonequivalent service course.

E 77 (formerly E 77) is equivalent to 3 units of E 77S (formerly E 75).

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.

Note: In addition to the courses listed below, the Department of Electrical Engineering and Computer Sciences offers the following courses, found in the Engineering section of this catalog: 66, Engineering Design Studio; 77S, Self-Paced Scientific and Engineering Problem Solving Using Computers; 95, Engineering Project Management; 233, Applications of Parallel Computers; 235, Sparse Matrix Methods.

104. Linear and Nonlinear Circuits. (4) Four hours of lecture and two hours of discussion per week. Prerequisites: 40 (may be waived by instructor). Mathematics 1B and Physics 7B. Analysis of passive circuits, sinusoidal steady-state response, transient response, operational amplifiers, digital building blocks, digital systems, microprocessor control, power systems and machines. This course is not for students majoring in Electrical Engineering. (F,SP) Staff

105. Microelectronic Devices and Circuits. (4) Students will not receive credit for 105 after taking 140. Three hours of lecture, one hour of discussion, and three hours of laboratory per week. Prerequisites: 40 or 401. This course covers the physics and modeling of silicon devices, InP-based MOSFETs, and bipolar transistors. Digital circuits, and logic design are introduced. MOS and bipolar small-signal amplifiers are discussed in depth, including differential pairs, current-source biasing, and two-stage operational amplifiers. Frequency response and noise of the transistors is covered. ABET criteria: 3 units of science, 1 unit of design. (F,SP) Howe

110. Electronic Circuit Interconnection. (2) Two hours of lecture per week. Prerequisites: 104, 140, 117A, and Computer Science 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 interconnection considerations. (SP) M. Graham

116. Electromagnetic Fields and Waves. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: Mathematics 1B and Physics 7B. Review of static electric and magnetic fields and applications; Maxwell's equations; plane waves; propagation and reflection of plane waves; introduction to guided waves. Minilabs on statics, transmission lines, and waves. (F,SP) Staff

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 static electric and magnetic fields and applications; Maxwell's equations; plane waves; propagation and reflection of plane waves; introduction to guided waves. Minilabs on statics, transmission lines, and waves. (F,SP) Staff

117B. Electromagnetic Fields and Waves—II. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 112. The propagation of electromagnetic waves through waveguides; resonant systems; electromagnetic materials; radiation and diffraction. (SP) Staff

118. Introduction to Optical Communications Systems. (3) Three hours of lecture per week. Prerequisites: 112. Introduction to optical communications systems, emphasis on principles of optical components and optical information processing systems, emphasis on principles of optical links, including the transmitter, optical fiber propagation, and the receiver, and the optical properties of the major components such as laser sources, detectors, transimpedance amplification and limitations due to noise. Coherent and Incoherent communication systems. (F,SP) Staff

120. Signals and Systems. (4) Four hours of lecture and one hour of recitation per week. Prerequisites: 104; Mathematics 50B. Continuous and discrete-time signals.
121. Noise Analysis of Communications Systems. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 120. Elementary probability and random process theory; description of modulation systems, AM, FM, digital transmission methods such as H FI. Determination of optimum noise analysis of modulation systems. Signal space concepts, error rate analysis of digital modulation systems, including non-coherent systems. (SP) Staff

122. Introduction to Communication Networks. (2) Two hours of lecture and one hour of discussion per week. Prerequisites: 40, and Mathematics 504, Network architectures. Protocols and routing in store-and-forward networks (e.g. ARPANET and IBM's SNA). Satellite and packet radio network (e.g. ALOHA and cellular phones). Local area networks (e.g. ETHERNET and FDDI). Software-topology correspondence. Some hardware issues (e.g. VLSI controllers, fiber optics). (SP) Staff

123. Digital Signal Processing. (4) Three hours of lecture, one hour of discussion, and one hour of laboratory per week. Prerequisites: 120. Discrete time signals and systems, Z-transforms, Fourier transforms, fast Fourier transform, windowing, filtering, sampling, S-z to Z-methods, frequency-transformation methods, optimization methods, 2-dimensional filter design. (F,SP) Staff

124. Spectral Analysis Lab. (1) One course credit. Prerequisites: 120 (may be taken concurrently). An introduction to the kinematics, dynamics and control of robots, robotic vision, sensing and the programming of robots. The course will cover forward, inverse, kinematics of serial chain manipulators. The manipulator Jacobian, force relations, and the control of motors for position control of the manipulator. Trajectory generation, obstacle avoidance, automatic planning of fine and gross motion strategies for robot programming languages. Proximity, tactile and force sensing. (F,SP) Staff

125. Introduction to Robotics. (4) Three hours of lecture and one hour of recitation per week. Prerequisites: Computer Science 60B, 120 or equivalent; consent of instructor. An introduction to the kinematics, dynamics and control of robots, robotic vision, sensing and the programming of robots. The course will cover forward, inverse, kinematics of serial chain manipulators. The manipulator Jacobian, force relations, and the control of motors for position control of the manipulator. Trajectory generation, obstacle avoidance, automatic planning of fine and gross motion strategies for robot programming languages. Proximity, tactile and force sensing. (F,SP) Staff


130. Integrated-Circuit Devices. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 40 and Physics 7C. Overview of basic semiconductor physical mechanisms. The electronics of metal-semiconductor contacts, pn junctions, bipolar transistors, and of junction and MOS field-effect transistors. Properties that are significant to device operation for integrated circuits. Silicon device and circuit technology. (F,SP) Staff

131. Semiconductor Electronics. (3) Three hours of lecture and two hours of laboratory per week. Prerequisites: 130 (which may be taken concurrently). Formerly 130, 131B and a portion of 134, Physics of solid-state electronics. Review of quantum mechanics; charge and current structure, lattice vibrations, band theory, electrons and holes, diffusion and drift, recombination, high-field phenomena, optical effects, device applications. Several one-hour minilectures done in pairs with the aid of a Teaching Assistant. (F) Gustafson

134. Microwave Communication Design. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: 117A and Physics 7C. Six fundamental experiments (characteristics of antennas, microwave components, network analyzer measurement; laser-geometry, electrical, electromagnetic, and electromagnetic wave propagation), and five special experiments to be chosen from twelve available in microwave, optical, and plasma devices and measurements. (SP) Mal

135. Microwave, Optics and Plasma Laboratory. (3) Two hours of lecture and four hours of lab per week. Prerequisites: 117A and Physics 7C. Six fundamental experiments (characteristics of antennas, microwave components, network analyzer measurement; laser-geometry, electrical, electromagnetic, and electromagnetic wave propagation), and five special experiments to be chosen from twelve available in microwave, optical, and plasma devices and measurements. (SP) J. Smith

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 light and matter; modulation and detection; other applications. (SP) Staff

140. Linear Integrated Circuits. (3) Three hours of lecture per week. Prerequisites: 104 and 105. Frequency response of cascaded amplifiers, dominant-pole techniques, gain-bandwidth exchange. Feedback amplifiers with useful input and output feedback. Design of amplifier stability, windowing, noise and gain limitation, frequency sampling, S-z to Z methods, frequency-transformation methods, optimization methods, 2-dimensional filter design. (F,SP) Staff

141. Digital Integrated Circuits. (4) Three hours of lecture, three hours of laboratory, and one hour of discussion per week. Prerequisites: 40 and 104; 130 recommended. Introduction to digital integrated circuits. Transistor logic families: NMOS, CMOS, TTL. MOS inverters and gates. Propagation delay and noise margins. Dynamic logic concepts. Bipolar transistor inverter and gates. Regenerative logic circuits. Memories. (F,SP) Staff

142. Integrated Circuits for Communications. (3) Three hours of lecture per week. Prerequisites: 40, 104, and 105. Analysis and design of electronic circuits for communication systems. Analysis of distortion in amplifiers. Design of power amplifiers and voicerecorders. Design of voltmeter-controlled oscillator, phase-locked loops. (F,SP) Meyer

143. Processing and Design of Integrated Circuits. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: 130. Integrated circuit fabrication technology. Mask layout, diffusion, monolithic active and passive components, device structure and characterization, parasitic effects. Relation between physical layout and electrical characteristics. MOS transistors will be fabricated in the laboratory and electrically evaluated. (F,SP) Staff

145A. Sensors, Actuators and Electrodes. (4) Three hours of lecture and four hours of laboratory per week. Prerequisites: 40 plus elementary chemistry and physics. Introduction to the physical bases of transduction, detection of signals in the presence of noise, applications of tuned- and distributed-parameter network theory to design and analysis of sensor and actuator systems in acoustics, optics, mechanics, fluid dynamics, thermodynamics, chemical dynamics and electrodynamics of structures and devices. Biological sensors and actuators. (F) Lewis

145B. Computer Applications in Biology and Medicine. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 140. Transformations utilizing digital computers, of biological and medical data to useful compact representations. Applications to medical diagnosis and medical systems management. (SP) Budinger

145L. Introductory Electronic Transducer Laboratory. (3) Three hours of laboratory and two hours of lecture per week. Prerequisites: 40. Laboratory exercises exploring a variety of electronic transducers for measuring physical quantities such as temperature, force, displacement, sound, light, ionic potential, the use of circuits for low-level differential amplification and analog signal processing; and the use of microcomputers for digital signal analysis and display. Lectures cover principles explored in the laboratory exercises; construction, response and signal to noise of electronic transducers and actuators; and design of circuits for sensing and controlling physical quantities. (F) Danner

145M. Introductory Microcomputer Interfacing Laboratory. (3) Three hours of laboratory and two hours of lecture per week. Prerequisites: 40 and 86B. Laboratory exercises constructing basic interfacing circuits and writing 20-100 line C programs for data acquisition, storage, analysis, display, and control. Use of the IBM PC with microprogrammable digital counter/timer, parallel I/O port, and analog I/O port. Circuit components include anti-aliasing filters, the S/H amplifier, A/D and D/A converters. Experiments include effects of aliasing in periodic sampling, fast Fourier transforms of basic waveforms, the use of the Hanning filter for leakage reduction, Fourier analysis of the human voice, digital filters, and control using microcomputer interfacing. Laboratory exercises cover principles explored in the laboratory exercises and design of microcomputer-based systems for data acquisition, analysis, and control. (SP) Derenzon

146. Dynamic Networks in Biology. (3) Three hours of lecture per week. Prerequisites: 40 or Mathematics 50B. Introduction to the analysis of engineering models and analytical methods to continue and discrete deterministic and stochastic biological processes. Network formats used to deal with cellular, organismal, and population phenomena. (F) Keller

147. Electrical Radiation and 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)

191A. How Things Work. (1) One and one-half hours of lecture per week. Must be taken on a pass/fail basis. Prerequisites: Junior standing in Electrical Engineering or equivalent. Seminars will be on how electronic technologies are being applied in real-life commercial and industrial products. A different category of products will be covered each week by a different speaker. Most speakers will come from industry. Possible topics: radio, audio equipment, computer/medical equipment, TV, VCP/Vertex, cellular phone, computers, TSDP, LSI, computer-CISC/RISC, magnetic storage, optical storage, LAN, world electronic market. Students are required to submit a short paper. (SP) Ko

192. Mechatronic Design Laboratory. (3) Three hours of laboratory, one hour of lecture, and one hour of discussion per week. Prerequisites: 120. Computer Science 60B, 120 or equivalent. Intended for seniors in Electrical Engineering or Computer Science. Design project course, focusing on application of theoretical principles in electrical engineering to control of a small-scale system, such as a mobile robot. Small teams of students will design and build a robot system incorporating sensors, actuators, and intelligence. (F) Hearing

193. Senior Project Course. (3) Course may be repeated for a maximum of 6 units. Three hours of lecture, one hour of discussion per week. Prerequisites: Senior standing in EECs and consent of instructor. Students in the course will determine the project and organize into groups of four to six students. Each group will work on a project and is expected to complete a working model and a written report on the design, implementation, and management of the project. (SP) Graham

199. Directed Group Study for Advanced Undergraduate. (3-5) Three to five hours of individual study per week. Must be taken on a pass/fail basis. Prerequisites: 2.0 GPA or better; 60 units completed. Group study of selected topics in
electrical engineering, usually relating to new developments. (F,SP) Staff

199. Supervised Independent Study. (1-4) Course may be repeated for a maximum of four units per semester. Individual conferences. Must be taken on a pass/no pass basis. Pre-requisites: Assistant in instructor and major adviser. Supervised independent study. Enrollment restrictions apply. (F,SP) Staff

Graduate Courses

205. Electron and Gaseous Devices. (2) Three hours of lecture per week. Prerequisite: 117A. Theory and applications of vacuum and gaseous devices, with emphasis on devices of the electron-microscope type used for microbeam analysis. (SP)


216. Microwave Antennas. (3) Three hours of lecture per week. Prerequisite: 114A 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. (F)

217. Microwave Circuits. (3) Three hours of lecture per week. Prerequisite: 114A or consent of instructor. Techniques of analog circuit technology in the high-frequency regime above 1 GHz. Transmission line and distributed circuit elements; S-parameter design of high-frequency active circuits; computer-aided analysis and design. Emphasis on design of planar high-frequency circuits. (F) Schwarz


221A. Linear System Theory. (4) Three hours of lecture and two hours of recitation per week. Prerequisites: 120; Mathematics 112 recommended. Basic system concepts; state-space and I/O representation. Properties of linear systems. Controllability, observability, feedback stabilization. State observers. Characteristic polynomial. Nyquist test. (F,SP) Staff

221B. Multivariable Feedback Systems. (3) Three hours of lecture per week. Prerequisites: 221A or equivalent and one undergraduate control course. MIMO feedback systems, theory and design. Stabilization, tracking, disturbance rejection. Two degrees of freedom design. Robustness. Large scale interconnected systems. Linear Quadratic optimal Control. (SP)


223. Stochastic Systems: Estimation and Control. (3) Three hours of lecture per week. Prerequisites: 221 and 226, or equivalent. Design of baseband and passband digital communications systems. Characteristics of media, modulation alternatives including PAM, FSK, and spread spectrum systems. Comparison of frequency and time division equalization. Line, convolutional, and trellis coding. Timing and carrier recovery, multiplexing and multiple access, network synchronization. (SP) Staff

225A. Digital Signal Processing. (3) Three hours of lecture per week. Prerequisites: 123 and 226, or equivalent. Formerly EECS 225. Advanced techniques in digital signal processing, non-linear and non-stationary characteristics of signals, specialized filtering methods, time-domain processing, time-dependent frequency representations, spectral estimation, adaptive filtering and estimation. Detailed treatment of speech processing, image processing, digital coding, as well as radar signal processing. (SP) Staff

225B. Multidimensional Signal Processing. (3) Three hours of lecture per week. Prerequisite: 123. Multidimensional signal and system analysis, design and representation. Implicit and explicit sampling schemes, Fourier analysis, stability issues, design and implementation of FIR and IIR filters. Additional topics depend on instructor and may include: Signal reconstruction from partial information, Array processing, beamforming and spectral estimation, image processing, video coding, as well as radar signal processing. (SP) Staff

225C. VLSI Signal Processing. (3) Three hours of lecture per week. Prerequisites: 141, 123. Formerly 295B-295C. Course examines the components and technologies of VLSI signal processing systems. Building blocks and design styles. Simulation and specification. Architectural trade-offs. Synthesis techniques. (SP) Brodersen, Rabaey


227B. Optimization in Engineering Design. (3) Course may be repeated for credit with different instructors and with permission of lecturer per course. Prerequisites: 227A or consent of instructor. Formulation of engineering design problems as semi-infinite optimization problems. Examples from electronic circuit control, system and structural design. Semi-infinite optimization and optimal theory and algorithms. (F) Polak

228. Communication Networks. (2) Two hours of lecture per week. Prerequisites: 122 and 226, or equivalent. Analysis and design of communication networks. Circuit, packet, and hybrid switching approaches. Protocols, including setup, routing, flow control error recovery. MM1 and M/G/1 queueing theory and applications. Markovian and non-Markovian models of webs, networks, including delay and blocking. (SP) Wallrand

229. Information Theory and Coding. (3) Three hours of lecture per week. Prerequisites: 226 recommended. Statistics 202A or equivalent. Formerly EECS 229B. Fundamental bounds of Shannon theory and source and channel coding theorems. Galois field theory, algebraic error-correction codes. Private and public-key cryptographic systems. (SP)


231. Solid-State Devices. (3) Three hours of lecture per week. Prerequisites: 130 or equivalent. Physical principles of semiconductor devices. Metal-oxide-semiconductor systems, high-field and hot carrier effects. Advanced discussion of bipolar and field-effect transistors with emphasis on the behavior dictated by present and future technology trends. (SP) Staff


233. Lightwave Systems. (2) Two hours of lecture per week. Prerequisites: 120 and 121 or equivalent; 136 recommended. Fiber transmission properties. Direct-detection systems; Analog and digital transmitter and receiver design, take-up and end infrared, optical fiber amplifiers. Coherent communication: FM noise and modulation of laser diodes, quantum limited detection, homodyne and heterodyne detection. Lightwave systems, high-speed communication systems, optical CATV systems. (SP) Lau, Kan

236A-236B. Quantum and Optical Electronics. (3) Three hours of lecture per week. Prerequisites: 117A, Physics 137A or equivalent. Interaction of radiation with atomic and semiconductor systems, density matrix treatment, semiclassical laser theory (Lamb's), laser resonators, specific laser systems, laser dynamics, Q-switching and mode-locking, noise in lasers and optical amplifiers. Electro-optics and nonlinear optics, phase conjugation, electrooptics, acoustooptics and magneto-optics, coherent optics, stimulated Raman and Brillouin scattering. (F,SP) Staff

238. Superconductive Devices and Circuits. (3) Three hours of lecture per week. Prerequisites: 117A, Physics 137A or equivalent. Interaction of radiation with atomic and semiconductor systems, density matrix treatment, semiclassical laser theory (Lamb's), laser resonators, specific laser systems, laser dynamics, Q-switching and mode-locking, noise in lasers and optical amplifiers. Electro-optics and nonlinear optics, phase conjugation, electrooptics, acoustooptics and magneto-optics, coherent optics, stimulated Raman and Brillouin scattering. (F,SP) Staff

240. Advanced Analog Integrated Circuits. (3) Three hours of lecture per week. Prerequisites: 140. Analysis and optimized design methods of analog subsystems, analysis of achieving wide-band amplification, gain-bandwidth considerations; analysis of noise in integrated circuits and
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low noise design. Precision passive elements, analog switches, amplifiers and comparators, voltage reference in NMOS and CMOS circuits. Serial, parallel, and other advanced approaches to data acquisition and digital converters. Switched-capacitor and CCD filters. Applications to codes, modems. (F,SP) Staff

241. Advanced Digital Integrated Circuits. (3) Three hours of lecture per week. Prerequisites: 142, 240. Analysis and design of present-day integrated circuits for digital and analog systems, and their applications in telecommunication, computer hardware, microprocessors, microcontroller, and real-time systems. Course emphasizes the design methodology and analysis of integrated circuits. (F,SP) Staff

242. Advanced Integrated Circuits for Communications. (3) Three hours of lecture per week. Prerequisites: 142, 240. Analysis, evaluation and design of present-day integrated circuits for digital communication and computer hardware. Course emphasizes the design methodology and analysis of integrated circuits. (F,SP) Staff

243. Advanced IC Processing and Layout. (3) Three hours of lecture per week. Prerequisites: 142, 240 and either 140 or 141. The key processes for the fabrication of integrated circuits. Optical, X-ray, and electron beam lithography, ion implantation, coater deposition and dry etching. Power and efficiency considerations for photolithography, vacuum deposition, wet and dry etching, and ion milling. Effects of phase and defect equilibria on process control. (SP) Staff

244. Computer-Aided Design of Integrated Circuits. (3) Three hours of lecture per week. Prerequisites: 140 or 141. This course will cover a wide variety of topics in the theory and practice of computer-aided design of integrated circuits. The course will emphasize state-of-the-art techniques and both theoretical aspects as well as the application of results to the design of integrated circuits. Topics to be covered include simulation, layout techniques, synthesis, verification, testing, and integrated design systems. (F) Staff

246. Biological Systems. (3) Three hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. Advanced approaches to linear and nonlinear problems in dynamical systems and their modeling and analysis of biological phenomena. (SP) Keller

250A. System Theory. (2) Course may be repeated for credit. Two hours of lecture per week. Recent developments in system theory and related areas. Lectures oriented toward advanced students. (F,SP) Staff


250C. Advanced Circuit Theory. (1-2) Course may be repeated for credit. Two hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Current research topics in electrical circuits, networks, and systems. Topics are independent of the subject matter of the student's research. (F,SP) Staff

250D. Superconductive Integrated Circuits. (3) Three hours of lecture per week. Prerequisites: 140 or 141. This course will cover the principles and tools for the design and analysis of superconductive integrated circuits. Basic concepts in superconductivity and Josephson junctions. Equivalent circuits and analogs. Calculation of circuit elements. CAD tools. Noise. Fabrication technology. Analog and digital circuits. Project.

250E. Regular and Stochastic Motion in Dynamical Systems. (3) Three hours of lecture per week. Prerequisites: Upper division course in classical mechanics or consent of instructor. Invertible and near integrable systems, canonical perturbation theory, Lie transforms, linearization of vector fields, stability of linear and nonlinear systems, stability of periodic solutions. Stability of steady state, transient behavior, chaos, instability, and multi-scale dynamics. Bifurcation and chaos in discrete and continuous systems. (SP) Staff

250F. Mathematical Methods in Electromagnetic Theory. (3) Three hours of lecture per week. Prerequisites: 250A, Guseynov. Topics include: Boundary integral equations and their numerical solution. Thin films, multilayers, and dielectric coatings. Thin film deposition, wet and dry etching. Fabrication processes and systems. Typical topics included: Design of optical coats and systems for advanced semiconductor lasers, quantum well optoelectronic devices, solar cells, and infrared detectors. Recent topics include: Beam lithography, plasma etching, and optical lithography. The course will focus on the preparation and characterization of thin film devices for advanced applications in photonic devices and optical communication. Various aspects of semiconductor laser design, quantum well optoelectronics, semiconductor laser devices, and modern communication systems are covered.


250M. Microprocessors and Microcontrollers. (2) Two hours of lecture per week. Prerequisites: 150 and 143, or consent of instructor. Fundamental principles, fabrication techniques and constraints, and case studies of microprocessors and microcontroller design. Integrated circuit design and fabrication processes and their applications in computer architecture and system design. (F) Staff

250N. Integrated Circuit Technology Design. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: 140 or equivalent. Current problems in integrated circuit process design and fabrication with emphasis on: submicron lithography and planarization for multi-level metallization. Lectures will cover current design rules; basic lithography issues; passivation and metallization processes, deep submicron technology, and multi-level circuit synthesis. (F) Bratton, Sangiovanni-Vincentelli

250O. Microsensors and Microactuators. (2) Two hours of lecture per week. Prerequisites: 150 and 143, or consent of instructor. Fundamental principles, fabrication techniques and constraints, and case studies of microprocessors and microcontroller design. Integrated circuit design and fabrication processes and their applications in computer architecture and system design. (F) Staff

250P. Thin Film Technology for IC Fabrication. (3) Three hours of lecture per week. Prerequisites: 143 or equivalent. Fabrication processes and systems. Typical topics included: Design of optical coats and systems for advanced semiconductor lasers, quantum well optoelectronic devices, solar cells, and infrared detectors. Recent topics include: Beam lithography, plasma etching, and optical lithography. The course will focus on the preparation and characterization of thin film devices for advanced applications in photonic devices and optical communication. Various aspects of semiconductor laser design, quantum well optoelectronics, semiconductor laser devices, and modern communication systems are covered.

250Q. Plasma Simulation. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 147 or Physics 142. Recent developments of algorithms and techniques for computer-aided design of integrated circuits. (SP) Staff

250R. Advanced Topics in Random Processes and Queuing Theory. (2) Two hours of lecture per week. Prerequisites: Instructor's approval. Discussion of current topics of active research interest in photonic devices and optical communication. Various aspects of semiconductor laser design, quantum well optoelectronics, semiconductor laser devices, and modern communication systems are covered.

250S. Advanced Topics in Photonic Devices and Optical Communication. (2) Two hours of lecture per week. Prerequisites: Instructor's approval. Discussion of current topics of active research interest in photonic devices and optical communication. Various aspects of semiconductor laser design, quantum well optoelectronics, semiconductor laser devices, and modern communication systems are covered.

250T. Advanced Topics in Signal Processing. (2,3) Course may be repeated for credit. Three to four hours of lecture per week. Prerequisites: 225, 228. Discussion of current topics of active research interest in photonic devices and optical communication. Various aspects of semiconductor laser design, quantum well optoelectronics, semiconductor laser devices, and modern communication systems are covered.

250U. Digital Computers in Experimental Systems. (3) 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, psychology. (SP) M. Graham

250V. Adaptive and Identification Systems. (3) Three hours of lecture per week. Prerequisites: Statistics 111 or equivalent. Topics in the theory of adaptive and learning systems. Topics include: white noise and random processes, Kalman filtering, recursive signal processing, advanced software techniques, and digital signal processing. (SP) Zador

250W. Special Issues in Semiconductor Manufacture. (3) Course may be repeated for credit. Two hours of lecture per week. Prerequisites: 140 or 141, 143, Statistics 135 or equivalent. Covers advanced studies in high volume IC production emphasizing process control, equipment design and implementation, and the issues related to the design and circuit design for manufacturability, statistical process control and computer integrated manufacturing systems. Independent Group Projects. (SP) Spanos
290X. Radio Telescopes. (3) Three hours of lecture per week. Prerequisites: 17A, Synthesis of celestial brightness, structure, and motion as measured on the ground. Paraboloidal, spherical, cruciform, and interferometric antennas. Observation and oscillillation measurements. Atmospheric effects and intensity interference.

290Y. Critical Problems in Communications Integrated Circuits. (2) Course may be repeated for credit. Two hours of lecture per week. Prerequisites: 142 or 240, Evaluation and design of critical integrated circuits in communication applications. Broad-band, power amplifiers; maximum frequency of bipolar collector oscillators and mixers; advanced MOS A/D conversion techniques including oversampling and self-calibration; new configurations for telecommunication including digital data switches, receiver design, clock recovery: multi-moding (squiggling) in MOS oscillators; CAD tools and analog IC design including synthesis, distortion and noise analysis (SP, Gray)

298. Group Studies, Seminars, or Group Research. (1-4) Course may be repeated for credit. One to four hours of lecture per unit. Section 1-40 to be graded on a satisfactory/unsatisfactory basis. Sections 41-49 to be graded on a letter-grade basis. Advanced study in various subjects through special seminars on topics to be announced. Equipment and/or special problems. Group participation in comprehensive design problems. Group research on complex problems for analysis and experimentation. (F,SP) Staff

299. Individual Research. (1-12) Course may be repeated for credit. Independent, Individual study or investigation leading to the solution of problems in electrical engineering. (F,SP) Staff

602. Individual Study for Doctoral Students. (1-6) Course may be repeated for credit. Course does not satisfy unit or residence requirements for doctoral degree. Independent study, in consultation with faculty member. Must be taken on a satisfactory/unsatisfactory basis. Individual study in consultation with the major field advisor, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. (and other doctoral degrees). (F,SP) Staff

Professional Courses

301. Teaching Techniques for Electrical Engineering. (1) One hour of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing. Weekly seminars and discussions of effective teaching techniques. Use of educational objectives, alternative forms of instruction, and evaluation of teaching concepts and techniques in electrical engineering. Student and self-evaluation. 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


Upper Division Courses

IDS 100. History of American Technology. (4) Four hours of lecture per week. Historical development of technology from colonial times to the present. Analysis of technical innovation in its cultural, economic, and political setting. Topics include the Industrial Revolution, technological change in warfare,LM theory of invention, and the evolution of technology in industrialization and the use of corporations. Sponsoring departments: History and Electrical Engineering and Computer Science.

IDS 119. Introduction to Computers. (3) Students who have completed courses in Computer Science 7, 8, or the 50 series will receive no credit for IDS 110. Three hours of lecture per week. Prerequisites: Upper division standing. Students must also be enrolled in IDS 110L (with the same grading option as in 110) or an equivalent departmental course. Primarily for students in the social sciences and humanities and in the professional view of the field. 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 and graphics, simulation, and telecommunication. Sponsoring departments: Engineering Interdisciplinary Studies and Education.

IDS 110L. Introductory Computer Laboratory. (1) Four hours of laboratory per week. Prerequisites: Upper division standing. Students must also be enrolled for IDS 110 (with the same grading option as in 110L). Primarily for students in the social sciences and humanities and in the professional courses. Laboratory exercises are drawn mainly from word processing, database management, electronic spreadsheets, graphics, simulation and telecommunication. Sponsoring departments: Engineering Interdisciplinary Studies and Education.

IDS 110F. Introductory Computer Laboratory. (1) Four hours of laboratory per week. Prerequisites: Upper division standing. Students must also be enrolled for IDS 110 (with the same grading option as in 110F). Primarily for students in the social sciences and humanities and in the professional courses. Laboratory exercises are drawn mainly from word processing, database management, electronic spreadsheets, graphics, simulation, and telecommunication. Sponsoring departments: Engineering Interdisciplinary Studies and Education.


Computer Science

Please refer to the Computer Science Service Courses section preceding the Electrical Engineering course listings.

Lower Division Courses

2. Topics in Computer Science. (1) One hour of lecture per week. Prerequisites: Consent of instructor. This is a seminar course in which computer scientists describe their professional activities and interests. The aim is to give entering undergraduate students a comprehensive view of the field. Students are required to give presentations on papers they read and projects they complete. (F,SP) RowE

3. Introduction to Symbolic Programming. (4) Refer to computer science service course restrictions. Two hours of lecture, one hour of discussion, and approximately six hours of self-paced instruction per week. Prerequisites: High school algebra. Introduction to computer programming, emphasizing symbolic computation and functional programming style. Students write programs of at least 200 lines of code, in a dialect of the LISP programming language. (F,SP) Clancy

3S. Introduction to Symbolic Programming (Self-paced). (1)-4 Refer to computer science service course restrictions. Course may be repeated up to 4 times. Four hours of discussion and three to four hours of laboratory per week. Prerequisites: High school algebra. Introduction to computer programming, emphasizing symbolic computation and functional programming style. Students will write a project of at least 200 lines of code, in a dialect of the LISP programming language. Same material as CS 3 but in self-paced format. Units assigned depend on amount of work completed. First two units of CS 3S must be taken to qualify for Computer Science "Self-paced Course". Credit restrictions appear at the beginning of the EECS section of the General Catalog. (F,SP) Clancy

85. Introduction to Programming (Self-paced). (1)-4 Refer to computer science service course restrictions. Three hours of lecture per week. Prerequisites: Upper division standing. High school algebra. The same material as 8 in a self-paced format. Units assigned depend on amount of work completed. Computer solution, using the Pascal language, of problems drawn from various fields, with emphasis on nonnumerical applications. May be repeated for credit up to a total of 4 units.

9A. Introduction to Fortran for Scientific Computation (Self-paced). (1) Refer to computer science service course restrictions. Prerequisites: 8 or equivalent. Self-paced Fortran course 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. (F,SP) Clancy

9B. Pascal for Programmers (Self-paced). (1) Refer to computer science service course restrictions. Self-paced. Must be taken on a passed/not passed basis. Prerequisites: Programming experience in another 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 (Self-paced). (1) Refer to computer science service course restrictions. Must be taken on a passed/not passed basis. Prerequisites: Programming experience in another language, or with pointers in a high-level language. Self-paced course in the LISP programming language and the techniques of functional programming. Functions and lists; recursion; functions acting on other functions; higher-order functions; and functions as stored values. (F,SP) Clancy

9E. Productive Use of the UNIX Environment. (1) Self-paced. Must be taken on a passed/not passed basis. Prerequisites: Computer science service course restrictions. Must be taken on a passed/not passed basis. Prerequisites: Mathematics 51 or equivalent. Introduction to the LISP programming language and the techniques of functional programming. Functions and lists; recursion; functions acting on other functions; higher-order functions; and functions as stored values. (F,SP) Clancy

98. Pascal for Programmers (Self-paced). (1) Refer to computer science service course restrictions. Must be taken on a passed/not passed basis. Prerequisites: Programming experience in another 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

60A. The Structure and Interpretation of Computer Programs. (4) Two hours of lecture, two hours of discussion, and six hours of laboratory per week. Prerequisites: Mathematics 21A (may be taken concurrently). 3 or the Advanced Placement Computer Science test may be taken concurrently. Advanced programming techniques of abstract data types, data-directed programming, and message-passing; (b) between programming languages, using functional and rule-based languages as examples. It also relates these techniques to the practical problems of implementation of languages and algorithms on a von Neumann machine. (F,SP) Harvey

60B. Machine Structures. (3) Two hours of lecture, one hour of discussion, and four hours of laboratory per week. Prerequisites: Mathematics 3 or equivalent, former 55. The internal organization and operation of digital computers. Machine architecture support for data types (numbers characters, strings), data structures (arrays, stacks, queues, linked lists), design and implementation of languages, evaluating programs, and manipulating memory (recursion). (F,SP) Harvey

60C. Data Structures and Advanced Programming. (4) Two hours of lecture, two hours of discussion, and six hours of laboratory per week. Prerequisites: 60A, 60B, Mathematics 55 or 113A (math courses may be taken concurrently). Advanced programming techni-
gram. Review of elementary calculus principles of software engineering applied to various data structures: arrays, linked structures, queues, stacks. Advanced data structures and algorithms: graphs and trees, strings, searching, sorting, hashing. (F, SP)

80. Programming Applications. (3) Two hours of lecture and one and one-half hours of discussion per week. Prerequisites: 60B, 68B. Second course in computer programming for non-majors. Practice with microcomputer software: word processors, spreadsheets, graphics packages, database management programs. Concepts of computer organization, compilers, operating system. Efficient use of computers. Exercises in Pascal programming, including recursion. Programming project in an area of the student’s choice. (F, SP)

95. Topics In Computer Science. (1) Course may be repeated twice for credit. Consent of instructor. Prerequisites: Consent of Instructor. This is a seminar course in which computer scientists describe their professional activities and interests. The aim is to give entering undergraduate students a comprehensive view of 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

Upper Division Courses

150. Components and Design Techniques for Digital Systems. (3) Three hours of lecture, one hour of discussion, and three hours of laboratory per week. Prerequisites: 60B, EECS 40 or 42, EECS 43 recommended. Basic building blocks and design methods to control synchronous digital systems. Alternative representations for digital systems. Bipolar TTL vs. MOS implementation technologies. Standard logic (SIS, MSI) vs. programmable logic (PLD, FPGA). Finite State Machine design. Digital computer building blocks and techniques for the design of specialized digital software. Formal hardware laboratories and substantial design project. Informal software laboratory periodically throughout semester. (F, SP) Katz

152. Computer Architecture and Engineering. (5) Three hours of lecture and two hours of discussion per week. Staff. Prerequisites: 150. Instruction set design, Register Transfer. Computer design project requiring about 100 hours. Data-path design. Controller design. Memory system. Addressing. Microprogramming. Computer arithmetic. Survey of recent advances. (F, SP) Staff

162. Operating Systems and System Programming. (4) Three hours of lecture, one hour of discussion, and four hours of laboratory per week. Prerequisites: 60C. Basic concepts of operating systems and system programming. Utility programs, subsystems, multiprocess program execution. Processor scheduling and interprocess communication and synchronization. Memory allocation, segmentation, paging. Loading and linking. Libraries. Resource allocation, scheduling, performance evaluation. File systems, storage devices, I/O systems. Protection, security and privacy. (F, SP) Staff

164. Programming Languages and Compilers. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 60C. Survey of programming languages. The design of modern programming languages: control structures of scanning, parsing, semantic analysis, and code generation. Implementation of interpreters, compilers, and assemblers. Overview of run-time organization and error handling. (F, SP) Staff

169. Software Engineering. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 50C, Math 55 or 113. Ideas and techniques for designing, developing, and modifying large software systems. Function-oriented and object-oriented modular design techniques, designing for re-use and maintaining software structure and documentation. Verification and validation. Cost and quality metrics and estimation. Project team organization and management. Students will work in teams on a substantial software programming project. (SP) Staff

170. Efficient Algorithms and Intractable Problems. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 60C, Mathematics 55. Concept and basic techniques in the design and analysis of algorithms; models of computation; lower bounds; algorithms for sorting; sequences; trees; and UNION-FIND algorithms; numerical and algebraic algorithms; combinatorial algorithms. Turing machines, how to count steps, deterministic and nondeterministic Turing machines, NP-completeness. Unsolvable and intractable problems. (F, SP) Staff

172. Formal Languages and Automata Theory. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 160, Mathematics 55 or 113A. Variations on the theme of finite automata. Nonde- terminism and regularity. Properties of languages accepted by finite automata; context-free grammars and push-down automata. Turing machines and computability. Time and space bounded computation. Special classes of grammars and languages. (F, SP) Staff

174. Combinatorics and Graph Theory. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 170. Permutations, combinations, generating functions, recursion relations, inclusion-exclusion principle, Pólya’s theorem, Hall’s theorem; planar graphs, Euler graphs, Hamiltonian graphs, coloring problems; independence numbers, covering numbers. (SP) Staff

184. Foundations of Computer Graphics. (4) Three hours of lecture, one hour of discussion, and three hours of laboratory per week. Prerequisites: 60C; knowledge of linear algebra and calculus. Introduction to principles of computer graphics. Comparison of various display devices. Two- and three-dimensional transformations such as rotation, scaling, translation and their matrix representations. Homogeneous coordinates. Projective transformations. Several formulations for perspective projection. Algorithms for clipping, hidden surface removal, antialiasing. Lighting models for reflection, transparency. Mathematical techniques for curve and surface representation. (F, SP) Staff

186. Introduction to Database Systems. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 60C, knowledge of C. Access methods and file systems to facilitate data access. Hierarchical, network, relational and object-oriented data models. Query languages for models. Embedding query languages in programming languages. Database services including protection, integrity control and alternative views of data. High level graphical user interface applications, browsers and report writers. Introduction to transaction processing. Database system implementation to be done as term project. (F, SP) Staff

188. 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, game playing, knowledge representation and reasoning, reasoning under uncertainty, expert systems, learning, perception, language understanding. (F, SP) Staff

189. Introduction to Knowledge-Based Systems and Languages. (3) Three hours of lecture per week. Prerequisites: 60C or 160 or consent of instructor. Knowledge representation and knowledge acquisition. Introduction to Prolog and logic programming; query languages and relational models of data. Question answering, inference, and information analysis. (F) Staff

195. Social and Economic Implications of Computer Technology. (3) Two hours of lecture and one and one-half hours of discussion per week. Must be taken on a pass/no pass basis. Prerequisites: Major in EECS or CS or consent of instructor. How computer hardware and software shape society from Babbage to today. Current issues such as competition, pricing, job displacement, security and privacy, computer crime, weapons systems, export of technology, management of large systems, government projects. Projects for future development of computer technology. Philosophical and ethical issues concerning artificial intelligence. (SP) Lawler

H196. Honors Seminar for Computer Science Majors. (3) Three hours of lecture per week and project work. Must be taken on a pass/no pass basis. Prerequisites: 250, CS 196 or consent of instructor. Study in-depth of several topics in computer science to be chosen by the instructor. Students will assess current literature in the topics and present oral reports in classes. Each student will carry out a project. (SP) Staff

198. Directed Group Studies for Advanced Undergraduates. (1-4) Course may be repeated for credit. Course format varies with section. Must be taken on a pass/no pass basis. Prerequisites: 198. Undergraduate students in good standing in an area of the student’s choice. (F, SP) Staff

199. Supervised Independent Study. (1-4) Course may be repeated for a maximum of four units per semester. Individual conferences. Must be taken on a pass/no pass basis. Consent of instructor and major advisor. Supervised independent study. Enrollment restrictions apply. (F, SP) Staff

Graduate Courses

250. VLSI Systems Design. (4) Three hours of lecture and four hours design laboratory per week. Prerequisites: 150. Undergraduate course on design of integrated circuits and systems concentrating on architectural and topological issues. VLSI architectural, systolic arrays, self-timed systems. Trends in VLSI development. Physical limits. Tradecraft in custom-design, standard cells, gate arrays. VLSI design tools. (F) Staff

252. Graduate Computer Architecture. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 152. Graduate survey of contemporary computer organizations covering: early systems, CPU and system design, instruction sets, control, processors, busses, ALU, memory, I/O interfaces, connection networks, virtual memory, pipelined computers, multiprocessors, and real-time studies. Term paper or project is required. (F, SP) Staff


254. Topics In VLSI Chip Design and Implementation. (4) Course may be repeated for credit. Three hours of lecture and three hours of design laboratory per week. Prerequisites: 250. Formerly 2524. Design and implementation and testing of VLSI/VLSI multi-project chips. Apply the design technology learned in CS 250 to build systems on silicon chips. Design for testability, preparation of test system and systematic testing of the fabricated chips. (SP) Staff

258. Parallel Processors. (2) Two hours of lecture per week. Prerequisites: 252. Parallelism, its representation, models and properties. Parallelism detection, schedules, parallel processes. Principle of pipeline computer, classification, scheduling: current trends in pipeline architectures. Computer network, deadlock, protocol, routing; global information management, security, distributed operating systems and databases. (SP) Staff

259. Fault Tolerant Systems. (2) Two hours of lecture per week. Prerequisites: 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 reliability models and their assessment. (SP) Staff

260. User-Interfaces to Computer Systems. (3) Three hours of lecture per week. Prerequisites: 182 and 170. Techniques for developing user-friendly computer systems. Form-based user-interfaces, Window and display management abstractions. Case studies of novice- and expert-user interfaces. Students will complete a substantial project. (SP) Staff

261. Security In Computer Systems. (3) Three hours of lecture per week. Prerequisites: 182 and 170. Technionies of common computer system security. Protecting and verifying the security of the systems. Cryptographic protocols. (SP) Staff

262. Advanced Topics In Operating Systems. (4) Three hours of lecture per week. Prerequisites: 182 and 170. Techniques for computer operating systems. Early computer operating systems. Form-based user-interfaces, Window and display management abstractions. Case studies of novice- and expert-user interfaces. Students will complete a substantial project. (SP) Staff

263. Design of Programming Languages. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 182. Syntactic and semantic aspects of the design of programming languages, formal description of syntax and semantics, advanced programming techniques, structured programming, debugging, verification of programs and compilers, and proofs of correctness. (F) Staff

264. Implementation of Programming Languages. (4) Three hours of lecture, one hour of discussion, and six hours programming laboratory per week. Prerequisites: 164, 263 recommended. Compiler construction. Lexical analysis, syntax analysis, semantic analysis, code generation and optimization, storage management, run-time organization. (SP) Staff

265. Advanced Programming Language Implementation. (3) Three hours of lecture per week. Prerequisites: 264. Table-driven and retargetable code generator implementation. Formal semantics and global optimization methods. Code optimization for advanced languages and architectures. Local code improvement. Optimization by program transformation. (F) Staff


267. Applications of Parallel Computers. (3) Three hours of lecture and one hour of laboratory per week. Models of parallel programming. Fundamental algorithms for linear algebra, sorting, FFT, etc. Survey of parallel machines and machine structures. Exiting parallel programming languages, vectorizing compilers, environments, optimizations. Data parallelizing techniques. Techniques for synchronization and load balancing. Detailed study and algorithm program development of medium sized applications. Also listed as Engineering 233. (SP) Staff


269. Software Engineering and Large System Design. (3) Two hours of lecture, one hour of discussion, and six hours laboratory per week. Prerequisites: 182 and 164. Design and construction, maintenance, and evolution of large software systems. The course will study techniques for developing large software systems, including advanced programming languages, programming methodologies, design tools, and project management. Students will be expected to participate in one or more small projects that will explore some standard and innovative techniques. (F) Staff

270. Combinatorial Algorithms and Data Structures. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 164 and 270. Design and analysis of efficient algorithms for combinatorial problems. Network flow theory, matching theory, matroid theory; augmenting-path algorithms; branch-and-bound algorithms; data structure techniques for efficient implementation of combinatorial algorithms; analysis of data structures; applications of data structure techniques to sorting, searching, and geometric problems. (SP) Staff

271. Randomness and Computation. (3) Three hours of lecture per week. Prerequisites: 170 and at least one course numbered 270-279. Computational applications of randomness and computational theories of randomness. Approximate counting and uniform generation of combinatorial objects. Generation of random walks on expanders graphs, explicit construction of expanders graphs, randomized reductions, Kalmogorov complexity, pseudo-random number generation, semi-random sources. (F) Staff

272. Probabilistic Analysis of Algorithms. (3) Three hours of lecture per week. Prerequisites: 170. Staff

273. Foundations of Parallel Computation. (3) Three hours of lecture per week. Prerequisites: 170, or consent of instructor. Formerly 292F. This course is concerned with the application of probability theory to problems in computer science. Probabilistic analysis of algorithms including the use of randomization in efficient algorithms, randomization in networking and the construction of Hamiltonian circuits, matchings, cliques and colorings in graphs. Probabilistic analysis of inductive inference methods. Probabilistic construction of expanders graphs and other combinatorial objects. Staff

274. Computational Geometry. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 170 or equivalent. Formerly 292F. Constructions. Geometric data structures; algorithms for constructing geometric structures, convex hulls, triangulations, Voronoi diagrams, arrangements of hyperplanes; relationships among these problems. Search problems: advanced data structures; subdivision; random search; various kinds of range searches. Models of computation; lower bounds. (SP) Staff


276. Number Theory and Cryptography. (2) Two hours of lecture per week. Prerequisites: 170 and either Mathematics 113A or 115A. Computing the greatest common divisor; efficient exponentiation mod n; efficient algorithms for some probabilistic, some deterministic, (used the Extended Riemann Hypothesis) to decide primality and extract square roots modulo a prime; not so efficient factoring; applications of number theory to cryptography. (SP) Staff

277. Concrete Complexity. (3) Three hours of lecture per week. Prerequisites: 170 and Mathematics 113A, The study of inherent complexity of specific computational problems. Circuits, logic, decision trees, parallel programs, decision tree models, sorting and searching, evasive graph properties, algebraic complexity, computation complexity, VLSI complexity, time-space trade-offs. (F) Karp

278. Machine-Based Complexity Theory. (3) Three hours of lecture per week. Prerequisites: 170. Properties of the complexity of randomized and nondeterministic computation. Comparison of randomized vs. nondeterminism; time vs. space; complexity hierarchies; aspects of the P-NP question; relative power of various abstract machines. (SP) Staff

279. System Support for Scientific Computation. (3) Three hours of lecture per week. Prerequisites: 60LA. Formerly 118B 118A. Staff


281. Machine Learning. (3) Three hours of lecture per week. Prerequisites: 88B or consent of instructor. Learning from the point of view of artificial intelligence with contributions from philosophy and psychology. Readings and discussion will cover concept learning, compilation and intelligent caching, knowledge-based generalization, reasoning by analogy, inductive learning, architectures for general learning systems, knowledge acquisition, and analysis of learning systems. A substantial project will be undertaken. (SP) Staff

282. Algebraic Algorithms. (3) Three hours of lecture per week. Prerequisites: 164, Mathematics 113B or permission of instructor. Theory and construction of symbolic algebraic computer programs. Polynomial arithmetic, GCD, factorization, integer, fast Fourier transform, and other elementary functions, analytic approximation, simplification, design of computer systems and languages for symbolic manipulation. (F) Pateman
228. Programming Technology for Artificial Intelligence and Symbol Manipulation. (3) Three hours of lecture per week. Prerequisites: 164. Advanced LISP. Programming, AI programming languages, indexing, discrimination nets, unification pattern matching, production systems, predicate calculus based systems, frame-based systems, representations for geometric and spatial forms, symbolic and algebraic manipulation techniques. (F) Staff

229. Computer-Aided Geometric Design and Modeling. (3) Three hours of lecture per week. Prerequisites: Mathematical skill in calculus and linear algebra. Mathematical techniques for curve and surface representation, geometric data interpolation, interpolatory splines, tensioned splines, Bezier curves and surfaces, B-splines, Beta-splines, Coons patches, tensor product forms, as well as subdivision and boundary conditions, and computational considerations. (F) Staff

230. Procedural Generation of Geometrical Objects. (3) Three hours of lecture per week. Prerequisites: 184 or equivalent. Object description languages and generators for geometric modeling, computer graphics, robotics, engineering, and architecture. Converting numeric data into geometries for visualization. Creating parameterized mathematical entities in three and four dimensions. Tessellations, convex hulls, object intersections. Automatic rounding, interspersing objects, interpolatory curves, animation, growth algorithms, self-similar fractal objects. Other advanced topics and recent developments in the field. (SP) Sequin

231. Implementation of Data Base Systems. (3) Three hours of lecture per week. Prerequisites: 162 and 186. Advanced topics in the design of data base systems on modern hardware systems. Considerations concerning operating system design, including buffering, page size, prefetching, etc. Query processing algorithms, database security and concurrency control systems. Implementation of distributed data bases and data base machines. (F) Staff

232. Advanced Robotics. (3) Three hours of lecture per week. Prerequisites: Electrical Engineering 125. Advanced topics related to current research in robotics. Planning and control issues for robotic systems, taking into account: dynamic constraints, control and sensing uncertainty, and non-holonomic motion constraints. Analysis of fiction for assembly and grasping tasks. Current topics including robot vision and force sensing. Environmental perception from sparse sensors for dextrous hands. Grasp planning and manipulation. (SP) Staff

233. Artificial Intelligence Approach to Natural Language Processing. (3) Three hours of lecture per week. Prerequisites: 164. Representation of conceptual structures, language analysis and production, models of inference and memory, high-level text structures, question answering and conversation, machine translation. (F) Staff

234. Knowledge Representation and Use in Computers. (3) Three hours of lecture per week. Prerequisites: 188 or equivalent. Fundamentals of knowledge representation and use in computers. Predicate calculus, propositional logic, probability and expectation theory, and their use in capturing commonsense and expert knowledge. Theorem-provers, planning systems belief networks and influence diagrams as reasoning mechanisms. Use of conceptual structures for Intelligent agents. A project will be undertaken. (F) Russell

235. Concurrent Programming. (2) Course may be repeated for credit. Two hours of lecture per week. Prerequisites: 162 or equivalent with 164 and 263 recommended but not required. Concurrent programming languages, algorithms, and supporting architectures. Reasoning about concurrent programs: formal models and informal techniques. Comparison of concurrent programming languages and methods. How to program with them. Implementation techniques. Interaction of concurrent language design and hardware design. (SP) Staff


237. Advanced Topics in Distributed Computing Systems. (2) Course may be repeated for credit with consent of instructor. Two hours of lecture per week. Prerequisites: 162 recommended. Build- ing distributed computing systems, issues and techniques; communication and computation, distributed data, identification of resources and their distributed management, decentralized synchronization mechanisms, security and protection, performance and modeling of distributed systems, programming language and system support for distributed applications. (SP) Staff

238. Database Management Systems and Infor mation Retrieval. (2) Two hours of lecture per week. Prerequisites: 168 or 268 recommended. This course covers implementation issues in information retrieval systems, with emphasis on use of relational DBMS technology. Topics include: survey of large scale information retrieval applications, typical query patterns and database characteristics; interaction between user interface considerations and queries; representation of textual and bibliographic data in database systems; query processing algorithms, retrieval systems; computer to computer protocols for information retrieval. (F) Staff


240. Special Topics. (1-4) Course may be repeated for credit. Topics will vary from semester to semester. (See Computer Science Division announcements.) (F) Staff

241. Group Studies Seminars, or Group Research. (1-4) Course may be repeated for credit. One to four hours per unit. Sections 1-25 to be graded on a satisfactory/unsatisfactory basis. Sections 26-35 to be graded on a satisfactory/unsatisfactory basis. Advanced study in various subjects through seminars on topics to be selected by each student, informal groups of special problems, student participation in comprehensive design projects, or research group on complete problems for analysis and experimentation. (F,SP) Staff

242. Individual Research. (1-12) Course may be repeated for credit. Independent study. Investigations of problems in computer science. (F,SP) Staff

243. Individual Study for Doctoral Students. (1-4) Course may be repeated for credit. Course does not satisfy unit or residence requirements for doctoral degree. Independent study, consultation with faculty member. Must be taken on a satisfactory/unsatisfactory basis. Individual study in consultation with the major professor. Must take an opportunity to consult with qualified students to prepare themselves for the various examinations required for candidates for the Ph.D. (and other doctoral degrees). (F,SP) Staff

Professional Courses

300. Teaching Practice. (1-4) Course may be repeated for credit. Three to twenty hours of discussion and consulting per week. Must be taken on a letter grade basis. Supervised teaching practice, in either a one-on-one tutorial or classroom discussion setting. (F,SP) Staff

301. Teaching Techniques for Computer Science. (1-3) Course may be repeated for credit. One hour of discussion per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Discussion and practice of techniques for effective teaching. (F,SP) Chaney, White

Endocrinology (College of Letters and Science)

Group Office: 345 Hallowell Hall, 642-5024
Chair: Charles S. Nolte, Ph.D.
Professors:
James P. Allison, Ph.D.
Roy L. Caldwell, Ph.D.
Marian C. Diamond, Ph.D.
James W. Freestone, Ph.D.
Stephen E. Goldman, Ph.D.
Norman Kretchmer, M.D., Ph.D.
Paul S. Leblanc, Ph.D.
Werner Lotter, Ph.D.
Satsiyabrata Nandi, Ph.D.
Charles S. Nolte, M.D.
Paula S. Timiras, M.D., Ph.D.
Indu M. Verma, Ph.D.
Howard A. Bern, Ph.D. (Emeritus)
Lawrence S. Rosenberg, Ph.D. (Emeritus)
Robert H. Srebnik, Ph.D. (Emeritus)

Associate Professors:
Gregory Apono, Ph.D.
Marc Brodsky, Ph.D.
Gertude C. Buehring, Ph.D.
Gary Firestone, Ph.D.
Halio-Ping Moore, Ph.D.

The Graduate Program

The faculty associated with the program leading to the M.A. and the Ph.D. in endocrinology have divergent interests representing endocrinology in the broadest sense: chemical messengers (autocrine, paracrine, endocrine and ecdysteroidal), with approaches from molecular and cellular endocrinology through organizational and comparative endocrinology to chemical ecology.

Students who plan to work for higher degrees in endocrinology at Berkeley will be advised by a graduate student advisor and by the professor who directs their research. The graduate advisor and the major professor will ascertain whether students have met the minimum requirements, will recommend to prospective candidates what additional courses to take, will decide with them the fields to be covered in the qualifying examinations, and will act generally in an advisory capacity. The candidates are expected to devise and execute plans leading to 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 advisors or at the office of the graduate advisor) and pass one of the examinations above, including passage of an oral qualifying examination.

Energy and Resources Group

(Special Studies)

(Interdisciplinary Advisory Program and Graduate Program)

Department Office: Bldg. T-4, Room 100, 642-1640
Chair: Jeffrey M. Romm, Ph.D.

Professors:
Mark N. Christensen, Ph.D. University of California at Berkeley. Indigenous resources, conservation
John Hart, Ph.D. University of Wisconsin. Ecology, climate, water
John P. Holdren (Vice Chair), Ph.D. Stanford University. Energy, environment, environmental science and policy
Richard Norgaard, Ph.D. University of Chicago. Resources, environment, development
Gene A. Rochlin (Adjunct), Ph.D. University of Chicago. Energy, security, political economy
Jeffrey H. Sommer and Richard E. Keeler (Resource Management) Cornell University. Forest and wildlife economics
Jack Hollander (Emeritus), Ph.D. University of California at Berkeley. Technological innovation, technology transfers

Lecturers:
Edward F. Kahn, Ph.D. University of California at Berkeley. Electric utility finance
Alan C. Malir, Ph.D. University of California at Berkeley. Energy conservation in buildings.
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 50 other affiliated faculty members whose main appointments span all five colleges and four of the schools of the Berkeley campus, as well as 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 in the program, about a third of them doctoral candidates. The students come from a wide variety of backgrounds—engineering, natural sciences, social sciences, and humanities.

Graduates. ERG graduates are employed across the U.S. and around the world in governmental and international agencies, legislative staff positions, national laboratories, public and private utilities, other energy and resource companies, consulting firms, public interest organizations, and universities.

Associate Professors:
- Miguel A. Altem, Ph.D. (Entomology)
- Christopher A. Barlow, Ph.D. (Resources Studies)
- William E. Dietrich, Ph.D. (Geology and Geophysics)
- Ky D. Frietsch, Ph.D. (Plant and Soil Biology)
- Christopher J. Ingrassia, Ph.D. (Economics)
- Michael Hapeman, Ph.D. (Agricultural and Resource Economics)
- Robert G. Harris, Ph.D. (Business Administration)
- Mariel Marri, Ph.D. (Materials Science and Mineral Engineering)
- Robert M. Price, Ph.D. (Political Science)
- Avital Ronell, Ph.D. (Comparative Literature)
- Karen Selin, Ph.D. (Economics)
- Laura Tyson, Ph.D. (Economics)

Assistant Professors:
- Catherine Koshland, Ph.D. (Biomedical and Environmental Health Sciences)
- Keith Leaque, Ph.D. (Plant and Soil Biology, Forestry and Resource Management)
- Mary Power, Ph.D. (Biological Engineering)
- Chris M. Rose, Ph.D. (Business Administration)
- Gail Schiller, Ph.D. (Architecture)

Lecturers:
- William Ahern, Ph.D. (Graduate School of Public Policy)
- E. Dietrich, Ph.D. (Environmental Science)
- Daniel Luten, Ph.D. (Economics, Geography)

Research Associates:
- Samuel Berman, Ph.D. (Lawrence Berkeley Laboratory)
- Carl Calabrese, M.S. (Lawrence Berkeley Resources Group)
- Iris Borg, Ph.D. (Lawrence Livermore National Laboratory)
- Ted Dyer, Ph.D. (Governmental Studies)
- Nancy Brown, Ph.D. (Lawrence Berkeley Laboratory)
- Robert J. Busch, Ph.D. (Future Resources Associates)
- Nancy Eman, M.S. (Forestry and Resource Management)

Peter Gleick, Ph.D. (Pacific Institute for Studies in Development, Environment, and Security)

On leave, spring, fall

Energy and Resources Group / 223

Upper Division Courses

100. Energy and Society. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Upper-division standing; Physics 7A-B or Physics 88 and Math 18B or Math 2B and Chemistry 1A, or their equivalents. Formerly Environmental Sciences 102. Transport and fate of persistent pollutants, impact of human activities on the environment, and other interactions in biogeochemical cycles, environmental conditions of nuclear war. (SP) Holken, Harte

120. Renewable Resources for Electric Generation. (5) Students will receive no credit for 120 after taking Engineering 162. Three hours of lecture and one hour of discussion per week. Prerequisites: Upper-division standing; Physics 7A-B or 88A-B or equivalent. Characteristics of electric generating technologies based on renewable resources: hydroelectric, wind solar thermal, bioenergy, geothermal, and tide power. Physical and engineering aspects; the utility perspective; criteria for implementation; cost, reliability, output profiles, operating characteristics, modularity, resource availability, environmental impact, utility regulatory issues. (F) Christensen

140. Efficient Use of Energy. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: Physics 7A-B or 88-A-B or equivalent. Energy systems, energy conservation, energy efficiency, the energy industries, energy policy, and sustainability. (SP) Holken, Harte

141. Residential Energy Conservation. (3) Three hours of lecture and one hour of laboratory per week. Prerequisites: Upper-division standing. Engineering, economic, and policy aspects of residential energy conservation: building heat loss calculations, thermal comfort, life cycle costing and economic analysis of conservation potentials in appliances, house design, and national and local energy policies. (F) Christensen

151. Politics of Energy and Environmental Policy. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Upper-division or graduate standing; some coursework in social science and technical areas. How existing agencies and policy makers incorporate new concerns into their deliberations, and how agencies given the mandate to address the newer concerns seek to fold their priorities into the existing institutional and policy structures. (F) Rochlin

190. Seminar in Energy, Environment, Development and Security Issues. (3) Course may be repeated for credit. One to three hours of lecture per week. Prerequisites: Upper-division standing and consent of instructor. Critical, cross disciplinary analysis of specific issues or general problems of how people interact with environmental and resource systems. More than one section may be given each semester on different topics depending on faculty and student interest. (F,SP) Staff

198. Directed Group Studies for Advanced Undergraduates. (1-10) Course may be repeated for credit. Hours to be arranged. Must be taken on a pass/no pass basis. Prerequisites: Upper-division standing and consent of instructor. Group studies of selected topics. (F,SP) Staff

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Hours to be arranged. Must be taken on a pass/no pass basis. Prerequisites: Enrollment restricted by regulations in General Catalog. Individual conferences. (F,SP) Staff
291. Ecological and Social Dimensions of Global Change. (2) One and one-half hours of lectures per week. May be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of Instructor. Maximum enrollment 25. This seminar will explore the potential social and ecological impacts of global change, focusing on ecological and economic tradeoffs associated with the following human responses to global change: adaptation, prevention, and no response. Emphasis is placed on developing predictive models of how the Earth System (including humans) will respond to global change. Also listed as Integrative Biology 272, Geography 244, and IDS 272. (F) Chapin, Firestone, Harte, Wells

292A. Analytical Methods in Energy and Resources. (2) Two hours of lectures per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of Instructor. Quantitative methods for energy and resource analysis. Topics include linear algebra, difference equations, statistical methods, chemical equilibrium theory, and thermodynamics. (F,SP) Christensen

292B. Interdisciplinary Problem Solving as a Profession. (2) Two hours of lectures per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Open to ERG graduate students only. An introduction to interdisciplinary research, including such topics as organizing time and information, selecting and defining research topics, conducting research, writing skills, oral presentations, getting published, getting funded, finding employment. (F,SP) Christensen

292C-292D. Master's Project Seminar (2,2) Two hours of seminar per week. Credit and grade to be awarded upon completion of the full sequence. (F,SP) Christensen

292E. Capstone Seminar (1) One and one-half hours of discussion per week and three hours of laboratory per alternate weeks. Prerequisites: Consent of Instructor. Application of general course work to specific problems. Individualized work for the various exams required of candidates for the Ph.D. (F,SP) Staff

Professional Courses

301. Graduate Student Instructor Practicum. (3) Course may be repeated for credit. Two hours of seminars per week. Prerequisites: Graduate standing in Energy and Resources Group. Graduate student presentations and faculty-student discussions. An advanced topic in interdisciplinary energy research. Seminar on topical issues in energy and resources. Instructor determines class meetings and assignments; unit determined according to instructor and student time requirements by the Curriculum Committee. (F,SP) Staff

Interdepartmental Studies Courses

Graduate Courses

IDS 235. Community Scale Energy Systems. (3) Three hours of lectures/discussion per week. Prerequisites: Consent of Instructor. Energy supply at the community scale through development of locally available renewable energy resources (solar, wind, hydro, geothermal, bioenergy, and fuel cells). (F) Staff

Engineering (College of Engineering)

For a description of the programs in engineering, see page 92.

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

24. Freshman Seminar. (1) Course may be repeated for credit as topic varies. One and one-half hours of lecture/discussion per week for weeks 2-11 of the semester. Must be taken on a pass/no pass basis. Taught by faculty and guests, features presentations and discussions on the various fields of engineering study and the many career paths open to graduates. One or more field trips will be arranged. At least one book report required. Sponsoring department: Mechanical Engineering. (F,SP) Hodges, Schwarzy, Webster

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 to engineering design. Engineering sketching and drafting. 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) Lien

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 equilibrium of structures and two-dimensional systems. Work and potential energy, the principle of virtual work, stability of equilibrium. Sponsoring Department: Civil Engineering. (F,SP) Staff

46. Properties of Materials. (3) Three hours of lecture per week and three hours of laboratory on alternating weeks. An introduction to the 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, ceramics, and the electrical properties of semiconducting materials. Sponsoring Department: Materials Science and Mineral Engineering. (F,SP) Staff

47. Supplemental Work in Lower Division Engineering. (1-5) Course may be repeated for credit. Application of basic principles of physics and chemistry to the engineering properties of materials. Sponsoring Department: Materials Science and Mineral Engineering. (F,SP) Staff
66. Engineering Design Studio. (3) Five hours of laboratory and one hour of lecture per week. Creative principles of multidisciplinary engineering design. Students work in teams of no more than three persons, plus the faculty advisor, on a project of their choosing. Aspects of the design process, communicating engineering ideas, scope of a project, tinkerer as a first responder to engineering, using tools and computer aided design, selecting design materials, fabricating the prototype, testing and modifying the prototype. No final examination. Sponsoring departments: Mechanical Engineering and Electrical Engineering and Computer Sciences. (F,SP) Auslander, Schwall.

77. Scientific and Engineering Problem Solving Using Computers. (3) Two hours of lecture, one hour of discussion, and four hours of laboratory per week. Prerequisites: Mathematics 50A (may be taken concurrently) and Physics 7A. Formerly 7. Using computers as a tool to augment the scientific method, students will learn numerical analysis, computer graphics, scientific visualization, data analysis, computer-aided design, and computer-aided manufacturing. (F,SP) Staff.

117. Methods of Engineering Analysis. (3) Three hours of lecture per week. Prerequisites: Mathematics 50B. Methods of theoretical engineering analysis; techniques for analyzing partial differential equations and the use of approximate methods for solving systems. Sponsoring Department: Mechanical Engineering. (F) Glasser.

118. Introduction to Scientific Computing. (3) Three hours of lecture per week. Prerequisites: 7; Mathematics 50B, or equivalent knowledge of computer programming; proficiency in FORTRAN or similar computer language. Course is designed to introduce students to the computer-based solution of engineering problems. Use is made of a high level language (currently FORTRAN). Linear algebraic equations, roots of nonlinear equations, optimization, partial differential equations, ordinary differential equations, and error analysis. Discussion of software evaluation and mathematical software libraries. Sponsoring department: Mechanical Engineering. (F) Corsella.

120. Principles of Engineering Economics. (3) Two hours of lecture and one hour of discussion per week. Prerequisite: Mathematics 50B. Introduction to principles of engineering economics. Topics include capital flows, effect of time and interest rates, investment appraisal, depreciation and taxes, preference under risk, decision analysis, capital sources and their effects. Economic studies. Sponsoring Department: Industrial Engineering and Operations Research. (F,SP) Dreyfus, Staff.

147. Supplementary Work in Upper Division Engineering. (1-3) Courses may be repeated for a maximum of 3 units. Three to nine hours of discussion and one to four hours of programming laboratory per week. Prerequisites: Mathematics 18; Programming experience preferred. The purpose is to help students prepare for upper division engineering courses. Linear and dynamic systems, queuing and inventory models. Examples will be drawn from various engineering disciplines to illustrate techniques, models, and optimization of engineering systems. Sponsoring Department: Industrial Engineering and Operations Research. (F) Ross.

110. Venture Design: The Startup Company. (3) Course may be repeated for credit. One to three hours of lecture per week. The class will nominate and select a set of students to form a company. Four person project teams will be established by individual company and team. Each team will in turn select a product and specify a management, financial, technical, and marketing personnel. The structure of the course will be built around the progressive creation of a business plan by each project team. Team progress presentations by one person on each team (management, finance, etc.) will be made weekly on a rotating basis. (F,SP) Staff.

115. Engineering Thermodynamics. (4) Students will study the laws of thermodynamics and its applications. Prerequisites: Mechanical Engineering 105 or Chemical Engineering 141. Four hours of lecture per week. Prerequisites: Physics 7B, Math 50A; Chemistry 1B recommended. Formerly Material Sciences 101 and Nuclear Engineering 110. Fundamental laws of thermodynamics for simple substances; application to flow processes and to nonequilibrium mixtures; statistical thermodynamics of ideal gases and crystalline solids; chemical and material thermodynamics; multiphase and multicomponent reactions in reacting systems; electrochemistry. Sponsoring Department: Materials Science and Nuclear Engineering. (F) Lehman.

161. Solar Energy. (3) Three hours of lecture per week. Prerequisites: Physics 7B or 8B. Survey of solar energy conversion, practice and prospects. Solar geometry, collection systems, solar heating, solar space conditioning, solar ponds, photothermal and photovoltaic electricity generation. Photothermal applications and biomass thermal and solar energy applications. Sponsoring Department: Materials Science and Nuclear Engineering (F) Staff.

162. Renewable Resources for Electric Power. (3) Three hours of lecture per week. Prerequisites: Physics 7B or 8B or Engineering 48 or 160. Renewable energy sources, tidal, biofuel, conservation technologies for expanding electric power supply. Characteristics of the electric power industry. Economics engineering, environmental aspects. Experiments and project. Sponsoring Department: Materials Science and Nuclear Engineering. (SP) Staff.

166. Engineering Project Management. (3) Five hours of laboratory and one hour of lecture per week. Prerequisites: At least senior standing in engineering and consent of instructor. Students will be mentored by the students enrolled in the senior Engineering Design Studio. Developing and presenting a technical lecture. Control of scope/schedule/budget of engineering projects. Teaching, building and motivating the project team. Design revision, decision making, quality control. No final examination. Sponsoring departments: Mechanical Engineering and Electrical Engineering and Computer Science. (F,SP) Staff.

190. Technical Communication. (3) Three hours of lecture per week. Prerequisites: Engineering 115, or equivalent course; upper division standing. Principles of technical communication: analyzing one's audience; organizing material; developing a new, economical style; preparing effective material and rhetorical strategies for formal technical reports, feasibility studies, abstracts, descriptions and instructions, proposals, letters, and memos. Practice in oral presentations to technical and non-technical audiences. Sponsoring Departments: Mechanical Engineering Interdisciplinary Studies. (F,SP) Staff.

194. Applications of Technology. (3) Three hours of lecture per week. Prerequisites: Upper division standing. An interdisciplinary approach to social implications of engineering. Lectures on the social, political and ethical aspects of the engineering curriculum. Economic analysis for engineering decision making; Capital flows, effect of time and interest rates, investment appraisal, depreciation and taxes, preference under risk, decision analysis, capital sources and their effects. Economic studies. Sponsoring Department: Engineering IDS. (SP) Staff.

193. California Engineer. (1) Course may be repeated once for credit. Three hours of laboratory per week. Must be taken on a pass/no pass basis. Work on the California Engineer Magazine, in one or more of the following capacities: read/rewrite articles, edit articles, enter articles into UNIX computer system for typesetting, draw technical illustrations, photograph, layout, typeset, edit illustrations, enter articles into UNIX computer system for typesetting, draw technical illustrations, photograph, layout, typeset. (F,SP) Staff.

201. Ocean Engineering Seminar. (2,3) Two hours of lecture or two hours of lecture and one hour of discussion per week. Prerequisites: Enrollment in Engineering or consent of instructor. Lectures on new developments in ocean, arctic engineering. The optional third unit covers the analysis and design of scuba diving equipment. Students will be divided into groups of three to five students. Each group will require that students meet with the instructor one extra hour per week to work on an individual project. Topics covered: ice mechanics, deformation of global ice fields, and ocean waves. Course requirements: Oral report and consent of instructor. Sponsoring Department: Engineering Interdisciplinary Studies. (SP) Staff.
Engineering—Double Major Programs

(College of Engineering)

Engineering Undergraduate Dean's Office: 308 McLaughlin Hall, 843-7694

Double Major Programs of Study. The Double Major Program is designed for students who wish to undertake study in two major areas of engineering 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 be completed in four years, it may be necessary to extend the course of study to complete in four years. Both majors are shown on the student's transcript of record. Admission to double major programs is closed to freshmen, but open to transfers, who are required to petition for change to double major programs in the fall of the sophomore year. 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 and Materials Science
- Nuclear Engineering

In addition to the double major programs within the College of Engineering listed above, students are eligible to apply for the College of Engineering and the College of Chemistry. These majors are available to majors in the fields of:
- Materials Science and Engineering
- Chemical Engineering
- Petroleum Engineering
- Nuclear Engineering

Details on these curricula can be found in the Announcements of the College of Chemistry and College of Engineering.

Students must apply for admission to the College of Chemistry for these double major programs.

Engineering—Interdisciplinary Studies

(College of Engineering)

The Meakin interdisciplinary Studies Center helps engineering students develop skills that go beyond their departmental program. At the undergraduate level, the center supports the interdisciplinary component of engineering departmental courses by offering the courses Engineering 190, Technical Communication, and Interdepartmental Studies 140, Technical Communication for Nanotechnology. At the graduate level, the center supports the cross-disciplinary studies of seminars and public lectures and conferences. The center supports such collegewide offerings as Engineering 110, Venture Design, and coordinates the courses IDS 110/110L, Introduction to Computers, a basic overview of computers offered to students outside the college.

At the graduate level, the center supports the activities of three graduate groups and several interdisciplinary committees.

The graduate groups include Applied Science and Technology, Bioengineering, and Biophysics. The Applied Science and Technology Graduate Group leads to the M.S. and Ph.D. degrees in applied science and technology. The intercampus Bioengineering Graduate Program combines a joint program between the San Francisco and Berkeley campuses, leading to the Ph.D. degree in bioengineering. The Biophysics Graduate Group leads to the M.A. or Ph.D. degree in biophysics. For more information please consult the catalog.

Prospective graduate students interested in any of these graduate programs should apply directly to the program of their choice.

Additional information about the center may be obtained by writing the Meakin Interdisciplinary Studies Center, 230 Bechtel Engineering Center, College of Engineering, University of California at Berkeley; Berkeley, CA 94720.
Engineering Courses

Note: Engineering's Interdisciplinary Studies Center offers the following courses found in the Engineering catalog: 24, The Engineering Profession; 151, Toxic and Hazardous Waste Management; 191A, Social Implications of Technology; 201, Ocean Engineering Seminar; 210, Introduction to Civil Engineering Technology; 209B, Applied Science and Technology Seminar; 210A, Arctic Ocean Engineering.

Upper Division Courses

110. Venture Design: The Startup Company. (3) This course may be repeated for credit. One to two hours of lecture per week. Prerequisites: Upper division standing. Students must also be enrolled in IDS 210A, Business Administration. The course will focus on the development of the business plan and the implementation of the venture. Students will work in teams to develop a business plan for a startup company. The course is designed to be a hands-on learning experience, with a focus on the practical aspects of starting a business. Students will be expected to complete a business plan for their venture, and to present their plan to the class.

190. Technical Communication. (3) Three hours of lecture per week. Prerequisites: English 1A or equivalent course; upper division standing. Principles of technical communication: analyzing one's audience; organizing material; developing 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.

Graduate Courses

296. Operational Management of Technology. (3) Three hours of lecture per week. Prerequisites: Graduate standing in Business Administration or Engineering. This course covers the operational process for realizing new technologies and product concepts, and integrates the efforts of all functions within the innovation chain. The course includes the development of a business plan for a startup company, and the implementation of the venture.

294. 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 fashion which will generate key insights into how technology can be developed and managed.

Engineering Science

(College of Engineering)

The undergraduate Engineering Science curriculum is multiprofessional and is administered by the Engineering Science Committee. The program includes closely related fields of the natural sciences, mathematics, physics, and engineering. This course is designed to introduce students to the innovation process and its management. It draws on a variety of disciplines and attempts to integrate them in a fashion which will generate key insights into how technology can be developed and managed.

Programs for the Bachelor's Degree

Beginning fall 1994, applicants at the freshman level may apply to the bioengineering, environmental engineering, or general engineering science programs. Students will be advanced to the upper division in engineering science upon satisfactory completion of prerequisite courses and achievement of a 3.0 overall grade-point average. At the time of advancement to junior status, students enrolled in the general engineering science program must submit a change of major petition for either the engineering mathematics and statistics or the engineering physics majors or a major in another of the engineering departments. Students who wishes to change engineering departments must submit a change of major petition to the Student Affairs Office. Changes of college major to EECS or bioengineering are rarely approved.

All engineering science programs must include six courses of at least 3 units each in humanities and social studies selected from an approved list of courses. Of these, at least one course must be an English composition course equivalent in content to English 1A, one must be from a list of selected courses in History and Cultures, one must be from a list of selected courses in sciences, and two must be upper division courses. The English composition course and either the course in History and Cultures or that in Literature and Values must be taken for a letter grade. A minimum of two courses, at least one of which is in the upper division, must be taken from a single department.

Lower Division. Required (for all upper division programs in engineering science): Mathematics 1A-1B; Computer Science 36B replaces Chemistry 1B for students in engineering mathematics and statistics; Computer Science 60A or 60B replaces Chemistry 1B for students in engineering mathematics and statistics; Computer Science 77; Physics 7A-7B; Electrical Engineering and Computer Science 40, Biology 1A-1B, and Engineering 45 for students in engineering physics; English 1A or its equivalent; 6 units of lower division technical electives for students in engineering mathematics and statistics and for those in engineering physics. (Transfer students admitted to engineering mathematics and statistics, or engineering physics may substitute 6 units of upper division technical electives approved by an advisor.)

Upper Division. All engineering science programs must include at least 40 units of approved technical electives (mathematics, physics, engineering and computer science). 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.

Particular requirements of the various options in the engineering science program are described below.

The Announcement of the College of Engineering should be consulted for full details.

Bioengineering. Required: Chemistry 121A or 121B; upper division mathematics/science elective; Engineering 153; and selected courses chosen from approved clusters.

Engineering Mathematics and Statistics. Required: Computer Science 60B; Mathematics 116, 128A, 104, and 105 or 185; Statistics 101 or 134; electives, which must include: at least four approved upper division courses in mathematics or statistics.

Engineering Physics. Required: Mathematics 104 and 185 or 121A-121B; Physics 110A-110B or Electrical Engineering and Computer Sciences 100A-100B; Nuclear Engineering 104A or Physics 111 or Electrical Engineering and Computer Sciences 135; Physics 112 or Engineering 112; Physics 141A or Geology 111 or 112; Engineering 111; Mechanical Engineering 108 or 185; 14 units of upper division courses in the Department of Physics.

Environmental Engineering Science. Required: Civil Engineering 100 or Mechanical Engineering 105 or Chemical Engineering 120A; Civil Engineering 130 or Mechanical Engineering 104; Chemical Engineering 141 or Engineering 115 or Mechanical Engineering 105; Civil Engineering 111; Mathematics 121A-121B or Mathematics 110 and Mathematics 128A or Statistics 134 and Statistics 135 or Engineering 117 and Engineering 118; Civil Engineering 105 or Civil Engineering 173 or Mechanical Engineering 116 or Mechanical Engineering 116; the advanced science sequence; and the engineering science skills cluster as outlined in the Announcement of the College of Engineering.
English

College of Letters and Science

Undergraduate Office: 322 Wheeler Hall, 652-3467
Graduate Office: 318 Wheeler Hall, 652-4028

David C. Lloyd, Ph.D. Cambridge University. Cultural and critical theory, modern literature.
William Nestrick, Ph.D. Harvard University, Renaissance literature.
John D. Niles, Ph.D. University of California at Berkeley. Old and Middle English, folklore, history of English language, Renaissance literature.
Katherine Bausch, Ph.D. Rutgers University. African American literature (especially before 1800), American literature.
M. Susan Schwikow, PhD. Yale University. Feminist theory, American women writers, modern poetry.

Paul J. Alpers, Ph.D. Harvard University. 16th- and 17th-century literature, comparative literature.

Charles F. Aitken, Ph.D. University of North Carolina. Modern literature, American poetry, modern literature, biography.
Carol Christ, Ph.D. Yale University. Victorian literature, women in literature.

John S. Coolidge, Ph.D. Harvard University. 17th-century dramatic literature.

Richard Feingold, Ph.D. Columbia University. Restoration and 18th-century literature.

Donald M. Friedman, Ph.D. Harvard University. 16th and 17th centuries, Milton, Shakespeare.

Stephen J. Greenblatt, Ph.D. Yale University. Renaissance culture, culture and anthropology.

Robert Hass, Ph.D. Stanford University. Poetry, poetry criticism.

Steven M. Knappe, Ph.D. Cornell University. Literary theory, 18th- and 19th-century literature.

Donald A. Mitchell, Ph.D. University of Michigan. Nonfiction, American studies, American literature.

Leonard Michaels, Ph.D. University of Chicago. Modern poetry, short fiction writing, the short story.

Anna Maddox, Ph.D. Harvard University. Old and Middle English literature.

Bashar Muhammad, Ph.D. University of Iowa. Fiction writing, 17th-century literature.

Alten Nelson, Ph.D. University of California at Berkeley. 17th-century English literature.

Raymond Oliver, Ph.D. Stanford University. The short poem, 1250-1600, French and German poetry.

Morion D. Palay, Ph.D. Columbia University. Romantic period, literature and the visual arts.


Ralph W. Rader, Ph.D. Indiana University. 18th-century literature and letters.

Hugh M. Richardson, Ph.D. Oxford University. Renaissance and early modern literature (English, European).

Peter D. Scott, Ph.D. McGill University. Medieval European literature.

George A. Stani, Ph.D. Princeton University. The novel, English literature.


James Tucker, Ph.D. Oxford University. 17th- and 18th-century literature.

Alex Zelding, Ph.D. Princeton University. Modern British and American literature.

Jens A. Holm, Ph.D. (Emeritus)

Robert Bloom, Ph.D. (Emeritus)

Richard Bay, Ph.D. (Emeritus)

Philip W. Damon, Ph.D. (Emeritus)

Bertrand Evans, Ph.D. (Emeritus)

John Jordon, Ph.D. (Emeritus)

Charles Muscarella, Ph.D. (Emeritus)

John F. Ruddy, Ph.D. (Emeritus)

Norman Rabkin, Ph.D. (Emeritus)

John L. Traut, Ph.D. (Emeritus)

Alwin Reinert, Ph.D. (Emeritus)

Wayne Shumaker, Ph.D. (Emeritus)

John L. Terrell, Ph.D. (Emeritus)

Eusebio Varela, Ph.D. (Emeritus)

Affiliated Faculty:

Susan M. Bhow, Ph.D. Yale University. Feminist theory, American women writers, modern poetry.

Lecturer:

Florence Elin, Ph.D. University of California at Berkeley. Modern and contemporary poetry, Renaissance songs.

Senior Lecturers:

Thom Gunn, M.A. Cambridge University. The study and writing of poetry, American literature.

Maxine Wong-Kim, A.B. University of California at Berkeley. Asian American literature.

Ishmael Reed, The writing of poetry and short fiction

Gary Soto, M.A. California at Irvine. Creative writing, poetry, essay, California literature.

Affiliates:

Alfred Arteaga, Ph.D. University of California at Santa Cruz. Literary Theory, Chicana literature, Shakespeare.

Kathleen Bausch, Ph.D. Rutgers University. African American literature (especially before 1800), American literature.

Jenny Franchot, Ph.D. Stanford University. American literature, the novel.

Steven Goldsmith, Ph.D. University of Pennsylvania. Romantic literature, critical theory.

Dorothy Hale, Ph.D. University of California at Berkeley. American literature, the novel.

Susan Hegeman, Ph.D. Duke University. American studies, American literature.

Steven Justice, Ph.D. Princeton University. Late Medieval literature.

Jeffrey Knapp, Ph.D. University of California at Berkeley. Renaissance literature.

Celeste Langdon, Ph.D. University of Pennsylvania. Romantic poetry, 18th-century literature.

Samuel Otter, Ph.D. Cornell University. 17th-century American literature.

Nancy Rutterfield, Ph.D. Stanford University. 17th-century American and Russian literature.

Harvey Coro, Ph.D. University of California (especially ethnic) literature, Native American literature.

Jane Johnson, Ph.D. American Studies and Women's Studies.

Jenifer Johnson, Ph.D. American Studies and Women's Studies.

The Department of English offers courses in literature, language, and writing. Our courses in literature have many different focuses: major authors, historical periods, genres, critical methods. Courses in language offer instruction in both the history and the structure of the English language. Writing courses offer training in both expository and creative writing.

The major in English is designed to introduce students to literary history and to the work of major British and American writers, to acquaint them with a variety of historical periods and geographical and cultural regions of English language and literature, to create awareness of the interrelationship of literary and the visual arts, and to provide continued training in critical writing. Before declaring the major, students normally must have completed the Reading and Composition requirement of the college. (Students are strongly urged, though not required, to take the required R&A courses in the English department: English 1A and 1B or the "writing-intensive" form of any of several lower division introductory courses to English literature, 223A, 260, 280, 282, 286, 30A, 30AB, 44A, or 44B. 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 and American writers offer an intensive survey of major authors from Chaucer through the twentieth century and continued practice in critical writing; and, concurrently with either half of the major course, English 15, the Introduction to Literary Study, which examines fundamental issues in literary analysis through reading, writing, and discussion. English majors 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 religious tradition, together with the "core" of the major, which further upper division study proceeds. While all five are required, three of them (15, 46A and any two of the remaining four) must be taken as prerequisite to declaring the major.

Awareness of the historical varieties of writing in English and familiarity with a wide range of literary enterprises in literary study are fostered by the remaining specifications of the major: a course in Shakespeare; a course in literature through Romanticism (exclusive of Greek and Latin literature); a course in critical enterprises chosen from 161 or 162 (literary theory and history of criticism), or the 170 series (interdisciplinary perspectives on literature and criticism), or the 180s (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 to intellectual and aesthetic problems in a single literary figure or problem, in 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 advisers. Consultative 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.

College Writing. Students must have fulfilled the requirement in English 46A-46B before taking any course in the Department of English. For further information, see the College Writing listing in Index.

Teacher Training. The Department of English offers an examination waiver program for the Single Subject teaching credential in English. For further information, contact the department's Teacher Training advisor or the Student Services Office, School of Education, Tolman Hall.

Note: The semester in which a particular course will be offered and the instructor who will teach it may change after this catalog is printed. Please consult the "departmental course listing" in the "Course Offerings" section (available well before the beginning of each semester in the ASUC Bookstore, Textbook Department). Specific topics in the following staff courses vary from year to year: English 31, 37, 39, 135, 136, 138, 139, 150, 156, 166, 205, and 250; offerings and instructors are listed each semester in the department's "Announcement of Classes." Many of the courses listed below have limited enrollments.

Major Program

The English major program comprises two parts: a structure of prerequisites and an array of further specifications of electives. No fewer than 12 courses (exclusive of those needed to fulfill major requirements) must be upper division courses.

Prerequisites: In order to declare the major, students must:

(1) normally have completed the Reading and Composition requirement of the college (1A-1B, or the equivalent); English 1A and 1B, or their equivalents in other departments (European equivalents)

(2) have taken English 15 and any two of the four upper division core requirements of the major listed below. (ALL FOUR of these core requirements must be fulfilled in order to complete the major, but only two need be taken by the time the student files the declaration of major.)

(a) English 46A, or one of the two upper division courses that may be offered as its equivalent.

(b) English 46B, or one of the two upper division courses that may be offered as its equivalent.
equivalent. (For these equivalents, see the major program description available at the department office.) At least one course in American literature, selected from the following: English 30A, 30B, 31, 37, 130A, 130B, 130C, 130D, 131, 132, 133, 134, 135, 136; d) one course in the classical or the Biblical background literature. (English 44A is strongly recommended, but see the major program description for a list of other courses that also fulfill this requirement.)

The Major: Besides English 15 and the four additional core requirements above, English majors must select courses in their major from the following:

1. A course in Shakespeare (English 117E, 117T, or a 150 seminar on Shakespeare does not fulfill this requirement);
2. A course in literature through Romanticism (English 150A, 150B, 150C, 150D, or 150);
3. English 161 or 162 or a course from the 170 or 180 series;
4. A course in the cultures of English; or
5. English 150 (English 150 does not fulfill any other requirement of the major);
6. Two electives.

Except for the two electives, courses taken to complete the 12-course requirement for the major must be taken for a letter grade.

Further details about the major are available from the department office.

Honors Program. H195A-H195B is a two-semester course, graded IP at the end of the first semester. Students must take the two-semester core courses and seminars in the major. The major, H195A is organized as a course in literary criticism working toward the formation of a thesis topic. H195B will include regular meetings with the thesis advisor, plus group meetings with the H195 instructor. During this second semester each student will write an honors thesis of 40-60 pages. Completion of the thesis is required for a passing grade. Students are encouraged to take a 170 course or a 180 course with an instructor of their choosing. English majors may not take the honors course unless they have completed all other courses.
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sites: Consent of Instructor. Students will work through the semester on a single project, either fiction (novel) or non-fiction (biography, history).

1430. Expository and Critical Writing. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of Instructor. A seminar in expository and critical writing.

143E. Playwriting. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of Instructor: A seminar in Playwriting.

143N. Prose Non-fiction. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of Instructor: willingness to translate, working knowledge of at least one foreign language. Open to those who wish to assimilate foreign influences for writing poetry or to seek a fuller understanding of any foreign poetry by rendering it into English. (SP) Anseaga

144. Practical Writing. (4) Three hours of lecture/discussion per week. Prerequisites: Consent of Instructor: willingness to translate. Instruction 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 non-majors.

Courses in Language

Note: Courses in language have irregularly scheduled tutorials, as the instructional material demands.

Lower Division Courses:

25. Language. (4) Three hours of lecture per week. The origins and symbols of human speech; pattern, change, and growth in language, with emphasis on English; interrelationships of language and thought; practical implications of these issues in America today.

Upper Division Courses

101. The English Language. (4) Three hours of lecture per week. Structure and history of the English language.

102. Problems in English Linguistics. (4) Course may be repeated for credit with consent of Instructor. Three hours of lecture per week. Topics vary from year to year, but will consider diachronic and synchronic linguistics and their application to the study of literature. (SP) 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


15. Introduction to Literary Study. (4) Three hours of lecture/discussion per week. Designed for prospective English majors. Reading in a variety of literary texts and types as introduction to critical thought and writing about literature. Taught in limited-enrollment sections; readings vary from section to section. (SP) Stahl

17. Shakespeare. (4) Three hours of lecture per week. Lectures on Shakespeare and reading of his best works. (SP) Allier

17W. Shakespeare. (6) Open only to students who have not yet completed the second half of the Reading and Composition requirement. Three hours of lecture per week. Prerequisites: 1A or equivalent. Course syllabus and format identical to 17, above, with 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) Allier

20. Modern British and American Literature. (4) Three hours of lecture per week. Lectures on and discussion of major authors of modern British and American literature. (SP) Crews

20W. Modern British and American Literature. (6) Open only to students who have not yet completed the second half of the Reading and Composition requirement. Three hours of lecture and two hours of discussion per week. Prerequisites: 1A or equivalent. Course syllabus and format identical to 20, above, with two additional one-hour section meetings per week devoted to writing instruction and additional writing assignments. Fulfills second half of Reading and Composition requirement.

24. Freshman Seminars. (1) Course may be repeated for credit as topic varies. One hour of seminar per week. Sections 1-2 to be graded on a letter-grade basis, Sections 3-4 to be graded on a pass/fail basis. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Berkeley Seminars are offered in all areas of study. Topics vary from department to department and semester to semester. (F) Christ -

26. Introduction to the Study of Poetry. (4) Three hours of lecture per week. Lectures and discussion on poetry intended to develop the student's ability to understand and interpret a poem. Designed primarily for students whose major is not English, but majors and prospective majors are welcome. (SP) Schwilk; Booth

28W. Introduction to the Study of Poetry. (6) Open only to students who have not yet completed the second half of the Reading and Composition requirement. Three hours of lecture and two hours of discussion per week. Prerequisites: 1A or equivalent. Course syllabus and format identical to 26, above, with 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) Schwilk

27. Introduction to the Study of Fiction. (4) Three hours of lecture per week. Lectures and discussion intended to develop the student's ability to understand and evaluate fiction. Designed primarily for students whose major is not English, but majors and prospective majors are welcome.

27W. Introduction to the Study of Fiction. (6) Open only to students who have not yet completed the second half of the Reading and Composition requirement. Three hours of lecture and two hours of discussion per week. Prerequisites: 1A or equivalent. Course syllabus and format identical to 27, above, with 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) Schwilk

28W. Introduction to the Study of Drama. (6) Open only to students who have not yet completed the second half of the Reading and Composition requirement. Three hours of lecture and two hours of discussion per week. Prerequisites: 1A or equivalent. Course syllabus and format identical to 28, above, with 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) Schwilk


A. Through 1985:

30A. American Literature. (4) Three hours of lecture and two hours of discussion per week. Prerequisites: 1A or equivalent. Formerly 30W. Open only to students who have not yet completed the second half of the Reading and Composition requirement. Course syllabus and format identical to 30A-30B above, with two additional one-hour section meetings per week devoted to writing instruction and additional writing assignments. Fulfills second half of Reading and Composition requirement. An introductory survey of American literature.

A.W. Through 1885.

B. Since 1885.

31. Literature of American Cultures. (4) Course may be repeated for credit with different topic and consent of instructor. Three hours of lecture per week. An introduction to the ethnic diversity of American literature. The course will take substantial account of the literature of three or more of the following groups: African Americans, Native Americans, Asian Americans, Chicanos/Latinos, and European Americans. Topics change from semester to semester. Students should consult the department's "Announcement of Classes" well before the beginning of the semester for details. This course satisfies the American cultures requirement. (SP) JanMohamed

37. Special 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.

39. Freshman Seminar. (4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Prerequisites: Consent of Instructor. Topics vary from semester to semester. Students should consult the department's "Announcement of Classes" for offerings well before the beginning of the semester.

44. Modern British and American Literature. (4) Three hours of lecture per week. The study of selected works written for children through the twentieth century with consideration of the more important aspects of English literary history. (SP) Stahl

46A-46B. Major British Writers. (4;4) Three hours of lecture/seminar per week. Prerequisites: 1A-1B. Discussion of typical works of major authors from Chaucer through the twentieth century with consideration of the more important aspects of English literary history. (SP) Stahl

46A. Chaucer through Milton.

B. The 18th through the 20th centuries. (F,SP) Staff

80K. Children's Literature. (4) Three hours of lecture per week. The study of selected works written for children. (F) Schwilk

95. Other Voices: Multicultural Literary Perspectives. (2) Course may be repeated for credit. One hour of lecture and one hour of discussion per week. Must be taken on a passed/not passed basis. Prerequisites: Reading and Composition 1A-1B; consent of Instructor. Formerly 97. This course will introduce students to the literary study currently being undertaken by English Department faculty interested in issues of gender, race, and class, and the formations of minority discourse. Each week a scholar or writer will lecture on literary study that reflects cultural and racial concerns. Upper division English ma-
109A-109B. Introduction to Early English Poetry. (4) Three hours of lecture per week. A. Lyrics and religious poems. (SP) Oliver

110. The English Bible As Literature. (4) Three hours of lecture per week. Introduction to the English Bible as a literary work. (F,SP) Anson, S. Knapp

110A-110B. Medieval Literature. (4) Three hours of lecture per week. A. Development of literary form and idiom throughout the Christian West from the first to the fifteenth century. (SP) Dinshaw

111. Chaucer. (4) Three hours of lecture per week. Lectures on and discussion of Chaucer's major works. (F) Nelson

112. Middle English Literature. (4) Three hours of lecture per week. Middle English literature exclusive of Chaucer studied in the original language. (SP) Middleton

114A-114B. English Drama. (4) Three hours of lecture per week. A. English drama to 1603. B. English drama from 1603 to 1700. (F,SP) Nelson, J. Knapp

115A-115B. The English Renaissance. (4) Three hours of lecture per week. A. Beginnings of the English Renaissance and literature of the 16th century. (SP) Friedman

116. Backgrounds of English Literature in the Continental Renaissance. (4) Three hours of lecture per week. A survey of the principal continental documents which are important to an understanding of the English Renaissance. (F) Richmond

117A-117B. Shakespeare. (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 non-majors.

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 requirements for a course in Shakespeare in the major.

117J. Shakespeare. (4) Three hours of lecture per week. Prerequisites: Consent of instructor. Studies of selected plays, with practice in various critical approaches, e.g., establishing text, relation to source, changing concepts of comedy and tragedy, influence of theatrical conditions on technique.

117S. Shakespeare. (4) Three hours of lecture per week. Lectures on Shakespeare and reading of his best works. (F,SP) Adelman, Greenblatt

117T. Shakespeare in the Theatre. (4) Three hours of lecture per week. Prerequisites: Enrollment in conjunction with or as a sequel to 117J or 117A-117B. The interrelation of Elizabethan plays and stage prac-

118. Milton. (4) Three hours of lecture per week. Lec-

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) Feinberg

120. The Age of Johnson. (4) Three hours of lecture per week. Lectures on and discussion of later eighteenth-century British literature.

121. Romantic Period. (4) Three hours of lecture per week. Blake, Wordsworth, Coleridge, Byron, Shelley, Keats, and contemporaries. (F) Langan

122. Victorian Period. (4) Three hours of lecture per week. Literature of the Victorian period with an emphasis on poetry and non-fictional prose.

125A-125B. The European Novel. (4) Three hours of lecture per week. Lectures on and discussion of major European novels. (F) Bernstein

125D. The 20th-Century Novel. (4) Three hours of lecture per week. Lectures on and discussion of major novels of the twentieth century.

125E. The Contemporary Novel. (4) Three hours of lecture per week. Important contemporary novels, some of which may be read in translation.


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. (F) Nestick

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.

130B. American Renaissance. (4) Three hours of lecture per week. Lectures on and discussion of the major texts of the American Renaissance. (F) Otter

130C. American Literature: 1865-1900. (4) Three hours of lecture per week. Lectures on and discussion of American literature from the Civil War through 1900. (SP) Franchot

130D. American Literature: 1900-1945. (4) Three hours of lecture per week. A survey of modern American literature. (F) Hale

131. American Poetry. (4) Three hours of lecture per week. A survey of American poetry from 1800 to 1890, and selected poems from Puritan times until the present. The special emphasis of the course will be historical, with particular atten-

132. American Novel. (4) Three hours of lecture per week. A survey of major American novels. (SP) Rut-

133. Black Writers in America. (4) Three hours of lecture per week. Black writers in the American cultural context. (F,SP) JanMohamed, Bassard

134. Contemporary Literature. (4) Three hours of lecture per week. A study of the best and most important litera-

135. Literature of American Cultures. (4) Course may be repeated for credit with different topic and con-

136. American Studies. (4) Course may be repeated for credit with different topic and consent of instructor. Three hours of lecture per week. Lectures on and discussion of various aspects of the American literature written in English in Africa, the Caribbean, India, and Southeast Asia. Topics will vary from semester to semester. Students should consult the department's "Announcement of Classes" for current offerings well before the start of the semester. (F,SP) Artzeg, McQuade, Franchot, Loewinsohn

138. Studies in Third World Literature in English. (4) Course may be repeated for credit with different topic and consent of instructor. Three hours of lecture per week. Lectures on and discussion of major texts of the American literature written in English in Africa, the Caribbean, India, and Southeast Asia. Topics will vary from semester to semester. Students should consult the department's "Announcement of Classes" for current offerings well before the start of the semester. (SP) Mukhtarje

150. Upper Division Seminar. (4) Course may be re-

152. Women Writers. (4) Course may be repeated for credit with different topic and consent of instructor. Three hours of lecture per week. Topics will vary from semester to semester.

160. Methods and Materials of Literary Criticism. (4) Three hours of seminar per week. An introduction to issues in literary criticism with emphasis on application of principles and methods to selected literary texts.

161. Introduction to Literary Theory. (4) Three hours of lecture per week. This class will focus on liter-

166. Special Topics. (4) Course may be repeated for credit as topic varies. Three hours of lecture per week. Prerequisites: Consent of instructor. Designed primarily for English majors. Topics vary from semester to semester. Students should consult the department's "Announcement of Classes" for offerings well before the beginning of the semester. (F,SP) Staff

170. Literature and the Arts. (4) Course may be re-

*On leave, spring
**On leave, fall

Recipient of Distinguished Teaching Award
198. Supervised Independent Study for Advanced Credit. (1-4) Course may be repeated for credit. Independent. Must be taken on a pass/no pass basis. Prerequisites: Open to students who have completed 12 units of upper division English with an average grade of not less than 6. Meetings to be arranged. Enrollment is restricted by university regulations. Reading and conferencing with the instructor in a field that shall not coincide with that of any regular course and shall be specific enough to enable students to write essays based upon their studies. (F,SP) Staff

Teachers' Courses

301. Problems in the Teaching of Literature. (3) Seminar. Students will serve as readers and discussants in the upper-division course and must have completed satisfactorily a seminar in literature. (SP) Staff

302. The Teaching of Composition and Literature. (3) Course may be repeated for credit with consent of instructor. Three hours of lecture/discussion per week. Must be taken on a satisfactory/unsatisfactory basis. Discussion of course aims, instructional methods, grading standards, and special problems in the teaching of composition and literature, with practice in handling sample essays. When given for Graduate Student Instructors in the English 1A-1B Program or the English 46 series, the course will include class visits. (F,SP) Staff

303. The Teaching of Composition. (3) Three hours of lecture per week. A course designed for experienced Associates in the Department of English, based on the instructor's materials developed by the Bay Area Writing Project. (SP) Staff

307. Community College English Programs: Principles and Practice. (3) Two hours of lecture per week. Prerequisites: Completion of 3/4 of work in the graduate English program. 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. (SP) Staff

309. Supervised Practice in Building and Evaluating Student Work. (1-3) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Students will serve as readers in an undergraduate lecture course. Evaluation of student papers, examinations and exercises, weekly individual consultation with the instructor of the lecture course, and a final written assignment by the student of the training received. (F,SP) Staff

Graduate Courses

For admission to some seminars, special competence in a foreign language 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, bibliography, critical theory and practice. (F) Abel, Amman, Otter

201A. The English Language. (4) Three hours of lecture per week. Structure of English. The structure of present-day English: pronunciation, grammar, vocabulary. (R) Bayley

201B. The English Language. (4) Three hours of lecture per week. Prerequisites: A knowledge of the structure of English, of Old English, and of Latin. History of English. (F) Abel

202. History of Literary Criticism. (4) Three hours of lecture per week. (F) Allen

203. Graduate Readings. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Open to students who have completed 12 units of upper division English with an average grade of not less than 6. Meetings to be arranged. Enrollment is restricted by university regulations. Reading and conferencing with the instructor in a field that shall not coincide with that of any regular course and shall be specific enough to enable students to write essays based upon their studies. (SP) Staff

204B. Senior Seminar: Special Topics. (4) Three hours of seminar per week. Prerequisites: Normally open only to senior students with a GPA of 3.5 or better. Consent of instructor. Topics may vary from semester to semester; open primarily to a field of special interest. (SP) Staff

204S. Satire. (4) Three hours of lecture per week. Study of representative satirical forms, techniques, and points of view.

205. Tragedy. (4) Three hours of lecture per week. Study of tragic forms, techniques, and points of view. (F) Coddington

206Z. Science Fiction. (4) Three hours of lecture per week. A survey of science fiction which includes both short stories and novels. The focus will be on the analysis of the texts and on the history and theory of the genre.

193. Computers in the Humanities: Literary Applications. (4) This 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. Introduction to the major programming languages and to bibliographic techniques. The course will include sufficient instruction in a programming language to enable students to program text manipulations. In addition to formal classroom study, students need to allocate five to seven hours of 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. Two to four hours of supervised tutoring in Student Learning Center each week. Must be taken on a passed/not passed basis. Prerequisites: Pre-enrollment interviews required. Tutoring Berkeley undergraduates in College Writing 1A, 1B, and other writing and 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

98. Independent Study. (1-4) Course may be repeated for credit. Independent. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Open to sophomores and juniors with a GPA of 3.0 or higher and a GPA of 3.5 or higher in courses taken at Berkeley in major. Consent of instructor is required. This is a two-quarter course, graded IP at the end of the second quarter. During the second semester, each student will write an honors thesis. Consent of the instructor is required for a pass/fail grade in the course. (F,SP) Abel, Hales, Langan

96A. Autobiography. (4) Three hours of lecture per week. Study of personal autobiography, and discussion of autobiographical forms. (F) Wong

100C. Comedy. (4) Three hours of lecture per week. Study of representative comic forms, techniques, and points of view.

100E. The Epic. (4) Three hours of lecture per week. Reading and discussion of epics, considering their cultural and historical contexts, the nature of their composition, the form of the epic. (SP) Staff

100H. Short Story. (4) Three hours of lecture per week. Lectures on and discussion of the form of the short story. (F) Mukherjee

100J. The Essay. (4) Three hours of lecture per week. Study of the essay as a literary form, the circumstances of its use and development, and its function in twentieth-century culture.

100L. Lyric Verse. (4) Three hours of lecture per week. Study of lyric forms and techniques. (SP) Oliver

100R. The Romance. (4) Course may be repeated for credit with consent of instructor. Three hours of lecture per week. Study of the romance as a literary genre. Topics may vary from semester to semester; focuses may be on a particular period (e.g., medieval, modern). (F) Kratins

100S. Satire. (4) Three hours of lecture per week. Study of representative satirical forms, techniques, and points of view.

100T. Tragedy. (4) Three hours of lecture per week. Study of tragic forms, techniques, and points of view. (F) Coddington

100Z. Science Fiction. (4) Three hours of lecture per week. A survey of science fiction which includes both short stories and novels. The focus will be on the analysis of the texts and on the history and theory of the genre.

193. Computers in the Humanities: Literary Applications. (4) This 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
207. Independent Study for Graduate Students in English. (1-12) Course may be repeated for credit. Independent study. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. (F.S.P) Staff

289. Special Study. (1-8) Course may be repeated for credit. Independent. Primarily for students engaged in preliminary exploration of a restricted field, involving research and the writing of a report. May not be substituted for available seminars. (F.S.P) Staff

602. Individual Study for Doctoral Students. (1-12) Course may be repeated for credit. Independent. 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 do necessary work to prepare themselves for language examinations and the comprehensive examination. May be used for unit or residence requirements for the master's degree. (F.S.P) Staff

Entomological Sciences (College of Natural Resources)

Department Office: 218 Wettlman Hall, 642-6660

Acting Chair: Alexander Purell, Ph.D.

Professors:

Associate Professors:


Staff:
Rudolph L. Piga, Ph.D. University of Minnesota, Insect ecology.
Evel E. Schlinger, Ph.D. University of California, Davis. Systematic entomology.
Ray F. Smith, Ph.D. University of California at Berkeley. Medical entomology, medical control.
Edward S. Sweeney, Ph.D. University of California at Berkeley. Vector entomology (Emeritus).
Yoshinori Terada, Ph.D. University of California at Berkeley. Insect pathology (Emeritus).
William E. Waters, Ph.D. Yale University. Forest entomology (Emeritus).
Clarence J. Wehmhann, Ph.D. University of California at Berkeley. Behrmorphology (Emeritus).

Lecturers:
Thomas E. Miller, Ph.D. University of Cambridge, England. Insect behavior.
George C. Poliner, Jr., Ph.D. Cornell University, Nematology.
Richard Garza, Ph.D. University of California at Berkeley. Biological control, mosquito control.

Stephen C. Welter, Ph.D. University of California, Riverside. Agriculture entomology.

Associate Professor:
Nicholas A. Mills, Ph.D. University of East Anglia, Norwich, Biological control.

Note: The College of Natural Resources is presently reorganizing its course offerings. Please consult the College and Schools section in the front of this catalog for a brief description of programs proposed for the college in the future. For current information about program offerings and course offerings, please consult the departmental office listed above in the Dean's Office, Office of Student Affairs, 106 Gianni Hall, 642-0542.

The Department of Entomological Sciences presents a diversified and highly interdisciplinary teaching and research program. This includes the following areas of emphasis:

Academic: 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 control methods.

Aquatic Entomology: the taxonomy and ecology of insects inhabiting aquatic environments.

Biological Control: the regulation of population of 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-bean interactions and population dynamics.

Insect Morphology: insect functional anatomy, with emphasis on 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 Virology: the characterization, pathology, 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 disease of humans and domestic animals.
Natural Products Chemistry: the identification and testing of naturally occurring products that affect the growth and behavior of invertebrates.

Nematology: the taxonomy, morphology, host-parasite relationships, and control of nematodes that affect invertebrates.

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 the 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 Gannan Hall, Haggard Hall, and Wellman Hall. In addition to laboratories and classrooms, the facilities include an outstanding entomological museum, specializing in the collections for pesticide chemistry, pathology, natural products chemistry and physiology, and an extensive library. Also available are insectary buildings, growth chambers, bioclimatic chambers, and a field station at the nearby Oxford Research Unit, and at the Division of Biological Control on the Gili Tract near Albany.

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.

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 minimum requirements are usually fulfilled by a bachelor's degree in entomology from an accredited institution. The preparatory undergraduate program should include: general entomology, insect classification, insect anatomy and physiology, systematics, entomology, insect ecology, applied entomology, and a year of organic and cellular biology. Courses in genetics, statistics, inorganic or organic chemistry, and physics are also required. Deficiencies in any of the courses must be remedied at the outset of graduate study.

Lower Division Courses

10. Natural History of Insects. (2) Two hours of lecture per week. An outline of the main facts and principles of biology as illustrated by insects, with special emphasis on their relationships to plants and animals, including humans. (SP) Doyen

11. Insects and Human Society. (2) Two hours of lecture per week. An introduction to the diversity and natural history of insects in natural and human environments. The course examines the wonder of insects, their interactions with the living world, and their contributions and impacts on human society. (F) Frankle

30. Biological Control. (2) Two hours of lecture per week. Regulation of populations of organisms, especially insects, through interactions with parasites, predators, pathogens, competitors. Discussion of examples in agricultural, forest, urban, and recreational environments. (F,SP) Mills, Gutierrez

Upper Division Courses

100. General Entomology. (4) Two hours of lecture and six hours of laboratory 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, methods for assaying their safety and activity. Offered odd-numbered years. (SP) Castrignano

101. Insect Classification and Diversity. (4) Two hours of lecture and six hours of laboratory per week. Prerequisites: 100. Formerly 104. Comparative biology of insect orders; classification and enumeration of families. (SP) Doyen

102. Functional Insect Anatomy. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: General biology, integrative biology or entomology. Structure, function, and comparative organization of insect systems. Offered odd-numbered years. (F) Staff

103. Insect Physiology. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: General biology, zoology, or entomology. A survey of the unique physiological mechanisms of insects, including the analysis of various physiological systems at the cellular, tissue, organ, and molecular level. The roles of the nervous and endocrine systems in coordinating physiological processes are emphasized. (SP) Tanouye

103L. Insect Physiology Laboratory. (2) Six hours of laboratory per week. Prerequisites: 103 (may be taken concurrently) or consent of instructor. Laboratory exercises and demonstrations using modern methods to study insect physiology. Includes experiments with the nervous system, muscles, heart, digestive and excretory systems, behavior, and development. Provides experience with a range of physiological instrumentation and laboratory techniques. (SP) Tanouye

104. Principles of Systematic Zoology. (2) One hour of lecture and three hours of discussion/laboratory per week. Prerequisites: 100 or consent of instructor. Principles and methods of animal taxonomy and phylogeny: history, concepts of species and other taxa, methods of classification, bibliographic procedures, nomenclature and museum practices, with emphasis on examples in insects. (F) Powell

105. Insect Ecology. (3) Two hours of lecture per week. Prerequisites: Biology 140 or 141, or Entomology 100. Recommended: Molecular and Cell Biology 140 or 142, 160. An introduction to comparative animal behavior and behavioral physiology in an evolutionary context, including but not limited to analysis of behavior, genetics and development, learning, aggression, reproduction, physiological adaptations, and physiological substrates. Two midterm exams and a library term paper. Also listed as Integrative Biology 144, Psychology 115B and Interdepartmental Studies 122. Offered even-numbered years. (SP) Barlow, Caldwell, Glickman, W. Lohrer

109L. Laboratory in Insect Behavior. (1) Three hours of laboratory per week. Prerequisites: 119, 122; may be taken concurrently. Insect laboratory oriented toward the study of animal behavior, including the design of experiments, analysis of results, and discussion of animal behavior in general. Offered even-numbered years. (F) Lofler

122. Animal Behavior. (4) Students will receive no credit for 122 after taking Integrative Biology 145. Three hours of lecture, one hour of discussion, and one hour of demonstration per week. Prerequisites: Biology 1A-1B or 11, or Psychology 1L. Recommended: Molecular and Cell Biology 140 or 142, 160. An introduction to comparative animal behavior and behavioral physiology in an evolutionary context, including but not limited to analysis of behavior, genetics and development, learning, aggression, reproduction, physiological adaptations, and physiological substrates. Two midterm exams and a library term paper. Also listed as Integrative Biology 144, Psychology 115B and Interdepartmental Studies 122. Offered even-numbered years. (SP) Barlow, Caldwell, Glickman, W. Lohrer

153L. Medical and Veterinary Entomology Laboratory. (1) Three hours of laboratory per week. Prerequisites: 100 and 104, or consent of instructor. Study of various host-parasite, prey-predator systems, especially those of significance to agriculture, forestry, urban, and recreational environments. Implementation of biological control methods involving importation, augmentation, and conservation of natural enemies. Offered odd-numbered years. (F) Mills

153L. Medical and Veterinary Entomology Laboratory. (1) Three hours of laboratory per week. Prerequisites: 100 and 104, or consent of instructor. Study of various host-parasite, prey-predator systems, especially those of significance to agriculture, forestry, urban, and recreational environments. Implementation of biological control methods involving importation, augmentation, and conservation of natural enemies. Offered odd-numbered years. (F) Mills

153L. Medical and Veterinary Entomology Laboratory. (1) Three hours of laboratory per week. Prerequisites: 100 and 104, or consent of instructor. Study of various host-parasite, prey-predator systems, especially those of significance to agriculture, forestry, urban, and recreational environments. Implementation of biological control methods involving importation, augmentation, and conservation of natural enemies. Offered odd-numbered years. (F) Mills
disease agents to humans and other animals, and study of the structural adaptations associated with free-living and parasitic stages and with blood feeding. Offered even-numbered years. (F) Later

164. Agricultural Acarology. (2) Two hours of lecture and two hours of laboratory per week. Prerequisites: An introduction to the biology, ecology, morphology, physiology, genetics, and classification of mites of agricultural importance. Methods to be used for the detection and identification of mites will be surveyed and compared, including host plant resistance, cultural, chemical, and biological controls. Staff

170. Chemical Ecology. (2) Two hours of lecture 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 phytotoxins and phytoxins. (F) Kubo

197. Field Studies in Entomology. (1-3) Course may be repeated for credit. One unit for three hours of work per week. Must be on a pass/not pass basis. Prerequisites: Consent of instructor. Study or research on topics that may vary from semester to semester. (F,SP) Staff

198. Directed Group Studies for Advanced Undergraduates. (1-3) Course may be repeated for credit. One unit for three hours of work per week. Must be on a pass/not pass basis. Prerequisites: Consent of instructor. Study or research on topics that may vary from semester to semester. (F,SP) Staff

199. Supervised Independent Study and Research. (1-3) Course may be repeated for credit. One unit for three hours of work per week. Must be on a pass/not pass basis. Prerequisites: Consent of instructor. Enrollment restrictions apply. (F,SP) Staff

Graduate Courses

200. Entomology Staff Seminar. (1) One hour of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Weekly meetings for the presentation of research findings by the faculty, visiting lecturers, and graduate students. Attendance by all graduate students is recommended. (F,SP) Staff

204. Principles of Systematic Entomology. (2) Course may be repeated for credit. Two hours of lecture per week. Prerequisite: 184. Theory and philosophy of systematic entomology, with emphasis on systematic and phylogenetic approaches to classification, biogeography, and nomenclature. Offered odd-numbered years. (F) Daly, Doyen, Powell

205. Insect Population Ecology. (2) Two hours of lecture per week. Prerequisites: 150 or 155, or consent of instructor. Population dynamics, regulation, and measurement, theory of natural control. Emphasis on models in population ecology relevant to insect populations and integrated pest management. Offered even-numbered years. (F) Wetter

214. Advanced Forest Entomology. (2) Two hours of lecture and guided discussions per week and two 2-day field trips. Offered odd-numbered years. Prerequisite: 106 or consent of instructor. Concepts and practices in forest entomology and the research from which they are derived. Offered even-numbered years. (SP) Dahsten, Wood

230. Biology of Parasitoids. (3) One hour of lecture and six hours of laboratory per week. Prerequisites: 106 or 130 or consent of instructor. The ecology, behavior, and developmental biology of parasitoids (protelean parasites). Emphasis is on laboratory and field analysis of host-parasitoid relationships and the evolution of these specialized adaptations in a wide range of taxonomic groups. Offered even-numbered years. (F) Staff

250. Plant Arthropod Interactions. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Behavioral ecology and physiological ecology of phytophagous Arthropoda, particularly insects. Impact of plant chemistry on behavior and physiology of insects. Impact of insecticides and microbe field trips; 1-2 hour meeting will precede each field trip and a 1-hour laboratory will follow each field trip. Techniques used for collecting blood-sucking arthropods and trapping selected vertebrate hosts; methods of processing specimens for study; examining blood, etc., for parasites and identification of specimens. Offered odd-numbered years. (SP) Lane

256. Insect Molecular Genetics. (2) Course may be repeated for credit. One hour of lecture and one hour of discussion per week. Prerequisites: 100 and Introductory Genetics courses. Introduction to principles, terminology, and techniques of molecular genetics in relation to insects. Topics include DNA structure, function and regulation, transformation of insects, and development of methods for the management of arthropod pests. (F) Staff

274. Presentation and Publication of Biological Research. (2) Three hours of session per week. Course will deal with topics such as organization of research presentations (seminars, papers at meetings), selection of presentation styles and visual aids, the scientific publication process, academic and other career options, and considerations about extramural funding. Individual research presentations and other assignments will be required. (F) Reash

286. Research Reviews in Comparative Virology. (1) Course may be repeated for credit. Three hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Reports and discussion of original research by staff and students. (F,SP) Volkman

287. Seminar in Insect Physiology. (1) Course may be repeated for credit. Three hours of seminar per week. A 3-hour seminar held once a week for graduate students to discuss the advances in insect physiology through individually prepared papers by students. (SP) Loher, Mittler

288. Seminar in Parasitology. (1) Course may be repeated for credit. Three hours of seminar per week. A 3-hour seminar held once a week for graduate students to discuss the advances in medical entomology/parasitology through individually prepared presentations prepared by students. (SP) Lane

299. Research in Entomology and Parasitology. (1-6) Course may be repeated for credit. Three hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Staff

601. Individual Study for Master's Students. (1-8) Course may be repeated for credit. Four hours of work per unit. May not be used for unit or residence requirements, for the Ph.D. May not be used for future degree requirements for the Ph.D. (F,SP) Staff

300. Supervised Teaching Experience in Entomology. (1-3) Course may be repeated for credit. Three hours of supervised teaching experience per week per unit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor and appointment as Graduate Student Instructor. Staff

Upper Division Courses

IDS 191A. Introduction to Laboratory Animal Science and Resources. (2) Two and one-half hours of laboratory and one and one-half hours of lecture per week. Must be taken on a pass/not pass basis. Prerequisite: 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 immobilization; animal welfare regulations and practices of humane care and breeding; animal genetics and diseases. Laboratory applications of lecture material. Staff

Staff

Entomological Sciences / 235
Environmental Design

(College of Environmental Design)

Undergraduate Office: 234 Wurster Hall, 642-0632
For a description of the programs in the College of Environmental Design, see page 94.

The college faculty has established several courses as a core of divisional work that is prerequisite to upper division major design courses offered by the Landscape Architecture and Environmental Design departments. These courses are designed to provide an introduction to the disciplining and environmental design courses that embrace the interests of more than one department. Having similar standing as environmental design courses, rather than department offerings, these courses are typically staffed by more than one department. They are administered by one only. For information regarding courses, contact the Department of Architecture, Landscape Architecture, and Environmental Design.

Lower Division Courses

1. Introduction to Environmental Design. (3) Three hours of lecture and two hours of discussion per week. Introductory survey course. Environmental awareness and environmental design. Berkeley campus used for case study. (F)

2. People and Environment. (3) Three hours of lecture and two hours of discussion per week. Survey of relationships between people and environments, designed and non-designed; interpretations of architecture and landscapes and introduction to their literature. (SP)

3. Principles of Landscape Architecture. (4) Three hours of lecture and five hours of studio per week. Basic principles of landscape architecture as applied to the design of the built environment. (F)

4. Introduction to Drawing. (4) Three hours of lecture and five hours of studio per week. Survey of landscape architecture as applied to the design of the built environment. (SP)

5. Introduction to Design. (4) Three hours of lecture and six hours of studio per week. Survey of the use of visual means to analyze and convey ideas regarding the environment. (F,SP)

6. History of the Environment. (3) Three hours of lecture per week and four 6-hour field trips. Survey of the development of the built environment of California, colonial times to present. (SP)

Upper Division Courses

1. Writing About Environmental Design. (2) Course may be repeated for credit. Three hours of laboratory per week and one-half hour tutorial every other week. Prerequisites: English 1B or equivalent, and consent of instructor. An intensive workshop for students in the general study of the landscape, and the built environment. Different forms of expression—critical, historical, and professional, even fictional—will be considered. Students will be divided into groups and will be assigned specific 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. (F)

2. Site Planning. (5) Two hours of lecture and six hours of studio per week. Prerequisites: Landscape Architecture 103 or Architecture 100B or equivalent. The focus of this course will be on the design and planning of the built environment. (SP)

3. Computer Applications for Environmental Design. (4) Three hours of lecture and five hours of studio per week. Prerequisites: I1A, I1B and Architectural 100B or equivalent. (F)

4. Photography As Creative Expression. (3) Three hours of lecture and two hours of discussion 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. (SP)

5. History of the U.S. Cultural Environment. 1793-1900. (3) Three hours of lecture and two hours of discussion per week. The evolution and interpretation of American landscapes—our everyday homes, highways, farms, stores, and recreation areas—with an emphasis on how to record the landscape as a record of social and cultural processes. (SP)

6. Senior Thesis. (4) Course may be repeated once for credit. Prerequisites: Directed study to students with approved individual majors in the College of Environmental Design. Directed study leading to preparation of a senior thesis. (SP)

Environmental Sciences

(College of Letters and Science)

Group Major Office: Division of Undergraduate and Interdisciplinary Studies, 301 Campbell Hall, 642-2628
Head Adviser: Mark Christiansen
Major Advisers: Area I: Physical Science: Mark Christiansen; William L.W. Berry; Area II, Biological Science: William Liddicker; Area III, Social Science: Edward Anderson, Orman 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 short of the problems stemming from the interaction of people with other people in cities; such matters must be left to the fields of urban and ethnic studies.

The senior seminar, Environmental Sciences 196A-196B, is an important feature of the group major in environmental sciences. Typically, a group of 25 or fewer seniors, including students from each of the three areas, works intensively under faculty guidance for two semesters on a specific environmental problem.

The group major program is administered through the Division of Undergraduate and Interdisciplinary Studies. Students are referred to this office for all administrative matters.

Major Requirements

Prerequisites: To be considered for admission to the group major in environmental sciences, one needs to:
1. Have already completed at least 30 units of college course work. (AP units are not included.)
2. Have already completed Environmental Sciences 10 or equivalent.
3. Have already completed or be in the process of completing the lower division required courses.

Because of the continual addition of new courses and the demise of others, in exceptional cases advisors may consider the substitution of certain other courses for those officially listed under the three major options.

Major Requirements for All Three Areas of Environmental Sciences

Lower Division Courses. Biology 11 (Biology 1A-1B can be substituted for Biology 11)
Chemistry 1A-1B or 4A-4B (for social science area only)
Chemistry 1 and 3A (for biological and physical science areas only)
Physics 8A-8B or 7A-7B
Computer Science 3 or Engineering 77 or Interdepartmental Studies 110
Environmental Sciences 10
Mathematics 1A-1B or Mathematics 16A-16B (for biological and social science areas only)
Upper Division Courses. Integrative Biology 105 or 153A or Forestry 170 if Biology 11 is taken
Energy and Resources 102
Anthropology 148 or Geography 130
Statistics 131A
Economics 100A or 101A or Political Economy of Natural Resources 100 (for social science area only)
Environmental Sciences 125
Environmental Sciences 196A-196B

Additional Upper Division Courses. A total of 30 upper division units is required in the major, including the upper division courses listed above. The remaining units are drawn from environmentally related courses in departments of the College of Letters and Science and selected courses in professional schools and colleges.

Area I (Physical)—mainly from physical sciences departments
Area II (Biological)—mainly from biological sciences departments
Area III (Social Science)—mainly from social science departments.

Lower Division Courses

10. Introduction to Environmental Science. (3) Three hours of lecture and one hour of discussion per week and one hour of field trip per semester. A survey of biological and physical environmental problems, focusing on geologic hazards, water and air quality, water supply, solid waste, introduced and endangered species, preservation of wetland ecosystems, interaction of technical, social, and political approaches to environmental management. (F,SP) Staff

Upper Division Courses

125. Environments of the San Francisco Bay Area. (3) Three hours of lecture per week and one hour of field trip per semester. A survey of the physical and human environments of the Bay Area, with an emphasis on the interaction of these environmental elements, their modification by humans, and problems deriving from human use. Environmental Science majors should take this course in the junior year. This course is the prerequisite to 196A, from which the senior thesis topic statement is determined. (SP) Staff

196A-196B, Senior Research Seminar in Environmental Sciences. (3) Three hours of seminar per week, field trips, community contacts, individual research tutorials. Prerequisites: Senior standing in the E.S. major and 125 Seminar and published research reports giving detailed attention to a specific, current environmental problem in the Bay Area. (F,SP) Staff

198. Directed Group Study. (1-4) Course may be repeated for credit. Independent study. Must be taken on a passed/not passed basis. Prerequisites: Enrollment is restricted by regulations listed in the General Catalog. (F,SP) Staff

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Independent study. Must be taken on a passed/not passed basis. Prerequisites: Enrollment is restricted by regulations listed in the General Catalog. (F,SP) Staff

Ethnic Studies

(Special Studies or College of Letters and Science)

Department Office: 3407 Dwinelle Hall, 642-6555
Chair: L. Yang-chi Wang, M.A.

Professors:
Marie Barrera, Ph.D. (Chicano Studies)
Evelyn N. Glenn, Ph.D. (Asian American Studies/Women's Studies)
Elaine H. Kim, Ph.D. (Asian American Studies)
Carlos Mufioz, Ph.D. (Chicano Studies)
Ronald T. Takaki, Ph.D. (Asian American Studies)
Gerald R. Vizcaino, Ph.D. (Native American Studies)
Terry P. Wilson, Ph.D. (Native American Studies)

Associate Professors:
Norma Alarcon, Ph.D. (Chicano Studies)
Clara Sue Kidwell, Ph.D. (Native American Studies)
Beatris Mattz, Ph.D. (Chicano Studies/Geography)
Maragata B. Maltz, Ph.D. (Chicano Studies)
Alex M. Sotozago, Ph.D. (Chicano Studies)

Liang-chi Wang, M.A. (Asian American Studies)
Sau-ing C. Wong, Ph.D. (Asian American Studies)

Assistant Professors:
Julia Curry, Ph.D. (Chicano Studies)
Trinh T. Giao, Ph.D. (Asian American Studies)
Beatris Mattz, Ph.D. (Chicano Studies)

Luanh Ross, Ph.D. (Native American Studies)

Lecturers:
Amado Y. Cabezas, Ph.D. (Asian American Studies)
Lori Ding (Chicano American Studies)
Jean Mosley (Native American Studies)

Undergraduate Major Advisers: M. Wang, 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 comprehensive and multidisciplinary understanding of the experiences and communities of African Americans, Asian Americans, Chicanos, 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 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 (economics, 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-level courses or three years of high school courses in a given language.

3. Completion of a course in mathematics, statistics, logic, or computer science.

4. Completion of a course in one of the natural sciences.

5. Completion of six courses outside the student's declared area of emphasis.

Major Requirements


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 African American studies).

Upper Division. 1. Completion of three core courses in ethnic studies: 130, 141, and 195.

2. Completion of two additional courses in ethnic studies.

3. Completion of six additional courses which form the basis of the declared area of emphasis. Two of the courses must be taken in two different ethnic studies programs (including African American studies).

Honors. The Department of Ethnic Studies provides a program leading to the A.B. degree with honors. Students will be recommended for honors if they have completed at least 30 units and two semesters with an average GPA of at least 3.3 for all work undertaken in the Department of Ethnic Studies and have behaved specifically for honors by the department chair upon recommendation by the faculty adviser for the group major. Honors students 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, students 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 African American studies.

Lower Division Courses

20. Introduction to Ethnic Studies. (4) Three hours of lecture per week. The University, its relationships to corporate structures, legislative bodies, community people, and specifically Third World people will be analyzed. This course satisfies the American cultures requirement. (F) Staff

21. A Comparative Survey of Racial and Ethnic Groups in the U.S. (3) Three hours of lecture per week. The University, its relationships to corporate structures, legislative bodies, community people, and specifically Third World people will be analyzed. This course satisfies the American cultures requirement. (F) Staff

22. Directed Group Study. (1-4) Course may be repeated for credit. Independent study. Must be taken on a passed/not passed basis. Prerequisites: Enrollment is restricted by regulations listed in the General Catalog. (F,SP) Staff

30. Third World Cultural Patterns. (3) Three hours of lecture 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.

41. A Comparative Survey of Protest Movements Since the 60's. (4) One hour of discussion per week. An introductory, com-
Upper Division Courses

100. Third World Literature in America. (4) Three hours of lecture per week. Analysis of how selected works (poetry, short stories, novels, drama, and literary criticism) reflect African-American, Chicano, Asian-American, and Native American consciousness and experiences. (FSP, SP) Wong

110. Narrative Writing. (4) Three hours of lecture per week. Prerequisites: Consent of instructor. A writing seminar with attention to the narrative practices that either mirror or reject mainstream descriptive, historical, and fictional stories. (SP) Vizcaino

112. Ethnicity and Race in Contemporary American Films. (4) Three hours of lecture per week. A depiction of race and ethnic relations in American films from the 1960s to the present. The course covers independent features as well as mainstream Hollywood and studio films. (SP) D'Ing

113. Electronic Images of Third World Communities. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: Consent of instructor. Focus on the use of television, video, and other electronic media to depict the Third World. (SP) Vizcaino

119. Race, Gender and Ethnicity in the Hollywood Film. (4) Three hours of lecture and one hour of discussion per week. Formerly 142. Explores the effects of American culture on Hollywood cinema pertaining to topic. This course satisfies the American cultures requirement. (SP) Muñoz

121. Race and Class in Third World Communities. (4) Three hours of lecture per week. A comparative analysis of race and class in Third World communities. Emphasis on the economic development in Third World communities. Special attention given to shifting world views in crossing borders, migrating, and resettling. (F, SP) Duster

123. Racial Inequality in America: A Comparative Historical Analysis. (4) Three hours of lecture and one hour of 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, Asian-Americans, and Native Americans within the context of American society and culture. (FSP, SP) Staff

131. Responses to Racial Inequality in America: A Comparative Analysis. (3) Three hours of seminar per week. Prerequisites: 130. Seminar on the political, economic, social, and cultural responses to racial inequality in America. (SP) Staff

132. Race, Family, and Historical Change. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Comparative analysis of the impact of industrialization and its socio-cultural effects on sex roles, family structure, and work in different historical periods. Emphasis on the interrelationships of these variables in the lives of African Americans, Chicano, and Native Americans. (SP) Staff

133. Borderlands: Ethnic World Views. (4) Three hours of lecture/discussion per week. Prerequisites: Upper division standing and consent of instructor. Examines ethnic theories and the ways people perceive the world and their place in it. Explores ethnic patterns and practices to understand ways individuals and groups internalize and express ways of thinking. Special attention to shifting world views in crossing borders, migrating, and resettling. (F, SP) Duster

135. Contemporary U.S. Immigration. (4) Three hours of lecture per week. The Myths, Reality and History of U.S. Immigration. Focus on the current journey of race, ethnicity, culture, class, gender, and sexual preference in U.S. politics. This course satisfies the American cultures requirement. (SP) Staff

136. Immigrant Women. (4) Three hours of lecture per week. Prerequisites: Upper division standing and consent of instructor. Examines patterns of women's immigration to the U.S. in specific socio-historical and cultural contexts. Special attention to race, ethnic and identity issues from woman-centered analysis and methodology. Also listed as IDS 136 and Women's Studies 136.

141. Protest Movements Since the 1960's. (4) Three hours of lecture and one hour of discussion per week. A comparative and interdisciplinary study of African, Mexican, Asian, Native American, and White Left protest movements in the United States since the 1960s. This course satisfies the American cultures requirement. (SP) Muñoz

144. Racism and the U.S. Law: Historical Treatment of Peoples of Color. (4) Three hours of lecture and one hour of discussion per week. Focuses on how racism is practiced by Latinos, Blacks, Asians and Native Americans through the institution of law. (SP) Muñoz

145. Religion and Ethnicity. (4) Three hours of lecture per week. A comparative analysis of religion as practiced by Latinos, Blacks, Asians and Native Americans. This course satisfies the American cultures requirement. (SP) Muñoz

146. The Effects of Racism on Child Development. (3) Three hours of seminar 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. Women of Color in the United States. (4) Three hours of seminar per week. Prerequisites: Consent of instructor. This course will explore the development of the field of women of color and its intersections with the subfields of women's studies. (SP) Staff

148. Economic Development in Third World Communities. (3) Three hours of lecture and one hour of discussion per week. Focuses on the economic development in Third World communities. Emphasis on the economic development in Third World communities. Special attention given to shifting world views in crossing borders, migrating, and resettling. (SP) Staff

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 interdisciplinary and theoretical, and emphasizes the relationship between ethnicity and social structure. (SP) Staff

150. People of Mixed Racial Descent. (4) Three hours of seminar per week. Focuses on the experiences of people of mixed racial descent, focusing on United States but with reference to other nations for comparative purposes. Includes historical perspective as well as exploring the psychology, sociology, literature, and cinema pertaining to topic. This course satisfies the American cultures requirement.

190. Advanced Seminar in Third World Studies. (1-4) Course may be repeated for credit as topic varies. One to four hours of seminar per week. Prerequisites: Consent of instructor. Advanced seminar in Third World studies with topics to be announced at the beginning of each semester. (SP) Staff

194. Quantitative Methods for Community Research. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Consent of instructor. To provide an understanding of quantitative research methods for studying social, economic, and political issues affecting minority communities. Attention given to problem articulation, modelling, instrumentation, data collection, statistical and data analysis, and interpretation in research in minority communities. (SP) Staff

195. Selected Issues in Third World Research. (4) Course may be repeated for credit as topic varies. Three hours of seminar 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. Issues will vary from semester to semester. (SP) Staff

H196A. Senior Honors Seminar for Ethnic Studies Majors. (3) Three hours of seminar per week. Prerequisites: 196A, Formerly H196A. Writing of a senior honors thesis. Senior honors seminar for senior Ethnic Studies majors who have been admitted to the honors program. (F, SP) Staff

H196B. Senior Honors Thesis for Ethnic Studies Majors. (3) Three hours of seminar per week. Prerequisites: H196A, Formerly H196B. Writing of a honors thesis. Senior honors seminar 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 pass/not passed basis. Prerequisites: Upper division standing and consent of instructor. Field work in Third World communities. Regular individual meetings with faculty advisor and written reports required. (F, SP) Staff

198. Supervised Group Study. (1-3) Course may be repeated for credit. Must be taken on a pass/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 pass/not passed basis. Prerequisites: Upper division standing and consent of instructor. Independent research on a topic which is approved by the writing of a major paper. Regular meetings with the faculty advisor. (F, SP) Staff

Ethnic Studies
Graduate Group (Special Studies)

Group Office: 3407 Dwinelle Hall, 642-6643
Chair: L. Ung-ehi Wang, M.A.

Professors:
William M. Banks, III, Ed. D. (African American Studies)
Marto Barrera, Ph.D. (Chicano Studies)
Michael Bernan, Ph.D. (Political Science)
Barbara Christian, Ph.D. (African American Studies)
Lawrence Constitution, Ph.D. (History)
Leon Uris, Ph.D. (History)
Michael Martin, Jr. (History)
Evelyn Nakano Glodf, Ph.D. (Asian American Studies)
Christian Brett Rivas, Ph.D. (Sociology)
William Simmons, Ph.D. (Anthropology)
Barbara Christian, Ph.D. (African American Studies)
Ronald Takaki, Ph.D. (African American Studies)
Evelyn Nakano Glodf, Ph.D. (Asian American Studies)
Lawrence Constitution, Ph.D. (History)
Carlos M. Munoz, Jr., Ph.D. (Chicano Studies)
Graduate Adviser: Ms. Melville.

The Ethnic Studies Graduate Group Program studies comparatively the histories, cultures, and communities of racial minorities in the United States. It seeks to analyze how the experience of various racial groups and their cultures differ from each other, how developments such as slavery and racial discrimination set apart Americans of color from Americans of European ancestry, and how minorities have been integrated into American society. Multidisciplinary in approach, it utilizes a broad range of social science and humanities methods to examine the critical area of race-in-American life. The curriculum focuses on racial minorities, particularly on African Americans, Asian Americans, Chicano/a, and Native Americans within the context of American society in general—its culture, economy, and institutions—in order to understand more deeply the origins, nature, and meaning of America's racial diversity.

The curriculum for the Ethnic Studies Graduate Program is taught by faculty from American, Asian American, Chicano/a, and Native American Studies as well as faculty from Sociology, History, Economics, Political Science, Geography, Anthropology, Music, and English. Students may obtain information regarding the requirements and curriculum from the graduate secretary of the Ethnic Studies Graduate Group.

Graduate Courses

200A. Major Issues in Ethnic Studies Scholarship: U.S. Study of Major Issues of Ethnic Studies Scholarship. Focus will be on theories of race and class in American society as they relate to Afro-Americans, Asian Americans, Chicanos, and Native Americans. A term paper utilizing a comparative approach required. (F) Tatakii

250. Research Seminar: Selected Issues and Topics. (4) Course may be repeated for credit. Four hours of seminar per week. Prerequisites: 200A or consent of instructor. A seminar course designed to investigate major issues of Ethnic Studies Scholarship. Study of major issues of Ethnic Studies Scholarship. Focus will be on theories of race and class in American society as they relate to Afro-Americans, Asian Americans, Chicanos, and Native Americans. A term paper utilizing a comparative approach required. (F) Tatakii

250. Research Seminar: Selected Issues and Topics. (4) Course may be repeated for credit. Four hours of seminar per week. Prerequisites: 200A or consent of instructor. A seminar course designed to investigate major issues of Ethnic Studies Scholarship. Study of major issues of Ethnic Studies Scholarship. Focus will be on theories of race and class in American society as they relate to Afro-Americans, Asian Americans, Chicanos, and Native Americans. A term paper utilizing a comparative approach required. (F) Tatakii

250. Research Seminar: Selected Issues and Topics. (4) Course may be repeated for credit. Four hours of seminar per week. Prerequisites: 200A or consent of instructor. A seminar course designed to investigate major issues of Ethnic Studies Scholarship. Study of major issues of Ethnic Studies Scholarship. Focus will be on theories of race and class in American society as they relate to Afro-Americans, Asian Americans, Chicanos, and Native Americans. A term paper utilizing a comparative approach required. (F) Tatakii

C. Major works in Chicano Studies.
D. Major works in Native American Studies.
E. Special Topics. (F,SP)

601. Individual Study for Master's Students. (4) Course may be repeated once for credit. Individual instruction. Must be taken on a satisfactory/unsatisfactory basis. Individual study, in consultation with Group faculty, to prepare students for master's examinations. (F,SP) Staff

602. Individual Study for Doctoral Students. (2-6) Course may be repeated for credit. Individual conferences. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: 200A-200B. Individual study, consultation with Group faculty, to prepare students for the doctoral oral examinations. A student will be permitted to accumulate a maximum of 16 units in 601 and 602, respectively, toward examination preparation. Units earned in these courses may not be used to meet academic residence or unit requirements for the master's or doctoral degree. (F,SP) Staff

Professional Courses

301. Professional Training: Teaching. (4) Course may be repeated for credit. Two hours of lecture and two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: EdD 200A-200B. Individual study, consultation with Group faculty, to prepare students for the doctoral oral examinations. A student will be permitted to accumulate a maximum of 16 units in 601 and 602, respectively, toward examination preparation. Units earned in these courses may not be used to meet academic residence or unit requirements for the master's or doctoral degree. (F,SP) Staff

Film

(College of Letters and Science)

Group Major Office: Division of Undergraduate and Interdisciplinary Studies, 301 Campbell Hall, 642-6984

Advisory Committee: Anton Kaes (German), director; Seymour Chatman (Rhetoric, Emotions), Carol Clover (Scandinavian), David Cohen (Rhetoric), Ulysses Duthol, Martin Fink (Film), Richard Kirshner (Film Archive), Gavriel Moses (Italian), William Nestrick (English), Kaja Silverman (Rhetoric).

Student Affairs Officer: Marty Gaster (Undergraduate and Interdisciplinary Studies, 301 Campbell Hall, 642-6984).

Group Major in Film

The group major in film is administered by the Undergraduate Interdisciplinary Studies. It has been designed to place the historical 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 languages.

Lower Division

History of Film: Two courses, one on film from its beginnings, covering the silent period and the concomitant development of theory and criticism and the other on another period in film. (FSP) Staff

History of Film: Two courses, one on film from its beginnings, covering the silent period and the concomitant development of theory and criticism and the other on another period in film. (FSP) Staff

Documentary Film: Film 28A.

Avant-Garde Film: Film 28B.

Language Requirement: In addition to the language used for the entrance to the University, students will choose a second language. The choice of a language is to be made so that, between the entrance requirement and the second language, both groups of the following languages are represented:

Group One: French, German, Italian, Japanese, Russian, or Swedish.

Group Two: Czech, French, German, Polish, Portuguese, Serbo-Croatian or Spanish.

Other languages such as Arabic, Hebrew, Korean, Chinese, and Tagalog may be substituted for one of these groups when taken in conjunction with course work in the relevant films in that language.

The student is to attain the level of three semesters in one language and two semesters in the other languages. (Three years of language in high school with minimum grades of C- equals two semesters of a language in college.) For further information see the Announcement of the College of Letters and Science. Courses taken to fulfill the language requirement for the major may be taken pass/no pass, but if they are also fulfilling the college requirement the last semester must be taken for a letter grade.)

Upper Division (30 units of upper division credit are required)

Required Courses: See the major "Announcement of Classes" for current offerings that satisfy these requirements and for specific topics being taught.

Film Theory: One course on the history of film theory (e.g., Film 100, English 173, Rhetoric 129).

Auteur: One course on an individual auteur (e.g., Film 151, Italian 170, Scandinavian 189).

Genre: One course on film genre (e.g., Film 108, English 176).

Film Electives: (Approximately 18 units) required to complete the major requirements of 30 upper division units (e.g., Film 22A, 25A, 25B, 325, 330, 197, 197F, History 103, Italian 170, Native American Studies 158, South and Southeast Asian Studies 137. Note: The class topics may be repeated if the student certifies in writing that he is sure they apply to films not yet in doubt please check with your Film Adviser.

Honor Programs. To be eligible for admission to the honors program in Film, a student must have attained senior standing with a grade-point average of 3.3 or higher on all University work and a 3.5 or higher average or higher in courses taken for the major. The levels of honors is as follows: Honors—3.5 GPA, High Honors—3.67 GPA, and Highest Honors—3.84 GPA. Students in the honors program must complete a senior honors thesis. Although the production of a film may be part of the preparation of the thesis and the film submitted as a documentation of film work, it will not be a substantial piece of writing on film criticism or film history.

Lower Division Courses

25A. The History of Film. (4) Three hours of lecture and three to four hours of laboratory per week. From the beginnings through the conversion to sound. In addition to the development of the silent film, the course will conclude with an examination of the technology of sound and examples of early sound experiments. (F,SP) Fabe

25B. The History of Film. (4) Three hours of lecture and three to four hours of laboratory per week. Prerequisites: 25A or equivalent. The sound era through 1971. (F) Fabe

28A. The Documentary Film. (3) Three hours of lecture and four hours of laboratory per week. Prerequisites: 25A or equivalent. An analysis of the development of the documentary film, including examples by Flaherty, Grierson, Riefenstahl, Wiseman, Staff.

28B. The Avant-Garde Film. (3) 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 Vigo, Duchamp, Leger, Bunuel, Clair, Dreyer, Brakhage, Kubelka, Snow, Gehr, Frampton, and Rainer. Staff.

50. Introduction to Film for Nonmajors. (4) Three hours of lecture and one and a-half hours of discussion per week. An introduction to film art and film

1*On leave, spring
2*On leave, fall
3Recipient of Distinguished Teaching Award
technique for students who are interested in exploring the visual and narrative aspects of film and video but do not necessarily wish to major in film. The course traces the development of world cinema from the first films of the 1890s to the 1970s, drawing on examples from American, European, Asian, and Third World cinema. Fabe

98. Directed Group Study. (1-4) Course may be repeated for credit up to 12 hours per term. Must be taken on a passed/not passed basis. Prerequisites: Restricted to freshmen and sophomores; consent of instructor. Supervised research by lower division students. (F,SP) Staff

99. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Three hours of lecture and two to four hours of laboratory per week. Must be taken on a passed/not passed basis. Prerequisites: Restricted to freshmen and sophomores; consent of instructor. Independent research by lower division student arranged by faculty. (F,SP) Staff

Upper Division Courses

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

101. Special Topics in Film Genre. (4) Course may be repeated for credit. Three hours of lecture and two to four hours of film laboratory per week. Study of film by "kind." Focus on a particular genre such as the documentary, the western, the animated film, film noir, the musical. Staff

151. Auteur Theory. (4) Course may be repeated for credit. Three hours of lecture and three to four hours of laboratory per week. Prerequisites: 100 or equivalent. The work of a single director.

195. Film Honors Theses. (4) Independent study with film faculty. Prerequisites: Senior standing with a 3.5 GPA on all University work and a 3.5 GPA in film majors. Students in the honors program agree to take H195 for a letter grade to complete a senior honors thesis. Although the production of a film may be part of the preparation of the thesis, the film subordinated to the written document or example, it is expected that the thesis will be substantial piece of writing on film criticism or film history, (F,SP) Kass

197A. Field Study at the Pacific Film Archive. (2) Three hours of fieldwork and one hour of group meetings per week. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor; film majors only. Students will learn about film bibliography and research materials. Interns will get a thorough orientation to the Pacific Film Archive library through introductory lectures and training sessions. Then, for three hours per week, they will help maintain the collection for inclusion in the clippings files. Interns will gain experience in libary organization and film bibliography, as well as a broad knowledge of the kinds of film reviews and criticism found in a variety of sources. (F,SP) Staff

197B. Field Studies for Majors. (3) Course may be repeated for credit. Individual conferences with Faculty Sponsor and at least nine hours per week at field study. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor; film majors only. The courses will vary in their emphasis. Some courses will be based on short field projects that are suitable for work in a wide range of pre- and post-production and video production related activities. The student will develop the field experience and its relationship to academic training with a member of the faculty. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor and faculty sponsor and student will establish individual meeting times and academic requirements for acceptable completion of the course. Consent to at least nine hours of field work per week. (F,SP) Staff

197C. Avant-Garde Film Study. (2) Two hours of fieldwork and one hour of discussion per week. Must be taken on a passed/not passed basis. Prerequisites: Declared film major, 25B (may be taken concurrently). Course may be repeated for credit. Students will learn about various aspects of archival and exhibition work, with a focus on experimental film. Working with PFA's experimental film curator, interns will curate an exhibition from the PFA's avant-garde collection. (F,SP) Staff

The Graduate Program

The requirements for the M.A. in folklore include 20 units of which at least 10 must be graduate level (200 number) in folklore, and an M.A. thesis based upon field work or some other research project. Students may take Anthropology 160, The Forms of Folklore. In addition, all students are required to take the interdisciplinary Folklore 250A-250B, Folklore Theory and Techniques. The student must also demonstrate proficiency in reading at least one foreign language. German is perhaps the most useful language for folklore studies, but French, Spanish, or some language intimately connected with the M.A. thesis may be approved to satisfy the language requirement. Questions on the requirements for the M.A. in folklore should be addressed to the graduate advisor, Folklore Program, in 201 Kroeber Hall.

Graduate Courses

250A-250B. Folklore Theory and Techniques. (4-4) Two hours of seminar per week plus seven hours of outside class. An interdisciplinary consideration of diverse topics related to folk and popular culture. (F,SP) Staff

266. The Folktales and Allied Forms. (4) Two hours of seminar per week. The study of folk narrative, including the structure of folklore, classification, and literary analysis.

286. Readings in Folklore. (3-6) Course may be repeated for credit. Individual conferences to be arranged. (F,SP) Staff

299. Directed Research. (3-6) Course may be repeated for credit. Individual conferences to be arranged. (F,SP) Staff

Forest Products

College of Natural Resources

Department Office: 478 Richmond Field Station, 642-7658; or call 478 Richmond Field Station, 231-6586.

The Major

The major in forest products is designed for students interested in the wise utilization of the many forest products used in our daily lives. It is also designed for students who seek an education embracing the broad field of renewable natural resources. Emphasis is placed on technical properties of the material to maximize benefits from the harvested tree. Courses provide a basic understanding of wood and its uses, the interactions with forest management and the importance of effective utilization in the management and conservation of forests. Students may select elective courses that are relevant to their individual interests and career objectives.

Career areas for men and women with a B.S. degree in Forest Products include supervision of production, planning of processing methods and facilities, and quality assurance; research and development of products and processes; and marketing, sales, and technical services. Students who desire careers in research or teaching may also prepare themselves for graduate study leading to the M.S. or Ph.D. degrees with specialization in such areas as wood chemistry, wood physics, forest products pathology, wood anatomy, and pulp and paper chemistry. During their freshman and sophomore years, students are expected to complete the following: biology, 3 units; chemistry, 11 units; calculus, 6 units; physics, 8 units; statistics, 3 units; English, 8 units; economics, 5 units; and approximately one-half of 18 units of restricted electives in social sciences or humanities. Students in their junior or senior years
must complete specified courses in forest products and forestry, the remainder of the restricted elective requirement, and sufficient elective courses to satisfy total unit requirements.

**The Minor**

Any undergraduate enrolled in a major which is related to or would be enhanced by forest study in forest products may declare a minor in forest products, subject to approval by the undergraduate advisor in forest products. The requirements for the minor are as follows: A minimum of five courses, three of which must be upper division, in forest products. All of the five courses must be taken for letter grade unless the course is offered only on a non-letter-grade basis. At least a C grade must be achieved in all courses taken in satisfaction of the minor. The course of study for the minor must be approved by the undergraduate advisor in forest products.

**Graduate Program**

Graduate work in forest products may be undertaken through the Wood Science and Technology program. For a description of the program, see the Wood Science and Technology section of this catalog.

**Lower Division Courses**

10. Wood As a Renewable Natural Resource. (3) Three hours of lecture per week. Survey the role of wood as a renewable, biodegradable resource in maintaining the needs of society for shelter and consumer products. Comparative review of renewable and non-renewable resource systems, and properties and uses of wood relative to ecological and environmental considerations. (SP).

**Upper Division Courses**

135. Biological Deterioration of Wood. (2) Two hours of lecture per week. Prerequisites: Consent of instructor. Formerly IDS 136. Study of the deterioration of wood in use by fungi, bacteria, and insects, and its control or prevention. (SP) Wilcox.

141. Mechanical Processing of Wood. (2) Two hours of lecture per week. Formerly WST 132. The theory of converting logs into sawn, peeled, or other machine-produced products. (SP) Staff.

142. Bonding Processes for Wood. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: Consent of instructor. Formerly WST 133. 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. (SP) Beall.

143. Chemical Processing of Wood. (2) Two hours of lecture and three hours of laboratory per week. Prerequisites: 134 or consent of instructor. Formerly WST 135. 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) Zavaretz.

150. Performance of Wood in Structures. (3) Three hours of lecture per week. A survey of wood properties and wood products of importance to building design and construction. Case studies dealing with proper use of wood and common building failures. (Currently offered as Architecture 159, Section 2, Fall semester). (SP).

156. Directed Group Study. (1-3) Course may be repeated for credit. Meetings to be arranged. Must be taken on a pass/credit/pass basis. Prerequisites: Consent of instructor. Formerly WST 156. Group study of special problems in forest products. (SP) Staff.

**Graduate Courses**

231. Wood Formation and Structure. (3) Three hours of lecture per week. Prerequisites: 151 or equivalent, or consent of instructor. Biomechanics 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 of uniaxial and bi-axial elongation. Formation of microfibres in cell wall. (F) Dodd.

232. Advanced Wood Physics. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: 135 or equivalent. Formerly Foresty 232. Absorption of water, nonaqueous liquids, adsorption of vapors and gases by wood. Shrinkage and swelling in water, aqueous solutions, and nonaqueous liquids. Fluid flow including permeability and diffusion. Thermal properties with modes of heat transfer important in wood processing and usage. (F) Quarter.

233. Advanced Wood Mechanics. (3) Three hours of lecture per week. Prerequisites: 133. Formerly Foresty 233. Deformation and fracture of wood, mechanics of the cell wall and current topics from the literature. (SP) Schleinwind.

234. Chemistry of Polysaccharides, Lignins, and Extractives. (3) Three hours of lecture per week. Prerequisite: 134 (may be taken concurrently) or equivalent. Formerly Foresty 234. Aspects of nomenclature, structure, biosynthesis, reactions, and distribution of terpenoids, fats, flavonoids, tannins, lignins, polysaccharides and polysaccharides, and related materials occurring in plant material, with emphasis on woody plant structures. Qualified undergraduates may take this course. (SP) Zavaretz.

238A. Wood Anatomy. (1-3) Advanced study in wood anatomy primarily for advanced graduate students. (F) Dodd.

238B. Wood Chemistry. (1-3) Advanced study in wood chemistry primarily for advanced graduate students. (F) Zavaretz.

238C. Chemical Processing of Wood. (1-3) Advanced study in chemical wood processing primarily for advanced graduate students. (SP) Staff.

238D. Wood Mechanics. (1-3) Advanced study in wood mechanics primarily for advanced graduate students. (F) Schleinwind.

238E. Wood Physics. (1-3) Advanced study in wood physics primarily for advanced graduate students. (F) Beall.

238F. Physical/Mechanical Processing of Wood. (1-3) Advanced study in physical/mechanical processing of wood primarily for advanced graduate students. (F) Beall.

238G. Wood Products Pathology. (1-3) Advanced study in wood product pathology primarily for advanced graduate students. (F) Wilcox.

238H. Wood Adhesion and Adhesives. (1-3) Advanced study in wood adhesion and adhesives primarily for advanced graduate students. (F) Beall.

238I. Production Management. (1-3) Advanced study in forest production management primarily for advanced graduate students. (F) Staff.

238J. Wood Formation and Quality. (1-3) Advanced study in wood formation and quality primarily for advanced graduate students. (F) Dodd.

238K. Seminar in Wood Science and Technology. (1) Course may be repeated for credit. Two hours of lecture and two hours of seminar. Course is taken on a satisfactory/unsatisfactory basis. Current staff and student research and reports in wood science and technology. (F) Beall.

**Forestry and Resource Management**

(College of Natural Resources)

**Department Office:** 145 Mulford Hall, 642-3785
**Chair:** John A. Helms, Ph.D.

**Professors:**

Reginald H. Barrett, Ph.D. University of California at Berkeley. Wildlife biology and management.

James W. Bertolome, Ph.D. University of California at Berkeley. Range ecology and management.

Frank D. Beall, Ph.D. University of Wisconsin, Madison. Ecology. Forests, forested watersheds, and forest ecosystems.

Don C. Emerman, Ph.D. Utah State University. Fisheries and aquatic ecology.

Sally K. Fairfax, Ph.D. Duke University. Environmental policy, land administration.

Louise P. Forman, Ph.D. Cornell University. Forest and wildlife ecology.

Willard A. Gardner, Ph.D. Iowa State University. Soil physics, soil biophysics.


William J. Libby, Ph.D. University of California at Berkeley. Forest genetics.

Robert E. Martin, Ph.D. University of Michigan. Wildland fire forecasting and management.


Dale R. McCullough, Ph.D. University of California at Berkeley. Wildlife biology and management.

William R. McComb, Ph.D. University of California at Berkeley. Forest economics.

Jeffrey M. Romm, Ph.D. Cornell University. Forest and wildlife policy.

Lee C. Wessen, Ph.D. University of Minnesota. Sampling theory, mensuration.

W. Wayne Wilcox, Ph.D. University of Wisconsin, Madison. Biodiversity.

Harsold P. Emerman (Emeritus), Ph.D. University of Nebraska. Fire ecology.

David L. Birik (Emeritus), Ph.D. University of Minnesota. Chemical properties of wood and wood products.

Robert A. Cockrell (Emeritus), Ph.D. University of Michigan. Wood science.

Robert N. Colwell (Emeritus), Ph.D. University of California at Berkeley. Remote sensing.

Harold P. Haedy (Emeritus), Ph.D. University of Nebraska. Range ecology and management.

Arno P. Schleinst (Emeritus), Ph.D. University of Michigan. Mechanical behavior of wood.

Arnold M. Schultz (Emeritus), Ph.D. University of Nebraska. Ecology.

Edward C. Stone (Emeritus), Ph.D. University of California at Berkeley. Silviculture, forest nursery management.

Denise E. Toegard (Emeritus), Ph.D. University of California at Berkeley. Forest economics.

Henry J. Viau (Emeritus), Ph.D. University of California at Berkeley. Forest economics and policy.

William E. Waters (Emeritus), Ph.D. Yale University. Forest ecology.

Eugene Zavaretz (Emeritus), Ph.D. University of California at Berkeley. Wood extractive chemistry.

Paul J. Zink (Emeritus), Ph.D. University of California at Berkeley. Soils and forest influences.

John A. Zinckus (Emeritus), Ph.D. University of Minnesota. Forest economics and policy.

**Associate Professors:**

Barbara H. Allen-Diaz, Ph.D. University of California at Berkeley. Range ecology and management.

Gregory S. Bing, Ph.D. University of Wisconsin, Madison. Forest biometrics and remote sensing.

Richard S. Dodd, Ph.D. University of Wales. Wood formation.

James J. Glass, Ph.D. University of Michigan. Forest economics.

Michael L. Horton, Ph.D. Oregon State University, Wildlife and Fisheries.

**Assistant Professor:**

Lynn Hultinger, Ph.D. University of California at Berkeley. Range and animal ecology.

**Adjunct Professor:**

Carroll W. Williams, Jr., Ph.D. University of Michigan. Forest pest management.

**Lecturers:**

Donald P. Gasser, M.S. University of California at Berkeley. Forest harvesting systems.

**Undergraduate Major Advisers:**

Mr. McBride, chair; Mr. Davis, Mr. Gasser, Ms. Hunsinger.

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

Note: The College of Natural Resources is presently reorganizing its course offerings. Please consult the description of the college in the Colleges and Schools section in the front of this catalog for a brief description of programs proposed for the college in the future. For current information about program requirements and course offerings, please consult the department of forestry or the Dean's Office, Office of Student Affairs, 106 Gillman Hall, 642-0642.

Major in Resource Management

The major in resource management provides the academic preparation and skill development appropriate to students desiring a future in the field of renewable natural resource management. It also serves as undergraduate preparation for graduate study in fields such as resource management, range management, forestry, recreation management, or conservation biology. In addition, it provides an excellent background for graduate study in professional fields such as law or business administration.

This major is distinguished from the forestry major by its broad focus on the management of renewable natural resources and by the flexibility of its curriculum.

Preparatory Program. The preparatory program requires two years (60 semester units) of college work designed to provide a solid foundation in natural and social sciences and an adequate complement of preparation in a foreign language.

Summer Field Program. An eight-week program of study for 10 units of credit is intended to introduce the student to wildland resources management. Ecology, identification and measurement of resources, and the land and water dynamics of the forest in resource management are the focus of the summer field program.

Upper Division Course Work. The final two years in the program include 18 units of core requirements for all options in resource management plus 21-24 units of course work that are directed to the student's primary area of interest. There are 28-31 units of electives that may be taken in any subjects that the student desires. For example, the elective may be taken in a particular technical area of knowledge in the option field or to broaden one's background by using the wide array of courses available at Berkeley.

Major in Forestry

The major in forestry is the top-rated program in the country. It is designed to prepare students to manage forests and wildlands 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, the U.S. Fish and Wildlife Service, the U.S. Bureau of Land Management, the U.S. National Park Service, various state and local forestry, wildlife, and park departments, international development and conservation agencies, private timber companies, consulting firms, and environmental organizations.

Program Flexibility. One third of the upper division course work for the major consists of core courses. The other two thirds of the upper division course work is made up of free electives. In consultation with a faculty advisor, students use these free electives to develop individual interests and to broaden their education.

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 agronomy, biometrics, ecology, economics, fisheries, forestry, genetics, management, photogrammetry and remote sensing, range, planning and policy, silviculture, sociology, soils, watershed management. Graduates in these programs can also be expected 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. This 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 professional forestry principles to specific management problems. After the completion of a Bachelor of Science degree in forestry, completion of the Master of Forestry degree is required. This degree program requires 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 program in Range Management and Wood Science and Technology, which offers 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 one of the largest collections of books and periodicals on forestry and natural resources in the world. The college's computing laboratories specializing in information processing and photogrammetry, tree physiology, and ecology, wildlife and aquatic biology, and an extensive herbarium and wildlife specimen collection. Departmental computing facilities include a mainframe computer 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 Gilt Tract. Field facilities include the 3000 acre Blodgett Forest near Georgetown, Whittaker's Forest adjacent to Sequoia National Park, and Hogcamp Creek for study of wildlife management. The department also maintains strong ties with the Forest Products Laboratory located at the Richmond Field Station, and the Wildland Resources Center. The location of the Berkeley campus also provides easy access to the presidio public and private resource management and conservation agencies, including the U.S. Forest Service, the U.S. Fish and Wildlife Service, the U.S. National Park Service, the California Department of Forestry and Fire Protection, and the California Department of Fish and Game.

Further Information. For further information on the department's programs, contact the department's Student Services Office in 133 Mulford Hall, 642-6410.

Lower Division Courses


Two hours of lecture and one hour of laboratory per week. Ecological, social and economic principles applied in the management of wildland resources; forests, range, water, fish and game. (F) Williams

18. Introduction to Culture and Natural Resource Management. (4) Three hours of lecture and one hour of laboratory per week. Cultural perspectives and physical processes affecting the way we use and manage fire, wildland and urban forests, rangelands, parks and preserves, and croplands in America. The basic concepts and tools for understanding the role of culture and the growth of professional management are introduced and used to examine the experience of American cultural groups in the development and management of western natural resources. This course satisfies the American cultures requirement. (F) Huntinger

51. Forestry Computer Programming and Applications.

One hour of lecture and three hours of laboratory per week. Prerequisites: High school algebra. Introduction to computer operating systems, program- ming, and applications software in natural re-
90. Senior Faculty Seminar, (1) Zero hours of sem-
inar every other week. Must be taken on a passed/not
passed basis. Prerequisites: Forestry major or con-
sent of instructor. Instruction in forest management. Readings, meet-
ings, and discussion with senior and emeriti members of the faculty. (F,SP)

Upper Division Courses

Note: Courses 100A-100E comprise the Field Study of Forestry and Wildland Resources.

100A. Wildland Resource Ecology. (4) Forty-five hours of lecture and field exercises per week for three weeks (Satundays included). Prerequisites: Eight units of biological science or consent of instructor. Ecology of the wildland vegetation, mountain chaparral, and riparian zones of the Northern Sierra Nevada. Major emphasis on ecology as a basis for resource management and the maintenance of biological diversity. Field identification of flora, fauna, and soils is emphasized. Extracourse.

100B. Silviculture. (1) Forty hours of lecture and field exercises per week for one week. Prerequisites: 100A. Evaluation of systems for managing forest stands including regeneration, controlling stand density, forest growth, and forest improvement, and prescribed burning. Extracourse.

100C. Forest Measurements, Aerial Photography and Surveying. (2) Zero hours of lecture for three weeks. Prerequisites: 100B. Procedures for measuring forest production and land surveying, aerial photography, timber inventories and measurement of trees and forest growth. Extracourse.

100D. Timber Resource Utilization. (1) Forty hours of lecture and field exercises per week for one week. Prerequisites: 100C. Harvesting and access systems, wood biology, timber products, and forest products. Visits to industrial operations to evaluate land management practices and utilization operations. Extracourse.

100E. Forest Resource Management. (2) Fifty hours of lecture and field exercises for one week (including Saturday and two evening sessions). Prerequisites: 100D. An introduction to integrative planning. The interactions of water, wood, wildlife, range, fisheries, and recreation resources are examined by student teams to develop an environmental assessment report and management recommendations for selected study areas. On-site analysis, presentation, and review of reports and plans is conducted.

101. Forest and Wildland Resource Inventory. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: 101, 102, and 103. Statistical and practical concepts presented to introduce concepts of forest and wildland resource inventory systems. Statistical designs include random, stratified, double and stage sampling as well as basic methods of regression estimation. Applications include timber sale; compartment, forest, and rangeland stock estimates, as well as estimate of change or growth. (SP) Wenses

102. Forest Photogrammetry and Photo Interpre-
tation. (2) Two hours of lecture and three hours of laboratory per week. Prerequisites: Algebra. Practical and conceptual presentation of techniques for using remote sensing, specifically aerial photography, for natural resource management. Includes photo measures of scale, parallel axis, and object height; flight planning; photo geometry; an introduction to the electromagnetic spectrum; and photo interpretation and mapping. Course concludes with an introduction to digital remote sensing data. (SP) Congalton

103. Forest Harvest Systems. (3) Two hours of lec-
ture and three hours of laboratory per week. Prerequisites: Upper Division standing in Forestry or consent of instructor. Fundamentals and techniques of forest systems. Access system development for forest management. The appropriate application of technological means for forest thinning and extraction are explored in light of biological, political, economic and personnel aspects of forest operations. (F) Gasser

104. Forest Measurement. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: 100B and 101, or consent of instructor. Measurement and estimation of growth and yield of forest stands using basic techniques from statistics and mathematics. (F) Biggs, Gillies

105. Wildland Fire Science and Management. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: Consent of instructor. History and effects of fire in forests and on rangelands; fundamentals of fuels, combustion, and fire behavior; organization of fire management; fire use, computer laboratory, and field exercises. (SP) Martin

106. Forest Insects and Diseases. (3) Three hours of lecture and three hours of laboratory per week. Prerequisites: Consent of instructor. Identification and management of pests that influence the forest ecosystem. Integration of entomological and pathological principles and examination of human intervention in pest epidemics. Enrollment may be limited. Offered odd-numbered years. (SP) Staff

107. Forest and Wildland Resource Economics. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: Four units of economic principles. Market and non-market resource values. Benefit-cost analysis of products. Allocation of resources between public and private interests. Impacts of governmental resource ownership and regulation. (F) Gillies, McKillop

111. Advanced Forest Economics. (3) Three hours of lecture per week. Prerequisites: 110 or consent of instructor. Introduction to forest resource economics, analysis of forest product markets. Assessment of investment opportunities in forestry. Forest taxation and asset valuation. (F) Gillies, McKillop

115. Forest and Wildland Resource Policy. (3) Three hours of lecture and one hour of laboratory per week. Prerequisites: Senior standing. Evolution of forest and wildland resource policies in the U.S.; processes and groups involved in formulating wildland resource policies and programs; administration of policies; current issues in wildland resource conservation. (SP) Romm

116. Forest Recreation Use and Management. (3) Two hours of lecture and four hours of laboratory per week. Prerequisites: Junior or senior standing. Management of forest and wildland areas for recreation. Emphasis on the ecological effects of recreation on natural systems. Offered even-numbered years. (SP) Staff

117. Sociology of Natural Resources. (3) Three hours of lecture and one hour of discussion per week. Sociology of people and relationships between societies and wildland resource management: social definition of natural resources; identification of publics; social organization of resource use; public involvement and participation. (SP) Fortmann

118. Resource Management and Cultural Diversity. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Upper Division standing. The course will propose answers to the question "does culture change?" by exploring different cultural traditions in three areas: the concept of the frontier; the definition of basic resources—land, wildlife, water; and basic resource management options and use. Historical and cultural traditions, conflicts, and current management conflicts will be used to explore persistent patterns of resource allocation and their impact on different cultural groups. Emphasis is placed on the American cultural requirement. (SP) Fairfax

119. Soil Hydrology. (3) Three hours of lecture and two hours of laboratory per week. Prerequisites: Soil Science 140. An introduction to fundamental hydrologic processes and modeling concepts. The emphasis is on forested and rangeland catchments with application to wildland systems. Requirement for Soil Science 150. (F) League

120. Forest and Range Soils. (2) Two hours of lec-
ture and one hour of laboratory per week. Prerequisites: Geology and general chemistry. The properties of soil in relation to the influence of forest and wildland vegetation are 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) Two hours of lecture and three hours of laboratory per week. Study of trees and associated woody species including their taxonomy and distribution, modes of growth, and decay of forest trees and wood. The modes of growth and stem structure will be considered in relation to habitat and life cycles, and to substitutability for timber value. Two required field trips (one over night). (F) Dodd

122. Forest Influences. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: Introduction to forest resource economics, ecology. The influence of the forest and wildland vegetation on energy disposal and microclimate; on hydrology, the local microclimate, and the local hydrologic balance. Involving water yield and water quality. Principles applicable to watershed and environmental management through forestry. Offered even-numbered years. (F) Zinke

123. Forest Ecology. (4) Three hours of lecture and one 4-hour field laboratory exercise per week plus weekend field trip. Prerequisites: 100A, eight units of biological science, and eight units of chemistry. The successional patterns that are the result of the dynamic interaction of system variables over the long term. Emphasis on the understanding of forest ecology as a basis for management of forest ecosystems. Field laboratory exercises to illustrate ecological principles and develop techniques for the assessment of forest ecosystems; (SP) Staff

124. Wildland Systems Ecology. (3) Two hours of lecture and three hours of 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) Staff

125. Principles and Practices of Silviculture. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: Ecological principles of ecosystem, ecology. Three Saturday field trips will be scheduled in lieu of several labs. Principles and concepts of the biological aspects of establishment, growth, composition, and quality of forest trees and stands. The manipulation of forests and control of stand structure to enhance forest productivity. (F) Helms

127. Forest Genetics and Tree Improvement. (3) Two hours of lecture and one hour of discussion per week, plus field trips. Prerequisites: 125; Biology 1 or equivalent. Focuses on the application of science 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 future forest management and development. Classical tree improvement is reviewed and critically evaluated. Clonal forestry is presented as an option to classical tree improvement. (F) Libby

130. Introduction to Wood as a Material. (4) Three hours of lecture and three hours of laboratory per week. Interdisciplinary introduction to wood as a material: its growth and formation, anatomy and ultrastructure, chemical composition and physical and mechanical properties. (F) Staff

141. Principles of Range Management. (4) Two hours of lecture and four hours of laboratory per week. Prerequisites: Forest and Wildland Resource Management. A 90-unit introduction to Range Science 140. An introduction to fundamental hydrologic processes and modeling concepts. The emphasis is on forested and rangeland catchments with application to wildland systems. Requirement for Soil Science 150. (F) League

Recipient of Distinguished Teaching Award

Recalled to active service
cation 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, 3D 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 hours of lecture and three hours of laboratory per week. Systematic relationships and identification of range grasses, forbs and shrubs, with emphasis on distribution, forage values and responses to use. (SP) Bartolome

143. Wildland Animal Nutrition. (3) Two hours of lecture and two hours of laboratory per week. Prerequisites: Consent of instructor. Nutrition of wild and domestic herbivores on range and forest lands. Nutritional considerations in management and restoration of wildlife habitat and livestock grazing lands. Includes carbohydrate, protein, lipid, mineral and vitamin nutrition. Examination of reproduction, growth, and survivorship as related to environment and nutritional factors. (F) Hunsberger

144. Range Ecology. (3) Three hours of lecture per week. Prerequisites: One course in ecology. The ecological basis for range management activities, considered in the context of western range ecosystem types. The role of range resources is related to range management practices discussed in the context of ecosystem processes. (SP) Bartolome

150. Agroforestry Systems. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: Upper Division Standing. Agroforestry principles and systems used worldwide are examined, with emphasis on the integration of agricultural systems and management of woody plants. (F) Witlox

170. Wildlife Ecology. (3) Two hours of lecture and one hour of discussion 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 hour of lecture and three hours of laboratory per week. Prerequisites: 101 or 102 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) Four hours of seminar 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 hours of lecture and three hours of laboratory per week. Prerequisites: Five semester units of Biology; upper division standing. Description of the biota and their interactions in lakes, streams, and estuaries. Emphasis on studying for weekly discussion on topics of entomophagy, thermal pollution, reservoirs, introduced species, spawning of salmonids. Laboratory is an independent research project. (SP) Erman

198. Directed Group Study. (1-3) Course may be repeated for credit. Meetings to be arranged. Must be taken on a pass/failed basis. Prerequisites: Consent of instructor. Independent study of special problems relating forestry and resource management. (F,SP)

199. Supervised Independent Study and Research for Undergraduates. (1-4) Hours to be arranged. Must be taken on a pass/failed basis. Prerequisites: Consent of instructor. See regulations regarding restrictions. (F,SP)

Graduate Courses

201. Advanced Forest Sampling. (3) Three hours of lecture/seminar per week. Prerequisites: 101, 104, or equivalent, or consent of instructor. Application of advanced sampling techniques, including measurement of forest and wildland resources, estimators, sampling designs, remote sensing, and multiple parameter surveys. (SP) Wensel

203. Remote Sensing of Forest and Other Natural Resources. (3) Three hours of lecture per week. Advanced photographic systems including color and color infrared photography, film and image sensors, and multiple parameter survey systems. Nonphotographic systems including multi-spectral scanner, thermal, and RADAR. The use of image processing, geographic information systems, and accuracy assessment. Topics to be discussed in one 3-hour lecture including laboratories to be arranged. (SP) Congallon

204. Advanced Forest Mensuration. (2) Two hours of lecture per week. Prerequisites: 101, 104; Statistics 20; Statistics 161 is recommended. An overview of research concerned with modeling of forest stands and trees. Statistical and mathematical forest modeling techniques. (F) Biging

205. Seminar on Fire as an Ecological Factor. (2) Course may be repeated for credit. Two hours of lecture/seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Focus on the fire ecology of forest and rangeland. (SP) Martin

209. Research Concepts and Methods. (3) Three hours of lecture/seminar per week. Prerequisites: Basic courses in statistics. Conceptual and methodological bases of research design, data analysis, and interpretation. Independent studies and individual projects critiqued. (SP) Wensel

210. Seminar In Advanced Forest Economics. (2) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate level economic theory and econometrics. Advanced treatment of a range of topics, including assessment of non-market values, analysis of forest products demand and supply, models of inter-regional trade, national and regional impacts, and other applications to the management of forest resources, and role of forestry in economic development. (F,SP)

211. Seminar In Analysis of the Forest Economy. (2) Two hours of lecture/seminar per week. Prerequisites: Eight semester units of economic theory, resource economics, or forest economics. Analysis of national and regional forest economics, indirect economic impacts of forest policy change, timber output goals. Applied econometrics and input-output analysis. (SP) Gillies, McKibbop

212. Seminar In Forest Economics. (2) Course may be repeated for credit. Two hours of lecture/seminar per week. Prerequisites: Eight semester units of economic theory, resource economics, or forest economics. Theory and practice of benefit-cost analysis in forestry with special reference to evaluation of investment projects, resource development programs, and land-use planning. (SP) Taguaured

213. Advanced Forest Management. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: 113. Application of mathematical programming and other analysis techniques to timber harvesting. Comparative evaluation of even-aged systems. Contemporary forest management issues. (SP) Davis

214. Case Studies In Forest Management. (1-4) Course may be repeated for credit. Minimum of 4 hours per week per unit. Hours to be arranged. Prerequisites: 101, 102, 104, or equivalent. Individual case studies involving the inventory, analysis, and management of forest resources. Intended primarily for Master of Forestry students. (F,SP)

215. Seminar In Forest and Wildland Resource Policy Analysis. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. Individual projects and group discussions concerning the economic, social, and political 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 forest resources. (SP) Fortmann

219. Advanced Topics In Hillslope Hydrology. (3) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: 150, Geography 117, or permission of instructor. Seminar will focus on runoff generation mechanisms and hillslope development processes. Topics will vary and include unsaturated and preferential flow, erosion and solute transport. Current papers from the literature are reviewed. Also listed as IDS 251 and Soil Science 251. (SP) Logue, Dietz

221. Genetics of Forest Trees. (2) Course may be repeated for credit. Two hours of lecture per week. Prerequisites: Genetics 110 or equivalent. Course alternates 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 Wildland Resource Management. (3) Two hours of lecture per week. Prerequisites: Any upper-division course in hydrology, climatology, soil-plant nutrition or physics, or forest influences or consent of instructor. Advanced treatment of topics concerning the role of forests and their management on energy balances, microclimate, hydrology, and elemental cycling. (F) Zinke

223. Seminar In Forest Ecology. (2) Course may be repeated for credit. Three hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Seminar on selected topics in the ecology of forests. (SP) McBride

224. Natural Resource Ecosystems. (2) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: One ecology course or consent of instructor. Application of systems principles to the management of ecosystems; method biology for integrating physical and biological aspects of ecosystem studies. (SP) Staff

225. Advanced Silviculture. (2) Three hours of lecture per week. Prerequisites: 125 or equivalent. Analysis and evaluation of current literature and experimentation, focus on combined discussion. Field trips may be included depending upon the topic. (SP) Helms

241. Range Assessment. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: 141 and Statistics 20 or equivalent required. Range vegetation sampling techniques with emphasis on
The Major

Courses 1, 2, 3, 4, and 36 or their equivalents; 10 upper division courses in French. Twelve upper division units must be taken in residence.

There are two options in the major, which share a common base in language study and the acquisition of competence in spoken and written French. Option A offers a strong core in culture and civilization and is especially suited as preparation for further literary study for those interested in college-level teaching careers. Option B focuses on literature in the broader context of French civilization in its historical, social, 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, H155A, H195B, 197, and 199 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, H155A, H195B, 197, and 199 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 may 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 of their choice in French literature or civilization. The results of this research constitute an honors essay, written under the supervision of a member of the regular faculty. Credit and grade are awarded upon completion of the sequence. The honors program is understood 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

Students in the College of Letters and Science may complete one or more minors of their choice, normally in a field both academically and administratively distinct from their major.

Required for minor in French: five upper division courses. 1. French 102; French 103A or 103B. 2. Three courses from French 112 to 189 (excluding French 140, 145, 146). All courses taken in the minor must be taken for a letter grade. Comprehensive examinations are not given in French.

Graduate Study

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 define three areas of study within French literature. Each of these areas, while related to the others, obliges students to view the discipline from a different perspective. The areas of study for the literature track are: (1) the work of a single major author; (2) a historical period in French literature; or (3) the development of a form, genre, or literary problematic. Students outline a proposed program of study in these three areas by submitting a Ph.D. program proposal during the first year of study at the University.

In the linguistics track, students are asked to choose particular areas of primary interest within the broad fields of (1) the structure of modern French; (2) the history of the French language; (3) the application of linguistic theory to the analysis of literary texts, all of this above to be based on a solid understanding of (4) theory and methodology of general linguistics. Students also choose an adjacent field of their choice germane to these studies.
**Lower Division Courses**

1. **Elementary French.** (5) Five hours of lecture and 0.66 hour of laboratory per week. Elementary French. Beginning. (F,SP)

2. **French for Graduate Students, Beginning.** Three hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Preparation for graduate reading examinations in the field of English and in all other disciplines. (F,SP)

3. **Intermediate French.** (5) Five hours of lecture per week. Prerequisites: 1 or equivalent. Intermediate French. Beginning of second-year work. (F,SP)

4. **Advanced Intermediate French.** (5) Five hours of lecture per week. Prerequisites: 3 or equivalent. Advanced Intermediate French. Continuation of second-year. (F,SP)

5. **Intermediate Conversation.** (2) Three hours of lecture per week. Prerequisites: 2 or consent of Director of Lower Division. Intermediate French conversation. May not be repeated for credit. (F,SP)

6. **Advanced Conversation.** (2) Three hours of lecture per week. Prerequisites: 3 or 13 or equivalent. Advanced conversation in French courses may be repeated once for credit. (F,SP)

7. **Berkeley Seminar.** (1) Course may be repeated for credit as topic varies. One hour of seminar per week. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP)

8. **Practical Phonetics.** (3) Two hours of lecture and one hour of laboratory per week. Prerequisites: French 3 or equivalent. Phonetics as an aid to pronunciation. (F,SP)

9. **Freshman/Sophomore Seminar.** (2-4) Course may be repeated for credit as topic varies. Seminar format. Prerequisites: Priority given to freshmen and sophomores. Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. (F,SP) Staff

10. **Practica in French Language.** (1) Half hour of laboratory per week. Prerequisites: French 102 or equivalent. (F,SP)

11. **Topics in French Literature.** (1) Half hour of laboratory per week. Prerequisites: 102 or equivalent. The course will focus on literary criticism and the relationship between criticism and fiction or philosophy in a given writer's work. (3,SP)

12. **Prose Fiction.** (3) Three hours of lecture per week. Prerequisites: 102 and 103A or 103B or equivalent. Studies in French prose fiction, 17th-19th centuries. (3,SP)

13. **Modern Theatre.** (3) Three hours of lecture per week. Prerequisites: 102 and 103A or 103B or equivalent. Studies in 20th-century theatre. (3,SP)

14. **History of the French Language.** (3) Three hours of lecture per week. Prerequisites: 102 and 103A or 103B or equivalent. Advanced language, intended to enlarge vocabulary and increase ability with French through extended readings in various fields. Exams and term papers. (3,SP)

15. **Translation and Debate.** (3) Three hours of lecture per week. Prerequisites: 102 and 103A or 103B or equivalent. Formerly 131A-131B. In-depth knowledge of French and accuracy in its use are the goals of this course. A textbook and systematic exercises will be used to assist in the demanding task of translating, mainly from English to French. Sorgen

16. **18th Century and French Literature.** (3) Three hours of lecture per week. Prerequisites: 102 and 103A or 103B, or equivalent. A historical survey of the 18th century with emphasis on the origins of the philosophical movement and the development of modern art forms in the theatre and the novel. (3,SP)

17. **Beginner's course.** (F,SP)

18. **Advanced Conversation.** (2) Three hours of lecture per week. Prerequisites: 2 or consent of Director of Lower Division. Advanced conversation in French courses may be repeated once for credit. (F,SP)

19. **Practical Phonetics.** (3) Two hours of lecture and one hour of laboratory per week. Prerequisites: French 3 or equivalent. Phonetics as an aid to pronunciation. (F,SP)
133. Theory of Utterance (theorie de l'encollement). (3) Three hours of lecture per week. Prerequisites: 102 and 103A or 103B. Introduction to the French vocabulary and syntax specific to economics, politics and business. Oral and written comprehension, written compositions (including correspondence) in oral expression. Conducted entirely in French. Sorgen.

135. French Dialectology. (3) Three hours of lecture per week. Prerequisites: 102 and 103A or 103B or equivalent. The varieties of French spoken in France as well as in French-speaking areas outside of Europe.

137. French for Economics, Politics and Business. (3) Three hours of lecture per week. Prerequisites: 102 and 103A or 103B or equivalent. The evolution of pronunciation and grammar. Fleischman.

137A. French Dialectology. (3) Three hours of lecture per week. Prerequisites: Ducrot's "theory of utterance" and apply it to French. An examination of certain large cultural concepts from a double point of view, to show how their meaning yields a commentary on the act that produced them (encollement). This theory of utterance is developed out of but goes beyond speech-and-thing theory, proposing an interpretation of speaking as "polyphoie", as a kind of theatrical representation.

140. Readings in French Literature. (3) Three hours of lecture per week. Prerequisites: Reading knowledge of French. Readings in French. Class discussions and exercises in English. Does not count for the French major. B. The Nineteenth Century.


150A-150B. Women in French Literature. (3-3) Three hours of lecture per week. Prerequisites: 102 and 103A or 103B, or equivalent. A study of French women as portrayed in French literature and of the contributions of women to French literature and thought.

151. Francophone Literature. (3) Course may be repeated once for credit with different topic. Three hours of lecture per week. Prerequisites: 102 and 103A or 103B or equivalent. A study of French women as portrayed in French literature and of the contributions of women to French literature and thought.

170. French Films. (3) Four hours of lecture and two hours of studio per week. Prerequisites: 102 and 103A or 103B, or equivalent. Beginning French cinema studies: The language of film. Dutot.

171A-171B. A Concept In French Cultural History. (3-3) Three hours of lecture per week. Prerequisites: 102 and 103A or 103B, or equivalent. An examination of certain large cultural concepts from a double point of view, to show how their meaning yields a commentary on the act that produced them (encollement). This theory of utterance is developed out of but goes beyond speech-and-thing theory, proposing an interpretation of speaking as "polyphoie", as a kind of theatrical representation.

172A-172B. Psychoanalytic Theory and Literature. (3-3) Three hours of lecture per week. Prerequisites: 102 and 103A or 103B, or equivalent. The relevance of psychoanalysis to literary texts. Concepts of fantasy, the self, history. Explored through texts by Racine, Balzac, Lautmart, Rimbaud and Proust.

173. Linguistics and Literature. (3) Three hours of lecture per week. Prerequisites: 102 and 103A or 103B, or equivalent. The impact of linguistics on the theory of literature and the practice of literary criticism. Problems of language, including the study of language and the language of literature. Topics vary from year to year. Staff.

174. Music and Literature. (3) Three hours of lecture per week. Prerequisites: 102 and 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. Smock.

175A-175B. Literature and the Visual Arts. (3-3) Three hours of lecture per week. Prerequisites: 102 and 103A or 103B, or equivalent. The interrelation of literary works from the arts and the human sciences, this course will investigate the relations between images and written texts.

176A-176B. Introduction to French Linguistics. (3-3) Three hours of lecture per week. Prerequisites: 102 and 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. Smock.

177A-177B. History and Criticism of Film. (3-3) Four hours of lecture and two hours of studio per week. Prerequisites: 102 and 103A or 103B, or equivalents; 170 or equivalent. The development of French cinema. Discussions, oral and written reports will be based on three major works from the work of major French film directors. Dutot.

178A-178B. Studies in French Film. (3-3) Three hours of lecture and one hour of laboratory per week. Prerequisites: 102 and 103A or 103B, or equivalents; 170 or equivalent. Topics vary from year to year.

179A-179B. French Civilization. (3-3;3) Three hours of lecture per week. Prerequisites: 102 and 103A or 103B, or equivalent. Survey of French civilization: History, Arts and Society, through the interpretation of literary texts. One course from 180A-180B-180C-180D is required for completion of the Option B major. F. Social and economic structures and theories of rhetoric in the French language. Fleischman.

180A-180D. French Culture and Civilization. (3-3;3) Three hours of lecture per week. Prerequisites: 102 and 103A or 103B, or equivalent. Survey of French civilization: History, Arts and Society, through the interpretation of literary texts. One course from 180A-180B-180C-180D is required for completion of the Option B major. F. Social and economic structures and theories of rhetoric in the French language. Fleischman.

181A-181B. A Year In French History. (3-3) One course from 161A-1B may be repeated once for credit with different topic and with consent of the under-graduate adviser. Three hours of lecture per week. Prerequisites: 102 and 103A or 103B, or equivalent. The study of a year in French history from many points of view: political, sociological, intellectual, and artistic, as well as literary.

182A-182B. Perspectives on History. (3-3) Three hours of lecture per week. Prerequisites: 102 and 103A or 103B, or equivalent. This course will study both contemporary and subsequent reaction to historical events or figures. Topics vary from year to year.

183A-183B. Configurations of Crisis. (3-3) Course may be repeated once for credit with different topic and consent of undergraduate adviser. Three hours of lecture per week. Prerequisites: 102 and 103A or 103B. A study of the pressures on art, political, and economic structures at moments of crisis in French history. Problems of continuity and discontinuity in aesthetic and social history.

184A-184B. French Literature in its Cultural Context. (3-3) Three hours of discussion per week. Prerequisites: 102 and 103A or 103B, or equivalent. (Formerly 127) A survey of French literature from the Middle Ages to the end of the Eighteenth century, in which we will study the greatest masterpieces of French literature prior to the Revolution.
220A-220B. Studies In 16th Century Literature. (4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Offerings vary from year to year. See the Department’s Course Description for current topics. Johnson

220A-220B. Studies In 17th Century Literature. (4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Offerings vary from year to year. See the Department’s Course Description for current topics. Lichtenstein

231. Baroque Literature. (4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Seminar study of baroque poetry, drama and novel, treating one genre each year.

240A-240B. Studies In 18th Century Literature. (4) Course may be repeated for credit as topic varies. Three hours of seminar per week: Offerings vary from year to year. See the Department’s Course Description for current topic.

243. The 18th Century Novel. (4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Seminar study of the novel in its various manifestations and trends in the literature and culture of France.

250A-250B. Studies In 19th Century Literature. (4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Offerings vary from year to year. See the Department’s Course Description for current topic.

251. Francophone Literature. (4) Three hours of seminar per week. Focuses upon the relationship between oral and written cultures in Francophone Africa and/or 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 tradition and culture and modernism; the search for political identity and individualism. Offerings vary from year to year.

260A-260B. Studies In 20th Century Literature. (4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Offerings vary from year to year. See the Department’s Course Description for current topic.

265. Modern Theatre and Cinema. (4) Course may be repeated for credit as topic varies. Three hours of seminar per week.

270A-270B. Literary Criticism. (4) Three hours of seminar per week. A study of various critical approaches to literature.

275A-275B. Problems of Literary Theory. (4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Offerings vary from year to year. See the Department’s Course Description for current topics.

280A-280B. Interdisciplinary Studies In French. (4) Three hours of seminar per week. Interdisciplinary, team-taught course offered through sponsorship of the Townsend Center for the Humanities. It will investigate, through historical and literary modes of analysis, the invention of the French nation and national identity in the medieval and early modern periods. See department for current topic.

282. French Literary and Social History. (4) Three hours of 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) Only graduate students may repeat course. Three hours of seminar per week. Study of the 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 Cezanne; reading from reviews, monographs, treatises, novels, diaries and letters of the period.

296. Special Study. (1-4) Course may be repeated for credit. Individual conferences. Designed for students engaged in exploration of a restricted field, involving the reading of primary material. May not be substituted for available graduate courses. (F,SP)

299. Individual Research. (4-12) Course may be repeated for credit. Individual conferences. Reserved for students directly engaged in writing the doctoral thesis. (F,SP)

301. Teaching French In College: First Year. (3) Three hours of lecture and attendance at demonstration class for five hours per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: For graduate students teaching at college level. Required for all new T.A.s. Bi-weekly lectures on methodology, grading and testing, demonstration class with required attendance five times per week; laboratory observations; supervised classroom teaching. Additional seminars and discussion sections on methodology. Required for all Graduate Student Instructors teaching French 1 for the first time. (F,SP)

302. Teaching French In College: Advanced First Year. (3) Three hours of lecture and attendance at demonstration class for five hours per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: For graduate students teaching at college level. Required for all new T.A.s. Bi-weekly lectures on methodology, grading and testing, demonstration class with required attendance five times per week; laboratory observations; supervised classroom teaching. Additional seminars and discussion sections on methodology. Required for all Graduate Student Instructors teaching French 2 for the first time. (F,SP)

303. Teaching French In College: Second Year. (3) Course may be repeated for credit. Three hours of lecture and attendance at demonstration class for five hours per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: 301, 302 or equivalents. Lectures and discussion on the methodologies used in teaching second-year French, grading and testing; occasional attendance at demonstration class and one hour of laboratory observations; supervised classroom teaching. Required of all instructors teaching French 3. (F,SP)

304. Teaching French In College: Advanced Second Year. (3) Course may be repeated for credit. Three hours of lecture and one hour of laboratory per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: 301, 302, 303 or equivalents. Lectures and discussion on the methodologies used in teaching second-year French, grading and testing; occasional attendance at demonstration class; language laboratory observations; supervised classroom teaching. Required of all instructors teaching French 4. (F,SP)

335. Teaching French In College: Practical Phonetics and Aural Comprehension. (2) Three hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Readings and lectures in practical phonetics and the teaching of aural comprehension. Required of all GSIs teaching French 35 for the first time. Attendance at demonstration classes two hours per week; language laboratory observations; supervised classroom practice. (F,SP) Sorgen

Freshman and Sophomore Studies (College of Letters and Science)

The courses and programs formerly administered by the Freshman and Sophomore Studies office are now housed in several locations on campus. A brochure describing small classes in the new Freshman Seminar Program is produced each semester and mailed to all freshmen. Further information about the special 1-credit courses (the “24” series) and the 1-3-credit optional freshman seminar 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 Millet’s Don Juan. Sponsoring departments: Music and French.

Upper Division Courses

IDS 118. Enlightenment and the Visual Arts In 18th Century France. (4) Three hours of lecture per week. Prerequisites: Students must have a reading knowledge of French and/or appropriate background in the history of Western art. The course will deal with the internalization of the visual arts and ideas. Starting with those elements which were carried over from classicalism in the 17th century, the course will examine topics indicative of a change in style, ideas and attitudes, fostered by selected points of interest. Sponsoring departments: History of Art and French.

IDS 125. Mozart and Beaumarchais: The Figaro Cycle. (4) Three hours of lecture plus extensive listening assignments. Prerequisites: Must be a French or music major, or consent of instructor. Beaumarchais’s plays and the 1-3-5 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 Millet’s Don Juan. Sponsoring departments: Music and French.

Professional Courses

301. Teaching French In College: First Year. (3) Three hours of lecture and attendance at demonstration class for five hours per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: For graduate students teaching at college level. Required for all new T.A.s. Bi-weekly lectures on methodology, grading and testing, demonstration class with required attendance five times per week; laboratory observations; supervised classroom teaching. Additional seminars and discussion sections on methodology. Required for all Graduate Student Instructors teaching French 1 for the first time. (F,SP)

302. Teaching French In College: Advanced First Year. (3) Three hours of lecture and attendance at demonstration class for five hours per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: For graduate students teaching at college level. Required for all new T.A.s. Bi-weekly lectures on methodology, grading and testing, demonstration class with required attendance five times per week; laboratory observations; supervised classroom teaching. Additional seminars and discussion sections on methodology. Required for all Graduate Student Instructors teaching French 2 for the first time. (F,SP)

303. Teaching French In College: Second Year. (3) Course may be repeated for credit. Three hours of lecture and attendance at demonstration class for five hours per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: 301, 302 or equivalents. Lectures and discussion on the methodologies used in teaching second-year French, grading and testing; occasional attendance at demonstration class and one hour of laboratory observations; supervised classroom teaching. Required of all instructors teaching French 3. (F,SP)

304. Teaching French In College: Advanced Second Year. (3) Course may be repeated for credit. Three hours of lecture and one hour of laboratory per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: 301, 302, 303 or equivalents. Lectures and discussion on the methodologies used in teaching second-year French, grading and testing; occasional attendance at demonstration class; language laboratory observations; supervised classroom teaching. Required of all instructors teaching French 4. (F,SP)

335. Teaching French In College: Practical Phonetics and Aural Comprehension. (2) Three hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Readings and lectures in practical phonetics and the teaching of aural comprehension. Required of all GSIs teaching French 35 for the first time. Attendance at demonstration classes two hours per week; language laboratory observations; supervised classroom practice. (F,SP) Sorgen
Genetics

(College of Letters and Science or College of Natural Resources)

The Graduate Group in Genetics, an interdisciplinary graduate group, no longer admits graduate students and will be dissolved when the last student graduates, or in the year 2000, whichever comes first.

Students who wish to pursue graduate training in genetics at Berkeley should determine which of the departments mentioned below their research interests are most closely allied. Students should then apply to that department.

As part of the reorganization of the biological sciences at Berkeley, genetics is undergoing a renaissance and is heavily represented in the faculty interests of the three departments for research in biology: Molecular and Cell Biology, Integrative Biology, and Plant Biology. The Department of Molecular and Cell Biology has its own Division of Genetics. Other genetics belong to such campus departments as Biomedical and Environmental Health Sciences, Nutritional Sciences, and Plant Pathology. Genetic research is particularly strong in genetic regulation (in animals, plants, fungi, and prokaryotes), development genetics, neurogenetics, animal virus genetics, and evolutionary, ecological, and population genetics.

Both M.S. and Ph.D. degree programs are available, but strong preference is given to applicants to the doctoral program. An undergraduate major in one of the biological sciences is the standard preparation for incoming students. Completion of undergraduate courses in mathematics, statistics, physics, chemistry, biochemistry, and several fields of biology will reduce course work during the doctoral program. On average, students take five years to earn the Ph.D. degree. Students take the qualifying examination by the end of their third year and usually serve two semesters as a teaching assistant.

Geography

(College of Letters and Science)

Department Office: 501 Earth Sciences Building, 642-3803
Chair: David Stoddard, Ph.D.

Professors:
Orman E. Granger, Ph.D. University of Toronto; Climatology, pure and applied
David L. Dovers, Ph.D. Thiel College of Economics; Soviet Union, history of geography
Beatriz Manz, Ph.D. Montana State University; Geography, urban, environmental
Richard A. Walker, Ph.D. Johns Hopkins University; Economic geography, environmental studies, United States
Michael J. Watts, Ph.D. University of Michigan; Agriculture, rural development, Africa
Theodore M. Oberlander, Ph.D. (Emeritus) Syracuse University; Geographical data, cartography
James E. Vance, Jr., Ph.D. (Emeritus) Clark University; Urban, transportation, Canada, United States

Associate Professors:
Roger Byrne, Ph.D. University of Wisconsin; Biogeography, paleoclimatology
Beatriz Murcia, Ph.D. Stanford University; Latin American, human political geography
Robert R. Reed, Ph.D. University of California at Berkeley; Cultural geography, comparative urbanism, Southeast Asia

Assistant Professors:
Michael H. Jacobs, M.A. Johns Hopkins University, Latin America, development issues, urban
Lisa E. Wells, Ph.D. Stanford University; Geomorphology, Glacial Geology, Latin America

Departmental Major Advisor: Consult Student Services Assistant; Graduate Advisor: Mr. Walker.

Advice concerning requirements for undergraduate and graduate students is offered by the departmental advisors; guidance in the student's special field of interest is administered by the appropriate member of the staff. New students entering the department for the first time must consult the departmental advisors 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 that understanding involves thorough study of (a) the interlocking systems of the natural environment (climate, landforms, biota) and the evaluation of natural resources; (b) those diverse human 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 study of various aspects of human, physical, and regional geography as well as cartography, quantitative methods, and field work. Backgrounds in the natural and social sciences, history, and statistical methods will be found useful to the geographer 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 advisor in order to avoid repeating lower division work.)

Upper Division. A minimum of 32 units. One course from each of the following groups: 100-109; 110-125; 130-138; 140-149; 150-168; and 180-189. Students must fulfill requirements by completing at least 21 units from within one of the following specialties: physical, cultural, urban-economic, environmental resources, and regional. All students are encouraged to take 180 and 181 and 189.

Honor Program. With the consent of the major adviser, a student with an overall grade-point average of 3.5 or higher and a grade-point average of 3.5 or higher in courses in the major may apply for admission to the honors program. Application for acceptance in the program should be made by the beginning of the senior year. A senior in the honors program must complete Geography H195A and/or H195B, in which a thesis is required, and may take graduate seminars.

The Minor

Students in the College of Letters and Science may complete one or more minors of their choice, normally in a field both academically and administratively distinct from their major.

Required: Five upper division courses, all taken for a letter grade. A grade-point average of 2.0 is required in all courses applied to the minor.

Students with a minor in geography must take (a) at least one course in the physical geography series (140-149) and (b) at least one course in either the cultural series (100-109), the urban-economic series (110-125), or the environmental series (130-138). Students planning to apply a course from the cultural series (100-109) towards a 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 physical, cultural, economic, urban, and regional geography, it places strong emphasis on the interrelationships among these specialties and on 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 archival research and to complete a dissertation examination. Further details, including foreign language requirements, are available from the departmental office.

Lower Division Courses

1. Global Environments. (4) Three hours of lecture and two hours of laboratory per week. The global pattern of climate, landforms, vegetation, and soils. The relative importance of natural and human-induced change, global warming, forest clearance, accelerated soil erosion, glacial/palaeoclimatic change and its consequences. (F,SP) Byrne, Stoddard

2. Introduction to Cultural Geography. (3) Three hours of lecture and one hour of laboratory per week. Historical and contemporary spatial patterns. The development and spread of cultural adaptations, human use of resources, transformation and creation of human environments. (FSP) Niehschmann, Reed

3. Fieldwork. (3) Three hours of fieldwork per week. Travels to a region of interest for one quarter. Fieldwork is the only requirement for the field course. Students must have a field guide and submit a written report. (FSP) Hayes, Reed

4. The Locality and the Global. (4) Three hours of lecture and one hour of laboratory per week. An introduction to economic geography. Various scaled patterns of production, the household as an economic unit, and localized patterns of daily life. Focus on multilateral aspects of economic systems. (FSP) Hayes, Reed

5. Introduction to Environmental Geography. (4) Three hours of lecture and one hour of laboratory per week. The physical systems and processes that characterize the natural environment; human responses to environmental change. (FSP) Stoddard

6. Historical and Contemporary Environmental Policy. (4) Three hours of lecture and one hour of laboratory per week. The historical and contemporary development of environmental policy, and the scientific and social aspects of environmental studies. (FSP) Stoddard

7. Seminar. (1) Variable number of lecture hours. Independent study course. Open only to graduate students.

90. Seminars for Lower Division Students. (3) Three hours seminar and one hour consultation per week. A reading and discussion seminar for freshmen and sophomore students. Topics to vary.

Upper Division Courses

100. Cultural Geography of Indigenous Peoples. (3) Three hours of lecture per week. Worldwide, 168 societies can be divided into two groups: (a) societies of some 3000 Fourth World nations. This course discusses the cultural and political change that has occurred in these societies and the changes that are affecting them; (b) societies of indigenous peoples and their nations. Resultant state-nation conflicts now account for most of the world's wars, genocides and nationalism. Emphasis is placed on the geographic base to indigenous nations and contemporary economic, political, ecological and military invasions and disruptions.

101. Cultural Geography of Urban Environments. (3) Three hours of lecture per week. Population, environment and urbanization; religious geography and human settlements; cities as expressions of varying cultural traditions.

104. The City in the Third World. (4) Three hours of lecture 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. (FSP) Stoddard

107. Geography of Religions. (3) Three hours of lecture per week. Major themes concerning the origins and cultural roles of religions, sacred places, and spaces; pilgrimage; religious influences on population dynamics; holy cities; religion and political authority. (FSP) Stoddard

108. Political Geography. (3) Three hours of lecture per week. The evolution and viability of selected nation states; regional blocs and spheres of influence. Eu-
ropean imperialism and the "new nations"; sensitive frontiers. Internal cohesion, capitals, core-areas, and centrifugal forces. A comparative evaluation of world power. Hoexter

108. Prehistoric Agriculture. (4) Three hours of lecture per week. Agricultural origins and dispersals in the light of recent biological and archaeological evidence. Byme


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) Prid

112. Historical Geography of Transportation. (4) Three hours of lecture per week. The influence of geography on transportation and urban and regional maintenance of transportation technologies and patterns; the shaping of patterns of settlements and economy by transportation innovation; the role of transportation in urban and regional development in Western Europe and Anglo-America. Buell

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, mixed agriculture, demographic growth, patterns of labor use, agroecology and rural development. kicked

116. Economic Geography of the Non-Industrial World. (4) Three hours of lecture per week. Historical development of the non-industrial world. Survey of world economic geography from classical times through the Middle Ages to the present. The morphological expression of society in the medieval, early-industrial, and modern city. McKercher

122. Social Geography. (4) Three hours of lecture per week. An examination of the social relations in the U.S. from the 19th century to the present. Migration, segregation, division of labor by gender, race, and class; work-place residence relationships. Feminist theory as a tool in social geographic research. Jacobson

130. Natural Resources and Population. (4) Three hours of lecture per week. An examination of the exploitative relations between man and nature and their impact upon the world's population. The role of natural resources in the world economy, national development and human welfare focusing on the following: 1) The origins of scarcity and abundance, population growth and migration, hunger and poverty. 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 voyaging and tourism; cultural adaptation 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 use systems; perceptions of and adaptations to natural hazards such as floods, droughts, earthquakes, tornadoes, and volcanic eruptions.

135. Water Resources. (4) Three hours of lecture per week. Water use, water supply and public policy: history, institutions, current controversies. Topics include agricultural irrigation, urban water, energy, project evaluation, pollution, environmental impacts, artificial scarcity and over development. Emphasis on California. Wason

138. Political Ecology of the Third World. (4) Three hours of lecture per week. Political factors affecting ecological conditions in the Third World. Topics include environmental degradation, migrations, agriculture, production, role of international aid, divergence in standard of living, political power, participation and decision making, access to resources, global environmental policies and treaties, political strife and war. (SP) Marn

140. Analysis of Landforms. (4) Four and one-half hours of lecture per week. Prerequisites: 1 or equivalent. Geomorphic processes and the origin of landforms in varying geological and climatic environments. Pedley

141. Topographic Map Analysis. (4) Four hours of seminar per week. Prerequisites: 140 or equivalent. The analysis of landforms portrayed by contours on the structured and map series published by the U.S. Geological Survey. Buell

142. Biology and Geomorphology of Tropical Islands. (13) Nine hours of lecture for six weeks, field projects for six weeks, and three hours of lecture for the next three weeks. Natural and evolutionary biology of island terrestrial and freshwater organisms, and of marine organisms in the coral reef and lagoon systems will be studied, and the geomorphology of volcanic islands, coral reefs and reef islands will be discussed. Special emphasis will be placed on topics linked to subsequent field studies on the island of Moorea (French Polynesia). Also listed as Entomological Sciences 112, IDS 158, and Integrative Biology 158. (F) Stoddart

144. Principles of Meteorology. (4) Three hours of lecture and one hour of discussion per week. Weather systems, horizontal and vertical structure, weather fronts, types and mechanics of extratropical disturbances, weather forecasting. Emphasis on synoptic processes and weather maps. Emphasis on numerical weather prediction. Black

146. Applied Physical Climatology. (4) Three hours of lecture per week. Prerequisites: 1 or consent of instructor. The role of air-sea interactions in the study of climate; climatic patterns at different scales of atmospheric circulation including analysis and forecasting with examples from the Northeastern Pacific-Western North American area. (SP) Granger

147. Climatic Change. (4) Three hours of lecture per week. Fluctuations in climate during the period of instrumental measurements. The role of air-sea interactions, volcanic eruptions, solar variability, human activities, etc., in regional and hemispheric climate anomalies. Granger

148. Biogeography. (4) Three hours of lecture per week. Prerequisites: 1 or a lower division course in Biology or Earth Science. Changing distribution patterns of plants and animals on a variety of temporal and spatial scales. The effects of "continental drift," Pliocene climatic change, agricultural origins and dispersal, the ecological consequences of invasions and extinctions. Island biogeography. Kallerschmidt

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 review of vegetation and vegetation change in selected areas of North America. Evaluation of the relative importance of natural and cultural disturbance. Effects of climatic change, changes in fire frequency, grazing impacts, selective cutting, habitat modifications. Preservation problems. Smith

150. California. (4) Three hours of lecture per week. An ecological approach to the study of California's unique geography 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 history. Current land use patterns and land management plans for the unique regions and landscapes. This course satisfies the American cultures requirement. (SP) Walker

151. The American West. (4) Three hours of lecture per week. The arid West, excepting California, as a settlement and resource frontier; historical and contemporary perspectives. (F) Walker

152. Historical Geography of the United States. (2) Two hours of lecture per week. The evolution of the settlement patterns, regional economies, and cultures of the United States as it is related to the spread of the human landscape and its response to varying physical conditions.

153. Geography of Canada. (4) Three hours of lecture per week. The physical and cultural geography of Mexico, Central America, and the West Indies. Emphasis on the area's cultural historical development and present-day ecological, demographic, and economic patterns.

155. Spanish South America. (4) Three hours of lecture per week. Environment and culture of the Andean and La Plata countries.

156. Political Economy and Historical Geography of Latin American Development. (4) Three hours of lecture per week. This course examines the problems of development and underdevelopment in Latin America by using comparative economic and geographical materials from selected countries. A strong historical focus on regional economic development, relations between the state and the economy, and processes of urbanization should offer special insights into the nature of Latin American development. (F) Johns

157. The Caribbean Region. (4) Three hours of lecture per week. This physical, cultural, political and socio-economic factors responsible for the diversity of the region and of peoples and landscapes. Topics: The Caribbean islands in the Western Hemisphere; a regional perspective, the physical geography, climates of the region, population, culture, and social structure. Johns

161. Sierra Nevada. (4) Three hours of lecture per week. Prerequisites: Upper division standing. A geographical survey of the Sierra Nevada range of California and Nevada geology, geomorphology, climate, hydrology, snow surveying, vegetation, history of exploration and settlement, economic development, recreational use, administration of public lands. (F) Shuey

162. Soviet Union. (4) Three hours of lecture per week. Prerequisites: Upper division standing. A geographical survey of the Soviet Union, national economy, 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. Hoexter

163. Southeast Asia. (4) Three hours of lecture per week. Environment, culture and economic development of mainland and Insular Southeast Asia. (F) Reed

165. Africa: Ecology and Development, (4) Three hours of lecture per week. An overview of selected issues in the development of sub-Saharan Africa. Topics include rural development, ecological change, demographic transition, migration, urban growth, agricultural development, and peasant economy. Waite

166. The Arid Lands. (4) Three hours of lecture per week. Formerly 170. Varying physical environments and human activities in the arid regions of the world, and resulting ecological and socio-economic problems in selected areas.

167. The Middle East. (4) Three hours of lecture per week. Physical geography, human geography, countries 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.


175. Underdeveloped Southeast Asia. (4) Course may be repeated for credit with different instructor. Three hours of seminar per week. A read-
180. Field Methods for Physical Geography. (5) Two hours of lecture per week and six weekend field trips. Prerequisites: 148 or consent of instructor. Field Introduction to geomorphology, biogeography, and California landscapes. Students conduct field experiments and mapping exercises. Results of field projects are analyzed and presented as a technical report. Oral field reports are required for some trips.

181. Urban Field Study. (4) One hour lecture and nine hours (one day) fieldwork per week. Prerequisites: 148 or consent of instructor. Laboratory introduction to the metropolitan Bay Area: its history, economy, social makeup, and physical appearance. Evolution of spatial patterns, social justice and conflict in the city, business location, real estate and housing, images and identity.

183. Cartographic Representation. (4) Two hours of lecture and six hours of laboratory per week. Problems in the representation of quantitative and qualitative data on thematic maps. (SP)

184. Laboratory Methods in Physical Geography. (4) Two hours of lecture and three hours of laboratory per week. Prerequisites: 148 or consent of instructor. Laboratory introduction to the use of physical geography in the field, and to the use of computer programs for the analysis of data. Three hours of laboratory per week. (SP)

185. Image Analysis in Geography. (4) Four hours of lecture per week. An introductory survey of current methodology in the field of air photo interpretation and remote sensing. Emphasis on the practical application of aerial photography and non-photographic systems as applied to the detection, identification, measurement, and analysis of features in the natural and man-made environments.

189. History of Geographical Thought. (3) Three hours of lecture per week. Recurring themes, problems and controversies in the development of geography from ancient times, but with most emphasis on the 19th and 20th centuries. Its place in knowledge, relations with other disciplines, and its image and role in various countries. (SP) Hoonson H195A-H195B. Honors Course, (1-4) Course may be repeated for credit. Hours to be arranged. Prerequisites: Admission to Honors Program. Required for Honors in Geography. Students will write a thesis. One or two semesters, at the instructor’s option; if two semesters, thesis may be awarded upon completion of the sequence. (F,SP)

197. Field Study in Geography. (1-4) Course may be repeated for credit. Regular individual meetings with faculty sponsor. Must be taken on a passed/not passed basis. 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)

200. Directed Group Study. (1-4) Course may be repeated for credit. One hour of lecture and three to six hours of laboratory per week. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor. (F,SP)

203. First Year Graduate Seminar. (3) Three hours of seminar per week. This seminar, and one hour of consultation per week, will be devoted to certain topics in human and cultural geography. A survey of faculty research interests. (F,SP)

204. Geographical Research Methods and Theories. (3) Three hours of seminar per week. Prerequisites: Graduate standing. Analysis of geographic research methods and theories. Emphasis on field research and historical development or field-based studies in geography. Reading course. (SP) Nietschmann

240. Advanced Landforms Analysis. (4) Three hours of seminar per week. Prerequisites: 148 or equivalent. Problems and methods of geomorphic analysis.

242. Physiography of Western North America. (4) Three hours of seminar and one hour of consultation per week. Prerequisites: 148 or equivalent. Physiographic development of western North America with emphasis on current research.

244. Ecological and Social Dimensions of Global Change. (2) One and one-half hours of discussion per week. Prerequisites: 148 or equivalent. Ecological and economic change associated with the following human responses to global changes: adaptation, prevention, and no response. Emphasis is on developing predictive models of how the Earth System (including humans) will respond to global change. Also listed as Energy and Resources 291, Integrative Biology 272, and IDS 272.

250. Topics in Cultural Geography. (4) Course may be repeated for credit. Two hours of seminar and one hour of consultation per week. Research seminar on selected topics in cultural geography. (F,SP)

251. Topics in Economic Geography. (4) Course may be repeated for credit. Three hours of seminar per week. Research seminar on selected topics in economic geography.

252. Topics in Urban Geography. (4) Course may be repeated for credit. Two hours of seminar and one hour of consultation per week. Research seminar on selected topics in urban geography. (F,SP)

255. Topics in Political Geography. (4) Course may be repeated for credit. Two hours of seminar and one hour of consultation per week. Research seminar on selected topics in political geography. (F,SP)

256. Topics in Historical Geography. (4) 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. (4) Course may be repeated for credit. Two hours of seminar and one hour of consultation per week. Research seminar on selected topics in social geography. (SP) Pr Requirements:

260. Topics in Biogeography. (4) Course may be repeated for credit. Three hours of seminar and one hour of consultation per week. Research seminar on selected topics in biogeography.

262. Topics In Latin America. (4) Course may be repeated for credit. Three hours of seminar and one hour of consultation per week. Research seminar on selected topics in Latin America. (SP) Manz

266. Topics In Maritime Geography. (4) Course may be related for credit. One hour of lecture and one hour of consultation per week. Reading course on selected topics in maritime geography.

251. Topics In Cultural Geography. (4) Course may be repeated for credit. Two hours of seminar and one hour of consultation per week. Research seminar on selected topics in cultural geography. (F,SP)

252. Topics In Economic Geography. (4) Course may be repeated for credit. Three hours of seminar per week. Research seminar on selected topics in economic geography.

255. Topics In Political Geography. (4) Course may be repeated for credit. Two hours of seminar and one hour of consultation per week. Research seminar on selected topics in political geography. (F,SP)

256. Topics In Historical Geography. (4) 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. (4) Course may be repeated for credit. Two hours of seminar and one hour of consultation per week. Research seminar on selected topics in social geography. (SP) Pr Requirements:

260. Topics In Biogeography. (4) Course may be repeated for credit. Three hours of seminar and one hour of consultation per week. Research seminar on selected topics in biogeography.

262. Topics In Latin America. (4) Course may be repeated for credit. Three hours of seminar and one hour of consultation per week. Research seminar on selected topics in Latin America. (SP) Manz

266. Topics In Maritime Geography. (4) Course may be related for credit. One hour of lecture and one hour of consultation per week. Reading course on selected topics in maritime geography. (SP) Nietschmann

280. Advanced Field Study in Geography. (3-7) Course may be repeated for credit. One hour of lecture and eleven hours of fieldwork per week. All day or all Saturday. Each additional unit requires four hours of fieldwork per week. Extended field project required.

284. Departmental Research Seminar. (1-4) Course may be repeated for credit. One hour of seminar per week. (One-half hour of presentation followed by one-half hour of discussion.) Must be taken on a satisfactory/un satisfactory basis. An informal seminar for the presentation of graduate research in progress. (F)

295. Geography Colloquium. (1) Course may be repeated for credit. One and one-half hours of lecture per week. Must be taken on a satisfactory/un satisfactory basis. Prerequisites: Required of all graduate students not yet advanced. In regular lectures on current research and field work. (F,SP)

296. Directed Dissertation Research. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/un satisfactory basis. Prerequisites: Advancement to Ph.D. candidacy. (F,SP)

297. Directed Field Studies. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/un satisfactory basis. Prerequisites: Open to students directly engaged in field studies. (F,SP)

298. Directed Study for Graduate Students. (1-6) Course may be repeated for credit. Sections 1-20 to be graded on satisfactory/un satisfactory basis. Sections 21-41 to graded on a letter-grade basis. Special tutorial or seminar on selected topics not covered by available courses or seminars. (F,SP)

*On leave, spring
†Recipient of Distinguished Teaching Award
**Geology and Geophysics**

**Graduate Department**: 301 Earth Sciences Building, DES-3003
**Chair**: To be announced

**Professors**
- Walter Alvarez, Ph.D., Princeton University, Stratigraphy, structure, tectonics, impacts
- William N. Berry, Ph.D., Yale University, Paleozoic, paleoecology, community paleoecology
- George H. Brittan, Jr., Ph.D., University of California at Berkeley, Ore-forming processes, geochemistry
- Mark S. Burov, Ph.D., University of California at Los Angeles, Physics of planetary interiors
- Ian E. Carmichael, Ph.D., Imperial College of Science and Technology, University of London, Igneous and experimental petrology
- Donald J. DePaolo, Ph.D., California Institute of Technology, geochronology
- William E. Dietrich, Ph.D., University of Washington, Hydrology and fluid mechanics
- Harold G. Helgeson, Ph.D., University of California at Berkeley, Theoretical geodynamics, thermodynamics
- Raymond Jeanloz, Ph.D., California Institute of Technology, Laboratory experimental geophysics
- Lance R. Johnson, Ph.D., California Institute of Technology, Seismology, earth geophysics
- David J. Joung, Ph.D., Stanford University, Cordilleran and circum-Pacific tectonics
- Theofanis Kassiris, Ph.D., St. Louis University, Crustal structure, earthquakes, instrumentation
- Barbara K. Kious, Ph.D., University of Paris, Seismology, deep-earth structure, earthquakes
- Chi-yuen Wang, Ph.D., Harvard University, Tectonophysics, plate tectonics, thrust plate kinematics
- Hans-Rudolf Wenk, Ph.D., University of Zurich, Complex mineral and mineralogical petrology
- Bruce A. Bolt, Ph.D., Harvard University, Tectonophysics
- Geophysics, fundamental and applied geophysics
- Richard L. Hay, Emeritus, Ph.D., Princeton University, Geology and Geophysics

**Graduate Programs**

- **The College of Engineering**, with the cooperation of the Department of Geology, offers a curriculum in engineering geoscience leading to the degree of Bachelor of Science (see section on Engineering Science in this catalog).

**Graduate Courses**

- **Lower Division Courses**: Chemistry 1A-1B, Geology 10 or Geophysics 1A-1B, Physics 5A, Biology 1B, plus 4 additional lower division units from physical sciences or biology.
- **Upper Division Courses**: Geology 117, 185, Energy and Resources 102, plus 19 additional upper division units chosen in consultation with the major advisor.

**Honors Program**

- **Graduate Programs**, 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:
  - 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.
  - One year each of college chemistry and physics at the level of Chemistry 14 and Physics 7A-7B.
  - For geology students, broad undergraduate training in geology, including paleontology, geophysics and geochemistry.
  - For geophysics students, additional mathematics and physics at the upper division level.

**Student Requirements**

- 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 or Ph.D. program by the beginning of the first semester. A master's degree is not prerequisite for a Ph.D. Students should plan to cover a broad spectrum of advanced courses, selected in consultation with the graduate adviser. Students may apply for admission to the honors program after completing 12 units in the major.


**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 two additional upper division units, of which at least 12 must be purely graduate units.

**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 special emphasis on the physics of the earth.

**Lower Division Courses**: Mathematics 1A-1B, Mathematics 50A-50B, Physics 7A-7B-7C, Chemistry 1B, Biology 1B, plus 4 additional lower division units from physical sciences or biology.

**Upper Division Courses**: Geology 117, 185, Energy and Resources 102, plus 19 additional upper division units chosen in consultation with the major advisor.

**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 two additional upper division units, of which at least 12 must be purely graduate units.

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**Lower Division Courses**: Mathematics 1A-1B, Mathematics 50A-50B, Physics 7A-7B-7C, Chemistry 1B-1A.


**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 two additional upper division units, of which at least 12 must be purely graduate units.

**The Major in Engineering Geoscience**

The College of Engineering with the cooperation of the Department of Geology, 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:
  - 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.
  - One year each of college chemistry and physics at the level of Chemistry 14 and Physics 7A-7B.
  - For geology students, broad undergraduate training in geology, including paleontology, geophysics and geochemistry.
  - For geophysics students, additional mathematics and physics at the upper division level.

**Student Requirements**

- 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 or Ph.D. program by the beginning of the first semester. A master's degree is not prerequisite for a Ph.D. Students should plan to cover a broad spectrum of advanced courses, selected in consultation with the graduate adviser. Students may apply for admission to the honors program after completing 12 units in the major.


**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 two additional upper division units, of which at least 12 must be purely graduate units.

**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 special emphasis on the physics of the earth.

**Lower Division Courses**: Mathematics 1A-1B, Mathematics 50A-50B, Physics 7A-7B-7C, Chemistry 1B-1A.
Candidates for the Ph.D. degree must prepare and defend two research propositions at the oral qualifying examination during the third semester. These two propositions must demonstrate a breadth of knowledge and understanding in geophysics and geology. There is no formal course requirement, but students are encouraged to take graduate courses in mathematics and physical sciences as well as in earth sciences according to individual needs. 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-source mass spectrometry and clean laboratory facilities for stable and radiocarbon isotope measurements and microsampling/microanalysis at Lawrence Berkeley Laboratory. Research uses the Nd, Sr, Pb, Ca, O, H and C isotope programs 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 18 seismographic stations in northern California to study the seismology and in adjacent parts of Nevada, Oregon, and Idaho to conduct other related research. This research in seismology includes the study of earthquake wave propagation, the nature of the waves, their relation to earth structure, the nature of earthquake sources, eigenvibrations of the earth, and the theory of the seismograph. Offices are in the Earth Science Building; seismographs and laboratories are in Highland Hall, which contains an underground vault in Strawberry Canyon.

Center for Computational Seismology. Within the Earth Sciences Division at the Lawrence Berkeley Laboratory is a facility for modern seismological research which relies heavily upon advanced computer facilities for data processing. The center is used in a number of Geology, the processes that change them, and the theory of the seismograph. Offices are in the Earth Science Building; seismographs and laboratories are in Highland Hall, which contains an underground vault in Strawberry Canyon.

Geology

Lower Division Courses

3. The Water Planet. (2) Two hours of lecture per week. An overview of the processes that control water supply to natural ecosystems and human civilization. (F) West

4. Geochemical Interactions. (3) Three hours of lecture per week. Introduction to the chemical processes and principles of chemical weathering; chemical weathering reactions; soil formation; surface water; and the water cycle. (F) Jaffe

5. Geologic Record of Climate Change. (3) Three hours of lecture per week. This course will review the geologic record of climate change emphasizing how such knowledge can constrain present day thinking about (and predictive models of) future climate change. We will cover the entire spectrum of climate variability from the geologic past through the last 10,000 years. (F) Rabinowitz

6. Understanding the Earth. (3) Students will receive no credit for 10 after taking 50. Three hours of lecture and two hours of discussion per week. 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 as the Earth system has evolved. (F) Rabinowitz

12. The Planets. (3) Three hours of lecture per week. A tour of the planets and moons of the solar system and an introduction to their internal structures, atmospheres; surface features, and orbital properties. Processes that form planets and act to continually change them are discussed, as are comets, asteroids, and rings. Information gained from recent spacecraft missions is highlighted. (SP) Jeanloz

38. Freshman/Sophomore Seminar (2-4) Course may be repeated for credit as topic varies. Seminar format. Sections 1-2 to be graded on a letter-grade basis. Sections 3-5 to be graded on a pass/No pass basis. Prerequisites: Priority given to freshmen and sophomores. Freshman and sophomore seminars offer upper-class students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-section setting. These seminars are offered in all campus departments; topics vary from department to department and form to semester. (F, SP) Staff

50. Introduction to Geology. (3) Three hours of lecture per week. Prerequisites: 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. (F) Jones

50L. Introductory Geology Laboratory. (1) Three hours of laboratory per week. Prerequisites: Must be taken concurrently with 50. Practical study of minerals, rocks and geologic maps. Exercises on geologic processes. (F, SP) Staff

80. Environmental Earth Sciences. (2) Students will receive no credit for 80 after taking Integrative Biology 80 or Paleontology 105. Two hours of lecture per week. The course describes geologic processes active on the earth and in the earth and man's interactions with them. Geology of the earth and its processes. (F) Alvarado

90. An Introduction to the Physical and Chemical Processes of the Earth. (3) Three hours of lecture per week. Prerequisites: 90 or consent of instructor. Geologic aspects of weathering of rocks, sedimentary rocks, and transform faults. (SP) Berry

98. Directed Group Study. Course may be repeated for credit. Group meetings of various lengths. Must be taken pass/No pass basis. Group studies of selected topics which vary from semester to semester. (F, SP) Staff

Upper Division Courses

100A. Introduction to Minerals. (2) Two hours of lecture and six hours of laboratory for first seven and one-half weeks. Prerequisites: Chemistry 1A or equivalent. Elementary crystallography; crystal chemistry; classification and physical properties of common minerals; identification in hand specimens. (F) WenK

100B. Introduction to Rocks. (2) Two hours of lecture and six hours of laboratory for first seven and one-half weeks. Prerequisites: 100A or consent of instructor. Introduction to the origin of igneous, sedimentary and metamorphic rocks; identification of rocks by macroscopic and microscopic properties. (F) De Paolo

101. Field Geology. (3) Nine hours of fieldwork per week. Prerequisites: 10 or 50 or equivalent introductory geology lecture course advised. Geologic mapping and field observation in the Berkeley Hills; interpretation of geological processes and synthesis of geological history from structural and stratigraphic investigations. (SP) Brimhall

102. Optical Properties of Minerals and Rocks. (2) One hour of lecture and three hours of laboratory per week. Prerequisites: Chemistry 1A; 100A-100B should be taken concurrently. The optical properties of rocks are studied in thin sections with the petrographic microscope. (F) WenK

105. Hydrogeology. (3) Three hours of lecture per week. Prerequisites: Math 50A-50B, Physics 7A, Chemistry 1A-1B. Origin and composition of water in the earth; fundamental principles of flow in permeable rocks; energy and solute transport in groundwater; hydrogeology and tectonics; migration and entrainment of hydrocarbons; contaminant hydrogeology. (SP) Wang

106. Mineral Resources. (4) Three hours of lecture and three hours of laboratory per week and weekend field trips. Prerequisites: 10 or 50 or equivalent and Chemistry 1A-1B or consent of Instructor. Behavior of metals in the earth; survey of forming crustal environments and processes; temporal and geographic distribution of mineral resources; regolith response to climate change; introduction to mineral exploration; interpretation of the environment; the role of resource management and policy. (F) Brimhall

107. Plate Tectonics. (4) Four hours of lecture and one hour of discussion per week. Prerequisites: Mathematics 50A-50B; Physics 7A-7B; senior standing in Geology, Geosciences, or related field. Geometry of the outer part of the earth; the origin of plate tectonics; magnetics, and heat flow to plate tectonics; geological processes at plate margins; evolution of mountain belts; driving mechanism for plate tectonics; interpretation of relationship of earth processes.

110. Tectonic Evolution of Western North America. (3) Three hours of lecture, one hour of discussion per week. Prerequisites: Geology 100A or equivalent. Plate tectonic field trip. Prerequisites: 50, 100A and 100B, 101. Principles of regional stratigraphic, structural and tectonic analysis, based on plate tectonic theory. Emphasis on examples from Nevada and California; includes analyses of rifted margins; magmatism; degrading development; duced& oceanic assemblages; accreted arc terranes; Mesozoic subduction complexes and related plutonic rocks; transform faults and Cenozoic continental disruption. Jones


116. Structural Geology. (3) Three hours of lecture and three hours of laboratory per week. Prerequisites: 102 and consent of instructor. Introduction to structural geology. Graphical methods in elementary structural geology: spherical projections; orthographic projections. Development of structural cross sections; vector block diagrams. Introduction to theories of stress and strain and the origin of common structures in deformed rocks.

117. Geomorphology. (3) Three hours of lecture and three hours of laboratory per week, plus weekend field trip. Prerequisites: 50 or consent of instructor. Quantitative examination of landforms, runoff generation, weathering, mechanics of soil erosion by water and wind, mass wasting, glacial and periglacial processes and hillside evolution. (F) Dietrich

118. Summer Field Course. (6) Six weeks in the field. Prerequisites: Freshmen and sophomores; senior standing in Geology and consent of instructor. 119 is strongly recommended. Six weeks of intensive geological field work, including preparation of final report. Enscoremination. Staff

119. Geologic Field Studies. (2) Course may be repeated for credit. Prerequisites: 101 and consent of instructor. Two to four weekend field trips to localities of geological interest. (F, SP) Alvarez, De Paolo

131. Introduction to Theoretical Geochmistry. (3) Three hours of lecture and three hours of laboratory per week. Prerequisites: Chemistry 1A-1B, 100A and 100B, senior standing in Geology and consent of instructor. Chemical thermodynamics in solution chemistry in a geologic context. (SP) Helgeson

135. Mineralogy-Crystallography. (4) Two hours of lecture, three hours of laboratory, and one hour of discussion per week. Prerequisites: Chemistry 1A-1B, 100A and 100B, senior standing in Geology and consent of instructor. Crystal chemistry and spectroscopic methods in solution chemistry in a geologic context. (SP) Helgeson

161. Igneous Petrology. (4) Three hours of lecture and four hours of laboratory per week. Prerequisites: 100A and 100B, or consent of instructor. Mineral identification by X-ray diffraction and investigation of crystal defects by transmission electron microscopy. Crystal structure and defect microstructures as indicators of geological processes. (SP) WenK

199. Geology and Geophysics / 253

On leave, spring
On leave, fall
Recalled to active service
Recipient of Distinguished Teaching Award
182. Sedimentary Rocks and Processes. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: 102. Physical processes in sedimentation; nature and origin of sedimentary rocks. Microscopic sedimentary petrology. Physical stratigraphy. (SP) Berry, Jones

185. Marine Geology. (2) Two hours of lecture per week and three hours of laboratory per week. Prerequisites: 191. Integration of Biology 185. Interrelationships between marine organisms and physical, chemical and geological processes in oceans. (F) Berry

H195. Senior Honors Course. (3) Individual conferences. Prerequisites: Limited to honors candidates. Original research and preparation of an acceptable thesis. May be taken during two consecutive semesters of senior year and may be substituted for six units of the upper division requirement with consent of major advisor. (F,SP) Staff

190. Directed Group Study. (1-4) Course may be repeated for credit. Group meetings of various lengths. Must be taken on a pass/no pass basis. Group studies of selected topics which vary from semester to semester. (F,SP) Staff

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Individual conferences. Must be taken on a pass/no pass basis. Enrollment is restricted by regulations. (F,SP) Staff

Graduate Courses


201. Seminar in Geochemistry. (3) Course may be repeated for credit. Three hours of discussion per week. Prerequisites: Consent of instructor. Principles and problems in geochemistry. (F) Helgeson

205. Advanced Ore Petrology. (3) Course may be repeated for credit. Three hours of lecture and three hours of laboratory per week plus one field trip. Prerequisites: 100A-100B, 108 and 131. Geological and geochemical aspects of ore formation and deposition, including field, theoretical, and experimental approaches.

209. Accretionary Tectonics in the Circum-Pacific Region. (3) Course may be repeated for credit. Three hours of seminar per week and several field trips. Prerequisites: 201. 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. (Jones

212. Advanced Stratigraphy and Tectonics. (3) Three hours of seminar per week. Prerequisites: Consent of Instructor. Evolution of the earth in response to internal, surficial and extraterrestrial processes. Alvarez

214. Advanced Igneous Petrology. (4) Three hours of lecture and four hours of laboratory per week. Prerequisites: Geology 131 and 161. The composition, generation and cooling of magmas to form igneous rocks. The physical and thermodynamic properties of silicate liquids. De Paolo

216. Advanced Structural Geology. (2) Course may be repeated for credit. Two hours of lecture and two hours of laboratory per week. Some fieldwork is assigned. 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. Dietrich

224. Isotopic and Trace Element Geochemistry. (3) Three hours of lecture per week. Prerequisites: Background in physical chemistry and math, through 50A or equivalent. Overview of isotopic methods for tracer studies and geochemistry in the earth and planetary systems. Inference of relevant scientific topics. Topics include time scales of geologic, oceanographic, atmospheric, and planetary processes; chemical evolution and structure of the mantle, crust, oceans, and atmosphere of the earth; fundamentals of nuclear processes; trace element and stable isotopes fractionation; isotopic composition of meteorites and implications for early solar nebula evolution. (SP) DePaolo

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 hillslope 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 and pressure; calculation of the thermodynamic properties of minerals at high pressures and temperatures; reaction kinetics; numerical prediction of the rate and extent of mass transfer resulting from weathering, diagenesis, metamorphism, hydrothermal metasomatism, etc. Helgeson

280. Research. (2-12) Course may be repeated for credit. Individual conferences to be arranged. Provides supervision in the preparation of an original research paper or dissertation. (F,SP) Staff

290. Seminar. (2-6) Course may be repeated for credit. Two to six hours of lecture/discussion per week. Topics will be announced each semester. (F,SP) Staff

298. Directed Group Study for Graduates. (1-9) Course may be repeated for credit. Group meetings and individual conferences. Section 1 (fall) to be graded on a satisfactory/unsatisfactory basis; other sections may be taken on letter-grade basis. (F,SP) Staff

601. Individual Study for Master's Students. (1-6) Course may be repeated for credit. Course does not satisfy unit or residence requirements for master's degree. Individual conferences. Must be taken on a satisfactory/unsatisfactory basis. (F,SP) Staff

602. Individual Study for Doctoral Students. (1-6) Course may be repeated for credit. Course does not satisfy unit or residence requirements for doctoral degree. Individual conferences. Must be taken on a satisfactory/unsatisfactory basis. (F,SP) Staff

Professional Courses

300. Professional Preparation: Supervised Teaching of Geology and Geophysics. (1-6) Course may be repeated for credit. One hour of discussion per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing and consent of graduate student instructor. Discussion, curriculum, class observation, and practice teaching in geology, geophysics, and earth science. (F,SP) Staff

401. The Use of the Electron Microprobe. (2) Course may be repeated for credit. Eight hours of laboratory per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing and consent of instructor. The operation of an electron microprobe and ancillary equipment for the analysis of inorganic solids. (F,SP) Carmichael, Brimhall

402. Electron Microscopy and X-Ray Diffraction. (2) Course may be repeated for credit. Eight hours of laboratory per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing and consent of instructor: The use of an electron microprobe, X-ray diffraction apparatus, and ancillary equipment. (F,SP) Wank

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 geological tectonics, distribution of earthquakes in space and time, mechanisms of earthquakes, effects of earthquakes, and earthquake hazard and risk. (F) Johnson

Upper Division Courses

104. Mathematical Methods In Geophysics. (4) Three hours of lecture and one hour of computer laboratory per week. Prerequisites: Mathematics 50A-50B. Linear inverse problems in the earth sciences; least squares; the generalized inverse matrix and Lagrange constraints; splines; probability and stochastic inference; significance tests; numerical transforms; differential equations of geophysics. (F) Romanowicz

106. Geodynamics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Physics 7A, Mathematics 50A-50B. Basic principles in studying the physical properties of earth materials and the dynamic processes of the earth. Examples are drawn from tectonics, mechanics of earthquakes, etc., and augment course material. (SP) Bukowinski

121. Seismology. (4) Two hours of lecture and six hours of laboratory per week. Prerequisites: Consent of instructor. One course in continuum mechanics; Physics 7A-7B; Mathematics 50A-50B, Formerly 121A-121B. Elastic waves in the earth; forward and inverse problems for the velocity distribution; reflection and refraction methods of seismic exploration. Theory of the seismograph; interpretation of seismograms; causes, effects, and distribution of earthquakes; mechanics of earthquakes; earthquake hazard and risk. (SP) McEvilly

122A. Physics of the Earth and Planetary Interiors. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Physics 105. Density distribution in the earth and planets. Equation of state of solids at high pressures; phase transitions; Inferences on the constitution of the earth and planetary interiors. Gravity fields of the earth and planets; the concept of isostatic equilibrium and Inferences on the dynamic nature of the earth and planetary interiors.

122B. Physics of the Earth and Planetary Interiors. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 108 and Physics 110A, In- termal structure of the earth. Chemical composition of the mantle and core. Temperature distribution and energetics of the earth's interior. The geodynamic field; plate tectonics; the earth's magnetic field. (SP) Johnson

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 ac- programs. Instrumentation to measure strong ground motion. Estimation of seismic motion at a site. Ground motion spectra. Influence of soils and geological structures. Seismic risk mapping.

199. Supervised Independent Study, (1-4) Course may be repeated for credit. Individual conferences. Must be taken on a pass/no pass basis. Enrollment is restricted by regulations. (F,SP) Staff

Graduate Courses

200. Fluid and Heat Transport in the Crust. (4) Three hours of lecture per week. Prerequisites: Physics 7A-7B, Chemistry 1A-1B, Math 50A-50B; open
German

(College of Letters and Science)

Department Office: 5317 Dwinelle Hall, 642-7444; FAX: 642-3243
Chair: Robert C. Helms, Ph.D.

Professors:
Bluma Goldstein, Ph.D. Harvard University
Gerd Hilts, Ph.D. Stanford University
Robert G. Holub, Ph.D. University of Wisconsin, Madison
Anton Kaes, Ph.D. Stanford University
Clare J. Kranach, Aplikation d'Alemann, Sorbomme
Winfried Kusukuna, Ph.D. University of California at Berkeley
Immanuel Rauch, Ph.D. University of Michigan
Hinrich C. Seeba, Dr. phil. University of Tübingen
Johan P. Snipper, Ph.D. University of California at Los Angeles
Frederic C. Tubach, Ph.D. University of California at Berkeley
Kenneth D. Welsinger, Ph.D. University of California at Berkeley
Richard Blinkmann (Emeritus), Dr. phil. University of Tübingen
Andrew O. Jasz (Emeritus), Ph.D. Harvard University
Joseph Mieke (Emeritus), Ph.D. Harvard University
Robert Piraz (Emeritus), Dr. phil. University of Tübingen
Blake Lee Sparr (Emeritus), Ph.D. Yale University

Associate Professors:
Thomas F. Shannon, Ph.D. Indiana University
Elena C. Tennen (Emerita), Harvard University
W. Daniel Wilson, Ph.D. Cornell University

Senior Lecturers:
Klaus A. Mueller, M.A. Columbia University (Emeritus)
Stephen Newton, Ph.D. University of California at Berkeley

225. Topics In High-Pressure Research. (Course may be repeated for credit. Two hours of lecture per week; prerequisites: Consent of instructor. Analysis of current developments and techniques in experimental and theoretical high-pressure research, with applications in the physical sciences. Topics vary each semester. (F,SP) Jeanklo)

285. Research. (2-12) Course may be repeated for credit. Individual conferences to be arranged. Provides supervision in the preparation of an original research paper or dissertation. (F,SP) Staff

299. Directed Group Study for Graduate Students. (1-9) Course may be repeated for credit. Occasional group meetings. In Section 1 (fall) must be taken on a satisfactory/unsatisfactory basis. Other sections may be taken on a letter-grade basis. (F,SP) Romanowicz, WANG

601. Individual Study for Master's Students. (1-8) Course may be repeated for credit. Does not satisfy unit or residence requirements for master's degree. Individual conferences. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: For candidates for the master's degree. Individual study for the comprehensive or language requirements in consultation with the field adviser. (F,SP) Staff

602. Individual Study for Doctoral Students. (1-8) Course may be repeated for credit. Does not satisfy unit or residence requirements for doctoral degree. Individual conferences. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: For candidates for the 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. (F,SP) Staff

Professional Courses

404. Modern Seismological Observation Techniques. (2) Course may be repeated for credit. Two to three hours of laboratory and one hour of discussion per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: 204 and graduate standing. Advanced instruction in interpretation and reduction making use of the instrumental and computer facilities of the Seismographic Station. The purpose is to enable graduate students to use analog and digital equipment for observation of seismic waves in their research. (F,SP) Staff

German

(Office of the Dean)

Chair: Robert C. Helms, Ph.D.

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Gerd Hilts, Ph.D. Stanford University
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Lecturers:
Stephen Newton, Ph.D. University of California at Berkeley

On leave, spring, fall
On leave, fall

Thomas Nolden, Ph.D. Yale University
Jeanne van Oosten, Ph.D. University of California at Berkeley

Major Advisor: Mr. Seeba.

Graduate Advisers: Literature: Mr. Wilson (post-M.A.); Mr. Welsinger (pre-M.A.); Linguistics: Ms. Rauch.

The Department of German offers undergraduates the opportunity to obtain a broad background in the field of German language, literature, and culture, and introduces them to the principles of literary 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 more specialized areas. The graduate offerings in linguistics constitute a complete program of study in Germanic languages. Instruction in methodology is provided for graduate student instructors and prospective teachers.

The curriculum of Dutch Studies focuses upon the language, literature, and culture of The Netherlands and Flanders.

The Major

Lower Division. German 1, 2, 3, 4, or their equivalent.

Upper Division. 30 units of which a minimum of 14 must be taken at Berkeley. The following courses are required: 100, 101A, 101B, and 102A or 102B. Courses must be taken in the literature or culture of at least two different centuries (courses numbered 105 or higher); consult the major advisor or undergraduate assistant when in doubt concerning this requirement. No more than 4 units of the 102 series can be applied toward the major.

Students who have not achieved at least a B average in that part of the German 1-4 sequence 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 advisor or the undergraduate assistant when in doubt concerning this requirement. No more than 4 units of the 102 series can be applied toward the major.

Any course in the 195 series and an honors thesis (H196) must be completed. The Honors Committee, consisting of the major advisor 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 115).

Electives: Four upper division courses (excluding courses in English translation): only 2 units from German 109 may be applied to the minor. One course from another department related to German studies, or a course in Dutch 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 seminar in literature and one course in linguistics are required. Students are granted the degree upon passing either a written or 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-linguistic, 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 must be able to determine a dissertation topic. 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 to develop three years of proficiency in German literature. 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 extensive knowledge of 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 consult with their graduate advisor in order to set up their program of study for the Ph.D. For their dissertation research, students may choose to concentrate on contemporary or historical German language. They are expected, however, to be knowledgeable in all periods of the history of the German language as well as in all components of its grammar. 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 hours of lecture per week. Four of the weekly class meetings will be conducted in German, with one lecture on language and culture in English. Students develop the basic elements of communicative competence in both spoken and written language within a cultural frame. (F) Staff

2. Elementary German. (5) Five hours of lecture per week. Prerequisites: 1 or equivalent. Students continue to develop the basic elements of communicative competence in both spoken and written language. (F,SP) Staff

2G. Elementary German for Graduate Students. Five hours of lecture per week. Must be taken on a satisfactory/un satisfactory basis. Elementary German for graduate students preparing for reading examinations. (F,SP) Staff

2. Elementary German. (5) Five hours of lecture per week. Prerequisites: 2 or equivalent. This course is designed to refine students' oral communicative competence and their ability to read and write. General review of grammar. (F,SP) Staff

3C. Oral Survival Skills. (3) Three hours of lecture per week. Prerequisites: 2 or equivalent. Designed primarily for those who are going to work or study in Germany. The course will consist of a thorough review of the skills necessary to achieve grammatical, sociolinguistic and sociocultural competence in everyday situations of work and leisure in German-speaking countries. Staff

4. Advanced German. (5) Five hours of lecture per week. Prerequisites: 3 or equivalent. Students acquire oral communicative strategies to function in socially appropriate ways in authentic situations of language use. They learn 1) to read and understand literary and non-fiction texts at multiple levels of interpretation and 2) to write in various ways. (F,SP) Staff

4T. Theater Workshop. (5) Combination of class meetings and workshops for minimum of five hours per week. Prerequisites: 3 or equivalent. Theater option of German 4. Discussion of postwar drama and dramaaturgy, including the production of a major play, with emphasis on participants' roles in the process. Staff

25. Patterns and Images of Contemporary German Culture and Society. (2) Course may be repeated for credit as topic varies. Two hours of lecture per week. The course is designed to complement the German language training program with a lecture series stressing interdisciplinary perspectives of post World War II cultural developments in Central Europe. Lecture material to be supplemented with films and videotapes and guest lectures on occasion. (F,SP) Staff

5S. Freshman Seminar. (3) Course may be repeated for credit. Three hours of lecture/discussion per week. Prerequisites: Consent of Instructor. Limited enrollment. Variable topic. All readings in English. (F,SP) Goldstein, Kudzus, Kaas, Wilson

Upper Division Courses

Prerequisites: 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. The course is intended to acquaint students with basic literary genres and major figures in German literature from the eleventh century to the present, and to familiarize them with literary methodologies and bibliographical tools. Required of all German majors. (F,SP) Tarrnant, Wilson

Language

Upper Division Courses

101A-101B. Advanced German Grammar and Composition. (3S) Three hours of lecture/discussion per week. Prerequisites: 4 or consent of instructor. The purpose of this course is to improve the writing and speaking skills of students in their third year of German studies. Emphasis on correct use of the German language. Systematic review of German grammar. Weekly written assignments. No midterm or final examination. Required of all majors. Not open to native speakers. (F,SP) Staff

102. German Conversation. Either 102A or 102B may be repeated for credit, but only 4 units may be applied toward the major. Not open to native speakers. Three hours of lecture/discussion per week.

102A. Intermediate German Conversation. (2) Prerequisites: 4 or consent of instructor. This course is designed to expand the vocabulary and to improve pronunciation. Discussion of current events affecting Germany and the US, analysis of culturally significant texts. Participants are expected to make several oral presentations. (F,SP) Staff

102B. Advanced German Conversation. (2) Prerequisites: 102A or consent of instructor. This course is designed to perfect oral proficiency in German. Discussion of current events affecting Germany and the US, analysis of culturally significant texts. Participants are expected to make several oral presentations. (F,SP) Staff

105C. Topical German Conversation. (2) Prerequisites: 102A, 102B or consent of Instructor. This course is designed primarily for students in the social sciences who want to practice their German by discussing current political and social issues. Emphasis will be placed on the ongoing debate on national identity, nationalism and European Integration as it is affected by the dramatic changes in Germany. Reading will include articles by T.W. Adorno, M. Horkheimer, L. Lowenthal, W. Benjamin, J. Habermas, H. Arendt and A. Mitscherlich.

105. Middle High German for Undergraduates. (3) Not open to graduate students for credit. Three hours of lecture/translation/discussion per week. Students will learn the fundamentals of Middle High German grammar and will read selections from major narrative works of the Hohenstaufen period.

106. Readings In Middle High German. (3) May not be substituted for but may be taken concomitantly with 203. Three hours of lecture/discussion per week. Prerequisites: 105, or equivalent. Reading course designed to increase student's Middle High German repertoire.

106C. Literary Translation. (3) Three hours of lecture/discussion per week. Prerequisites: Two upper division courses in German literature. This course introduces students to the problems of literary translation from German to English.

Cultural History

Upper Division Courses

110. From 800-1546. (3) Three hours of lecture per week. The social, political, and historical background to Medieval literature from the Age of Charlemagne to the Empire of Charies V.

111. From 1500-1800. (3) Three hours of lecture/discussion per week. The social, political, and historical background to German literature from the Reformation to the Age of Reason. (SP) Hillen

112. From 1800 to the Present. (3) Three hours of lecture/discussion per week. The social, political, and historical background to German literature since the French Revolution.

Literary History

Upper Division Courses

120. The Literature of the Middle Ages. (3) Three hours of lecture/discussion per week. Introduction in
modern German or English translation to major literary monuments of the Hohenstaufen period, intended for undergraduates with no knowledge of Middle High German. (F) Tucheb

121. Renaissance, Reformation, and Baroque. (3) Three hours of lecture/discussion per week. Major authors and their works from the 15th through the 17th century.

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. Dichtung (especially Lessing), novels, poetry and philosophical and political texts in their historical settings.

123. Classicism. (3) Three hours of lecture/discussion per week. Problems of Weimar 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.

124. Romanticism. (3) Three hours of lecture/discussion per week. Literature, philosophy and aesthetic theory of the Romantic period. (SP) Goldstein

125. 19th Century Literature. (3) Three hours of lecture per week. Major problems and trends in 19th century German literature.

126. Modern Literature. (3) Three hours of lecture/discussion per week. Introduction to philosophical and aesthetic trends at the turn of the century. Analysis of literary texts by Th. Mann, F. Kafka, S. George, R.M. Rilke, G. Benn, B. Brecht.

127. Contemporary Trends. Three hours of lecture/discussion per week.


128. German Nationalism. (3) Three hours of lecture/discussion per week. The course will deal with the brief but influential period of German Nationalism within its social and political context at the turn of the century (Zola, Ibsen, Strindberg, Tolstoy, etc.).

Approaches to Literature

Upper Division Courses

131. Philosphical Approaches to Literature. Three hours of lecture/discussion per week. Prerequisites: 100.


133. Sociological Approaches to Literature. Three hours of lecture/discussion per week. Prerequisites: 100.

133A. Das Bürgersche Trauerspiel. (3) Prerequisites: 100. Middle-class tragedy of the 18th and 19th centuries and its theory in terms of the relationships between literature and society: patriarchy, class ideology, political issues, etc.

133B. German Literature and the French Revolution. (3) This course will reflect recent attempts to redefine the traditional periods of German literature by taking account of the central importance of the German revolution as well as the development of Weimar Classicism and early Romanticism. We will also look at the politically charged reception of German Classicism in the nineteenth century, and at a nineteenth-century and a twentieth-century literary confrontation with the Revolution (Böchner, Weiss).

135. Psychological Approaches to Literature. Three hours of lecture/discussion per week. Prerequisites: 100.

135A. Writing and Silence. (3) Based on texts by R. Walser. This course will focus on various modes of creating and negating meaning.

136. Literary Through Literature. (3) Three hours of lecture per week. Formerly 204. Exploration of the role that literature can play in the acquisition of literacy in a first and second language. Linguistic and psycholinguistic issues: orally and literary, discourse text, schema theory, and reading research. Literary issues: stylistics and critical reading, reader response, structure of narratives. Educational issues: the literary text in the social context of its production and reception by intended and non-intended readers. (SP) Kramsch

Author

Upper Division Courses

139. Lessing. (3) Three hours of lecture/discussion per week. Formerly 148. A study of his contribution as playwright, theorist, and philosopher. An introduction to 18th-century trends in philosophy and literary theory will precede the analyses of selected texts.

140. Goethe. (3) Three hours of lecture/discussion per week. Introduction to Goethe's prose, drama, and poetry. (F) Wilson

141. Schiller. Three hours of lecture/discussion per week.

141A. A Study of Schiller's Major Dramas. (3) Some attention given to dramatic theory, prose and poetry. Welsinger

142. Heine. (3) Three hours of lecture/discussion per week. Study of Heine's prose and poetry.

144. Franz Kafka. (3) Three hours of lecture/discussion per week. Formerly 149. A careful study of Kafka's writings that will consider them in their social, historical, and cultural contexts and will focus on a number of significantly different interpretative approaches to his works.

146. Stefan George and Rainer Maria Rilke. (3) Three hours of lecture/discussion per week. Formerly 146. Introduction to philosophical, ideological and aesthetic trends at the turn of the century; analysis of lyrical texts from 1890-1920.

149. Brecht. (3) Three hours of lecture/discussion per week. Formerly German 147. An introduction to Brecht's work.

Special Topics

Upper Division Courses

150. Literature of the German Democratic Republic. (3) Three hours of lecture/discussion per week. An introduction to the major writers of prose and drama.

151. Austrian Literature. Three hours of lecture/discussion per week.

151A. Viennese Literature and Culture at the Turn of the Century. (3) This course will focus on literature, psychology, and philosophy of the turn of the century. Goldstein

151B. Austrian Literature from mid-19th Century to Present. (3) The primary aim of this course is to become acquainted with some representative significant writings of Austrian literature from the mid-nineteenth century to the present. Thus we will read works by Grillparzer, Rilke, Kafka, Schnitzler, Hofmannsthal, Broch, Musil, Joseph Roth, Freud, Canetti, Handke, and Elfirede Jellinek. We will also try to explore some of the theoretical writings around the turn of the century that gave rise to the concept "die Moderne." Goldstein

155. Studies in Poetry. Three hours of lecture/discussion per week. Topic varies from year to year. (SP) Kudszus
We will closely analyze the major films of the period and relate them to Weimar culture and society. (SP) Kies (F)

Film of the Third Reich. (4) A study of the function of propaganda in the films made under Hitler. Using a few key documentary films, we will try to develop a better understanding of the "semiotics" of fascist art. We will also examine the social context of film art in the Third Reich and analyze how German postwar films have depicted the Hitler period. (F)

New German Cinema. (4) We will examine films directed by Straub, Herzog, Fassbinder, Wenders, Syberberg, Schloendorff and lesser-known filmmakers in terms of their distinct visual styles, narrative principles, and thematic preoccupations. Discussions of modernism and postmodernism will help place these films in larger contexts. (SP) Staff

Graduate Courses in Literature

Introductory

Proseminar in German Literature. (4) Two hours of seminar and one hour of tutorial per week. This seminar will provide a brief introduction to the history of German literature, art and philosophy from the Enlightenment to the present day. Prerequisite: Sophomore standing.

Major Periods in German Literature. Three hours of hours of tutorial/discussion per week. Designed for graduate students. This course will study the major literary movements of the 18th, 19th, and 20th centuries. Prerequisite: 201B.

Upper Division Courses

History of the German Language. (3) Three hours of lecture/discussion per week. Designed for undergraduate and graduate students interested in the history of the language of the newly reunited Germany, which was the means of a rich linguistic legacy from the Latin/Latin, Germanic, Armenian, and Slavic languages. (SP) Shanan

Structure of Modern German. (3) Three hours of lecture/discussion per week. A course designed for undergraduates and graduates interested in the structure of modern Germanlanguage. (SP) Taube

Introduction to the Linguistic Study of German. (3) Three hours of lecture/discussion per week. A basic overview of the field of German linguistics, including modern German in its various aspects, the historical development of language, and concluding with a discussion of the modern dialects of the modern era. The course is designed for undergraduates and graduates. (SP) Shanan

Seminars and Special Study

Upper Division Courses

Undergraduate Seminars. Three hours of seminar per week. Prerequisite: 100. Formerly 130.

Franz Kafka. (5) Formerly 130A. This seminar will explore Kafka's short prose and his novels. We will consider the circumstances and misfortunes of Kafka's protagonists, the enigmatic world they try to inhabit, and the various ways in which their stories are presented in literary prose.

20th Century Poetry. (3) Analysis of various aspects of poetry from the beginning of the century to today, including works by Brautigam, Schlegel, and others. A grade of A or A- is required for all papers for this course.

Research Seminars for Undergraduates. (3) Course may be repeated for credit. Three hours of seminar per week. Each seminar offered under this topic is required of all students participating in the departmental Honors Program. Variable topic. For specific topic contact departmental office. (SP) Kees, Weisinger

Honors Studies in German. (2-4) Prerequisites: One of the 95 courses. Supervised independent study and research course for honor students who are writing their theses for completion of the requirements for the Honors Program. (F) Staff

Directed Group Study. (2-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. Group study of selected topics which will vary from year to year. (F) Staff

Supervised Independent Study and Research. (2-4) Individual conference. Must be taken on a pass/no pass basis. Progress Report: Open to students who have completed at least 15 units of upper division German with an average no less than B. Supervised independent study and research. (F) Staff

200. Proseminar in German Literature. (4) Two hours of seminar and one hour of tutorial per week. This seminar will provide a brief introduction to the history of German literature, art and philosophy from the Enlightenment to the present day. Prerequisite: Sophomore standing.

201. Major Periods in German Literature. Three hours of hours of tutorial/discussion per week. Designed for graduate students. This course will study the major literary movements of the 18th, 19th, and 20th centuries. Prerequisite: 201B.

201A. Literature of the Middle Ages. (4) Survey of medieval German literature that concentrates on monu-ments of the Hohenstaufen period but also includes representative works from the later 13th, 14th and 15th centuries. Intended for M.A. candidates but open to all students with a working knowledge of Middle High German. (SP) Tuchab

201B. 16th and 17th Century. (4) Recommended for M.A. candidates.

201C. 18th Century. (4) An introduction to two hours of seminar and one hour of tutorial per week. This seminar will study the major literary and cultural movements of the 18th century in Germany. Prerequisite: 201B.

201D. 19th Century. (4) A critical overview of the major literary and intellectual currents of the 19th century. (SP) Weisinger

201E. 20th Century. (4) A survey of the major texts from the 19th century onward that have been important in the development of German literature. Prerequisite: 201B.

202. Written and Spoken German for Graduates. (4) Two hours of lecture/discussion plus one hour of tutorial per week. Intensive practice in the correct use of the German language, as well as its interchange over time with related languages such as English and Russian. (F) Rauh

203. Middle High German for Graduates. (4) Four hours of lecture/discussion per week. A course designed for graduate students interested in the history of the language of the newly reunited Germany, which was the means of a rich linguistic legacy from the Latin/Latin, Germanic, Armenian, and Slavic languages. (SP) Shanan

204. Oral and Written German for Graduates. (4) Three hours of tutorial/per week. Intensive practice in the correct use of the German language, as well as its interchange over time with related languages such as English and Russian. (F) Rauh

205. Studies in Medieval Literature. (4) Two hours of seminar and one hour of tutorial per week. Basic grammar, readings, techniques of editing Middle High German and modern language. (F) Tannant

206. Studies in Renaissance and Reformation. Two hours of seminar per week.

206A. Literature of the 16th Century. (4) Survey of monuments of German and Latin literature from the 16th and 17th centuries. Prerequisite: 201B.

207. Studies in the 17th Century. (4) Two hours of seminar per week. Formerly 203. 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.

210. Studies in the 18th Century. Two hours of seminar and one hour of tutorial per week. Formerly 211B.

210A. History of Enlightenment. (4) Formerly 211A. Literature will be studied as historical documents indicating the changes in literary and religious thought during the Enlightenment. Texts by Lessing, Kant, and Voltaire will be studied.

210B. The Writer and Enlightened Absolutism. (4) Formerly 211B. A sociopolitical approach: the writer and the court, the book trade, patronage, academies, and the reformed political authority. Important works by Kleist, Goethe, and Schiller will be studied.

212. Studies in the 19th Century. Two hours of seminar and one hour of tutorial per week. Formerly 212B.

212A. Topics in Romanticism. (4) Course may be repeated for credit. Formerly 212. Major authors and texts of the romantic period will be studied. (SP) Willson

212C. German Realism. (4) Formerly 214. This course will focus on the major novels and novellas of 19th-century realism.

212D. Naturalism. (4) Formerly 216. The works of German realism— with particular attention to Gerhard 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.

214. Studies in the 20th Century. (4) Course may be repeated for credit as topic varies. Two hours of seminar per week. Formerly 218.

208. Studies in the 17th Century. Two hours of seminar per week. Formerly 203. 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.

210. Studies in the 18th Century. Two hours of seminar and one hour of tutorial per week. Formerly 211B.

210A. History of Enlightenment. (4) Formerly 211A. Literature will be studied as historical documents indicating the changes in literary and religious thought during the Enlightenment. Texts by Lessing, Kant, and Voltaire will be studied.

210B. The Writer and Enlightened Absolutism. (4) Formerly 211B. A sociopolitical approach: the writer and the court, the book trade, patronage, academies, and the reformed political authority. Important works by Kleist, Goethe, and Schiller will be studied.

212. Studies in the 19th Century. Two hours of seminar and one hour of tutorial per week. Formerly 212B.

212A. Topics in Romanticism. (4) Course may be repeated for credit. Formerly 212. Major authors and texts of the romantic period will be studied. (SP) Willson

212C. German Realism. (4) Formerly 214. This course will focus on the major novels and novellas of 19th-century realism.

212D. Naturalism. (4) Formerly 216. The works of German realism— with particular attention to Gerhard 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.

214. Studies in the 20th Century. (4) Course may be repeated for credit as topic varies. Two hours of seminar per week. Formerly 218.

220. Bildungsroman. (4) Three hours of seminar per week.

228. Drama of the Twentieth Century. (4) Course may be repeated for credit. Two hours of seminar per week.

228. 20th-Century Novel. (4) Two hours of seminar and one hour of tutorial per week. A study of the major contemporary German novelists.

229. Lessing. (4) Three hours of seminar per week. Emphasis on the plays and their sociopolitical reference. Theological and theoretical writings. The writer's relation to authority and the literary market. (F) Hillen

230. Goethe. Three hours of seminar per week.

234A. Early Goethe. (4) 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.

234B. Goethe's Faust II. (4) This and other works of Goethe's later period will be read and discussed in the light of contemporary criticism and literary theory.

234C. Goethe and the Powerless. (4) An examination of Goethe's depiction and relation to marginalized groups: the lower classes, women, Jews, and oppositional intellectuals. Fictive as well as official and autobiographical writing will be read.

236. Schiller. (4) Three hours of seminar per week. Plays and aesthetic works of Schiller will be read and discussed. Emphasis on the historical and dramatic problems of the works.

238. Hölderlin. (4) Two hours of seminar per week. Formerly 255A.
240. Heinrich von Kleist. (4) Three hours of seminar per week. A study of Kleist's dramas with emphasis on problems of non-mimetic language and aesthetic representation within Kleist's concept of "Gebrechlichkeit der Welt."

241. Heinrich Heine. (4) Three hours of seminar per week. A study of Heine's works in their political and social contexts.

242. Hofmannsthali. (4) Three hours of seminar per week.

247. Hermann Hesse. (4) Three hours of seminar per week. A study of Hesse's novels from Peter Camenzind to Das Glasperlenspiel in terms of both matter and manner, and their evolution.

248. Franz Kafka. (4) Three hours of seminar per week.

251. Georg Trakl. (4) Two hours of seminar per week. Formerly 2555.

252. Nietzsche. (4) Two hours of seminar per week. The aim of the course is to explore a few of Nietzsche's most important texts and to examine the variety of ways he has been read, especially during the past two decades or so.

Theory

253. Seminar in Feminist Criticism and Theory. (2) Four hours of seminar per week. Four courses for four weeks. Contact the German Department for further information.

255. Interpretation and Criticism of Poetry. Three hours of seminar per week. A. Höldeferlin.

256. Problems of Literary Theory. (4) Course may be repeated for credit. Two hours of seminar and one hour of tutorial per week. Topics vary from year to year. For current topics see the department's "Course Descriptions" booklet. (SP) Holub

257. Historiety. (4) Three hours of seminar per week. A discussion of the relationship of history and literature as it affects the theoretical notion of the historicity of literature and the fictionality of historiography.

258. Language Teaching as Social Interaction. (4) Three hours of lecture per week. Application of insights from psycholinguistics, sociolinguistics, discourse analysis, and cultural studies to understanding the processes of work in the acquisition of a foreign language in instructional settings. Readings on relevant research. Observation and analysis of natural and instructional L2 discourse. (F) Kramsch

259. Postmodernism. (4) Two hours of seminar and one hour of tutorial per week. This seminar will explore the notion of "postmodernity" in its theoretical, historical, and cultural manifestations. Specifically we will (1) analyze recent German prose writings, films, and theoretical texts, (2) place these German contributions in the larger context of European and American debates about postmodernism, and (3) focus our attention on recent "postmodernist" reconfigurations of questions of history, myth, irrationalism, and of writing, reading and representation.

260. Literary Canon and Institutional History. (4) Three hours of seminar per week. A critical discussion of the canonization of classical texts in the historical institutional history of Literarische Bildung.

261. Myth and Metaphor: Patterns of Imagistic Thought. (4) Two hours of seminar and one hour of tutorial per week. Discussion of theories of myth and metaphor and their development to Hans Blumenberg and of the role of mythological patterns (e.g., Odysseus, Oedipus, Kassandra, Medea, Siegfried, Hermann, Wilhelm Tell, Rudolf von Habsburg) in German literary and intellectual history.

262. Aesthetic Theory. (4) Two hours of seminar and one hour of tutorial per week. The seminar will explore various aspects of aesthetic theory, concentrating on Kant's Kritik der Urtsklbtheil and Hegel's Vorlesungen über die Aesthetic. Special attention will be given to the ideological function of aesthetic theory.

263. Studies in Language. Three hours of seminar per week.


264. Psychoanalytic Readings. (4) Three hours of seminar per week. The seminar will explore both works by psychoanalysts such as S. Freud and a variety of psychoanalytic approaches to literature. The literary criteria of the 1980s will be a focus of attention. A forty-minute oral presentation and a substantial research paper will be among the requirements of the course.

265. Film Theory: Historical and Systematic Perspectives. (4) One hour of tutorial per week. Prerequisites: 200 or equivalent. Formerly 280C. This seminar will examine traditional and recent critical approaches to the study of film. Knowledge of film and background in literary theory required. (F) Kanes

268. Aspects of Literary and Cultural History. (4) Three hours of seminar per week. A comparison of literary and cultural developments in Germany and the United States. Emphasis is placed on individual research designed to develop teaching materials.

269. The Faust-Legend. (2) Two hours of seminar and one hour of tutorial per week. Formerly 2566. Study of the most provocative of the major German works of the Faust-legend from the 16th to the 20th centuries.

Graduate Courses in Linguistics

270. Comparative Germanic. (4) Three hours of seminar per week. Advanced topics in Germanic phonology, morphology, syntax, semantics, pragmatics. The principal Germanic dialects viewed within a synchronal framework and reconstruction. (SP) Rauch

273. Gothic. (4) Three hours of lecture/discussion per week. Study of the linguistic structures of the earliest Germanic-language communities. An examination of Germanic origins, Germanic relationships, and Gothic as a synchronic construct are considered. (F) Rauch

276. Old High German. (4) Three hours of lecture per week. Reading of poetic and prose texts in Old High German. The synchronic and diachronic study of the dialects of the High German language from the eighth to the eleventh century within the framework of modern linguistic method.

278. History of the Dutch Language. (4) Two hours of lecture and one hour of tutorial per week. The prehistory, emergence, development of Netherlandic, and its relation with English and German. See also Dutch 107. (SP) Shannon

282. Old Saxon. (4) Three hours of lecture/discussion per week. Study of the most provocative of the major Germanic languages in terms of structural identification. The study includes the dialects of the Old Germanic languages. The linguistic structures of the earliest Germanic-language communities. An examination of Germanic origins, Germanic relationships, and Gothic as a synchronic construct are considered. (F) Rauch

285. Approaches and Issues in the Study of Modern German. (4) Two hours of seminar and one hour of tutorial per week. Prerequisites: 103. A survey of relevant contemporary issues and topics in linguistic research on the structure of German.

290. Seminar in German Linguistics. (4) Course may be repeated for credit. Two hours of seminar and one hour of tutorial per week. Variable topic. For specific topics contact departmental office.

291. Methods and Issues in German Morphology. (4) Two hours of seminar per week. Formerly German 290F. Discussion of modern morphological research. Prerequisites: 1 or equivalent. (SP) Staff

299. Individual Study for Graduate Students in Literature and Linguistics. (3-12) Course may be repeated for credit. Individual conferences. Required for all graduate students in linguistics. Prerequisites: 200 or equivalent. Formerly 290A. Concentration on the dialects of the High German language from the eighth to the eleventh century within the framework of current linguistic method.

293. Comparative Diachronic Analysis. (4) Three hours of reading and discussion. Elementary study of the history of Germanic and Celtic languages. Formerly German 290G. Discussion of current topics. Contact departmental office.

300. Comparative Indo-European Languages. (4) Three hours of seminar per week. Formerly German 290A. 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.

304. Contemporary Grammars. (4) 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 Early New High German with Early English.

306. Dialectology. (4) Two hours of seminar per week. Formerly German 290D. Discussion of modern methods and results in the investigation of present-day German dialects. (F) Shannon

309. Semiotics. (4) Two hours of seminar per week. Formerly German 290D. 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.

Group and Individual Study

286. Directed Group Study. (2-4) Course may be repeated for credit as topic varies. Seminar. Must be taken on a satisfactory/unsatisfactory basis. (F, SP) Staff

299. Individual Study for Graduate Students in Literature and Linguistics. (3-12) Course may be repeated for credit. Individual conferences. Required for all post-M.A. students engaged in exploration of a restricted field, involving writing of a report, and for students writing their doctoral dissertations. (F, SP) Staff

602. Individual Study for Doctoral Students. (1-8) Course may be repeated for credit. Individual conference. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: At least one term of graduate-level study in the student's chosen area. (F) Staff

Courses in the Teaching of German

Professional Courses

301A-301B. The Teaching of German in College. (3,3) Three hours of seminar per week. Credit and grade to be awarded on completion of sequence. Credit and grade to be awarded upon completion of entire sequence. Required for all new graduate student instructors. For post-M.A. students engaged in exploration of a restricted field, involving writing of a report, and for students writing their doctoral dissertations. (F, SP) Staff

302. Teaching Practicum. (4) Course may be repeated for credit. Three hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing. Supervised teaching of lower division courses, including orientation workshops. (F, SP)

Dutch

Lower Division Courses

1. Elementary Dutch. (5) Five hours of lecture and one hour of laboratory per week. Beginner's course. (F, Staff)

2. Elementary Dutch. (5) Five hours of lecture and one hour of laboratory per week. Prerequisites: 1 or equivalent. (SP) Staff

3. Intermediate Dutch. (5) Five hours of lecture and one hour of laboratory per week. Prerequisites: 2 or equivalent.

39A. Modern Dutch Prose in the Lowlands. (3) Three hours of seminar per week. The course will be a freshman/sophomore seminar dealing with the post-war prose originating in Holland and Flanders. Em-
107. The Structure of Modern Dutch. (3) Three hours of lecture per week. A basic course on the structural properties of modern Dutch, including phonetics and phonology, morphology, and syntax. Comparison with English and German.

110. Advanced Dutch. (3) Three hours of lecture per week. Prerequisites: 3 or equivalent. Review of Dutch grammar, written exercises, and an introduction to Dutch literature. (F) van Oosten

120. Dutch Conversation. (2) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 110 or consent of instructor. Formerly 120A-120B. A course in spoken Dutch meant upon extending vocabulary and improving grammar and pronunciation, using newspaper and magazine articles dealing with modern Dutch culture.

125. Conversation and Composition. (3) Course may be repeated once for credit. Three hours of lecture per week. Prerequisites: 110 or consent of instructor. This course is designed to improve both the oral and written style of the student in Dutch, employing a variety of sources ranging from the newspaper to the essay to the creative forms (poetry, short story). The art of correspondence, both formal and informal, will be taught as well as the widely-varying spoken styles. (SP) Snapper

130. Advanced Grammar and Composition. (3) Three hours of lecture/discussion per week. Prerequisites: 110 or consent of instructor. A course in written English. Each student's knowledge of grammatical patterns, especially those occurring primarily in the written language. Extensive reading and writing practice.

140. Topica in Dutch Literature. (3) Course may be repeated for credit. Three hours of lecture/discussion per week. Prerequisites: 110 or consent of instructor. A course in written English. Each student's knowledge of grammatical patterns, especially those occurring primarily in the written language. Extensive reading and writing practice.

159. 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 the student's oral presentation.

160. History of the Lowlands in English Translation. (3) Course may be repeated for credit as topic varies. Three hours of lecture/discussion per week. Study of the major contemporary Dutch and Flemisch writers and their works. (F) Snapper

165. Flemish Literature in English Translation. Three hours of lecture per week.

165A. The Second World War. (3) Novels, short stories, and poetry dealing with the war by such writers as Hugo Claus, Louis Paul Boon, and Ward Ruyslbuck.

170. The Netherlands: Culture and Institutions. (3) Three hours of lecture/discussion per week. A historical study of the cultural contributions of the Netherlands and an analysis of the political system. (SP) van Oosten

175. General and Cultural History of the Southern Netherlands. (3) Three hours of lecture/discussion per week. This course focuses on the cultural and historical antecedents to thecession 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 Abele Spalen.

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) Staff

H190. Honors Studies in Dutch. (1-4) Course may be repeated for a maximum of 4 units. Prerequisites: Advanced standing. Supervised independent study and research course for honors students. (F,SP) Snapper

198. Directed Group Study. (1-4) Course may be repeated for credit. One to four hours of seminar per week. Must be taken on a passed/not passed basis. (F,SP) Staff

199. Special Studies in Dutch. (1) Course may be repeated for credit. Individual conference. Must be taken on a passed/not passed basis. Prerequisites: Overall GPA of 3.0. Enrollment is restricted by regulations in General Catalog. (F,SP) Staff

Graduate Courses

240. Graduate Readings in Dutch. (4) Course may be repeated for credit. Three hours of lecture per week. Various periods and genres in Netherlandic literature from the Middle Ages to the modern period.

299. Individual Studies in Dutch for Graduate Students. (1-9) Course may be repeated for credit. Three hours of lecture per week. A major research paper in the areas of Dutch literature. (F,SP) Snapper

UC Berkeley-UC San Francisco Joint Medical Program. A five-year program leading to the M.S. in Health and Medical Sciences from UC Berkeley and the M.D. from UC San Francisco. The master portion of the curriculum consists of at least 20 units of academic course work and a thesis. Students are expected to acquire a solid familiarity with a selected area of interest related to health and medicine by mastery of basic skills that will enable them to do independent work in this area. The master's program is interdigitated with the required preclinical science courses during the first three years of the medical school. This program leads to five years of continuity in the clinical and academic aspects of the curriculum. Berkeley awards the master's degree upon successful completion of the first three years of work, and UC San Francisco awards the medical degree after satisfactory completion of the fourth and fifth years. Students selected for this program must have focused intellectual interests in a field that would complement their premedical training. They must also meet the rigorous academic requirements for entrance into medical school and have formed some commitment to the broader aspects of health care.

Genetic Counseling Program. Genetic counseling involves assisting individuals and families to understand and deal with the emotional and social consequences of the occurrence or risk of occurrence of a genetic disease or birth defect. Genetic counselors usually work as members of a medical team in a general genetics clinic, prenatal diagnosis clinic, or prenatal screening program. The two-year program leads to an M.S. Didactic counseling and clinical counseling; clinical techniques in biochemistry, cytogenetics, and DNA technology; relevant aspects of fertility and embryology; counseling techniques and related aspects of psychology; ethics; and community resources and education. Fieldwork placements in both years provide on-site experience that is closely integrated with didactic material through courses and individual supervision.

Admissions. Admissions requirements of the two graduate programs vary. As a minimum, applicants must be eligible for admission to the University in graduate standing, with an undergraduate upper division grade-point average of at least 3.0, along with a bachelor's degree from an accredited college or university. Applicants must be eligible for admission to the University in graduate standing, with an undergraduate upper division grade-point average of at least 3.0, along with a bachelor's degree from an accredited college or university. Applicants to the Joint Medical 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 Joint Medical program, telephone 642-5671; the Genetic Counseling program, 642-6328.

Lower Division Courses

24. Freshman Seminar. (1) Course may be repeated for credit as topic varies. One hour of seminar per week. Sections 1-2 to be graded on a letter-grade basis. Sections 3-4 to be graded on a passed/not passed basis. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an Intellectual topic with a faculty member in a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP)

98. Directed Group Study. (1-3) Course may be repeated for credit. Three to nine hours of group study (or tutorial or fieldwork) per week. Must be taken on a passed/not passed basis. Prerequisites: Consent of In-
Upper Division Courses

198. Directed Group Study. (1-3) Course may be repeated for credit. This is a group (or tutorial or fieldwork) per week. Must be taken on a passed/not passed basis. Organized group study on topics selected by Health and Medical Sciences Program graduate students under the sponsorship and direction of a member of the Health and Medical Sciences faculty. (F,SP) Steinbach

Graduate Courses

201. Systemic and Regional Human Anatomy. (7) Three hours of lecture and twelve hours of laboratory per week. Prerequisites: Molecular and Cell Biology 134 or Molecular and Cell Biology 135D or other advanced work in mammalian biology; consent of instructor required. Former Anatomy 205, Dissection, x-ray and surface anatomy of the body; with special reference to the functional capacities of the structure examined. (F) Srebnik

202. Anatomy of Human Development. (2) Two hours of lecture per week. Prerequisites: Graduate standing in biological science. Former Anatomy 210. Instruction is in demonstration and dissection of embryos. Outside reading required. (F,SP) Srebnik

205A-205D. Physical Diagnosis. (11;11;11) One hour of lecture and three hours of laboratory every other week. Prerequisites: Graduate standing in HMS Joint Medical Program; concurrent enrollment in 206A, 206B, 206C, or 206D.

A & B. Introduction to the physical diagnosis: One physical examination of fellow students and patients, lectures, and demonstrations. One organ system approach is used.

C & D. The complete patient interview and complete physical examination with case presentation to staff and fellow students. A lecture on the examination of various organ systems will precede each ward experience. (F,SP) Swartzberg

206A-206D. Introduction to Clinical Medicine: Basic Principles of Disease Processes. (3;3;3) Three hours of lecture and two and one-half hours of case presentation per week. Prerequisites: Graduate standing in HMS Joint Medical Program. Formerly 206A-206B-206C-206D-206E-206F. A four semester sequence introducing basic principles of clinical medicine taught by organ system and ending in integration, and applying the basic principles to specialty areas. The clinical sessions which form the core of this course are didactic, meeting 1½ hours; the second weekly session is held at various hospitals, and has a ½ hour lecture followed by 2½ hours of case presentation of hospitalized ambulatory patients who demonstrate the lecture topic. (F,SP) Swartzberg

208. Introduction to Clinical Psychiatry. (4) Three hours of lecture and two hours of laboratory per week. Prerequisites: Graduate standing in Health and Medical Sciences Program. This course will teach specific skills of psychiatry, along with a body of knowledge about the human mind as it relates to the health and disease of other organ systems in the individual. Under supervision, students will interview psychiatric patients and present results in written form. (F) Katz

209A-209D. Principles of Human Pathology. (2.5;2.5;2.5;2.5) Two hours of lecture per week and three hours of laboratory every two weeks. Prerequisites: Consent of instructor. This course is a basic introduction to the pathology of disease processes affecting specific organ systems (system pathology). Laboratory sessions utilize computer aided instruction and microscopic slide review. (F) Truxel

211. Human Neurobiology. (3) Three hours of lecture per week. Prerequisites: 220 or Molecular and Cell Biology 129 (or equivalent) and consent of instructor. All aspects of basic neurobiology needed for medical education will be covered, including central nervous processing, sensory input, motor input and output, and consciousness. Intensive student work in preparation of material presented and the use of clinical correlates and problems will emphasize the role of neurobiology in medical education. (SP) Steinbach

220. Human Physiology. (4) Three hours of lecture and four hours of laboratory per week. Prerequisites: 201; Molecular and Cell Biology 102; or consent of instructor. How major organ systems work and interact to maintain human life. Covers basic physics and physiology relevant to the practice of medicine by means of lectures and eight clinical case discussions, with relevant demonstrations of human physiology. (F,SP) Steinbach

227. Introduction to the Clinical Process. (2) One and one-half hours of lecture and one and one-half hours of laboratory per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing in Health and Medical Sciences Program or consent of instructor. An interdisciplinary approach to the study of health and illness, health care systems, and the practice of health and professional-client interaction. Focus is on development of observational, information-gathering, and interpersonal communication skills. (SP) Swartzberg

231A-231B. Principles and Practices of Counseling in Health Services. (3-3) Three hours of lecture per week. Prerequisites: Graduate standing in Health and Medical Sciences Program or consent of instructor. First semester develops theoretical foundations appropriate to counseling in health settings; second semester concentrates on skills and ability in children and infants, and impacts on family. Emphasis on integration of theory and clinical experience. Second semester, open only to HMS students in given term. (F,SP) Staff

247. Health Politics, Policy, and Policy Analysis. (4) Four hours of seminar per week. Prerequisites: Graduate standing in Health and Medical Sciences Program or consent of instructor. This seminar for future health practitioners presents a multi-disciplinary analysis of health services organization, financing, and policy. Students will study policy questions and analyze the relevant theories. Students will be exposed to current health policy and policy forces and institutions that affect health. (F,SP) Staff

251. Thesis Seminar. (5) Course may be repeated for credit. Two hours of seminar every other week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. When specified, this course will be for students in the program. In all sections of the course, students will meet weekly to discuss the plans for the thesis and the research to be performed for the thesis. (F,SP) Staff

261. Introduction to the Clinical Process. (2) One and one-half hours of lecture and one and one-half hours of laboratory per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing in HMS Joint Medical Program or consent of instructor. First semester develops theoretical foundations appropriate to counseling in health settings; second semester concentrates on skills and ability in children and infants, and impacts on family. Emphasis on integration of theory and clinical experience. Second semester, open only to HMS students in given term. (F,SP) Staff

271. Thesis Seminar. (5) Course may be repeated for credit. Two hours of seminar every other week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. When specified, this course will be for students in the program. In all sections of the course, students will meet weekly to discuss the plans for the thesis and the research to be performed for the thesis. (F,SP) Staff

281. Ethics Committees and Health Care Decision Making. (2) Course may be repeated for credit with consent of instructor. Two hours of lecture per week. Prerequisites: Graduate Standing and Consent of Instructor. This course will discuss some of the ethical issues that permeate modern medicine and medicine and discussion will focus on methods for grappling with these problems. Actual cases discussed by the student in the class. The course will be graded satisfactory/unsatisfactory. (SP) Kushner

299A-299B. Advanced Seminar in Genetic Counseling. (3-3) Three hours of lecture/seminar per week. Prerequisites: 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) Well

299C. Colloquium on Health and Health Care. (5) Course may be repeated for credit. One and one-half to two hours of lecture every other week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing or consent of instructor. A series of guest lecturers will discuss aspects and implications of health care reform from economic, ethical, and policy perspectives. Specific topics will be presented by invited experts in various areas of the field. (F,SP) Staff

299D. Special Study. (1-10) Course may be repeated for credit. Individual meetings with faculty members must be arranged. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing. Designed to permit selected graduate students to pursue special study under the direction of a faculty member. (F,SP) Staff

Professional Courses

475. Supervised Field Work and Counseling in Human Genetics. (6-10) Field work. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing in HMS Program or consent of instructor. Field experience for students preparing to work as genetic counselors. (SP) Well

497A-497B. First Year Field Placement for Genetic Counseling. (8) May be taken for one academic year. Variable. One unit for each four hours per week scheduled at placement. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Limited to first year Genetic Counseling students; concurrent enrollment in 299A-299B. Supervised field work for one semester in a birth defects center. Primarily designed for Genetic Counseling students but open to qualified graduate students. (F,SP) Well

History (College of Letters and Science)

Department Office: 3229 DeWitt Hall, 643-1971

Professors

Richard M. Abrams, Ph.D., Columbia University. Recent U.S., political, economic, business

Aaron Aronson, Ph.D., University of Leeds, Late modern Europe, International relations

Barbara A. Bady, Ed.D., Oxford University. Britain since 1509, Tudor-Stuart, English

Paula S. Pass, Ph.D., Columbia University. America since 1607, social and family relations, education

Jan de Vries, Ph.D. Yale University. European economics, Germany, politics, social culture

Mary E. Berry, Ph.D., Harvard University. Japan

Mary E. Berry, Ph.D., Harvard University. Medieval, England, Italy, China

Barbara Capp, Ph.D., Harvard University. Medieval and Renaissance

Diana S. Clemen, Ph.D., University of California at Santa Barbara. Medieval, Renaissance, Women

Jan de Vries, Ph.D., Yale University. European economics

Ronald J. Fain, Ph.D., Columbia University. America since 1607, social and family immigration and education

Gerald D. Feldman, Ph.D., Harvard University. Late modern Europe, social and cultural

Amos Funkenstein, Ph.D., Ffric University of Berlin, Medieval

Erich S. Gruen, Ph.D. (Gladys Rehard Wood Professor) University of California, Ancient Greece and Rome

Samuel Haber, Ph.D., University of California at Berkeley. Recent U.S., intellectual, social

*On leave, spring, fall

**On leave

†Recipient of Distinguished Teaching Award
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; Freshman and Sophomore Studies 44A, 44B; Undergraduate Interdisciplinary Studies 55A
2. European History since the Renaissance: 5, 15, 30B, 31; Freshman and Sophomore Studies 44C, 44D; Undergraduate Interdisciplinary Studies 55B
4. Latin America, Asia, Africa: 8A, 8B, 9A, 9B, SC, 9D, 10

A freshman-sophomore seminar (History 39) may be substituted in one of the areas required for admission to the major.

In the upper division, history majors must complete at least seven history courses, including:

1. Four upper division lecture courses, chosen from at least two of the following—Ancient, European, British, United States, Latin America, Asia, Africa, History of Science. May include Economics 111A, 111B, 113, and 115.
2. Two proseminars (History 103) in two different fields of history, as listed in 1 above (for purposes of this regulation of history courses in European History pre-1600 and post-1600 may be counted as proseminars 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 department and seminars are available to students at introductory and advanced levels.

Professor:
Geoffrey G. Kozioi, Ph.D. Stanford University. Medieval

Guenter B. Rose, Ph.D. University of Chicago, M.D. University of California at Berkeley. History of medicine, health sciences (Health Sciences, U.C.S.F)

Major Advisers: Consult Undergraduate Office.

The Department of History offers a program of instruction ranging widely over the historical record of human experience. The chronological, geographic, and topical range affords great flexibility to students working toward degrees in history and to those who wish to give a historical dimension to their studies in other disciplines. Lecture courses and seminars are available to students at introductory and advanced levels.

The Major

While the faculty supervisor will assign a grade for H195 or 285, the Honors Committee will determine whether or not the essay is of honors quality.

The Honors Committee will evaluate the candidate's course work, performance in H102, the oral examination, and the research essay. If the student's work is of honors quality in the committee's 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 wish to participate in the Education at Home Program. The program is conducted through the UC Riverside campus, open to undergraduates from any campus in the UC system. Those selected for participation will spend nine weeks in Williamsburg, one in Philadelphia, and a concluding week in Washington, D.C.; it is a one-quarter program. For further information, brochures or application forms, call (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 the degrees of M.A. and Ph.D. should address inquiries to Graduate Admissions, Department of History. Candidates will be admitted for the fall semester only.

Further Information. The Schedule of Classes 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, including when and by whom each course will be given.

Lower Division Courses

4. Origins of Western Civilization. Two hours of lecture and two hours of discussion per week. Introduces study of major historical events in the origins of western civilization. Emphasis on class discussions, readings in the sources, and writing of essays.

4A. Ancient. (4)

4B. Medieval. (4)

5. European Civilization From the Renaissance to the Present. Two hours of lecture and two hours of discussion per week. A survey of European history from the Renaissance to the present. (4)

7. Introduction to the History of the United States. Two to three hours of lecture and two hours of discussion per week. A twotothreehoursecourseinthehistoryoftheUnitedStates.10A. Middle East. (4)

9. European Civilization From the Renaissance to the Present. Two hours of lecture and two hours of discussion per week. A survey of European history from the Renaissance to the present. (4)

9D. Middle East. (4)

10. African History. (4) Two hours of lecture and two hours of discussion per week. An introductory survey of the history of Africa.

9A. China. (4)

9B. Japan. (4)

9C. India. (4)

9D. Middle East. (4)

10. African History. (4) Two hours of lecture and two hours of discussion per week. An introductory survey of the history of Africa.

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
portion catalog during pre-enrollment week each semester.

16. The Forging of the U.S.: Expansion and Inter- 
cultural Encounter. (4) Three hours of lecture and two hours of discussion per week. Con- 
siders the culturally diverse Americans who reside within the geographical boundaries of today's U.S. The history, societies, cultures, perceptions, attitudes and laws of the various ethnic and cultural groups comprise the subject matter. Courses will be looked at chronologically in terms of the natu- 
ral historical processes that brought them together dur- 
ing expansion westward and southward by the Anglo- 
Americans and their governmental units. The courses: 
European, Native, African, Chicano Americans and 
Pacific Rim peoples. This course satisfies the Amer- 
ican cultures requirement.

17A-17B. Studies In Ancient History. (4,4) Four 
hours of lecture per week. Intended to introduce stu- 
dents to the problems and methods of studying Amer- 
ican history through the use of primary source mate- 
rials.

30. Science and Society. 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.

30B. Science, Technology, and Society since Newton. 
(4) The development of science and its applications 
as a major force in modern society.

31. The Voyages of Columbus. (4) Two hours of 
lecture and two hours of discussion per week. The 
course uses Columbus' voyages as a lens for exam-
ining geography, cartography, navigation, ship build-
ing, exploration, commerce, medicine, natural history, 
etymology, etc., during the Renaissance and early-
middle modern times. The examination will take into account the political, social, and religious circumstances of the age.

39. Freshman/Sophomore Seminar. (4) Course 
may be repeated for credit with different instructor. 
Seminar prerequisite: Consent of instructor. Fresh-
man and sophomore seminars offer lower division students the opportunity to 
explore an intellectual topic with a faculty member 
and a group of peers in a small-seminar setting. These 
seminars are offered in all campus departments; top-
ics vary from department to department and from 
semester to semester. Grading based on discussion and 
written work. (F,S,P)

93X. Directed Group Study. (1) Course may be 
repeated for credit. One hour of directed group study per 
week. Must be taken on a passed/not passed basis. 
Only for students enrolled in a lower-division history 
lecture course. An extra weekly session emphasizing 
writing and speaking skills, taken in addition to regu-
lar lecture and discussion.

Upper Division Courses

100. Special Topics in the Various Fields of His- 
tory. (4) Course may be repeated for credit. Four 
hours of lecture/discussion per week. Designed pri-
marily to permit the instructors to deal with a topic with 
which they are especially concerned, usually more re-
stricted than the subject matter of a regular lecture 
course. A combination of informal lectures and dis-
cussions, term papers, and examinations, with all 
grading by the instructor. Instructors and subjects to 
vary; consult department catalog during pre-enroll-
ment week each semester.

100X. Special Topics: Short Course. (1) Course 
may be repeated for credit. Course does not satisfy 
major requirement for history. Four hours of lec-
ture/seminar per week. Must be taken on a passed/not 
passed basis. An abbreviated version of History 100, 
lasting four weeks only. Topics and instructors vary. 
Consult department catalog for details.

101. Seminar in Historical Research and Writing 
for History Majors. (5) Three hours of seminar per 
week, individual research projects carried out in sem-
inar sections in various historical fields resulting in a 
lengthy paper, with readings and discussions on gen-
eral problems of historical inquiry. In addition to regular 
group class meetings with the instructor, research, 
and preparation totaling ten to twelve hours per week are required.

102. Colloquium on Historical Thought. (4) 
Two hours of seminar per week. Prerequisites: Completion of 
101; either junior honors standing or senior non-
honors standing. Consideration of the nature and func-
tion of historical thought as manifested in major his-
torical classics and selected historical problems. 
Required of honors program juniors; open, by per-
mission of instructor, to non-honors program seniors upon completion of 101.

103. Preseminar: Problems in Interpretation in 
the Several Fields of History. Course may be repeated 
for credit with consent of instructor. Three hours of 
seminar/discussion per week. Prerequisites: Consent of 
Instructor. Designed primarily for majors in his-
torical elementary training in historical criticism and re-
search. Emphasis will be placed on writing and dis-
cussion. For precise schedule of offerings, see 
department catalog during pre-enrollment week each 
semester.

103A. Ancient. (4)

103B. Europe. (4)

103C. England. (4)

103D. United States. (4)

103E. Latin America. (4)

103F. Asia. (4)

103H. Africa. (4)

103N. Canada. (4)

103S. History of Science. (4)

103U. Studies in Comparative History. (4)

105. Ancient Greece. Three hours of lecture and 
one hour of discussion per week.

105A. Bronze Age and Archaic. (4) Until ca. 500 B.C. 
The beginnings of civilization 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 suc-
cessors, the social, political and economic history of 
the new Hellenistic kingdoms, and the expansion of 
Greek culture into the Near East.

106. Ancient Rome. Three hours of lecture and 
one hour of discussion per week.

106A. The Roman Republic. (4) A history of Rome 
from the foundation of the city to the dictatorship of 
Caesar. The course examines the evolution of Repub-
lican government, the growth of Roman imperial-
ism, and the internal disruptions of the age of the 
Gracchi, Sulla, and Caesar.

106B. The Roman Empire. (4) A history of Rome from 
Augustus to Constantine. The course surveys the 
struggles between the Roman emperors and the sen-
atorial class, the relationship between civil and military 
government, the emergence of Christianity, and Ro-
man literature as a reflection of social and intellectual 
trends.

107. Topics in Ancient History. Three hours of lec-
ture and one hour of discussion per week.

107A. Ancient Athenian Law. (4) This course will con-
centrate on the courts and procedural law in their his-
torical development. Some attention will be given to 
distinctive features of Athenian law in comparison to 
other systems.

107B. The Age of Cicero. (4) Examinations of events, 
forces, trends involved in the fall of the Roman Rep-
plica 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) This course will examine the legal, social 
and political status of women in early antiquity as 
compared to the treatment of women in the imagina-
tive literature authored by the ancient Greeks.

108. Byzantium. (4) Three hours of lecture and one 
hour of discussion per week. The sacred, cultural, and 
religious history of the Near East and eastern Mediter-
anean world from late antiquity through the early middle 
ages. The survival of the Roman Empire in Byzantium, 
the Sassanian Empire in Iran, and the rise of Islam are the topics covered.

109A. Islamic History. (4) Three hours of lecture 
and one hour of discussion per week. The Middle East 
from the origins of Islam to the 19th 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 
emergence of Turkey and the Middle East: Seljuks, Ottomans, and Safavids.

109C. The Middle East From the 18th Century to 
the Present. (4) Three hours of lecture and one hour 
of discussion per week. The breaking of pre-modern 
empires and the formation of national states in the 
Arab world, Turkey, and Iran; Islam and nationalism.

110. Inner Asia. (4) Three hours of lecture and one 
hour of discussion per week. Origins, development, 
and dynamics of nomadic societies; history of the 
Seychann, Halang-ru, Huns, Turks, and Mongols; their 
relations with Greece, Rome, Iran, China, and Russia; 
consideration of Inner Asia by historians of the middle ages and 
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. Medieval and Early Modern India to the Coming 
of the British. (4)

114B. Modern South Asia. (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 lec-
ture 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 feudal-
ism, the medieval oligarchy, the rise of the gentry, 
peasant rebellions, late-imperial mercantilism, and 
modern student movements.

117B. Modern Chinese Intellectual History. (4) Tradi-
tional Chinese roots of 19th-Century reformist thought 
are traced; modern Sino-Western revolutionary na-
tionalism is analyzed through the overthrow of the 
Manchu, the rule of the Nationalists, and the rise of 
the Communists.

118. Japan. 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. 

*On leave, spring, fall
†Recalled to active service
‡Recipient of Distinguished Teaching Award
118B. Intellectual History of the United States. (4) Three hours of lecture and one hour of discussion per week.

132A-132B. Intellectual History of the United States. (4) Three hours of lecture and one hour of discussion per week.

133. Religion in American Society. (4) Three hours of lecture and one hour of discussion per week. Pre-requisites: Previous work in American history essential; some knowledge of European history desirable. American religious history from the beginnings to the present. Emphasis on the religious, doctrinal, and social effect. The course will treat varieties of Protestantism primarily, with some attention to Catholicism, Judaism, Eastern religions, and non-theist humanism.

134A-134B. The Age of the City. (4) Three hours of lecture and one hour of discussion per week. A cultural and social history of urban life in America, with emphasis on the nineteenth century.

135. American Economic History. (4) No credit for 135 after Econ 113. Three hours of lecture and one hour of discussion per week.

136. Women in American Society. (4) Three hours of lecture and one hour of discussion per week. A survey of the social history of American women, focusing on changes in women’s roles in society and popular attitudes toward women over the course of three centuries.

137. The Repealing of America. (4) 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 overview of the shifting 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 pre-industrial immigrants, through migration streams during the industrial and “post-industrial” eras of the nation. This course satisfies the American cultures requirement.

139. 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) Three hours of lecture and one hour of discussion per week. The history of Mexico from the colonial period (1519-1777) through the present. The liquidation and transformation of the Spanish empire 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) Three hours of lecture and one hour of discussion per week. History of the Andean region that now comprises modern Peru, Bolivia, and Ecuador, from the Indian period (fifth century) to the present.

143. Brazil. (4) Three hours of lecture and one hour of discussion per week. From 16th Century conquest and settlement to the emergence of an industrial econo- my and one hour of discussion per week. 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-indepen- dence rise of Buenos Aires and of the cattle export economy. The creation of the national state: immi- gration, modernization, agricultural expansion. The ex- haustion of the export economy; growing social and political conflicts.

150. Medieval England. Three hours of lecture and one hour of discussion per week. Emphasis on inter- pretation of primary sources.

150A. The Anglo-Saxon Period. (4) From the Romans through the Norman conquest (to Domesday Book and Eadmer).

150B. From the Conquest to 1290. (4) Government, observation of government, community, religion, and social change.


151. Modern Britain. Three hours of lecture and one hour of discussion per week. Prerequisites: An ele- mentary knowledge of the history of Western Europe. Survey history of Britain from approximately the Tudor period to the present.

151A. 1485-1660. (4)

151B. 1660 to the Present. (4)

152. Topics in British History. (4) Three hours of lecture and one hour of discussion per week.

153. British Empire and Commonwealth. (4) Three hours of lecture and one hour of discussion per week.

154. Canada. (4) Three hours of lecture and one hour of discussion per week. A survey of Canadian history, from exploration and first settlement through colonial expansion, Confederation and nationalhood 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 West- ern 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 re- peated once for credit with consent of instructor.

156A. History of Christian Thought, 200-600 A.D. (4) Three hours of lecture and one hour of discussion per week. Emphasis on the “symbolist” (rather than the “philosopher”) mentality which pervaded the patriotic and early medieval periods. Deals in its entirety with the period of the Church Fathers from Tertullian and Origen to Gregory the Great; particular stress on the thought of St. Augustine.

156B. Medieval Intellectual History, c. 1050-1270. (4) Three hours of lecture and one hour of discussion per week. Emphasis on the interplay between the sym- bolist non-linear thinking found mostly in monastic cir- cles and the growth of new forms of "scientific," linear thinking found in the newly established cathedrals and universities.

156C. The State in the Middle Ages. (4) Three hours of lecture and one hour of discussion per week. An in- quiry into the nature of the "State," the preconditions of its emergence in the late medieval ages, and its place in fundamental issues of political morality.

157. The Renaissance and the Reformation. (4) Three hours of lecture and one hour of discussion per week. European history from the fourteenth to the mid- dle of the seventeenth century. Political, social, and cultural development. The interplay between the religious and the secular will be examined, together with the rise of Renaissance culture, and the religious upheavals of the sixteenth century.

158. Modern Europe. Three hours of lecture and one hour of discussion per week.
158A. Early Modern and Revolutionary Europe. (4)
158B. 1815-1914. (4)
158C. 1914 to the Present. (4)

159. European Economic History. Three hours of lecture and one hour of discussion per week.
159A. European Economic History. (4) Survey of the economic and social developments of Europe up to the eve of industrialization. Including the transformation of peasant-based, agrarian economies, capitalist organization, colonial expansion, and international trade. This course is equivalent to Economics 111A; students will not receive credit for both courses.
159B. European Economic History. (4) The Industrial Revolution and the rise of the European economy to world prominence in the 19th century, emphasizing the diffusion of the industrial system and its consequences, the world trading system, the rise of modern imperialism. This course is equivalent to Economics 111B; students will not receive credit for both courses.

160. The International Economy of the Twentieth Century. (4) Three hours of lecture and one hour of discussion per week. Development and crises of the advanced economies, with particular emphasis on trade relations with third world countries. Economic impact on labor and social movements. This course is equivalent to Economics 115; students will not receive credit for both courses.

161. Emergence of Modern Industrial Societies. (4) Four hours of lecture per week. Survey of the development of the modern political economies of the United States, Europe, and Japan; evolution and interaction of the major institutions of advanced capitalist societies; differences and similarities of their business communities, labor organization, and patterns of government relationships with the private sector.

162A-162B. International History. (4-4) Three hours of lecture and one hour of discussion per week. European international relations in the 16th and 20th centuries, with emphasis on the political and economic forces shaping foreign policy and the international system.

163. Modern European Intellectual History. Three hours of lecture and one hour of discussion per week. Thought and art considered in their social and political contexts.
163A. From the Enlightenment to 1870. (4)
163B. From 1870 to the Present. (4)

164. Social History of Western Europe. Three hours of lecture and one hour of discussion per week. European Society before the Industrial Revolution. (4)
164B. European Society from 1750 to the Present. (4)

165. Topics in Modern European History. Three hours of lecture and one hour of discussion per week. State and Society in Europe since the Reformation. (4)
165A. State and Society in Europe since the Reformation. (4)
165B. The Revolution in European Culture since the Late 18th Century. (4)

166. Modern France. Three hours of lecture and one hour of discussion per week.
166A. Early Modern France to 1715. (4)
166B. Old Regime and Revolution. (4)
166C. Modern France. (4)

167. Modern Germany. Three hours of lecture and one hour of discussion per week.
167A. Early Modern Germany. (4)
167B. Germany in the 19th Century. (4)
167C. Germany in the 20th Century. (4)

168. Spain and Portugal. Three hours of lecture and one hour of discussion per week.
168A. From Earliest Times to 1715. (4)
168B. From 1715 to the Present. (4)

169. Modern Italy. (4) Three hours of lecture and one hour of discussion per week.
170. The Netherlands. (4) Three hours of lecture and one hour of discussion per week. The Lowlands from the earliest times to the present monarchy; emphasis on the Golden Age of the 17th and 18th Centuries.
171. Russia. Three hours of lecture and one hour of discussion per week.
171A. Russia to 1700. (4)
171B. Russia 1700-1917. (4)
171C. The Soviet Union, 1917 to the Present. (4)

172. Topics in Russian History. (4) Three hours of lecture and one hour of discussion per week.
173. History of Eastern Europe. Three hours of lecture and one hour of discussion per week.
173A. From Earliest Times to ca. 1500. (4)
173B. From 1500 to 1900. (4)
173C. From 1900 to Present. (4)

174A-174B. Jewish History. (4-4) Three hours of lecture and one hour of discussion per week. Jewish history from earliest times to the present.

180. Topics in the History of Biology. (4) Three hours of lecture and one hour of discussion per week.

181. Topics in the History of the Physical Sciences. Three hours of lecture and one hour of discussion per week.
181A. Astronomy and Astrology in Medieval and Early Modern Europe. (4) Pre-requisites: Strong grasp of plane geometry.
181C. Chemistry and its Past. (4)

182A. Topics in the History of Technology. (4) Three hours of lecture and one hour of discussion per week.

183. Topics in the History of Medicine. (4) Three hours of lecture and one hour of discussion per week.

185. History of Christianity. Three hours of lecture and one hour of discussion per week. Christianity as a cultural, social, and political force in world history and as it has responded to cultural, social, and political change from antiquity to the present.
185A. Beginnings to ca. 1250. (4)
185B. 1250 to the Present. (4)

190. Society and the Sexes in Europe and the US, 1750 to the Present. (4) Three hours of lecture and one hour of discussion per week. Sex roles, sexuality and gender systems in social, political, economic and cultural life. This is a comparative course: specific societies (at least two) and periods to be covered will vary by semester. It will focus on specific historical events, issues, and periods in which gender was an especially significant factor.

192. Early Modern and Historical Method. (4) Independent Research. Prerequisites: Senior honors standing. Directed study centering upon the preparation of an honors thesis. Supervisors will be assigned to each student after consultation with the honors committee.

193. European Social Studies. (4) Directed Group Study. (1) Course may be repeated for credit. Two hours of discussion per week. Must be taken on a passed/not passed basis. Prerequisites: Course must be an extension of an existing history course. Extra weekly sessions emphasizing writing and speaking skills, taken in addition to a regular upper division lecture course.

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Independent study must be taken on a passed/not passed basis. Prerequisites: Enrollment is restricted by regulations.

Graduate Courses

200X. Special Topics: Short Course. (2) Course may be repeated for credit. Four hours of lecture/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.

275. Core Courses in the Literature of the Several Fields of History. Course may be repeated for credit. Three hours of seminars per week. To provide a broad survey of the literature and historiographical problems of the different fields in history.

275A. Ancient. (4)
275B. Europe. (4)
275C. England. (4)
275D. United States. (4)
275E. Latin America. (4)
275F. Asia. (4)
275N. Canada. (4)
275S. History of Science. (4)

280. Advanced Studies: Sources/General Literature of the Several Fields. Course may be repeated for credit. Three hours of seminars per week. For precise schedule of offerings see department catalog during pre-enrollment week each semester.

280A. Ancient. (4)
280B. Europe. (4)
280C. England. (4)
280D. United States. (4)
280E. Latin America. (4)
280F. Asia (For M.A. Candidates). (4)
280G. Asia (Ph.D. Candidates). (4)
280H. Africa. (4)
280N. Canada. (4)
280S. History of Science. (4)
280T. Economic History. (4)

280U. Studies in Comparative History. (4)

281. Paleography and Other Auxiliary Sciences. (4) Course may be repeated for credit with different instructor. Three hours of seminar per week. Introduction to the scholarly handling of texts, whether ancient or modern, inscriptions or manuscripts, and instruction in the methodologies, tools, sources, and the editing and use of texts relevant to a particular field of history; instruction in any auxiliary science requisite for historical research.

282. Numismatics. (4) Three hours of seminar per week. The use of coins as an historical source; theory and practice.

283. Historical Method and Theory. (4) Three hours of seminar per week. Designed especially for candidates for higher degrees in History. Stress is laid on practical exercises. For precise schedule of offerings see department catalog during pre-enrollment week each semester.

284A-284B. Quantitative Approaches to History and Demographic History. (4-4) Three hours of seminars per week. Study and application to history of quantitative methods and theories (e.g., statistics, demography, computer science); the use of population materials for the study of social history.

284L. Laboratory Section. (1) Three hours of laboratory and one hour of lecture per week. Introduction to computing. This course teaches the use and application of packaged statistical and text-editing programs, emphasizing special skills of particular interest to historians. The course can be taken concurrently with History 284L, but is offered independently of other departmental courses.
285. Research Seminars. Three hours of seminar per week. For precise schedule of offerings see department catalog during pre-enrollment week each semester.

285A. Ancient. (4)
285B. Europe. (4)
285C. England. (4)
285D. United States. (4)
285E. Latin America. (4)
285F. Asia. (4)
285H. Africa. (4)
285L. Legal History. (4)
285N. Canada. (4)
285S. History of Science. (4)
285T. Economic History. (4)
285U. Studies in Comparative History. (4)

285. Supervised Research Colloquium. (2-5) Course may be repeated for credit. Two hours of directed reading; two to four hours of discussion per week. Prerequisites: Consent of instructor. Preparation, presentation and criticism of research papers.

296. Directed Dissertation Research. (3-12) Course may be repeated for credit. Independent. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Open to qualified students directly upon graduation.

298. Independent Study for Graduate Students in History. (2-12) Course may be repeated for credit. Independent. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of Instructor.

299. Directed Reading. (2-12) Course may be repeated for credit. Independent. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Individual conferences to be arranged. Intended to provide directed reading in subject matter not covered in scheduled seminars.

601. Individual Study for Master's Students. (1-8) Course may be repeated for credit. Course does not satisfy unit or residence requirements for master's degree. Independent. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: For candidates for M.A. degree. Individual study, in consultation with the graduate advisor, to prepare for student's language examinations and the master's examination.

602. Individual Study for Doctoral Students. (1-8) Course may be repeated for credit. Course does not satisfy unit or residence requirements for doctoral degree. Independent. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: For candidates for doctoral degree. Individual study, in consultation with the graduate advisor, to prepare students for language examinations and the doctoral examination.

Interdepartmental Studies Courses

Upper Division Course

IDS 100. History of American Technology. (4) Four hours of lecture per week. Survey of American technology from colonial times to the present. Analysis of technical innovation in its cultural, economic, and political setting. Topics include the Industrial Revolution, technology of war, diffusion of science in technology, industrialization and the use of corporations. Sponsoring departments: History and Electrical Engineering and Computer Sciences.

Humansities

(College of Letters and Science)

The humanities field major was closed to new students at the end of Summer Session 1992. The interdisciplinary studies field major (ISF), established in fall 1992, unites the former field majors in humanities and social sciences. The ISF major thus affords undergraduates a thoroughly interdisciplinary framework for their studies. The program allows students to establish areas of concentration in the humanities, the social sciences, or in areas that draw on both.

For further information, see the interdisciplinary studies field major listing in this catalog.

Immunology

(School of Public Health)

Office: 19 Warren Hall, 642-6531

Professors:
- James Allison, Ph.D. (Molecular and Cell Biology)
- Phyllis Blair, Ph.D. (Molecular and Cell Biology)
- James L. Hardy, Ph.D. (Biomedical and Environmental Health Sciences)
- Marian Kaishov, Ph.D. (Molecular and Cell Biology)
- G. Steven Martin, Ph.D. (Molecular and Cell Biology)
- George Savinichia, D.Crim. (Biomedical and Environmental Health Sciences)
- Constantine Tempelis, Ph.D. (Biomedical and Environmental Health Sciences)

Associate Professors:
- Gurteek Bhihing, Ph.D. (Biomedical and Environmental Health Sciences)
- Hirotaka Saito, Ph.D. (Molecular and Cell Biology)

Assistant Professor:
- Nishat Shehri, Ph.D. (Molecular and Cell Biology)

Senior Lecturer:
- Anne Good, M.D., Ph.D. (Molecular and Cell Biology)

Graduate Adviser: Mr. Tempelis.

The Group in Immunology offers the M.A. and Ph.D. degrees. A large portion of research and graduate training in immunology on this campus is carried out in two departments: Molecular and Cell Biology in the College of Letters and Science, and Biomedical and Environmental Health Sciences in the School of Public Health. The former emphasizes the molecular and cellular biology of the immune systems; the latter stresses the medical and public health aspects of immunology.

The diverse interests and backgrounds of faculty in the group give students a variety of choices and latitude in the selection of a research adviser to meet their special interests. In addition, there is a broad scope of courses from which to select.

Facilities for study and research by graduate students are located in the administrative units of the faculty members of the group.

Industrial Engineering and Operations Research

(College of Engineering)

Department Office: 4135 Etcheverry Hall, 642-5484
Chair: Ronald W. Wolf, Ph.D.

Professors:
- Iian Adler, Ph.D. Stanford University. Mathematical Programming
- Richard E. Barlow, Ph.D. Stanford University. Reliability theory
- Stuart E. Dreyfus, Ph.D. Harvard University. Artificial neural networks
- George Glasser, Ph.D. Cornell University. Production systems, mathematical optimization
- Doris S. Hochbaum, Ph.D. University of Pennsylvania. Combinatorial optimization, management information systems
- Richard M. Karp, Ph.D. Harvard University. Combinatorial optimization
- Robert C. Leachman, Ph.D. University of California at Berkeley. Manufacturing management
- Shmuel S. Ofen, Ph.D. Massachusetts Institute of Technology. Manufacturing, Queuing theory
- Candece Yano, Ph.D. Stanford University. Production and distribution systems planning
- Edward R.F.W. Crossman, Ph.D. (Emeritus)
- E. Paul DeGarmo, M.S. (Emeritus)
- Raymond C. Grassi, M.S. (Emeritus)
- James T. Lappley, Jr., M.S. (Emeritus)
- George S. Miller, Ph.D. (Emeritus)

Adjunct Professor:
- Vinay Sohoni, Ph.D.

Industrial engineering and operations research are closely related fields that deal with the design, analysis, and control of complex systems that include people, machines, materials, and information, and the interactions of such systems with their environments. Industrial management, often computer-based, are extensively used in systems analysis, while designs systems, as in other fields of engineering, require well-developed integrative skills and creativity. The theoretical foundations of optimization, stochastic systems, reliability, and engineering economics often form the basis for operations research studies. Industrial engineering frequently uses knowledge of production, human systems, incentives, organizational behavior, and automation in the design and improvement of goal-seeking systems. These methods may be applied to a great variety of human activities both in public and private sectors, including manufacturing, banking, health care, communications, waste management, transportation, and logistics.

Undergraduates in Industrial Engineering and Operations Research receive broad training in engineering fundamentals, principles of economics and advanced mathematics and statistics in order to prepare them for elecive sequences which stress the construction of systems models, the role of the human being in these systems, and the related mathematical and computer methods of optimization and control. A unified core program is offered both for students who wish to pursue the profession and for students who, after further education at the graduate level, wish to engage in teaching and research. In order to satisfy the needs of students with diverse objectives, considerable flexibility in planning individual programs is provided.

Curriculum for the Bachelor's Degree

A total of 120 units is required, including:

Lower Division Course Requirements. Mathematics 1A-1B, 50A-50B; Engineering 77, 45; Physics 7A-7B; Chemistry 1A; English 1A; and EECS 100 (or EECS 40 and 43). Also, six courses of at least 3 units each in humanities and social studies selected from an approved list of courses are required. Of these, at least one course must be an English composition course equivalent in content to English 1A, one must be from a list of selected courses in History and Cultures, one must be from a list of selected courses in the Natural and Physical Sciences, and two must be upper division courses. The English composition course and either the course in History and Cultures or that in Literature and Values must be taken for a letter grade. A min-
imun of two courses, at least one of which is in the
upper division, must be taken from a single de-
partment.

Upper Division Course Requirements. Statistics
134, 135; Engineering 120 and 190; Business Ad-
ministration 120 or 125; and the following courses in
Industrial Engineering and Operations Research:
110, 115, 130, 140, 150, 160, 161, 162, 170, and
180. Also required are 8 units of upper-division
courses numbered 100-199 in an IER department,
and 3 in the IER Department, to be approved by
the adviser.

Graduate Programs

Graduate programs leading to the M.S., M.Eng.,
Ph.D. and D.Eng. are offered in two interrelated ar-
eas of study.

Industrial Engineering. This program has been
developed to meet the needs of engineers who wish to
ehance their competence in the design, analy-
ysis, control, and operation of complex systems in
industrial, service, or public sectors, or to prepare
for managerial positions by gaining a broader per-
ductive view of management.

Operations Research. This program prepares
the student for advanced work in the theory and ap-
plication of system science. It emphasizes the de-
development and use of quantitative models for
the analysis, design, and optimization of complex sys-
tems. Students work in teams under faculty supervision.

Lower Division Courses

24. Freshman Seminars. (1) Course may be
repeated for credit as topic varies. One hour of sec-
time per week. Students must be placed in a lower-division ba-
sis. Section 2 to be graded on a pass/credit basis.
The Berkeley Seminar Program has been de-
dsigned to provide new students with the opportunity to
explore an intellectual topic as a faculty member in
a small-seminar setting. Berkeley Seminars are offered in
all campus departments, and topics vary from de-
partment to department and semester to semester.
(F,SP,STAFF)

Upper Division Courses

110. Interactive Computation of IER Models. (4)
Three hours of lecture and two hours of laboratory per
week. Prerequisites: Knowledge of a computer pro-
gr amis and introduction to personal com-
p urators for implementation and debugging of models
useful in IER. Fundamentals of the APL language,
with emphasis on developing, implementing, and test-
ing of user-controlled programs in software used in
software development, such as documentation, work-
space integration, file management, graphics dis-
play, and full-screen interaction. Intensive computa-
tional laboratory using models-chosen from upper-di-
vision IER course to project. (F) Jewell

115. Industrial and Commercial Data Systems. (3)
Two hours of lecture and two hours of laboratory per
week. Prerequisites: 110 and Engineering 7. Review
of information system functions, technology, and or-
ganization, emphasizing industrial and commercial ap-
plication requirements and economic performance cri-
teria. Introductory survey of systems-analysis, design,
modeling and implementation of tools and techniques.
Design-oriented term project. (SP) Adiga

130. Modelling and Simulation of Dynamic Sys-
tems. (3) Three hours of lecture per week. Prere-
qu iquisites: 134 or 135, Mathematics 110 or 120.
1nstructor in charge. Berkeley Seminar. Modelling and Sim-
ulation 304-506; Statistics 134. Concepts of dynamic
control systems, including feedback and stability. Char-
acteristics of linear and nonlinear systems. Practice in
modeling and simulation of dynamic systems of
moderate complexity. Simulation of nonlinear and
stochastic systems. (SP) Adiga

131. Computer Simulation of Industrial Engineer-
ing Systems. (3) Three hours of lecture per week.
Prerequisites: Statistics 134 or 135. Computer simula-
tion: Introduction to the use of computer simulation
models to perform data collection and analysis.
Design-oriented term project. (SP) Adiga

140. Introduction to Industrial Production Methods.
(3) Two hours of lecture and two hours of laboratory per
week. Prerequisites: Statistics 135. Selection of prod-
uction methods; manual vs. automated and fixed
or flexible or robot automatic; economic analysis.
Analysis of automated materials control systems and
flow and time study. Analysis of fixed automation; parts
feeders and handlers, work heads, design for assembly. Ana-
lysis of robots; kinematics, statics, sensors, and ef-
fector, robot cell design. Design project required. (SP)
Mendel

150. Production Systems Analysis. (3) Three hours
of lecture per week. Prerequisites: 162 or Engineering
102; Engineering 120; Statistics 134. Analysis of
integrated production systems; use of opera-
tions models and quantitative methods of operations
research. (F) Yano

153. Facilities Planning and Design. (3) Two hours
of lecture and two hours of discussion per week. Prere-
qu iquisites: 150. Consideration of mathematical mod-
els of layout line balancing and conveyor systems.
Analysis of integrated material control systems in-
volving functions of storing, delivering, delivery, inven-
tory, and computer control. Design of automated ware-
housing and order-picking system simulation. (SP)
Adiga

160. Operations Research I. (3) Two hours of lec-
ture and one hour of discussion per week. Prerequisites:
Mathematics 18B, Engineering 7. Deterministic meth-
o ds and models in operations research. Unconstrained
and constrained optimization. Equality, inequality, and
integer constraints. Linear and integer programming;
Resource allocation, equipment replacement, manage-
ment, inventory control, production planning. (F) Jew-
ell

161. Operations Research II. (3) Two hours of lec-
ture and one hour of discussion per week. Prerequisites:
Statistics 134. Probability review. Conditional expec-
tation. The exponential distribution and poisson pro-
cess. Markovian Queuing Systems. Component failure
and reliability systems. Applications to manufacturing,
transportation and inventory models. (SP) Ross

162. Linear Programming. (3) Two hours of lecture
and one hour of discussion per week. Prerequisites:
Mathematics 50A. Formulation to linear programs. Op-
timization and control problems in industrial and
environmental systems. Convex sets; properties of op-
timal solutions. The simplex method; theorem of du-
ality; complementary slackness. Problems of post-opt-
imization. Special problems: network, problems. Digital
computation. (F,SP) Growley, Hocking

164. Introduction to Inventory Control and Queuing
Models. (3) Three hours of lecture per week. Prere-
qu iquisites: Statistics 134 or 100A. Graphical represen-
tation of cumulative arrivals and departures, storage,
and delays. Analysis of deterministic and probabil-
istic systems. Stochastic arrival and departure process,
applications of Poisson processes.

165. Forecasting, Quality Control and Quality As-
surance. (3) Three hours of lecture per week. Prere-
qu iquisites: Statistics 134. Influence diagrams based on
the Bayesian approach are used to model engineering
problems with special emphasis on quality assurance
and quality control. Decision trees, probabilistic models
applied to problems in inspection sampling, and in pre-
diction and control of manufacturing production qual-
ity. (F) Bartow

166. Decision Analysis. (3) Three hours of lecture
per week. Prerequisites: 161 or equivalent. Statistics
134. Introduction to the use of quantitative models and
formulations of decision analysis. Elective course that pro-
vides a systematic evaluation of decision making problems
under uncertainty. Emphasis on the formulation, analy-
sis, and interpretation of decision-making techniques in
Includes formulation of risk problems and probabilistic
or risk assessment graphs. Graphical methods and computer
software for data evaluation and decision making. Statis-
tical and influence diagrams that focus on model design.
(F,SP) Staff

170. Human Factors for Engineering Design. (3)
Two hours of lecture and two hours of laboratory per
week. Prerequisites: 140 or consent of Instructor.
Introduction to the design of human interfaces for en-
grineering systems, with emphasis on the control of
complex processes. Analysis of rational-human deci-
sion making providing formal definitions of “actor,”
“states” and “observations” and optimal decision mak-
ing rules. Design and evaluation of methods for illu-
strating the control of human behavior in the process control.
Rapid prototyping and development of interfaces through User Information Management
Systems (UMIS). Laboratory exercises and a design
project using UMIS undertaken. (F) Mendel

171. Introduction to Design of Human Work Sys-
tems and Organization. (3) Three hours of lecture
per week. Prerequisites: 140 or consent of Instructor.
Qualitative and quantitative models and techniques used
to maximize labor productivity, employee satisfac-
tion, and organizational effectiveness in industrial, ser-
tice, and public service systems. Labor requirements and task
performance factors; intrinsic and extrinsic motivation;
job design; formal and informal organization; leader-
ship and group behavior; sociotechnical systems; com-
putational and field projects undertaken. (F) Staff

(3) Two hours of lecture and two hours of discussion
per week. Prerequisites: 130, 150, 161 and 162 or Me-
chanical Engineering 102A, IER major or Manufac-
turing Engineering 7. Discussion of synthesis and de-
sign analysis and industrial engineering to the
analysis, planning, and/or design of industrial or gov-
ernmental systems. Consideration of technical and eco-
nomic aspects of design and process design. Students work in
teams under faculty supervision. Topics vary yearly. Written reports in lieu of final exam.
(SP) Staff

189. Directed Group Studies for Advanced Un-
dergraduates. (1-4) Course may be repeated for

*On leave, spring
*Recalled to active service
†Recipient of Distinguished Teaching Award
credit. Must be taken on a passed/not passed basis. 
Prerequisites: Senior standing in Engineering Group and consent of instructor. Four units and contact hours will have a one-to-one ratio. (F,SP) Staff

199. Supervised Independent Study. (1-4) Course may be repeated for a maximum of four units per semester. Individual conferences. Must be taken on a pass/fail basis. Two semester units. Consent of instructor and major adviser. Supervised independent study. Enrollment restrictions apply. (F,SP) Staff

Graduate Courses

215. Analysis and Design of Databases. (3) Two hours of lecture per week. Prerequisites: 262A or consent of instructor. Database requirements determination and analysis. Conceptual design of database structures using logical data models. Implementation using Database Management System Software on mainframe and/or personal computers. Interaction between databases and concepts in Artificial Intelligence. Design projects undertaken. (F) Adiga

220. Economics and Dynamics of Production. (3) Three hours of lecture per week. Prerequisites: 262A or may be taken concurrently). This is a second year graduate course concerning system reliability analysis; coherent structures; fault trees; reliability data analysis; reliability, availability and maintainability; reliability of complex systems; and reliability and maintainability considerations and performance evaluation. (SP) Ross

255. Reliability Theory. (3) Three hours of lecture per week. Prerequisites: 262A (may be taken concurrently). A second year graduate course concerning system reliability analysis; coherent structures; fault trees; reliability data analysis; reliability, availability and maintainability; reliability of complex systems; and reliability and maintainability considerations and performance evaluation. (SP) Ross

266. Network Flows and Graphs. (3) Three hours of lecture per week. Prerequisites: 262A (may be taken concurrently). Survey of solution techniques and problems that have formulations in terms of flows in networks (Max-flow min-cut theorem). Minimum cost flows. Multicommodity networks. Relations with linear programming, transportation problems, electrical networks and critical path scheduling. (SP) Adler


280. Applied Dynamic Programming. (3) Three hours of lecture per week. Prerequisites: 262A or equivalent. An advanced course in terminological process problems, analytical and computational techniques of solution, application to problems of equipment replacement, resource allocation, scheduling, search and routing. Brief introduction to decision making under risk and uncertainty. (SP) Dreyfus

290A. Advanced Mathematical Programming I. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Mathematics 110. 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). Polynomial time algorithms. Introduction to network flows models. Optimality conditions for non linear optimization problems. (F) Adler

290B. Advanced Mathematical Programming II. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Math 110 or equivalent. Basic first year graduate course in optimization of non-linear programs. Formulation and model building. Theory of optimization for constrained and unconstrained problems. Algorithms for non-linear optimization with emphasis on design considerations and performance evaluation. (SP) Oren

293A. Applied Stochastic Process I. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Statistics 154 or Statistics 206A. Con- ditional Expectation. Poisson and renewal processes. Renewal reward processes with applications to inventory, congestion, and network models. Discrete and continuous time Markov chains; with applications to various stochastic systems—such as exponential queueing systems, inventory models and reliability sys- tems. (F,SP) Wolf, Jewett

293B. Applied Stochastic Process II. (3) Three hours of lecture per week. Prerequisites: 262B and 262A. Continuous time Markov chains. The reversed chain concept in continuous time Markov chains with applications of queueing theory. Semi-Markov processes with emphasis on applications to reliability and inventory models. Non-Markovian models with applications. Introduction to Martingales. (SP) Ross

295. Logical Programming. (3) Three hours of lecture per week. Prerequisites: 262A or equivalent. A project course for students interested in applications of operations research and engineering methods. One or more systems, which may be public or in the private sector, will be selected for detailed analysis and re-designed by student groups.


299B. Dynamic Programming and Calculus of Variations. (3) Three hours of lecture per week. Prereq- uisites: 262A or equivalent. The necessary conditions of optimal control theory will be derived and interpreted, using dynamic programming.


299D. Bayesian Decision Analysis. (3) Three hours of lecture per week. Prerequisites: 262A or equivalent. A baysian decision oriented course at the graduate level concerned with solving engineering problems of a statistical nature. Emphasis will be on using influence diagrams and the Bayes model and will include design of experiments; multivariate decision making; cali- bration of measuring instruments, quality assurance, etc. (F) Barlow


299F. Advanced Mathematical Programming. (3) Three hours of lecture per week. Prerequisites: 262A. Selected topics in mathematical programming. The actual subjects covered may include: Convex analysis, duality theory, complementary pivot theory, fixed point theorems, optimization, algorithms, methods, ad- vanced topics in nonlinear algorithms, complexity of mathematical programming algorithms (including lin- ear programming).


299L. Logistics Modeling. (3) Two hours of lecture and one hour of laboratory per week. Prerequisites: 262A, 269. May be concurrent. Logistics covers: When and where (materials, equipment, energy and labor) should be produced, stored, and transported. The objectives are to teach students how logistics systems operate; to develop and verify logistics models; and to use models to improve system operations. Systems will be considered control, management, and physical systems. Models covered include networks, analytical approximations, graphs, and physical models.

299M. Constructing Probability Models for Engi- neering Systems. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 262A and Math 202A, or consent of instructor. Oper- ational methods for dealing with uncertainty in engi- neering systems. Applications to quality inspection, re- liability analysis, Newtonian and relativistic mechanics.
elasticiy and plasticity theory, thermodynamics, and other mathematical topics necessary for the understanding of the principles underlying the various theories of materials.

290L. Pricing Policies. (2) Two hours of lecture per week. Prerequisites: 262A, Economics 201A or consent of instructor. A study of the pricing policies of various firms, both domestic and international, from the point of view of the buyer and seller. Topics will vary from year to year. (SP) Staff

290R. Topics In Risk Theory. (3) Three hours of lecture per week. Prerequisites: 263A. Seminar on selected topics from financial and technological risk theory. Topics will include risk modeling, decision theory, portfolio management, and special topics in risk management. Emphasis will be on the use of mathematical models in the analysis of risk. (SP) Staff

290S. Object-Oriented Data Systems for Industrial and Commercial Applications. (2) Two hours of lecture per week. Prerequisites: 215 or equivalent. Analysis and design of industrial and commercial systems incorporating object-oriented data abstractions within a framework of object-oriented programming languages. Topics include object-oriented design and programming; object-oriented software engineering; object-oriented project management; object-oriented software development; object-oriented database management; object-oriented system analysis and design; object-oriented application development; object-oriented software engineering tools; and object-oriented software architectures. Examples include manufacturing applications. (SP) Staff

298. Group Studies, Seminars, or Group Research. (1-4) Course may be repeated for credit. Seminars. Sections 1-4 to be graded on a satisfactory/unsatisfactory basis. Advanced seminars in industrial engineering and operations research. (F,SP) Staff

299. Individual Study or Research. (1-12) Course may be repeated for credit. Individual conferences. Sections 1-12 to be graded on a satisfactory/unsatisfactory basis. Individual study for the comprehensive examination or the master's degree. (F,SP) Staff

601. Individual Study for Master's Students. (1-12) Course may be repeated for credit. Individual conferences. Must be taken on a satisfactory/unsatisfactory basis. Individual study for the comprehensive examination or the master's degree. Units may be used toward either the unit or residence requirements for the master's degree. (F,SP) Staff

602. Individual Study for Doctoral Students. (1-12) Course may be repeated for credit. Individual conferences. Must be taken on a satisfactory/unsatisfactory basis. Individual study in consultation with the major field adviser. Units may be used toward either the unit or residence requirements for the doctoral degree. (F,SP) Staff

Professional Courses

301. Teaching Assistant Training. (1-4) Course may be repeated for credit. One meeting per week with faculty member. Must be taken in a satisfactory/unsatisfactory basis. One meeting per week with faculty member discussing teaching methods including: text selection, clarity of oral delivery, use of visual aids, media resources; discussion hours. (F,SP) Staff

Integrative Biology (College of Letters and Science)

Department Office: 345 Mulford Hall, 642-5281 Graduate Student Services: 355 Mulford Hall, 642-7204 Graduate Student Services: 357 Mulford Hall, 642-5130 (Admissions) 642-5204 (Graduate Assistant)

Chair: Jere H. Lips, Ph.D.

Professors:

L. J. Goodwin, Ph.D. Iowa, Invertebrate behavioral biology F. Stuart Chapin, Ph.D. Stanford University, Physiological ecology

William A. Clemens, Jr., Ph.D. University of California at Berkeley, Mammalian paleontology, fusal analysis

Michael D. Gans, Ph.D. University of California at Berkeley, Neuroendocrinology, anatomy, hormones

Harry W. Greene, Ph.D. University of Tennessee, Herpetology and evolutionary biology

Carole Hodges-Dixon, Ph.D. Stanford University, Invertebrate functional morphology

Ned K. Johnson, Ph.D. University of California at Berkeley, Centipede, University of California at Berkeley, Arachnida

Donald R. Kaplan, Ph.D. University of California at Berkeley, Developmental morphology of vascular plants

Mimi A. Koehl, Ph.D. Stanford University, Invertebrate functional morphology and biomechanics

Licht, Ph.D. Michigan, Comparative physiology and endocrinology

William L. Lidicker, Jr., Ph.D. University of Illinois at Urbana-Champaign, Wildlife, unresearch

Jere H. Lips, Ph.D. University of California at Los Angeles, Paleontology of marine invertebrates

Charles S. Nicoll, Ph.D. Michigan State University, Homology and evolutionary morphology

James L. Patton, Ph.D. University of Arizona, Morphology and evolutionary ethology

Theo E. Rutow, Ph.D. Stanford University, Primate behavioral reproduction and cycles

Montgomery W., Ph.D. Harvard University, Theoretical evolutionary biology

Wayne F. Sousa, Ph.D. University of California at Santa Barbara, Marine ecology

Glenn J. Thomson, Ph.D. University of Melbourne, Microanatomy and functional biology

David W. Wake, Ph.D. University of Southern California, Herpetology and morphology

Marjorie H. Wake, Ph.D. University of Southern California, Vertebrate evolutionary morphology and reproductive biology

Max Allert (Emeritus), Ph.D. Columbia University, Cytology Zash M. Arnold (Emeritus), Ph.D. University of California at Berkeley, Biology of Paramphibia

Jerbet G. Baker (Emeritus), Ph.D. University of London, Evolution and ecology

George W. Barlow (Emeritus), Ph.D. University of California at Los Angeles, Ethology and ethology

Howard A. Bern (Emeritus), Ph.D. University of California at Berkeley, Phylogenetics and tumor biology

Lincoln Constance (Emeritus), Ph.D. University of California at Berkeley, Systematics J. Wyatt Durham (Emeritus), Ph.D. University of Washington, Cambrian and Tertiary invertebrate paleontology

Richard M. Einhorn, Ph.D. Drexel University of Pennsylvania at the University of Pennsylvania, Paleontology of lower vertebrates

Joseph T. Gregory (Emeritus), Ph.D. University of California at Berkeley, Paleontology of lower vertebrates

Cedric H. Haggard, Ph.D. University of California at Berkeley, Invertebrate zoology

Thomas H. Jukes, Ph.D. D.Sc. University of Toronto, Molecular evolution

Herbert L. Kier, Ph.D. University of California at Berkeley, Systematics and phylogeny

Robert O'Malley (Emeritus), Ph.D. University of California at Berkeley, Systematics and phylogeny

Oliver P. Pearson (Emeritus), Ph.D. Harvard University, Paleontological evidence in paleoecological studies

Frank A. Platte (Emeritus), Ph.D. University of California at Berkeley, Evolutionary biology

Donald E. Savage (Emeritus), Ph.D. University of California at Berkeley, Paleontology, palaeoecology, and evolution biology

James W. Valentini (Emeritus), Ph.D. University of California at Los Angeles, Paleontology and evolutionary biology

*On leave, spring, fall

*On leave, fall

Associate Professors:

Antony D. Baramski, Ph.D. University of Washington, Seattle, Comparative ichthyology

Thomas O. Dunning, Ph.D. University of Michigan, Computer science, computer-assisted methods

Robert J. Full, Ph.D. State University of New York at Buffalo, Comparative animal physiology

Kenneth A. Geiser, Ph.D. Yale University, Paleontology of lower vertebrates

Mary E. Power, Ph.D. University of Washington, Freshwater ecology

Rudolf Schmidt, Ph.D. University of Michigan, Comparative morphology of vascular plants

Seth B. Benson (Emeritus), Ph.D. University of California at Berkeley, Mammalology

Wayma L. Fry (Emeritus), Ph.D. Cornell University, Paleobotany, palaeoenvironments of plants

John E. Simpson (Emeritus), Ph.D. Rice University, Parasitology

Assistant Professors:

Carla D'Antonio, Ph.D. University of California at Santa Barbara, Plant physiology and ecology

Craig W. Osenberg, Ph.D. Michigan State University, Community ecology

Deborah P. Perry, Ph.D. University of Washington, Seattle, Invertebrate zoology

Professors:

Brent Berlin, Ph.D. Stanford University, (Anthropology) Evolutionary anthropology

Donald R. Lees, Ph.D. University of California at Berkeley, Developmental morphology of vascular plants

Raymond A. Keller, Ph.D. University of Chicago, Behavioral and population biology

David R. Liljeborg, Ph.D. University of California at Santa Cruz, Invertebrate paleontology

Donal P. Weston, Ph.D. College of William and Mary, Marine biology

Undergraduate Advisers: Mr. Samson, Ms. D'Antonio, Ms. Diamond, Mr. Greene, Mr. Johnson (chair), Mr. Licht, Mr. Lidicker, Mr. Padian, Ms. Perry, Ms. Power, Mr. Rowell, Mr. Schmid, Mr. Sousa, Mr. Wake.

Graduate Advisers: Mr. Caldwell, Mr. Chapin, Mr. Cierny, Mr. Duncanson, Mr. Hermsen, Mr. Koehl, Mr. Osenberg, Mr. Padian, Mr. Schwartz (chair), Ms. Thompson, Ms. Wake.

Undergraduate Program

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 department has special strength in the disciplines of morphology, organismal physiology, ethology, ecology, systematic biology, paleobiology, and evolution. A basic undergraduate course in these subjects in physical sciences and mathematics provides the foundation for the major. The upper division major program consists of a selection of courses representing the areas of genetics, plant diversity, animal diversity, and morphology, organismal physiology, and development. These core courses guarantee (1) instruction in the fundamental principles of experimental and theoretical research, (2) exposure to the structure, function, and relationship of a biological sample of plant and animal taxa, and (3) experience in field and laboratory approaches to the study of both living and fossil organisms. Additional upper division science courses should be taken to bring the total to 30 units toward completion of the major. This provides the background necessary for eventual graduate work, or other professional training programs, or a general education in biology.
Courses for Nonmajors

The department offers a series of courses for students not specializing in integrative biology. These courses consider the general principles of biology from a variety of viewpoints, ranging from the molecular to the behavioral and evolutionary. Several offerings also cover areas different from subsequent major courses, providing a useful introduction for students considering a major in integrative biology.

The Major

Lower Division. Required of all students in the major: Biology 1A (4), 1B (4); Chemistry 1A (4), 1B (4); Mathematics 16A (3), 16B (3), 18 (3), or Physics 1A (4), 1B (4). More advanced courses may be substituted for those listed above, with an adviser's approval. Recommended: Additional course work in mathematics, statistics, biochemistry, the history of biology, and foreign language(s).

Upper Division. Students must complete course work in all five core areas. Courses in at least three of these core areas should be in integrative biology:


2. A course in morphology and/or development. Options: IB 110 (2)/110L (2), IB 111 (2)/111L (2), IB 130 (4)/130L (2), IB 131 (3)/131L (2), IB 100 (2)/100L (2) [same as PB 100 (2)/100L (2), MB 131 (3), PB 130 (3)/130L (1)].

3. A course in organismal physiology. Options: IB 149 (2), IB 140 (4), IB 148 (4)/148L (3), IB 150 (3)/150L (3), IB 151 (3)/151L (1), MCB 160 (4)/160L (2), PB 135 (3)/135L (1), PB 140 (3), Entomol. Sci. 103 (3)/103L (2), Psych. 116 (3).

4. Two courses (lecture/lab) in organismal diversity. At least one lecture/lab course must involve significant field experience. (Please note: Lecture/lab constitutes one course.) It is recommended that both plant and animal diversity be included. Options: IB 101 (2)/101L (2), IB 102 (3)/102L (2), IB 103 (3)/103L (2), IB 104 (3)/104L (2), IB 143 (3)/143L (2), IB 168 (2)/168L (2), IB 176 (2)/176L (3), IB 181 (2)/181L (3), IB 182 (2)/182L (3), IB 183 (3)/183L (1), PB 110 (4), PB 120 (4), Entomol. Sci. 100 (4).

5. A course in ecology and/or behavior. It is recommended that both areas be included to complete the major. Options: IB 105 (3), IB 144 (4), IB 145 (3)/145L (3), IB 153 (3)/153L (3), IB 154 (3)/154L (3), Entomol. Sci. 106 (3), Entomol. Sci. 103 (3)/193L (1), Forestry 179 (3), Psych. 115B (4), IDS 122 (4).

In addition to the laboratory course specified in area 4 above, at least two additional upper division laboratory courses must be taken. It is recommended that majors include courses in both animal and plant biology in their programs.

Students who major in integrative biology will gain general knowledge in the biological sciences which will provide an excellent foundation for students interested in pursuing various health-related professions, or in various fields in human biology (e.g., psychology, sociology, demography, political science, resource management) or for those interested in biology of organisms and wish to pursue graduate studies in various subdisciplines such as marine biology, ecology, behavior, paleontology, and evolution, to name a few.

An undergraduate brochure is available from the Integrative Biology Department, Undergraduate Studies Office.

Graduate Program in 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 other appropriate backgrounds are encouraged to enter the program. The Department of Integrative Biology offers the M.A. by either thesis or examination, details of which may be obtained from the Department of Integrative Biology. The Ph.D. varies considerably, according to the background and interests of individual students. All candidates for the Ph.D. must pass an oral qualifying examination. 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 a required part of the Ph.D. program in integrative biology. Details of the program may be obtained from the department office.

Graduate 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. Independent study and internship opportunities are available to students who are especially interested in plants. The garden is rich in succulents and South American, South African, European, and Asian plants, as well as a Chinese medicinal herb garden and other ethnobotanical collections. New research opportunities are being added to the Director, Botanical Garden, University of California at Berkeley; Berkeley, CA 94720.

The Cancer Research Laboratory is a research institute and repository for specimens and information related to terrestial vertebrates. It has a large and growing collection of mammals, birds, reptiles, and amphibians. Research activities center on problems in evolutionary biology, with particular emphasis on systematic, morphological, paleontological, and ecological relations in undisrupted communities. Quallified graduate students and visiting researchers may use the facilities of the museum and the 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.

The Field Station for Behavioral Research is a research institute that supports behavioral studies on animals under natural and seminatural conditions.

Located on 20 acres of wooded hillsides at the top of Strawberry Canyon just to the rear of the central campus, the field station maintains and observes a variety of animal species. Faculty from several Berkeley departments including Integrative Biology, Earth and Planetary Sciences, and Environmental Studies, conduct research at the field station. Research facilities are available for graduate and postdoctoral research with the approval of the director. People interested in the field station may contact the director via the Department of Integrative Biology.

The Museum of Paleontology, a research and reference archive for faculty, staff, students, and qualified visiting scholars, has large collections of fossil vertebrates, invertebrates, protists, and plants, as well as collections of valuable library materials. The museum's vertebrate faunas include mammals, birds, reptiles, amphibians, fishes, and invertebrates ranging from coral reefs, lagoons, coastal beaches, backbay streams, wetlands and mountain forests. The terrestrial vertebrate fauna is sparse but unique, and the insect fauna is diverse. The marine fauna is about twice as rich as that in Hawaii. For further information, write to Professor Werner Loher, Director, Department of Entomology, Weillman Hall, University of California at Berkeley; Berkeley, CA 94720.

The Museum of Vertebrate Zoology is a research institute and repository for specimens and information related to terrestial vertebrates. It has a large and growing collection of mammals, birds, reptiles, and amphibians. Research activities center on problems in evolutionary biology, with particular emphasis on systematic, morphological, paleontological, and ecological relations in undisrupted communities. Quallified graduate students and visiting researchers may use the facilities of the museum and the 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.

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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 development, form and function, and life history of angiosperms and gymnosperms; flowering plant morphology; structure of roots, stems, leaves; reproductive biology; life cycle; angiosperm pollination; plant physiology; photosynthesis; and respiration; plant and animal interspecific interactions; classification; and diversity. Students who have completed at least 60 units and are in campus academic standing are encouraged to seek faculty sponsorship for independent study and research. Contact the Student Services Office for more information.

Note: Transfer students with 58-70 units must have had general chemistry and general biology. Those with more than 70 units also should have completed course work in organic chemistry.

Honors Program. Students with a GPA of at least 3.3 overall and in the major may enter the honors program at the beginning of the senior year. They must find an appropriate faculty sponsor for the work they wish to do and enroll in a written research In the honors thesis course. Students who have completed the thesis course are required to present the results of the work, in a written report, to the Honors Program. In order to graduate with honors, students must finish their work with a 3.3 grade-point average or higher overall and in the major.

Hons Honor Program. Students with a GPA of at least 3.3 overall and in the major may enter the honors program at the beginning of the senior year. They must find an appropriate faculty sponsor for the work they wish to do and enroll in a written research In the honors thesis course. Students who have completed the thesis course are required to present the results of the work, in a written report, to the Honors Program. In order to graduate with honors, students must finish their work with a 3.3 grade-point average or higher overall and in the major.
function; population genetics, ecology and evolution. Integration is the hallmark of the biological sciences, but open to all qualified students. Students must take both Biology 1A and 1B to complete sequence. Sponsored by Integrative Biology. (F, SP)

Liddicker, Schmid (F); Patton, Feldman, Resh (SP)

Note: Biology 1A and 1B are each taught both semesters, and students may enroll in either (but not both) during the fall or spring semester. Neither is a prerequisite for the other.

Biology 11. Introduction to the Science of the Living Organisms. (4) This course is jointly taught by Integrative Biology and Plant Biology. For course description see sections on Biology or Plant Biology.

15. Plant and Fungal Biology. (2) Students will not receive credit for 15 after taking Botany 10. Two hours of lecture per week. Prerequisites: 15L. (Must be taken concurrently). Open without prerequisite to all students and designed for those not specializing in the biological sciences. Formerly lecture portion of Botany 10. Fundamental concepts of biology as illustrated by the structure and function of plants and fungi. (SP) Schmid

15L. Laboratory in Plant and Fungal Biology. (1) Students with credit for Botany 10L may not receive credit for 15L. Two hours of laboratory per week. Prerequisites: 15L. (May be taken concurrently). Open without prerequisite to all students and designed for those not specializing in the biological sciences. Formerly laboratory portion of Botany 10. Laboratory study of structure and function of plants. (SP) Schmid

24. Freshman Seminars. (1) Course may be repeated for credit. One hour of seminar per week. Sections 1-4 to be graded on a letter-grade basis. Sections 5-8 to be graded on a passed/not passed basis. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F, SP) Staff

30. Animal Biology. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Open to all students, but designed for those not specializing in biology. Formerly Zoology 10. Principles and concepts of animal biology introduced through selected topics at the cellular, organismal, and population levels of organization. (F) Licht

31. Animal Biology: A Behavioral View. (3) Students will receive no credit for 31 after taking 149 or an Interscience 149 course. Three hours of lecture and one hour of film/demonstration and one hour of discussion per week. Prerequisites: Open to all students; designed for those not specializing in biology. Formerly Zoology 10. An introduction to the study of behavior, with broad coverage of major animal groups. Special attention will be paid to the emerging discipline of behavioral ecology. (F) Staff

32. Primate Biology. (2) Two hours of lecture per week. Formerly Zoology 14. An introduction to the order of primates. This course will focus on the structure, function, and behavior of primates and the principle principles of evolution. (SP) Tobalski

33. Topics in Paleontology: The Age of Dinosaurs. (3) Both 33 and 34 may be taken with credit for consent of instructor. Three hours of lecture per week. Formerly Paleontology 20. 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. (SP) Kapler

34. Topics in Paleontology: The Age of Mammals. (2) Both 33 and 34 may be taken with credit for consent of instructor. Two hours of lecture per week. Formerly Paleontology 2E. Open without prerequisite to all students and designed for those not specializing in paleontology. An introductory survey course on mammalian evolution. It will emphasize evolutionary theory, adaptation, mammalian diversity through time, and current issues in mammalian paleontology. (SP) Barbour

35. People in the Tropics. (2) Two hours of lecture per week. The course will deal with the nature of socialization in biology. Formerly Zoology 12. Natural history of human in the tropics, with emphasis on ecological relations between humans and other species. (SP)

36. The Brain: Its Potential. (2) Two hours of seminar per week to be taken on a passed/not passed basis. Prerequisites: Freshman standing. Formerly Anatomy 29. Exploring the biological basis of behavior. Beginning at the cellular level and working into the systems of the brain.

39. Topics in Integrative Biology. (2) Two hours of discussion per week. Must be taken on a passed/not passed basis. Open to freshmen; consent of instructor is required. Reading and discussion of the literature on particular topics in the field of integrative biology. Term paper and oral presentation. Section topics will vary from semester to semester. Students should check with department secretary for each semester's offerings. (SP) M. Wake

41. Marine Mammals. (2) Two hours of lecture per week. Prerequisites: Designed for those not specializing in Integrative Biology. A survey of marine mammal biology, emphasizing the developmental and social aspects of marine mammals, and their interaction with the ocean environment.

60. Evolutionary Biology—An Introduction for Non-Biology Majors. (2) Two hours of lecture and one hour of discussion per week. This course assumes no background in science. It will cover the history of evolutionary ideas, Darwin's theory and more modern developments. The emphasis is on the major features of the fossil record. Particular attention will be paid to recent controversies in evolutionary biology. (F) Staff

80. Life, Climates and Ecologies of the Past. (2) Two hours of lecture per week. Formerly Paleontology 15. Changes in plant and animal associations and interrelationships are traced in the context of environmental and climatic changes that took place throughout geologic time. Emphasis placed on using knowledge of modern ecologic relationships to understand those of the past. (SP)

82. Introduction to the Oceans. (2) Two hours of lecture and one hour of discussion per week. Formerly Oceanography 25. Prerequisites: To have had one of the following courses at a high school level: physics, chemistry or biology is recommended. Formerly Paleontology 25. The geology, physics, chemistry and biology of the ocean's surface layers and its relation to the rest of the world oceans. The application of oceanographic sciences to human problems will be explored through special topics such as energy from the sea, marine pollution, food from the sea and climate change. (F) Lipps

96. Supervised Independent Study and Research. (1-3) Courses may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: GPA of 3.4 or greater. Formerly Botany 96. Physiology 96, Anatomy 96. Lower division independent study and research leading to the preparation of the academic junior or senior student. Enrollment only with prior approval of faculty adviser directing the research. (F, SP) Staff

Upper Division Courses

100. Principles of Plant Morphology. (2) Two hours of lecture per week; Prerequisites: Botany 1A-1B, must be taken concurrently with 100L. Formerly lecture portion of Plant Biology 130. An analysis of the structural diversity of multicellular plants, especially flowering plants, conifers, and ferns. Of keys in identification of the native and introduced members of the native flora. (SP) Staff

100L. Laboratory for Principles of Plant Morphology. (2) Six hours of laboratory per week. Prerequisites: Botany 1A-1B; must be taken concurrently with 100L. Formerly laboratory portion of 130. Laboratory designed to accompany 100, Principles of Plant Morphology. Also listed as Plant Biology 100L and Interdepartmental Studies 100L. (SP) Staff

101. Diversity of Plants and Fungi. (2) Two hours of lecture per week. Prerequisites: Biology 1A-1B. Must be taken concurrently with 101L. An integrated treatment of the biology and evolution of the major groups in the plant, algal, and fungal kingdoms. Also listed as Interdepartmental Studies 101L. (SP)

101L. Laboratory in the Diversity of Plants and Fungi. (2) Four hours of laboratory per week and two 1-day field trips. Prerequisites: Biology 1A-1B. Must be taken concurrently with 101L. Laboratory for 101. Also listed as Interdepartmental Studies 101L and Plant Biology 101L.

102. Introduction to California Plant Life. (2) Two hours of lecture per week. Prerequisites: Must be taken concurrently with 102L. Formerly Botany 125. The relation of California plants and plant communities to soils, climate and the geologic history and recent Pleistocene. Also listed as Plant Biology 102L. (SP) Staff

102L. Laboratory in California Plant Life. (2) Three hours of laboratory per 102. Formerly Botany 125. Laboratory survey of major California flora. In the field and in the lab, emphasis on methods of keys in identification of the native and introduced flowering plants, conifers, and ferns of the state. (SP) Staff

103. Invertebrate Zoology. (3) Three hours of lecture per week. Prerequisites: Must be taken concurrently with 103L. Formerly Zoology 188. Laboratory study of invertebrate diversity and functional morphology, and field study of the natural history of local marine invertebrates. (SP) Kopald, Penny

104. Natural History of the Vertebrates. (3) Three hours of lecture per week. Prerequisites: Must be taken concurrently with 104L. Formerly Zoology 107. An introduction to the vertebrates, exclusive of fish. (SP) Johnson, Green

104L. Vertebrate Natural History Laboratory. (2) Three hours of laboratory and a four hour field trip per week plus special field projects. Prerequisites: Biology 1A-1B. Must be taken concurrently with 104L. Formerly Zoology 107L. Laboratory and field study of local vertebrates exclusive of fish. (SP) Johnson, Green

105. General Ecology. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Biology 1A or 11 or equivalent. Formerly Biology 150. An introduction to the principles of ecology, stressing the development and dynamics noted for the academically junior student. Enrollment only with prior approval of faculty adviser directing the research. (F, SP) Staff

106. Biological Oceanography. (3) Three hours of lecture per week plus one or two weekend field trips. Prerequisites: Biology 1A-1B. Recommended 103, 104, 104L, chemistry, and calculus. This course will teach the interactions of organisms with physical, chemical and geological processes in the ocean. Overviews of basic physical, chemical, and geological principles and the interaction of these two sets of processes follows by interdisciplinary discussions of open-ocean pelagic systems, the deep sea, coastal oceans, estuaries, and intertidal environments. Grade is based on oral exams, written assignments. (F, SP)

108. Principles of Paleontology. (3) Three hours of lecture per week. Prerequisites: A course in paleont-
110L Laboratory in the Evolutionary Morphology of Land Plants. (2) Four hours of laboratory per week. Prerequisites: 101, 101L recommended. Biology 1A-1B. Must be taken concurrently with 110. Formerly laboratory portion of Botany 110. Laboratory for 110. (SP)

111L Laboratory in the Anatomy of Vascular Plants. (2) Two hours of lecture per week. Prerequisites: 101, 101L; Biology 1A-1B. Must be taken concurrently with 111. A consideration of the functional and developmental aspect of cell, tissue, and organ structure of plants, including their adaptations to ecological factors such as pollination, reproduction, and habitat. Also included are interdepartmental Studies 112 and Plant Biology 111L.

120L Plants and Civilization. (3) Two hours of lecture and two hours of demonstration per week. Prerequisites: A course of high school or college biology or botany. Formerly Botany 118. Man's selection and use of plants for food, fuel, and fiber, and the interaction between the evolution of domesticated plants and the cultural evolution of man.

121. The Botanical Garden. (2) Three hours of lecture per week. Must be taken on a pass/no pass basis. Prerequisites: Consent of instructor. Formerly Botany portion of Botany 120 and Integrative Biology 121L. An introduction to the collections, facilities, and programs of the University Botanical Garden.

122L Horticultural Methods in the Botanical Garden. (1) Three hours of laboratory/discussion per week. Must be taken on a pass/no pass basis. Prerequisites: Consent of instructor. Formerly Botany 128. An introduction to horticultural techniques utilizing the diverse collections of the University Botanical Garden. (F,SP) Staff

130. Evolutionary and Functional Vertebrate Anatomy. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1A-1B. Must be taken concurrently with 130L. Formerly Zoology 106. The structure and function of vertebrates; analysis of patterns of evolution of vertebrates using morphological data and the comparative method. (SP) Staff

130L. Evolutionary and Functional Vertebrate Anatomy laboratory. (2) Six hours of laboratory per week. Prerequisites: Biology 1A-1B. Must be taken concurrently with 130. Formerly Zoology 176. Laboratory on the structure and function of vertebrates; analysis of patterns of evolution of vertebrates using morphological data and the comparative method. (SP) Staff

131. General Human Anatomy. (3) Three hours of lecture per week. Prerequisites: Biology 1A-1B or Chemistry 1A. Formerly Anatomy 108L. The functional anatomy of the human body as revealed by gross and microscopic examination. Designed to be taken concurrently with 131L. (F) Diamond

131L. General Human Anatomy Laboratory. (2) Four hours of laboratory per week. Prerequisites: Biology 1A-1B or Chemistry 1A. (may be taken concurrently with 131 or following 131 required). Formerly Anatomy 108L. Prepared human dissections, models and microscopic slides. (F) Diamond

132. Survey of Human Physiology. (4) Students will receive no credit for 132 after taking Physiology 100 or 101 or Molecular and Cell Biology 135L. Three hours of lecture and one hour discussion/lab per week. Prerequisites: 131L; previous or concurrent enrollment in 132. Consent of instructor. Formerly Physiology 100L. A survey of human and comparative physiological mechanisms underlying life processes in mammalian systems. (SP) Nocol

133. Anatomy Enrichment Program. (2) Course may be repeated for credit. Fieldwork—minimum of four hours per week arranged. Must be taken on a pass/no pass basis. Prerequisites: A or B grade in 131. Formerly Anatomy 107. The purpose of the course is for University students to teach human anatomy to grades K-7 in the public schools. The UCB students work in groups of 2-5 to plan their presentations to the teams of the body and then enter their school rooms to teach what they have learned in 131. (SP) Diamond

134. Paleobiology and Functional Morphology. (3) Three hours of lecture per week. Prerequisites: Consent of the instructor. Must be taken concurrently with 134L. Formerly lecture portion of Paleontology 112. Paleobiological approaches to the interpretation of morphology and techniques for studying the functions of fossil individuals, populations, and communities. Ancient paleobiological patterns and processes are compared and evaluated in the context of evolutionary theory, with examples from both marine and terrestrial systems.

135. The Mechanics of Organisms. (3) Three hours of lecture per week. Prerequisites: Senior standing and Biology 1A-1B. Formerly Zoology 127L. Functional morphology: the form of mechanical design principles; behavior of fluid and solid mechanics with examples of their biological implications, stressing the dependence of mechanical behavior on the structure of molecules, tissues, structural elements, whole organisms, and habitats. (F) Full

137. Cytology. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1A-1B or equivalent. Formerly Zoology 110L. Cell structure, function, and evolution. Methods studying cells and their organelles from a historical perspective. Mitosis, meiosis, sex determination, introduction to cytochemistry, chromosome changes in evolution.

137L. Cytology Laboratory. (2) Six hours of laboratory per week. Prerequisites: A course in cytology, cell biology, or genetics. Formerly Zoology 110L. Microscopic study of cell types and organelles; determination of cell and chromosome cycles; selective staining and preparatory methods.

138. Biochemistry of Chemical Mediation. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1A-1B. Organic Chemistry recommended. Formerly Zoology 120. Hormonal and paracrine mechanisms with emphasis on general principles and comparative vertebrate endocrinology.

139. Vertebrate Reproductive Biology. (3) Three hours of lecture per week. Prerequisites: Biology 1A-1B. Must be taken concurrently with 139L. Formerly Zoology 129. A survey of morphological, developmental, physiological, behavioral, ecological and evolutionary aspects of the reproductive biology of vertebrates.

139L. Vertebrate Reproductive Biology Laboratory. (1) Three hours of laboratory per week. Prerequisites: Biology 1A-1B. Must be taken concurrently with 139. Formerly Zoology 179. Laboratory on morphological, developmental, physiological, behavioral, ecological and evolutionary aspects of the reproductive biology of vertebrates.

140. Biology of Human Reproduction. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 132 or equivalent. Formerly Physiology 140. The anatomy and physiology of reproduction, embryology, endocrinology, evolution, and sexual function; conception and contraception; pregnancy and abortion; birth and lactation; sexual differentiation of the brain and reproductive organs; homosexuality. (F) Nocol

143. General Animal Parasitology. (3) Three hours of lecture per week. Prerequisites: Biology 1A-1B or equivalent. Must be taken concurrently with 143L. Formerly Zoology 161. Introduction to the biology of protozoan and metazoan parasites; selected experiments.

144. Animal Behavior. (4) Students will not receive credit for 144 after taking 145. Three hours of lecture, one hour of discussion, and one hour of demonstration per week. Prerequisites: Biology 1A-1B or equivalent. Formerly Zoology 181. Identification, morphology and physiology of protozoan and metazoan parasites; selected experiments. Two midterm exams and a term paper. Also listed as Entomology 122, Psychology 145, and Interdisciplinary Studies 122. Offered even-numbered years.

145. Animal Behavior. (4) Students will receive no credit for 145 after taking interdisciplinary Studies 122. Three hours of lecture, one hour of demonstration, and one hour of discussion per week. Prerequisites: Biology 1A-1B or equivalent. Formerly Zoology 181. A survey of insect concepts, mechanisms, and examples from both entomology and behavioral ecology, and in an ecological context. General and comparative features of parasitism, including properties common to diverse groups.

143L. General Animal Parasitology Laboratory. (2) Six hours of laboratory per week. Prerequisites: Biology 1A-1B or equivalent. Must be taken concurrently with 143L. Formerly Zoology 161L. Laboratory to study the biology of protozoan and metazoan parasites; selected experiments. Two midterm exams and a library term paper. Also listed as Entomology 122L, Psychology 145L, and Interdisciplinary Studies 122L. Offered even-numbered years.

145L. Laboratory and Field Studies of Animal Behavior. (3) Six hours of laboratory, one hour of lecture plus five to ten hours of unscheduled laboratory or field work per week. Prerequisites: 145, IDS 122 or Psychology 115, and consent of instructor. Formerly Zoology 135L.

148. Comparative Animal Physiology. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1A-1B. Comparative study of physiological systems among animal phyla. General physiological principles, including variation in neural, muscular, endocrine, cardiovascular, respiratory, digestive and osmoregulatory systems. (F) Full

148L. Comparative Animal Physiology Laboratory. (2) Six hours of laboratory and one hour of discussion per week. Prerequisites: Biology 1A-1B or equivalent. Must be taken concurrently 148. Biology 1A-1B. Basic laboratory tech-
150. Physiological Ecology of Animals. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1A-1B or equivalent. Formerly Zoology 128. Comparative animal physiology with emphasis on adaptation to the various aspects of the physical environment, such as gases, temperature, water and ions. (SP) Full

150L. Animal Physiological Ecology Laboratory. (3) Six hours of laboratory and one hour of discussion per week. Prerequisites: Previous or concurrent enrollment in 150. Consent of instructor; Biology 1A-1B or equivalent. This course will apply the principles learned in 150 to the measurement of physiological responses to environmental stresses. (SP) Full

151. Plant Physiological Ecology. (3) Three hours of lecture per week. Prerequisites: Biology 1B or consent of instructor. Will explore the physiological adaptations of plants to their physical and biological environment, considering both the physiological adjustments made by individual plants and their evolutionary responses seen in different species. We will begin with the physiological adjustments to environmental stresses (water, nutrients, light, and temperature) and then consider the physiological basis of competitive and mutualistic interactions between plants, animals and microorganisms.

151L. Plant Physiological Ecology Laboratory. (1) Three hours of laboratory per week, plus one hour of discussion and one 6-hour field trip. Prerequisites: Concurrent enrollment in 151 or consent of instructor. The course will introduce the student to the techniques and experimental approaches of plant physiological ecology, using modern equipment. The course will then use the experimental approaches learned in the lab exercises to address an unresolved question: What are the interrelated suite of physiological traits which enable plants to adapt to California's diverse environments?

153. Population and Community Ecology. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1B or consent of instructor. Principles of microbial, animal, and plant populations and ecosystems, illustrated with examples from marine, freshwater, and terrestrial habitats. Consideration of the roles of physical and biological processes in structuring natural communities. Observational, experimental, and theoretical approaches to population and community studies are emphasized. Topics will include quantitative approaches relying on algebra and elementary calculus. Discussion section will review recent literature in ecology. (F) Power

153L. Laboratory in Population and Community Ecology. (3) Eight hours of laboratory per week, plus two 4-hour field trips. Prerequisites: Biology 1B or equivalent, or 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 group field exercises conducted in local terrestrial, aquatic, and marine habitats. These exercises emphasize sampling methodology, experimental design, and interpretation of results. Two half of course devoted to independent research projects. A written report and class presentation of project results are required. (SP) Staff

154. Plant Population and Community Ecology. (2) Two hours of lecture per week. Prerequisites: Biology 1A-1B or equivalent, or 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 group field exercises conducted in local terrestrial, aquatic, and marine habitats. These exercises emphasize sampling methodology, experimental design, and interpretation of results. Two half of course devoted to independent research projects. A written report and class presentation of project results are required. (SP) Staff

154L. Laboratory in Plant Population and Community Ecology. (2) Four hours of laboratory per week and two or three 1-day field trips. Prerequisites: Biology 1B. Must be taken concurrently with 154. Laboratory in Plant Population and Community Ecology. (SP) D'Antonio

154L. Laboratory in Plant Population and Community Ecology. (2) Four hours of laboratory per week and two or three 1-day field trips. Prerequisites: Biology 1B. Must be taken concurrently with 154. Laboratory in Plant Population and Community Ecology. (SP) D'Antonio

155. Ecosystem Ecology. (3) Three hours of lecture per week. Prerequisites: Biology 1B or equivalent. This course will develop principles of ecosystems ecology, focusing particularly on how these principles apply to ecosystem recovery and to regional and global fluxes of carbon and nutrients. Offered alternate years. (SP) Chapin

155L. Ecosystems of California. (2) One 6-hour field trip per week. Prerequisites: Previous or concurrent enrollment in Introductory Plant Physiological Ecology. This class will apply the principles learned in 155 to California ecosystems. The class will visit the major ecosystems of California on weekly field trips. At each ecosystem, students will discuss climate, substrate, flora, fauna, and human impact to explain the unique properties of the ecosystem. Emphasis is placed on discussion of what types of community and ecosystem studies are most appropriate for each ecosystem. Offered alternate years. (SP) Chapin

156. Theoretical Foundations of Conservation Biology. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Biology 1A-1B or equivalent. Companion course with Conservation and Resource Studies 104. A survey of the principles of conservation biology emphasizing the ecological, evolutionary, and genetic foundations of the discipline. (SP) Lidicker

158. Biology and Geomorphology of Tropical Islands. (3) Nine 1-hour lectures for 6 weeks; field projects for 3 weeks. Natural history and evolutionary biology of land terrestrial and freshwater organisms, and of marine organisms in the coral reef and lagoon systems will be studied. Field projects will include visits to volcanic islands, coral reefs and reef islands will be discussed. Features of island biogeography will be illustrated with topics linked to subsequent field studies on the island of Moorea (French Polynesia). Also listed as Entomological Sciences 112, Geography 142, and IDS 158. (F) Caldwell, Lipps, D'Antonio

160. Evolution. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1A-1B; Molecular and Cell Biology 142 or equivalent. Formerly Zoology 140A. A course in evolutionary biology, with emphasis on basic processes, selection theory, adaptive responses, and patterns of speciation and phylogeny. (F) D. Wake

161. Population Genetics and Evolution. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1A-1B and Chemistry 34. Formerly Genetics 100C. A survey of basic ideas in population genetics including elementary theory, experimental population genetics, quantitative genetics and molecular evolution. Emphasis will be on the relationship between population genetics and evolutionary biology. (SP) Thomson

162. Quantitative Methods in Evolutionary Biology. (3) Three hours of lecture per week. Prerequisites: One year of college level mathematics (calculus) and a course in population genetics and evolution. Formerly Zoology 148. A survey of mathematical and statistical techniques used in evolutionary biology. Topics include quantitative genetics, demographic models in current and past populations, analysis of selection, 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.

163. Evolution Above the Species Level. (2) Two hours of lecture per week. Prerequisites: 162 or consent of instructor. Formerly Paleontol 103. Processes and patterns of evolution outside the realm of population biology: the explanation of diversity through time, evolutionary processes and mechanisms and protein evolution; origins of major groups and adaptations, rates and causes of extinctions; and the terminators of morphology. Special attention will be given to the study of fossils and their relationship to the fossil record and to the living world.

166. Biogeography. (3) Three hours of lecture per week. Prerequisites: An introductory course in biology. Principles underlying patterns of plant and animal distribution, based on critical analysis of evidence from selected groups, with special attention to earth history, biogeographic region, the distribution of barriers, dispersal, colonization, and extinction.

168. Systematics of Vascular Plants. (2) Two hours of lecture per week. Prerequisites: 101, 101L recommended. Biology 1A-1B. Must be taken concurrently with 168L. Formerly lecture portion of Botany 120. A study of the major groups of vascular plants and their evolution. (SP) Duncan

168L. Systematics of Vascular Plants Laboratory. (2) Six hours of laboratory per week. Prerequisites: 101, 101L recommended; Biology 1A-1B. Must be taken concurrently with 168L. Formerly laboratory portion of Botany 120. A laboratory course devoted to a survey on a world-wide basis of vascular plant families. (SP) Duncan

172. Advanced Primate Biology. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Anthropology 1 or Biology 1. The adaptive radiation of this most diverse order of mammals. The niches of primates in modern ecosystems; their anatomical and behavioral specializations and their indicator species, evolution. The mechanics and varieties of primate social organization compared with that of other mammals.

173. Mammalogy. (2) Two hours of lecture per week. Prerequisites: 104. Must be taken concurrently with 173L. Formerly Zoology 163. An advanced lecture course in the biology of mammals. (F) Patton

173L. Mammalogy Laboratory. (3) Six hours of laboratory per week, plus two 3-day field trips. Prerequisites: 104, Formerly Zoology 182. An advanced laboratory and field course in the biology and diversity of mammals. (F) Patton

174. Ornithology. (2) Two hours of lecture per week. Prerequisites: 104 or consent of instructor. Formerly Zoology 164. An advanced course in the biology of birds. (SP) Greene

174L. Ornithology Laboratory. (2) Six hours of laboratory per week, plus one weekend field trip. Prerequisites: Must be taken concurrently with 174. Formerly Zoology 184. An introduction to the diversity, morphology, and general ecology of birds of the world.

175. Herpetology. (2) Two hours of lecture per week. Prerequisites: 104. Must be taken concurrently with 175L. Formerly Zoology 165. Laboratory will teach students the diagnostic characteristics and some functional attributes, of amphibians and reptiles on a world-wide basis, with emphasis on behavior, ecology, functional morphology, and the interrelationship historically based on two examinations (midterm, final) and an independent research paper. (SP) Greene

175L. Herpetology Laboratory. (2) Four hours of laboratory per week, plus two field trips. Prerequisites: 104. Must be taken concurrently with 175. Formerly Zoology 185. Laboratories will teach students the diagnostic characteristics and some functional attributes, of amphibians and reptiles on a world-wide basis. Field trips will acquaint students with techniques for collecting, preserving, identifying, and studying amphibians and reptiles. (SP) Greene

176. Ichthyology. (3) Three hours of lecture per week. Prerequisites: 130, 104 recommended; must be taken concurrently with 176L. Biology 1A-1B. Consent of instructor. An advanced course in the biology of fishes. Students learn about the diversity of marine and freshwater fishes, their phylogeny and radiations, major features of their life history such as locomotion and schooling, migration, miltory, symbiosis, reproduction, and mating systems, and differences between fishes and other vertebrates. Often in even-numbered years. One midterm exam and a library term paper. Staff

176L. Laboratory in Ichthyology. (3) Six hours of laboratory per week, plus three field trips. Prerequisites: 176L may be taken concurrently and consent of instructor. Formerly Zoology 186. An introduction to...
the diversity of fishes, with emphasis on local species, and functional aspects of fish biology. Staff

180. Micropaleontology. (2) Two hours of lecture per week. Prerequisites: 182 and 182L, a course in Marine Geology, or consent of instructor. Must be taken concurrently with 180L. Formerly lecture portion of Paleontology 115. Marine Protista that are common in the fossil record will be discussed; this includes planktonic, benthic, and suspension-feeding foraminifers, diatoms, dinoflagellates, and coccolithophores. The biology, ecology, deposition, preservation, biostatigraphy, paleogeography, and special research applications of each group will be considered.

180L. Micropaleontology Laboratory. (3) Six hours of laboratory per week. Prerequisites: 182 and 182L; 185 Recommended. Must be taken in conjunction with 180L. Formerly laboratory portion of Paleontology 115. Laboratory demonstrating and studying marine Protista from the fossil record, including planktonic and larger foraminifers, diatoms, radulaeopora, dinoflagellates, and coccolithophores. The taxonomy, evolution, stratigraphy, biogeography, paleoecology, preservation, and research applications will be the focus.

181. Origin and Evolution of Plants. (2) Two hours of lecture per week. Prerequisites: Courses in Paleontology, Botany, or Systematics. Formerly lecture portion of Paleontology 120. Advanced study of plants found in the fossil record. Emphasis is on land vascular plant origins, colonization of the land, diversification and evolution.

181L. Origin and Evolution of Plants Laboratory. (3) Three hours of laboratory per week. Prerequisites: Courses in Paleontology or Botany, or Botany 120. Formerly laboratory portion of Paleontology 120. A laboratory designed to accompany 181. Fossil evidences for plant origins will be examined.

182, Invertebrate Paleontology. (2) Two hours of lecture per week. Prerequisites: 185. Must be taken concurrently with 182L. Formerly lecture portion of Paleontology 111. Paleobiology of invertebrates. The use of invertebrates in ecocratigraphy and chronotratigraphy. (F) Staff

182L. Invertebrate Paleontology Laboratory. (3) Six hours of laboratory per week. Prerequisites: Must be taken concurrently with 182. Formerly laboratory portion of Paleontology 111. Laboratory in invertebrate paleontology, with practical study of their uses in ecocratigraphy and chronotratigraphy. (F) Staff

183. Vertebrate Paleontology. (3) Must be taken concurrently with 183L. Three hours of lecture per week. Prerequisites: 182L. Introductory courses in earth history and zoology are recommended. Formerly lecture portion of Paleontology 125. An introduction to vertebrate paleontology, focusing on the history and phylogeny of vertebrates ranging from fish to human. Emphasis on evolution, taxonomy, functional morphology, faunas through time, and problems in vertebrate history, including diversity through time and extinction. Offered alternate years. (F) Barnsley, Clemons, Pedinan

183L. Vertebrate Paleontology Laboratory. (1) Must be taken concurrently with 183. Two hours of laboratory per week. Prerequisites: Biology 1B, introductory courses in earth history and vertebrate zoology recommended. Formerly laboratory portion of Paleontology 125. Closely supervised laboratory work under the direction of the instructor. Topics will vary from year to year. (F) Staff

184. Morphology of the Vertebrate Skeleton. (1) Must be taken concurrently with 184L. One hour of lecture per week. Prerequisites: 30, 33, or 34, Biology 1B or Anthropology 1. Formerly lecture portion of Paleontology 126. The integration of the morphology of vertebrates, with emphasis on selected groups of terrestrial vertebrates. Development and function of the skeleton are also considered. Offered alternate years. (F) Clemons

184L. Laboratory on the Vertebrate Skeleton. (1) Must be taken concurrently with 184. Six hours of laboratory and one hour of discussion per week. Prerequisites: 30, 33, or 34 or Biology 1B or Anthropology 1. Formerly Paleontology 126. Laboratory on comparative morphology of selected material representing all selected groups of vertebrates. Structure, anatomy, morphology, function, and development of the vertebrate skeleton. Offered alternate years. (F) Clemons

190. Seminar for Integrative Biology Majors. (1) One hour of seminar per week with student presentations. Must be taken on a pass/no pass basis. Prerequisites: Senior standing Integrative Biology majors. Formerly Botany 190. Student discussions of pertinent topics. (F,SP) Staff

194. Independent Study for Tropical Biology Quarter. (2) Two hours of lecture per week. Prerequisites: Enrollment in the Tropical Biology Quarter and consent of instructor. Lectures, reading, and discussion in tropical biology. (SP) Staff

H196A-H196B. Thesis Course. (3) Course may be repeated for credit. Individual arrangement. Prerequisites: Open only to students in Honors Program. Formerly Zoology 196A, 196B. 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

197. Supervised Field Studies By Upper Division Students. (1-4) Course may be repeated for credit. Meetings with instructor. Must be taken on a pass/ no pass basis. Formerly Paleontology 197. Zoology 197. Supervised experience in off-campus field work. Regular meetings with instructor and written report. (F,SP) Staff

198. Supervised Group Study and Research By Upper Division Students. (1-4) Course may be repeated for credit. Hours to be arranged. Must be taken on a pass/ no pass basis. Formerly Physiology 198, Anatomy 198, Physiology 199, Paleontology 199. Supervised research by groups. (F,SP) Staff

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Hours to be arranged. Must be taken on a pass/ no pass basis. Prerequisites: Background courses in chosen subject. Formerly Paleontology 199, Zoology 199, Botany 199, Physiology 199, Anatomy 199, Genetics 199. Enrollment restrictions apply; see department. (F,SP) Staff

Graduate Courses

201. Scientific Photography—Theory and Methodology. (1) One hour of lecture per week. Prerequisites: Graduate standing or consent of instructor. Formerly Biology 210, formerly Botany 210. An introduction to the theoretical and especially practical aspects of scientific photography, including darkroom work, flash technique, close-up photography, copy work and photomicrography.

201L. Scientific Photography—Laboratory. (1) Three hours of laboratory per week. Prerequisites: Graduate standing or consent of instructor. Formerly Biology 210. An introduction to scientific photography, focusing on demonstration and study of problems related to taxonomy, evolution, functional morphology, structure, and preservation of fossil vertebrates and their faunas through time. Offered alternate years. (F) Barnsley, Clemons, Pedinan

202. Quantitative Systematics. (2) Two hours of lecture per week. Prerequisites: One course in systematic or evolutionary biology. Formerly Botany 223. An examination of the theoretical background and application of modern systematic methods, including measures of similarity and difference, cluster analysis, ordination techniques, cladistic methods, and information retrieval.

202L. Quantitative Systematics Laboratory. (2) Two hours of discussion and four hours of laboratory per week. Prerequisites: One course in systematic or evolutionary biology. Formerly lab of 202. A discussion of recent papers and a laboratory devoted to the application of quantitative systematic methods. Each student will undertake a project using methods discussed.

203. Advanced Topics in Endoentomology. (3) One hour of lecture and one hour of discussion per week. Prerequisites: Consent of instructor. During the first half of the semester selected faculty and guest lecturers will present lectures on topics of their interest and will organize and lead the students in collaborative research on the selected topics. During the second half students will present lectures on related topics or other approved subjects. Also listed as IDS 203 and Molecular Cell Biology 232. (SP) Nickol

204. Introduction to Research in Integrative Biology. (1-12) Course may be repeated for credit. Individual arrangement. Prerequisites: Consent of instructor. Formerly Biology 204. An advanced study to experimental methods and research approaches in particular areas in Integrative Biology. (F,SP) Staff

205. Research Design. (2) Two hours of lecture per week. The course is intended to convey information and ideas that are necessary to become a practicing scientist but which are not conveyed in most academic courses. The course will cover differences between inductive and deductive approaches to science; formulation of effective hypotheses; ethics of science; inclusion of safety, confidentiality, construct validity; constructive responses to research and criticism; structure of the review process in granting agencies and journals. (F,SP) Staff

210. Paleobiology. (2) Two hours of lecture per week. Prerequisites: 110, 110L, Plant Biology 130, or consent of instructor. Formerly Botany 222. The study of living and prepared material and techniques relative to the study of form, biology; field trips.

211. Seminar in Plant Morphology and Anatomy. (1) Course may be repeated for credit. One hour of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Formerly Botany 251. The use of living and prepared material and techniques relative to the study of form, biology; field trips.

231. Invertebrate Review. (1) Course may be repeated for credit. One hour of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: 103 (or equivalent); senior or graduate standing; consent of instructor. Formerly Zoology 259. Reports and discussion of original research in invertebrate zoology. (F,SP) Staff

232. Seminar in Invertebrate Zoology. (2) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: 103 and consent of instructor. Formerly Zoology 258. Topics in selected areas of invertebrate biology; individual seminars report on topics selected in consultation with the instructor, and centered around a currently active field of invertebrate biology, which will vary from year to year.

233. Vertebrate Review. (1) Course may be repeated for credit. Two hours of seminar every other week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Formerly Zoology 255. Topics in selected areas of vertebrate biology; individual seminars report on topics selected in consultation with the instructor, and centered around a currently active field of vertebrate biology, which will vary from year to year.

234. Seminar on Biology of Amphibians and Reptiles. (1) Course may be repeated for credit. Two hours of seminar every other week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Formerly Zoology 265. Review of current research activity and literature concerning the biology of amphibians and reptiles. (F,SP) Greene, D. Wake, M. Wake

235. Biology of Fishes. (2) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. Formerly Zoology 266. Topics 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.
248. Seminar in Evolutionary Genetics. (Course may be repeated for credit. One and one-half hours per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Formerly Zoology 248. Recent developments in evolutionary genetics will be discussed in a seminar format. (SP) Thompson

250. Seminar in Ecology. (Course may be repeated for credit. Two hours of seminar per week. Prerequisites: 153. Readings and discussion of current topics. (F,SP) Staff

251. Ecological Research Reviews. (Course may be repeated for credit. One and one-half hours per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing and consent of instructor. Formerly Zoology 251. Discussion of current research in the field. People will be exposed to highlights of recent research. (SP) Forward

255. Seminar in Marine Biology. (Course may be repeated for credit. Two hours of seminar per week. Prerequisites: 138 or Molecular Cell Biology 195H. Formerly Zoology 255. Topics to vary.

256. Seminar in Physiological Ecology. (Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. Formerly Zoology 256. Topics to vary.

257. Seminar in Animal Behavior. (Course may be repeated for credit. Two hours of seminar per week. Prerequisites: 153 or consent of instructor. Formerly Zoology 257. Topics to vary. Report and discussion of current literature. (F) Caldwell

258. Seminar in Trophic Ecology. (Course may be repeated for credit. Two hours of seminar per week. Prerequisites: 153 or consent of instructor. Formerly Zoology 258. Specific topics will vary.

259. Advanced Paleontology. (Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. Formerly Paleontology 259. Topics vary from year to year but will include paleoecology of major groups of organisms or major environments from population community evolution, or taxonomic perspectives.

260. Advanced Botanical Systematics. (Two hours of lecture per week. Prerequisites: 166, 168L or equivalent and permission of instructor. Formerly Botany 260. Lectures will consider the morphological, cytological, and theoretical aspects 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. (One hour of lecture per week. Prerequisites: Consent of instructor. Formerly Botany 261. Principles, articles, recommendations of international Code of Botanical Nomenclature; analysis of Code through application to various natural resources; comparison with Zoological Code.

262. Topics in Systematic Botany. (Course may be repeated for credit. One hour of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Formerly Botany 262. Advanced study in various topics in plant systematics. Topics will be announced in advance of each semester. (F,SP) Duncan

263. Topics in Ecological and Evolutionary Biology. (Course may be repeated for credit. One hour of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Formerly Botany 263. Analysis of the primary literature in ecology and evolutionary biology. Topics will vary from semester to semester. (SP) D. Wake

264. Seminar in Evolutionary Biology of the Vertebrates. (Course may be repeated for credit. One hour of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing; consent of instructor. Formerly Zoology 264. Advanced topics in reproductive biology. (SP) Green, Johnson, Liddicker, D. Wake

265. Seminar on Speciation in Vertebrates. (Course may be repeated for credit. Two hours of seminar per week. Prerequisites: 104; graduate standing or consent of instructor. Formerly Zoology 265. Review of problems of speciation and isolating mechanisms in vertebrates, with emphasis on current literature.

267. Evolution and Systematics of Mammals. (Two hours of lecture per week and one weekend field trip. Prerequisites: 183, 183L, 184, 184L, and 160 or equivalent. Must be taken concurrently with IB 267L. Formerly Paleontology 267. Study of fossil record of Mammalia; comparative research on modern animals contributing to determination of mammalian phylogenetic relationships. A field trip will provide experience with collecting techniques. Offered alternate years.

267L. Laboratory in Evolution and Systematics of Mammals. (Six hours of laboratory and one hour of discussion per week. Must be taken concurrently with IB 267L. Formerly Paleontology 267L. Laboratory study of fossil record of Mammalia. Offered alternate years.

268. Seminar in Evolution above the Species Level. (Course may be repeated for credit. Two hours of seminar per week. Formerly Paleontology 246. Current issues in macroevolution and paleobotany, using both neontological and palaeontological data. Offered alternate years.

270. Population Genetics. (Two hours of lecture per week. Prerequisites: General Genetics and probability, or consent of instructor. Formerly Genetics 270. Genetics will be discussed in a seminar format. Offered alternate years. (SP) Kingsolver, Frank, Wiens. Special Topics in Evolutionary Genetics.

272. Ecological and Social Dimensions of Global Change. (Course may be repeated for credit. One and one-half hours of discussion per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Formerly Botany 272. Maximum enrollment 25. This seminar will explore the possible social and ecological impacts of global change, focusing on ecological and economic tradeoffs associated with the following human responses to global change: adaptation, prevention, and no response. Emphasis is placed on developing predictive models of how the Earth System (including human) will respond to global change. Also listed as Energy and Resources 291, Geography 244, and IDS 272.

275. Human Genetics. (Two hours of lecture per week. Prerequisites: General genetics and elementary probability or consent of instructor. Formerly Genetics 275. 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 genome, including genetic diversity and human disease.

280. Seminar in Paleontological Research. (One hour of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing; consent of instructor. Formerly Paleontology 280. Advanced topics in paleontological research. Discussion of original research by students, faculty, and visitors. (F,SP) Lips.
Instructor. Formerly Biology 250. Evolution and various fields of evolution. Topics vary from year to year.

282. Paleontology and Evolution of Amphiibians, Reptiles, and Birds. (4) Four hours of lecture per week. Prerequisites: 183, 183L, 184, 184L, 160 or equivalent. Laboratory in the paleontology of non-mammalian tetrapods, illustrated from the collections of the Museum of Paleontology. Must be taken concurrently with Integrative Biology 282. Offered alternate years.

283. Mammalian Paleofaunas of the World. (2) Two hours of lecture and one hour of discussion per week. Prerequisites: 287 and 267L. Must be taken concurrently with Integrative Biology 287. Succession of world’s mammalian faunas, their geography, stratigraphy, and ecology as related to geologic history and to contemporaneous paleobiota.

283L. Laboratory for Mammalian Paleofaunas of the World. (2) Six hours of laboratory and one hour of discussion per week. Prerequisites: 257 and 258L. Must be taken concurrently with IB 283. Formerly Paleontology 287. Laboratory study of mammalian paleofaunas.

284. Advanced Stratigraphic Paleontology. (2) Course may be repeated for credit. Two hours of seminar per week. Formerly Paleontology 240. Topics may vary from year to year but include evaluations of current literature and discussions aimed at refinement of paleontologic disciplines in stratigraphy and geochronology. Formerly established scientific principles, global tectonics, evolutionary biological theory.

285. Advanced Marine Micropaleontology. (2) Course may be repeated for credit. Two hours of seminar per week. Formerly Paleontology 245. Environment and history of foraminifera, radiolarians, ooadia, nanofossils and other marine microfossils.

286. Seminars in Paleontology. (2) Course may be repeated for credit. Two hours of seminar per week. Formerly Paleontology 250. Advanced study and current literature in various fields of paleontology. Topics vary from year to year. (F,SP)

287. Systematics Research Reviews. (1) Course may be repeated for credit. One hour of discussion per week. Prerequisites: Consent of Instructor. Offered for advanced study of recent research in plant systematics.

288. Seminar in Plant Ecology. (2) Course may be repeated for credit. Two hours of seminar per week. Prerequisite: Consent of Instructor. Topics will vary by semester.

289. Tropical Biology—An Ecological Approach. (8) Ten 1-hour lectures and 30 hours of laboratory per week. Prerequisites: Graduate standing in a biological discipline and a course in general ecology or consent of instructor. Formerly Biology 289. Evolution and dynamics of tropical biota, their relationships to tropical environments; an intensive field course in Costa Rica. Offered in cooperation with the Organization for Tropical Studies. This course is sponsored by the Graduate Council.

290. Research Seminar. (1) Course may be repeated for credit. One hour of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Formerly Zoology 290. Advanced study in various fields of Integrative Biology. Topics will be announced in advance of each semester. Enrollment in more than one section permitted. (F,SP) Caldwell, Lindberg

291. Research Seminar. (1) Course may be repeated for credit. One hour of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Formerly Zoology 240. Review and discussion of topics of current interest. Topics to vary. (F,SP) Staff

292. Integrative Biology Colloquium. One hour of meeting per week. Formerly Botany 280. Meetings for the presentation of original work by faculty, visiting lecturers, and graduate students. (F,SP) Staff

295. Concepts and Principles in Integrative Biology. (1) Course may be repeated for credit. One hour of discussion per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing or consent of Instructor. Must be attended. Discussion with faculty members of their papers reflecting integration in biology.

296. Special Study for Graduate Students. (1-4) Course may be repeated for credit. Individual conferences. Formerly Zoology 296. Reading or other advanced study arranged by staff with a member. (F,SP) Staff

297. Directed Field Studies. (1-4) Course may be repeated for credit. Field work. Must be taken on a satisfactory/unsatisfactory basis. Formerly Zoology 297. Open to qualified students directly engaged in field studies. (F,SP) Staff

298. Special Study in Integrative Biology. (1-12) Course may be repeated for credit. Must be arranged. Prerequisites: Consent of Instructor. Formerly Zoology 298 and Anatomy 298. Graduate research by small groups. (F,SP) Staff

299. Graduate Research. (1-12) Course may be repeated for credit. Individual study. Must be taken on a satisfactory/unsatisfactory basis. Formerly Botany 299, Paleontology 299, Physiology 299, Anatomy 299, Zoology 299. Credit awarded according to work planned and accomplished. (F,SP) Staff

301. Preparation In Graduate Teaching. (2) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Formerly Zoology 301, Paleontology 306. Designed for graduate students interested in teaching and furthering the understanding of science teaching at the university level. (F,SP) Staff

302. Practices of Teaching Integrative Biology. (2) Course may be repeated for credit. Maximum of six hours credit. Weekly conference with instructor and teaching hours assigned. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Appointment as a teaching assistant. Formerly Zoology 302, Physiology 302, Anatomy 302. Teaching laboratories, discussions, and/or field sections for an Integrative Biology or IDS course; analysis of teaching format and problems. (F,SP) Staff

303. Teaching Colloquium: Graduate Student Instructor Training. (2) Two hours of seminar plus workshops per week. Must be taken on a satisfactory/unsatisfactory basis. Series of workshops and seminars involving graduate students and faculty participation. The major objectives of this course are to train graduate students to become effective instructors and to discuss important issues that graduate students face when teaching undergraduate classes. (F) Staff

401. Museum Procedures and Techniques. (2) Course may be repeated for credit. One hour of discussion and three hours of laboratory per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of Instructor. Formerly Paleontology 401. Career and collection management of nature history materials to provide practical experience necessary for career in museums. (F,SP) Hutchison

Upper Division Courses

IDS 102. Diversity of Plants and Fungi. (2) Two hours of lecture per week. Prerequisites: Biology 1A-1B. Must be taken concurrently with 102L. An integrated treatment of the biology and evolution of the major groups in the plant, algae, and fungal kingdoms. Also listed as Integrative Biology 101 and Plant Biology 102. (F) D’Antonio, Taylor, West

IDS 102L. Laboratory in the Diversity of Plants and Fungi. (2) Four hours of laboratory per week and two 1-hour trips. Prerequisites: Biology 1A-1B. Must be taken concurrently with 102. Also listed as Integrative Biology 101L and Plant Biology 102L. (F) D’Antonio, Taylor, West

IDS 112. Anatomy of Vascular Plants. (2) Two hours of lecture per week. Prerequisites: Integrative Biology 101, 101L; Biology 1A-1B. Must be taken concurrently with 111L. A consideration of the functional and developmental aspects of cell, tissue, and organ structure of plants, including their adaptations to ecological factors such as pollination, dispersal, and water availability. Also listed as Integrative Biology 111 and Plant Biology 111L.

IDS 112L. Laboratory in the Anatomy of Vascular Plants. (2) Four hours of laboratory per week. Prerequisites: Integrative Biology 101, 101L; Biology 1A-1B. Must be taken concurrently with 112L. Offered for 112. Also listed as Integrative Biology 111L and Plant Biology 111L.

IDS 123. Animal Behavior Laboratory. (3) Course may be repeated for credit. One hour of lecture, three hours of laboratory, and one hour of discussion per week. Prerequisites: Biology 1A-1B. Must be taken concurrently with 123L. Requires a laboratory notebook. Also listed as Integrative Biology 123 and Plant Biology 123.

IDS 123L. Laboratory for Animal Behavior Laboratory. (3) Course may be repeated for credit. Three hours of laboratory per week. Prerequisites: Biology 1A-1B. Must be taken concurrently with 123. Required for Animal Behavior Laboratory and will work concurrently with 123. Offered for 123L. Also listed as Integrative Biology 123L and Plant Biology 123L.

IDS 135. Biology and Geomorphology of Tropical Islands. (13) Nine hours of lecture for six weeks; field project for six weeks; three hours of lecture for three weeks. Natural history and evolutionary biology of island terrestrial, freshwater organisms, and of marine organisms in the coral reef and lagoon systems will be studied, and the geomorphology of South Pacific islands, coral reefs and reef islands will be discussed. Features of island biogeography will be illustrated with topics linked to subsequent field studies on the island of Moorea (French Polynesia). Also listed as Entomology 135 and Geology 142, and Integrative Biology 158. (F) Caldwell

Graduate Courses

IDS 203. Advanced Topics in Endoecology. (2) One hour of lecture and one hour of discussion per week. Prerequisites: Consent of Instructor. During the first half of the semester selected faculty and guest lecturers will present lectures on topics of their interest and will discuss the material afterwards. During the
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. Undergraduate students majoring in each class must consult with the person 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 courses. The information appears at the end of each course description.

Lower Division Courses


2. Introduction to Cognitive Science. (3) Two hours of lecture and three hours of laboratory per week. This course is an introduction to the interdisciplinary field of cognitive science. Lectures and readings will survey research from artificial intelligence, psychology, linguistics, philosophy, neuroscience, and will cover topics such as the nature of knowledge, thinking, remembering, vision, imagery, language, and consciousness. Sections will demonstrate some of the major methodologies. Also listed as Cognitive Science 1 and Education in Mathematics, Science, and Technology 1. (SP) Piroli, Ramney

12. The Planets. (3) Three hours of lecture per week. A tour of the planets and moons of the solar system and an introduction to their internal structures, atmospheres, surface features, and orbital properties. Processes that form planets and act to continually change them are discussed, as are comets, asteroids, and rings. Important mission from recent spacecraft missions is highlighted. (SP) DePaolo, de Pater, Jeanloz, Lissauer

21. Languages and Peoples of the World. (4) Three hours of lecture and one hour of discussion per week. An introduction to the linguistic diversity of the university and the languages and peoples of the world. Also listed as Anthropology 21 and Linguistics 21. (SP) Sarich

41X. Heredity and Society. (4) Two hours of lecture and two hours of discussion per week. Prerequisites: Three or four years of high school biology. Basic genetic principles and mechanisms, evolution, philosophical implications and relation of genetics to global problems of human and environmental issues. Also listed as Molecular and Cellular Biology 41X and Plant Biology 41X. (SP) Freling

85. Environmental Physics. (3) Three hours of lecture and one hour of discussion per week. Elementary concepts of physics with application to problems of environment, energy, pollution, biology, geology. Specific examples of the role of physics in contemporary social issues. Sponsoring departments: Conservation and Resources Studies and Physics. (F) Staff

Upper Division Courses

100. History of American Technology. (4) Four hours of lecture per week. Survey of American technology from colonial times to the present. Analysis of technical innovation in its cultural, economic, and political setting. Topics include the Industrial Revolution, technology of war, diffusion of science in technology, industrialization, and the use of corporations. Sponsoring departments: History and Electrical Engineering and Computer Science.


102. Diversity of Plants and Fungi. (2) Two hours of lecture per week. Prerequisites: Biology 1A-1B. Must be taken concurrently with 102L. An integrated treatment of the biology and evolution of the major groups in the plant, algal, and fungal kingdoms. Also listed as Integrative Biology 102 and Plant Biology 102. (F) D'Antonio, Taylor, West

102L. Laboratory in the Diversity of Plants and Fungi. (2) Four hours of laboratory per week and two 1-day field trips. Prerequisites: Biology 1A-1B. Must be taken concurrently with 102. Laboratory for 102. Also listed as Integrative Biology 101L and Plant Biology 102L. (F) D'Antonio, Taylor, West

103. Introduction to Mathematical Economics. (3) Three hours of lecture per week. Prerequisites: Math 50A-50B, Formerly Economics 104. Selected topics illustrating the application of mathematics to economic theory. This course is intended for students in economics, mathematics, the physical sciences, and engineering, and for economics majors with adequate mathematical preparation. No economic background is required. Also listed as Economics 105 and Math 103.

104. Babylonian Religion. (3) Three hours of lecture per week. A survey of Babylonian religious beliefs and practices based on indigenous texts and monuments. Also listed as Near Eastern Studies 104 and Religious Studies 104. (FSP)

105. Modern Applications of Plant Biotechnology. (3) Two hours of lecture and one hour of discussion/demonstration per week. Prerequisites: Biology 1A-1B; Molecular and Cell Biology 112 and Plant Biology 112 recommended. This course is designed to introduce students to the principles and applications of modern plant biotechnology. Basic concepts of modern agriculture will be reviewed in light of emerging biotechnology applications. Emphasis will be placed on understanding the tools and strategies involved in optimizing plant productivity. Also listed as Plant Pathology 105 and Plant Biology 170. (F) Jackson, Sasaki

107. Principles of Plant Morphology. (2) Two hours of lecture per week. Prerequisites: Biology 1A-1B; must be taken concurrently with 107L. Formerly lecture portion of Plant Biology 130. An analysis of the structural diversity of multicellular plants, especially the higher forms, with emphasis on the developmental mechanisms responsible for this variation in form and the significance of this diversity in relation to the environments in which plants grow. Also listed as Plant Biology 100 and Integrative Biology 103. (F) Kaplan

107L. Laboratory for Principles of Plant Morphology. (2) Six hours of laboratory per week. Prerequisites: Biology 1A-1B; must be taken concurrently with 107L. Formerly laboratory portion of 130. Laboratory designed to accompany 107. Principles of Plant Morphology. Also listed as Plant Biology 100L and Integrative Biology 100L. (F) Kaplan

110. Introduction to Computers. (3) Students who have completed courses in Computer Science 7, 8, or the 50 series will receive no credit for IDS 110. Three hours of lecture per week. Prerequisites: Upper Division Standing. Students who have completed IDS 110L (with the same grading option as in 110) or an equivalent departmental course. Formerly 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,

On leave, spring, fall
On leave, fall
110L. Introductory Computer Laboratory. (1) Four hours of laboratory per week. Prerequisites: Upper division standing. Students must be enrolled for IDS 110 (with the same grading option as in 111L) and must be placed in the program through an appropriate background in the history of Western art. The course will deal with the interrelation of the visual arts and ideas. Students will be introduced to different ways of thinking about art and will expand their understanding of art in general. The course will be offered on a selective basis. Enrollment is limited to 11 students.

112L. Laboratory in the Anatomy of Vascular Plants. (2) Four hours of laboratory per week. Prerequisites: Integrative Biology 101, 101L; Biology 1A-1B. Must be taken concurrently with 111L. A consideration of the functional and developmental aspect of cell, tissue, and organ structure of plants, including their adaptations to ecological factors such as pollination, dispersal, and water availability. Emphasis is placed on the anatomy and physiology of vascular plants, including xylem and phloem. (SP) Staff

114A-114B. Advances in Aging: Alzheimer’s Disease; Biological and Social Dimensions. (2/2) Four hours of lecture per week. Prerequisite: Upper division standing. Students must be enrolled for IDS 114A-114B (with the same grading option as in 111L) and must be placed in the program through an appropriate background in the history of Western art. The course will deal with the interrelation of the visual arts and ideas. Students will be introduced to different ways of thinking about art and will expand their understanding of art in general. The course will be offered on a selective basis. Enrollment is limited to 11 students.

118. Enlightenment and the Visual Arts in 18th Century France. (4) Three hours of lecture per week. Prerequisites: Students must have a reading knowledge of French and appropriate background in the history of Western art. The course will be offered on a selective basis. Enrollment is limited to 11 students.

119. Multidisciplinary Studies and Field Experience in Aging. (2) Two hours of seminar per week for seven weeks. Prerequisites: Upper division or graduate student and consent of instructor. Study of adults 70 years and over. Students will visit older patients from local geriatric clinic and center with clinic staff. One-hour weekly seminar consists of lecture on aging by faculty from various disciplines. Other hour is devoted to case presentation by student on a patient’s condition. Course grade based on student participation and final paper demonstrating understanding of the social and cultural contexts of aging for older people. Sponsoring departments: Optometry, Social Welfare, Public Health, and Molecular and Cell Biology. (SP) Staff

120. The Child at Risk: Public Health and Social Justice 1840-1990. (3) Course may be repeated for credit. Three hours of lecture/seminar per week for seven weeks and six hours of fieldwork. Prerequisites: Upper division standing. An interdisciplinary, cross-cultural forum to examine the shifting hazards that children have faced locally and around the world since the industrial revolution, and responses to these hazards by state, philanthropic and community organizations. Topics include: theories of public health; statistics and the rhetoric of risk; the state, the family and social justice; birth and infant feeding in their social context; children and colonization. Also listed as PACS 120 and SAHS 120. (SP) Staff

121A-121B. Environmental Education. (3/3) Five and one-half hours of lecture/discussion and six hours of fieldwork per week. Prerequisites: 121A is prerequisite to 121B; consent of instructor. Theory and practice of translating ecological knowledge, environmental issues and educational theory. Fieldwork includes projects for all age levels and all facets of society, including schools. Concentrated experience in participatory education. Sponsoring departments: Education and Conservation and Resource Studies. (SP) Staff

122. Animal Behavior. (4) Students will receive no credit for 122 after Integrative Biology 145. Three hours of lecture, one hour of discussion, and one hour of demonstration per week. Prerequisites: Biology 1A-1B or 111, or Entomology 100. Recommended Preparation: 100L. An introduction to comparative animal behavior and behavioral physiology in an evolutionary context, including but not limited to analysis of behavior, genetics and development, learning, aggression, reproduction, adaptiveness, and physiological substrates. Two midterm exams and a library term paper. Also listed as Integrative Biology 144, Psychology 115B and Entomology 122. Even numbered years. (SP) Barlow, Caldwell, Glickman, W. Loher, . . .

123. Animal Behavior Laboratory. (3) Course may be repeated for credit. One hour of lecture, three hours of laboratory, and one hour of discussion per week. Prerequisites: Biology 1 or 11; Integrative Biology 31; or Anthropology 106; and/or consent of instructor. A laboratory course will single out specific topics in one of the many areas of great current interest (fail, Alzheimer’s disease; spring, geriatric care; etc., etc.). Methods for intervening will be taught to the students. Sponsoring departments: Optometry, Social Welfare, Public Health, and Molecular and Cell Biology. (SP) Staff

124. Scientific Approaches to Consciousness. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Consent of instructor. This course will discuss the scientific approaches to consciousness and its limits, including biological, psychological, and philosophical perspectives. Sponsoring departments: Anthropology, Integrative Biology, and Psychology. (SP) Staff

125. Basic Issues in Cognitive Science. (4) Students will receive no credit for 125 after Integrative Biology 120A. Three hours of lecture and one hour of discussion per week. Prerequisites: Upper division or graduate standing. Emphasis on understanding the nature of cognitive processes and the limitations of the computational model of mind. Also listed as Cognitive Science 100 and Psychology 120B. (F) Upchurch, (SP) Palmer

126. Women in the University: Gender and Higher Education. (3) Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. The course will cover the historical, social, and institutional contexts of higher education for women. It will explore the ways in which gender has shaped the experiences of women in higher education in the United States, employing both historical perspectives and data to contextualize the contemporary scene. Sponsoring departments: Anthropology, Integrative Biology, and Psychology. (SP) Staff

130. Seminar on Social, Political and Ethical Issues in Health and Medicine. (2) One hour of lecture and one hour of discussion per week. Prerequisites: Consent of instructor. The situations and experiences of women in higher education in the United States, employing both historical perspectives and data to contextualize the contemporary scene. Emphasis is placed on the nature of the history of American education and responses to these challenges. Also listed as Women’s Studies 122 and Education 122. (SP) Staff

131A. African American Diaspora 1858 to 1958. (4) Three hours of lecture per week. Prerequisites: Reading and composition requirement. Historical survey of black American writers and the portrayal of the black experience in American theatre. Emphasis on predominate themes, structural tendencies, socio-historical context. Also listed as African American Studies 151A and Dramatic Art 131A. (F) Wilkerson

131B. Contemporary African American Drama. (4) Four hours of lecture per week. Prerequisites: 151A or consent of instructor. Survey of contemporary black American theatre. Emphasis by African American writers and the portrayal of the black experience in American theatre. Emphasis on predominate themes, structural tendencies, socio-historical context. Also listed as African American Studies 151B and Dramatic Art 131B. (SP) Wilkerson

132. African American Dramatic Literature: Forms and Styles. (3) Three hours of lecture/labouratory per week. Introduction to play analysis with emphasis on the primary theatrical forms 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 plays and performance of plays. Also listed as African American Studies 152A and Dramatic Art 132. (F) Wilkerson

133. Game Theory in the Social Sciences. (4) Students will receive no credit for 133 after Economics 104. Three hours of lecture and one hour of discussion per week. A non-technical introduction to game theory. Basic principle, and models of behavior in play, will be a strong emphasis on applications to political science, economics, and other social sciences. Also listed under Political Science 135, Economics 110 and Political Economy of Industrial Societies 135. (SP) Staff

135. Mozart and Beaumarchais: The Figaro Cycle. (3) Three hours of lecture per week. Prerequisites: Upper division standing and consent of instructor. Examination of women’s immigration of the U.S. in specific socio-historical and cultural contexts. Special attention to race, ethnic and identity issues from women-centered analysis and methodology. Also listed as Ethnic Studies 136 and Women’s Studies 136. Offered alternate years. (SP) Staff

136. Immigrant Women. (4) Three hours of lecture per week. Prerequisites: Upper division standing and consent of instructor. Examination of patterns of women’s immigration of the U.S. in specific socio-historical and cultural contexts. Special attention to race, ethnic and identity issues from women-centered analysis and methodology. Also listed as Ethnic Studies 136 and Women’s Studies 136. Offered alternate years. (SP) Staff

140. Technical Communication for Non-Native Speakers of English. (3) Three hours of lecture per week. Prerequisites: English 1A, or equivalent course, upper division or graduate standing. Emphasis on improving language skills and use of the rhetorical and technical principles of written communication. This course is designed to prepare non-native speakers for the more advanced work in Engineering 190. Sponsoring departments: Subject A and the College of Engineering. (F, SP)

142. Women’s Lives Worldwide. (3) Course may be repeated for credit as topic varies. Three hours of lecture per week. Global influences on women’s lives in the past decades. New laws and new economic activities have altered traditional gender roles, and not only for the benefit of women. This course will explore a different region of the world each time it is offered. Topics to be offered: (a) South Asia; (b) East Asia; (c) Southeast Asia; (d) West Asia; (e) North Africa; (f) Latin America and the Caribbean; (g) Western Europe; (h) Eastern Europe; (i) other areas as defined. Also listed as Women’s Studies 142 and International and Area Studies 142. (SP) Staff
topics linked to subsequent field studies on the island of Moorea (French Polynesia). Also listed as Entomological Society of America, proceedings, volume 142, and Integrative Biology 158B. (F) Caldwell

160. High Energy Astrophysics and Cosmology. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Senior standing in Astronomy or Physics, or consent of instructor. Physics 112, and either Physics 110A or 110B or 115A-115B. Knowledge of classical and quantum mechanics required. Basic physics of high energy particles and radiation as they appear in compact astrophysical objects in the expanding Universe. Physics of supersymmetry, supergravity and black holes, cosmic rays, remnants and cosmic rays, pulsars, X-ray sources and quasars. The cosmological scale, elementary cosmological models and the mass density of the Universe. Evidence for dark matter, and concepts of the early Universe. Sponsoring departments: Astronomy and Physics. (SP) Arons, Sadoulet

167. Introduction to Chinese Philosophy. (4) Three hours of lecture and one hour of discussion 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, Hsun Tzu, Mu Tzu, Chuang Tzu, Tung Chu-chu, Chu Hsi, Wang Yang-ming, and Li Hung-ch'ang. The course, presented in the course is the development of Chinese ethical theory and the role of language in moral education. Also listed as Chinese 165 and Philosophy 167B. (SP) Johnson, Lee


182. Existentialism and Religious Thought: Kierkegaard. (3) Three hours of lecture per week. Prerequisites: One philosophy course. A study of Kierkegaard as philosopher, psychologist, and religious thinker with emphasis on those aspects of his thought and having provided the basis of existentialism; his criticism of modern culture, his understanding of the self as produced by incomensurable interpretations, and his secularization of the notion of incarnation through an analysis of the role of paradoxical in individual lives. Sponsoring departments: Philosophy and Religious Studies. (SP) Rubin

191. Public Health and Nuclear War. (2) One hour of lecture and one hour of discussion per week. The course is designed to focus on public health issues of the current arms race and the threat of nuclear war. Topicals to be considered include discussion, lecture, and directed readings. The course content will be applicable and medical effects of radiation, psychological, and health dimensions of destruction from preparation for detonation. Critical resolution and other preventive measures will be explored and tested. Sponsoring departments: Medicine and PAICS. (SP) Paulson

191A. Introduction to Laboratory Animal Science and Resources. (2) Two and one-half hours of laboratory and one and one-half hours of lecture per week. Must be taken on a pass/failed basis. Prerequisite: Biology 1A-1B or equivalent, upper division standing. For students working with laboratory animals. Lecture on basic animal science, including animal research models; principles of anesthesia, husbandry 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. (SP) HIBS5A-HIBS5B. Senior Honors Thesis. (3-3) Hours of lecture per week. Prerequisites: Energy Resources 120 or consent of instructor. Modeling methods in ecology and meteorology; stability analysis; effects of anthropogenic stress on natural systems. Also listed as Energy and Resources 202 and Soil Science 198. Offered alternate years. (SP) Gage

203. Advanced Topics in Endocrinology. (2) One hour of lecture and one hour of discussion per week. Prerequisites: Consent of Instructor. Modeling the dynamics of hormones and their receptors and ligands. Prerequisites: Energy Resources 120 or consent of instructor. Modeling methods in ecology and meteorology; stability analysis; effects of anthropogenic stress on natural systems. Also listed as Energy and Resources 202 and Soil Science 198. Offered alternate years. (SP) Gage

204. Animal Behavior Research Reviews. (1) Course may be repeated for credit. One and one-half hours of seminar per week. Prerequisites: Graduate standing; basic course in animal behavior; consent of instructor. Reports and discussions of original research completed or in progress. Students not expected to present a formal report, but all are expected to attend and enter into the discussions. Sponsoring departments: Integrative Biology and Psychology. (F) Caldwell

205. Wind and Wave Forces on Marine Structures. (3) Three hours of lecture per week. Prerequisites: Engineering 101 or Engineering 102, or equivalent. Determination of wind and wave forces on coastal structures, pipelines, fixed and mobile offshore platforms. Evaluation of nominal and extreme loadings. Load effects. Time and frequency domain characteristics of wind and wave loadings. Evaluation of accuracy of analytical models based on field and laboratory data. Also listed as Civil Engineering 205B and Naval Architecture 205B. (SP) Hogg

206. Advanced Seminar in Public and Nonprofit Management. (3) Three hours of seminar per week. Prerequisites: One or two concurrent courses. Determination of wind and wave forces on coastal structures, pipelines, fixed and mobile offshore platforms. Evaluation of nominal and extreme loadings. Load effects. Time and frequency domain characteristics of wind and wave loadings. Evaluation of accuracy of analytical models based on field and laboratory data. Also listed as Civil Engineering 205B and Naval Architecture 205B. (SP) Hogg

207. Public Management: Managers and Management. (3) Three hours of lecture per week. The character, role and influence of the manager in public and nonprofit organizations. Analytical and interpersonal skills, and strategic and methodological issues are its primary focus. (SP) Hogg

208. Public Management: Techniques of Management Control. (3) Three hours of lecture per week. The role of budgetary, financial, and physical management controls in facilitating effective policy making and administration. Performance and accountability measures. Coping with the external environment. Ethical dilemmas and current issues. (SP) Hogg

209. Public Management: Theorists of Management Control. (3) Three hours of lecture per week. Examination of method of analysis, and model requirements of 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. (SP)

209. Public Management: Applied Microeconomics. Three hours of lecture per week. This course provides a basic understanding of microeconomic principles as they relate to the public and nonprofit sectors of the economy. The focus is on demand and supply, market structure, and optimal pricing and production. (B) Also listed as Economics 276

210. Public Management: Organizational Understanding for Managers. Three hours of seminar per week. This course examines the role of the manager in complex settings, authority relations and goal formulation, professional and conflict, technological and organizational structures, problems of implementation, interorganizational politics and political environments. Case studies will be examined.

210H. Perspectives in Personality: Personality Theory. (2) Two hours of seminar per week. Major approaches to personality theory, including psychodynamic, behavioral, psychometric, and humanistic theories, as well as work in culture and personality, the study of social cognition, and the study of the self. (SP)

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. (F)

212. Public Management: Financial Management. (3) Three hours of lecture per week. An examination of the role of finance in the operation of governmental and nonprofit organizations. Topics include the analysis and management of cash flows, capital budgeting and capital structure, profitability and costs. Prerequisites: Math 104 and 110 and Statistics 101. (SP)

213A-B. Mathematical Economics. (3-3) Two hours of lecture 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 is possible, including theories of preferences, utility, demand, personal probability, games and general equilibrium. This course requires at least twelve hours of work per week including outside work and preparation. Also listed as Economics 207A-207B and Math 213A-213B.

215. Feudal Analysis in Archaeology. (4) One hour of lecture, one hour of discussion, and six hours of laboratory per week. Prerequisites: Integrative Biology 184, 184L, or a course in comparative anatomy. Introduction to systematic of animals commonly found in archaeological contexts, principles and procedures in faunal analysis of archeological sites, practical training in osteology and research methods, and preparation of a technical report on an archaeological site. Sponsoring departments: Anthropology and Integrative Biology.

216. Management of Change and Planning. (3) Three hours of lecture per week. This course focuses on techniques to facilitate change and planning in public service organizations. Topics to be included are: organization structures and processes, techniques of change, control and risk taking, the planning as a management function. Also listed as Educational Administration and Evaluation 261B and City and Regional Planning 207. (SP) Benveniste

217. Technology, Tasks and Politics. (3) Three hours of seminar per week. This course examines the nature of the tasks and technologies used by public sector agencies evolve over time, affecting the character of managerial work and the politics of the policy setting. The class examines theories of effective public management and case studies of situations that require managerial initiatives. Case studies are drawn from many policy areas, including public health, childcare policy, social service delivery, and regulatory policy. (SP)

218. Information Resource Management. (3) Three hours of seminar per week. This course studies management of information, including library cataloging, telecommunications and office automation. Using case studies, it explores management strategies in planning, policy and organizational issues in the context of current and future technologies. Sponsoring department: Public Policy. (SP)

219. Financing Tools for Public Managers. (3) Three hours of seminar per week. This course will examine new financing tools in California and financing options available to public managers. Emphasis will be placed on the use of a case study approach with the participation of leading finance officers and underwriters in California. The course will also discuss economic development aims and consider whether these aims can be achieved without significantly expanding the size of government. (SP)

220. Management of Professionals in Organizations. (3) Three hours of lecture per week. The history and concept of professional roles. Professionalization as an alternative to bureaucracy. Adapting supervision to professionals in technology. The need for the professional to plan for his career. Sponsoring departments: Psychology 250E and Social Welfare 210H. (SP) Runyan

221. Ecology and Epidemiology of Arthropod-Borne Zoonoses. (2) Two hours of lecture per week. Prerequisites: Biological Sciences 201 and Entomology 163 recommended. This interdisciplinary graduate course will focus on the ecology and epidemiology of zoonotic diseases transmitted by arthropods. Emphasis will be placed on the development of differential diagnosis and management strategies for the practitioner. (F)

222. Graduate Issues in Cognitive Science. (3) Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. This course is required of all Cognitive Science B.A.'s. The course will cover a wide range of topics as they intersect with the various disciplines. Also listed as Cognitive Science 200 and Psychology 222.

223. Citizen Involvement in the City Planning Process. (3) Students will not receive credit for 223 after making City and Regional Planning 205, Interdepartmental Studies 206 Fall 1990, and the Interdepartmental Studies 206 Fall 1991. Three hours of lecture/seminar per week. An examination of the roles of the citizens and citizen organizations in the city planning process. Examination of the effectiveness of different organizational models in different situations. Sponsoring departments: City and Regional Planning, and Landscape Architecture. (SP)

224. Human Evolution, Prehistory and Paleoenvironment. (2) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. A seminar course devoted to consideration of current research in paleoanthropology and related subjects. Sponsoring departments: Anthropology and Integrative Biology.

225. Protein/Nucleic Acid Chemistry and Enzymology. (3) Three hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. Protein structure, denaturation and folding. Nucleic acid chemistry, structure and cleavage. Protein-protein and protein-nucleic acid interactions. Enzyme kinetics and mechanism, catalytic antibodies. Intended for graduate students in Chemistry, Biochemistry and Molecular and Cell Biology 230 and Molecular and Cell Biology 214. (SP) Klann

223A-223B. Understanding Families: Methods in Family Research. (1) Two hours of seminar every other week. Prerequisites: Consent of instructor. This seminar 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. This seminar is given by two professors from 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. Sponsoring departments: Psychology and Social Welfare.

223. Environmental Law and Resource Management. (3) Three hours of seminar per week. Prerequisites: Consent of instructor. Formerly Landscape Architecture 223. An introduction to the American legal system governing the utilization and management of natural resources. An introduction to the techniques that have been developed by courts, legislatures, and administrative agencies for environmental protection. Topics will include: nuisance law, constitutional constraints, environmental impact statements, and permits for development control, pollution control, natural resources planning law. Sponsoring departments: Landscape Architecture and City and Regional Planning. (F) Twiss, Heyman

224. Community Scale Energy Systems. (3) Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. Energy supply at the community scale through development of locally available renewable energy resources (solar, wind, biomass). Analysis and site planning of energy technologies, energy supply and energy demand. For students in design, planning, energy, public policy, and related fields. Term project. Sponsoring departments: Architecture, Landscape Architecture and Energy and Resources Group.

225. Cognitive Science Research Discussion. (1) Course may be repeated for credit. One and one-half hours of discussion per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Student must be the Cognitive Science research assistant for one term. Cognitive Science Research Discussion Program. Sponsoring departments: Linguistics, Philosophy, and Psychology.

226. Research Methods in Environmental Design. (2) Two hours of seminar and two hours of laboratory per week. The components, structure, and meaning of the urban environment. Environmental problems, attitudes, and criteria. Environmental survey, analysis, and planning techniques. Environmental design criteria and environmental quality. Environmental simulation. Sponsoring departments: City and Regional Planning and Landscape Architecture. (F) Bosseimann

227. Urban Design in Planning. (3) Three hours of seminar/discussion per week. Prerequisites: Consent of instructor. This seminar will focus on urban design in the planning process, the role of environmental surveys, methods of community involvement, problem identification, goal formulation and alternatives generation, development regulations and presentation, design guidelines and review, environmental evaluation and impact assessment. Case studies. Sponsoring departments: City and Regional Planning and Landscape Architecture. (SP) Jacobs

228. Advanced Topics in Hillslope Hydrology. (3) Course may be repeated for credit. Three hours of

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

255A-255B. Eastern Frontiers of the Classical World. (3) Three hours of seminar per week. (Fall) Prerequisites: Consent of instructor. Western analysis of the archaeological and historical evidence for the ancient Orient and the agricultural and pastoral societies of the eastern Mediterranean and Asia Minor. Sponsoring department: Near Eastern Studies.

255B. Eastern Frontiers of the Classical World. (3) Three hours of seminar per week. (Spring) Prerequisites: Consent of instructor. Western analysis of the archaeological and historical evidence for the ancient Orient and the agricultural and pastoral societies of the eastern Mediterranean and Asia Minor. Sponsoring department: Near Eastern Studies.


270. Workshop in Institutional Analysis. (2) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Studies in current topics related to the administrative and institutional aspects of a university program, such as Family and Consumer Science. These courses selections should be made during the basic year. (SP)

271. Seminar in Neuropsychology. (3) Course may be repeated for credit. Three hours of lecture and two hours of laboratory per week. Lectures and case presentations from the literature are reviewed. Clinical implications of cognitive and information processing manifested in cases of aphasia, dementia stroke, traumatic injury, and other forms of neurological damage. Case presentations of patients allow students to discuss strategies for evaluation of cognitive functioning. Presentation of neuropsychological populations as opportunities for the study of cognitive functioning. Sponsoring departments: Education and Psychology.

272. Ecological and Social Dimensions of Global Change. (3) Three hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of Instructor. Maximum enrollment 25. This seminar will explore the positions of various scientific disciplines and the public policies associated with the following human responses to global climate change: global warming, acid rain, greenhouses, and no response. Emphasis is placed on developing predictive models of how the Earth System (including humans) will respond to global change. Also listed as Energy, Resources, and Environment 291, Geography 244, and Integrative Biology 272. (F) Chapin, Firestone, Harte, Wells

282. Tumor Biology Seminar. (1) Course may be repeated for credit. One hour of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Reviews and reports of current research in tumor biology. Sponsoring departments: Integrative Biology and Molecular and Cell Biology.

285. Theoretical Astrophysics Seminar. (2) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. The seminar will explore the various fields of theoretical astrophysics. Sponsoring departments: Astronomy and Physics.

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 agriculture and nutrition. Fossil pollen and microscopic charcoal analyses. Plant macrofossil identification. Graphical presentation of results, statistical analysis. Fieldwork usually in California or Mexico. Sponsoring departments: Geography and Integrative Biology. (SP) Byrne

291A. Oral Performance: Voice and Poetics. (4) This course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor required. The study of voice and poetics. Historical traditions organize and manage knowledge. Emphasis will be upon the totality of the performance, with a focus upon music as a codeterminant of the meaning and usage of the text. This seminar will consider the role of the speaker in the oral tradition, the role of the audience, and the role of the body in the performance of the text. This seminar will explore the ways in which oral performance and oral traditions may be used to support the study of the verbal structures of professional discourse. Sponsoring departments: Nutritional Sciences, Agricultural and Rural Economics and Social and Administrative Health Sciences. (SP) Staff

291D. Design, Construction, and Maintenance of Marine Structures. (3) Three hours of lecture per week. Prerequisites: Consent of instructor required. The course will examine the design, construction, and maintenance of marine structures used in marine industries. The course will cover the principles of mechanics as applied to marine structures, including breakwaters, piers, and fixed and mobile platforms. Emphasis will be placed upon the theoretical and practical aspects of the design of marine structures. Sponsoring departments: Civil Engineering and Naval Architecture 290A and Navial Architecture 290C. (SP) Staff

292. Tumor Biology Seminar. (1) Course may be repeated for credit. One hour of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. The seminar will explore the various fields of theoretical astrophysics. Sponsoring departments: Astronomy and Physics.

295. Systems and Integrative Biology. (1) Course may be repeated for credit. Two hours of seminar/laboratory per week. Must be taken on a satisfactory/unsatisfactory basis. 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: Nutritional Sciences and Molecular and Cell Biology. (SP) Staff

296. Management of Innovation and Policy. (3) Two hours of lecture 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 covers 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.

Interdisciplinary Studies

Field Major Office: Division of Undergraduate and Interdisciplinary Studies, 301 Campbell Hall, 842-2232

Professor: Donald A. McQuade, Ph.D. (Dean)

Lecturers: Robert Ehrlich, Ph.D. Earl Kee, Ph.D. Gary P. Wren, Ph.D.

The Major

The interdisciplinary studies field major (ISF), established in fall 1992, unites the former field majors in social sciences and humanities. The ISF major thus affords undergraduates a thoroughly interdisciplinary framework for their studies. The program allows students to establish areas of concentration in the humanities, social sciences, or areas that draw on both.

The field major is especially devised for students who are interested in a liberal arts education. The major combines breadth—courses drawn from a variety of disciplines—with an individual area of concentration tailored to the needs of each student. Students are responsible for developing their own program of studies with the advice and approval of a faculty member of the staff who will act as their official adviser.

Students are expected to select courses in a wide range of social science and humanities fields such as history, English, sociology, art history, economics, political science, and anthropology. These courses examine the interaction of disciplines and the pursuit of an aesthetic fulfillment of a unified principle defined by the area of concentration—a topic or theme at the heart of the student's major program, such as Family and Society, Science and Society, or an area of study conducted in an interdisciplinary context. Students complete the major with a senior thesis.

291A. Oral Performance: Voice and Poetics. (4) This course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor required. The study of voice and poetics. Historical traditions organize and manage knowledge. Emphasis will be placed upon the totality of the performance, with a focus upon music as a codeterminant of the meaning and usage of the text. This seminar will explore the ways in which oral performance and oral traditions may be used to support the study of the verbal structures of professional discourse. Sponsoring departments: Nutritional Sciences, Agricultural and Rural Economics and Social and Administrative Health Sciences. (SP) Staff

291D. Design, Construction, and Maintenance of Marine Structures. (3) Three hours of lecture per week. Prerequisites: Consent of instructor required. The course will examine the design, construction, and maintenance of marine structures used in marine industries. The course will cover the principles of mechanics as applied to marine structures, including breakwaters, piers, and fixed and mobile platforms. Emphasis will be placed upon the theoretical and practical aspects of the design of marine structures. Sponsoring departments: Civil Engineering and Naval Architecture 290A and Navial Architecture 290C. (SP) Staff

292. Tumor Biology Seminar. (1) Course may be repeated for credit. One hour of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. The seminar will explore the various fields of theoretical astrophysics. Sponsoring departments: Astronomy and Physics.

295. Systems and Integrative Biology. (1) Course may be repeated for credit. Two hours of seminar/laboratory per week. Must be taken on a satisfactory/unsatisfactory basis. 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: Nutritional Sciences and Molecular and Cell Biology. (SP) Staff

296. Management of Innovation and Policy. (3) Two hours of lecture 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 covers 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.

Professional Courses

407. Introduction to Scientific Diving. (4) Two hours of lecture, three and one-half hours of pool laboratory, and seven hours of open water practice. Prerequisites: Swimming test, free diving test, and medical exam, CPR and 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, submersion, 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) Austin

*On leave, spring
*On leave, fall
*On leave
*Recalled to active service
*Recipient of Distinguished Teaching Award
The field major is administered by a faculty advisory committee and is a part of the programs of the Division of Undergraduate and Interdisciplinary Studies.

Admission to the Major. Students will be considered for the interdisciplinary studies field major by competitive application. ISF faculty will review applicants on the basis of their academic performance and their expressed interest in the major. Students with a G.P.A. of 3.0 or better will be given priority. Prerequisites will include an analytical essay submitted by the student and an essay written by a faculty advisor. The essay should be submitted to the department office in 301 Campbell Hall for specific procedures, deadlines, and to receive a copy of the ISF student handbook, which specifies requirements.

Lower Division Requirements. One year of World Civilization (Undergraduate and Interdisciplinary Studies 44, 55, or equivalent). Courses that may be used in these areas may be accepted with the approval of the ISF student handbook, which is available in the Division of Undergraduate and Interdisciplinary Studies Office. The World Civilization requirement must be taken for academic work in the major.

Area of Concentration. As part of the application for admission to the program, each student must define an individual area of concentration, providing a focus for academic work in the major. The upper division concentration for the interdisciplinary studies field major must also be defined at this time, and courses selected to form a coherent and strong concentration.

Upper Division Courses

Each semester. Check the schedule of classes for current topic. (F,SP) Staff

Upper Division Courses

100A. Interdisciplinary Approaches to Social Theory and Cultural Analysis. (4) Three hours of lecture per week. Formerly Interdisciplinary Studies Field Major 100, Social Sciences 103A, and Humanities 100. Introduction to central theoretical investigations concerning the construction and organization of social life. Using some works from the "classical" traditions of social theory as well as some examples of contemporary analysis, this course will explore such topics as the nature of power and social/historical change, the nature of economic production and consumption, the meaning of difference—racial, sexual, class—the development of institutions, etc. (F,SP) Klee, Moran, Wren

100B. Interdisciplinary Approaches to Social Theory and Culture. (4) Three hours of lecture per week. Formerly Interdisciplinary Studies Field Major 100, Social Sciences 103A, and Humanities 100. Introduction to classical and contemporary analyses of the development and construction of individual identity, the concepts of subjectivity and agency, and notions about the inner life. An exploration of the construction of meaning and meaning is central to an examination of works from discourse analysis, symbolic anthropology, literary and film studies. (F,SP) Ehrlich, Klee, Wren

115. Ethnicity and Popular Culture. (4) Three hours of lecture, discussion with one or more group members. Minimum of 20 units (must have at least three courses) drawn from at least three fields or disciplines in the College of Letters and Science. However, with the consent of an ISF faculty advisor, a maximum of three courses from outside the College of Letters and Science may be accepted with the approval of the ISF student handbook. Courses in social welfare, journalism, public policy, city planning, business administration, architecture, etc. For further information, please see the Sample Area of Concentration listed in the ISF student handbook. Courses for the requirement must be upper division, i.e., numbered 100 or above. For purposes of determining the College of Letters and Science breadth requirements, the faculty will decide whether the course constitutes the Area of Concentration on the humanities or the social sciences.

2. Interdisciplinary Studies 100A-100B, Introduction to Social Theory and Cultural Analysis, the core courses for juniors.

3. ISF 190, Senior Thesis. The preparation and presentation of a senior thesis pertaining to the student's area of concentration.

Honors Program. Upper division students with an overall grade-point average of 3.5 and a grade-point average of 3.5 in the major may, upon approval of the advisor, enroll in the honors program. H195 will be substituted for ISF 190. Honors candidates must submit a detailed research proposal with a preliminary bibliography to the thesis advisor. They must also obtain the prior agreement of a faculty member (in addition to the advisor) to read and evaluate the completed thesis. Requirements for graduation in the honors program include: (1) 3.5 grade-point average in all courses taken for the major and (2) a recommendation for honors based upon high quality of the senior thesis.

Lower Division Courses

79. Undergraduate Colloquium. (1) Course may be repeated for credit with different topic and different instructor. One and one-half hours of lecture per week. Must be taken on a passed/not passed basis. Formerly Freshman and Sophomore Studies 79. Topics change each semester. Check the schedule of classes for current topic. (F,SP) Staff

International and Area Studies

(Division of International and Area Studies Teaching Programs, College of Letters and Science)

Office: 207 Moses Hall, 642-4466

International and Area Studies attempts to enhance the educational experience at the undergraduate and graduate levels. The courses that IAS offers are multidisciplinary and internationally focused, and they address timely and relevant issues not generally covered in existing campus courses. The courses are designed to be of interest to students of all majors. Since the course topics change from semester to semester, please consult with the program office regarding the current offerings.

Lower Division Courses

1. The Berkeley Forum on the International World. (1) Course may be repeated for credit. One and one-half hours of lecture per week. An introduction to major topics and current faculty research concerning international studies. Emphasis upon modern and contemporary society, areas and nations of regional significance, and culture. Lectures, by scholars from diverse disciplines, will address critical issues in politics and international relations, economics and business, culture and the arts, religion, ecology, social order, and more. (F,SP) Staff

20. International Education through Study Abroad. (1) One hour of lecture per week. Must be taken on a passed/not passed basis. Prerequisites: Freshman or sophomore standing. An introductory seminar will introduce lower division students to international education through study abroad opportunities. Weekly seminars include the general philosophy of international exchange in higher education, basic information for Berkeley students who have an interest in studying abroad; and cultural studies of different areas of the world including Africa, Asia, Europe, the Middle East and Latin America. (F) Staff

88. Issues in Political Economy and Development. (2) One and one-half hours of lecture and one hour of discussion per week. Must be taken on a passed/not passed basis. Prerequisites: Freshman or sophomore standing. Formerly Political Economy of Industrial Society. This course examines topics related to contemporary economic and political processes in both the international and domestic levels. Pea discussion groups led by honors students. (SP) Staff

Upper Division Courses

142. Women's Lives Worldwide. (3) Course may be repeated for credit as topic varies. Three hours of lecture per week. Global influences on women's lives have multiplied in the past decades. New laws and new economic activities have altered traditional gender relationships, not always to the benefit of women. This course will explore a different region of the world each time it is offered. Topics to be offered: (a) South Asia; (b) East Asia; (c) Southeast Asia; (d) West Asia/North Africa; (e) Africa south of the Sahara; (f) Latin America and the Caribbean; (g) the European Union; (h) Eastern Europe; (i) other areas as defined. Also listed as Women's Studies 142 and Interdepartmental Studies 142. (F,SP) Staff

196. Directed Group Study. (1-4) Course may be repeated for credit. Group must be organized. Must be taken on a passed/not passed basis. Student initiated course, the
198. Supervised Independent Study and Research for Undergraduates. (1-3) Course may be repeated for credit. Must be taken on a pass/no pass graded basis. Prerequisites: Consent of instructor. Written proposal must be approved by a faculty adviser. Enrollment restrictions apply; see the Introduction to Courses and Curricula section of this catalog. (F,SP) Staff

**Italian**

(College of Letters and Science)

Department Office: 5125 Dwinelle Hall, 642-2704 Chair: Michael George Clough, Ph.D.

Professors: Glan-Paco Baies, Ph.D., Johns Hopkins University, 20th-century literature, theory of criticism
Loesie G. Cloys, Ph.D., Columbia University, L.H.D., Renaissance comparative literature, Italian literature, drama
Ruggiero Stefanini, Dottore in Lettere, University of Florence. Medieval studies, Dante, Italian and Romance philology
Guastino Costa, Dottore in Lettere (Emersitus) Nicolas J. Perella, Ph.D. (Emeritus) Associate Professors: Steven Bellenchen, Ph.D., Cambridge University, Medieval literature, drama
Gabriel Moses, Ph.D., Brown University, Renaissance to late modern interdisciplinary politics, comparative literature, film

**Major Adviser:** Mr. Botrell

**Graduate Advisor:** Mr. Stefani

The department gives undergraduates the opportunity to study Italian in the Italian language and a broad background in Italian literature from its beginnings to the present. It also offers courses in English translation on Italian civilization, literature, and film. The graduate program offers in-depth training in the history and critical analysis of Italian literature along with courses in philology and stylistics.

**Graduate Program**

**Master of Arts in Italian.** A minimum of 27 units of combined upper-division and graduate courses of which at least 12 units must be at the graduate level and must include Italian 201; a comprehensive written examination based on a 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.

**Ph.D. in Romance Languages and Literatures (emphasis in Italian).** This program requires for admission an A.B. degree with a major in Italian appropriately equivalent to the undergraduate major at Berkeley. No specific courses are required, but students who have completed the graduate advanced courses 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, 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 an alternative plans of preparation, both of which require a detailed knowledge of Italian literature and familiarity with Romance philology, with emphasis on Italian. The first plan involves the study of Italian language and literature for four quarters, with one quarter of Romance literature as a collateral, and of prescribed masterpieces in the third. Plan II further requires a command of one broad, integrated field (period, movement, genre) in both Spanish and French literatures.

**Lower Division Courses**

1. **Elementary Italian.** (5) Five hours of lecture and one hour of laboratory per week. Basic grammar for beginners: Part I. (F,SP) 14A. Beginning Italian for Graduate Students. Three hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Basic grammar, reading, and translation.

2. **Elementary Italian.** (5) Five hours of lecture and one hour of laboratory per week. Prerequisites: 1 or 14A. Basic grammar for beginners: Part II. (F,SP)

2G. **Advanced Italian for Graduate Students.** Three hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: 1G or equivalent. This course is designed to develop and enhance reading and translation skills from Italian to English in major works of Italian literature. Preparation for reading knowledge and research. A midterm and final exam are required. (SP)

3. **Intermediate Italian.** (5) Five hours of lecture per week. Prerequisites: 2 or 14B. Grammar review, reading, and written composition. (F,SP) 14C. Intermediate Italian. (5) Five hours of lecture per week. Prerequisites: 3 or 14C. Selected readings in Italian culture and current events. Essentials of grammar; written and oral compositions. (F,SP)

4. **Advanced Italian.** (5) Five hours of lecture per week. Prerequisites: 3 or 14C. Essentials of Italian culture and current events. Essentials of grammar; written and oral compositions. (F,SP)

12. **Advanced Conversational Italian.** (3) Three hours of lecture/discussion per week. Prerequisites: 3 or equivalent, or consent of instructor. The course is designed to enhance and improve oral communication skills at the advanced level, by means of conversational practice, discussion of readings, student presentation, original material, and use of audio-visual materials and media. (SP) Di Carlo

**Upper Division Courses**

1. **Italian 101A-101B, 2.** Three upper-division literature courses (not in English translation).

**Major Requirements:** A minimum of 27 units of combined upper-division and graduate courses of which at least 12 units must be at the graduate level and must include Italian 201; a comprehensive written examination based on a reading list. Students desiring to continue for the Ph.D. in Italian will take an oral permission-to-proceed examination. Further information is available from the Italian Department.

**Doctor of Philosophy in Italian.** The Ph.D. program is open to students with an M.A. degree in Italian or in a program in which Italian was the major field of study. Requirements: Demonstration of a reading knowledge of Latin and a modern language other than Italian and English; a basic knowledge of Italian philology; a written and oral qualifying examination in a major field of Italian literature and in a minor of an approved related field; a dissertation. Detailed information is available from the Italian Department.

**Upper Division Courses**

1. Elementary Italian. (5) Five hours of lecture and one hour of laboratory per week. Basic grammar for beginners: Part I. (F,SP) 14A. Beginning Italian for Graduate Students. Three hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Basic grammar, reading, and translation.

2. Elementary Italian. (5) Five hours of lecture and one hour of laboratory per week. Prerequisites: 1 or 14A. Basic grammar for beginners: Part II. (F,SP)

2G. Advanced Italian for Graduate Students. Three hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: 1G or equivalent. This course is designed to develop and enhance reading and translation skills from Italian to English in major works of Italian literature. Preparation for reading knowledge and research. A midterm and final exam are required. (SP)

3. Intermediate Italian. (5) Five hours of lecture per week. Prerequisites: 2 or 14B. Grammar review, reading, and written composition. (F,SP) 14C. Intermediate Italian. (5) Five hours of lecture per week. Prerequisites: 3 or 14C. Essentials of Italian culture and current events. Essentials of grammar; written and oral compositions. (F,SP)

12. Advanced Conversational Italian. (3) Three hours of lecture/discussion per week. Prerequisites: 3 or equivalent, or consent of instructor. The course is designed to enhance and improve oral communication skills at the advanced level, by means of conversational practice, discussion of readings, student presentation, original material, and use of audio-visual materials and media. (SP) Di Carlo

4. Advanced Italian. (5) Five hours of lecture per week. Prerequisites: 3 or 14C. Essentials of Italian culture and current events. Essentials of grammar; written and oral compositions. (F,SP)

12. Advanced Conversational Italian. (3) Three hours of lecture/discussion per week. Prerequisites: 3 or equivalent, or consent of instructor. The course is designed to enhance and improve oral communication skills at the advanced level, by means of conversational practice, discussion of readings, student presentation, original material, and use of audio-visual materials and media. (SP) Di Carlo

4. Advanced Italian. (5) Five hours of lecture per week. Prerequisites: 3 or 14C. Essentials of Italian culture and current events. Essentials of grammar; written and oral compositions. (F,SP) 12. Advanced Conversational Italian. (3) Three hours of lecture/discussion per week. Prerequisites: 3 or equivalent, or consent of instructor. The course is designed to enhance and improve oral communication skills at the advanced level, by means of conversational practice, discussion of readings, student presentation, original material, and use of audio-visual materials and media. (SP) Di Carlo

**On leave, spring, fall**

**On leave, fall**

**Recalled to active service**

**Recipient of Distinguished Teaching Award**
nounced in the semester course lists of the Italian Department and the film program.

20. Princes, Servants, Citizens (In English). (3) Three hours of seminar per week. An undergraduate seminar that will analyze a set of literary texts with an interdisciplinary approach, with a view to European political theories in their historical evolution from feudalism to parliamentary democracies.

27. Time and Consciousness in the Contemporary Novel (In English). (3) Three hours of seminar per week. An undergraduate seminar that analyzes the struggle against time and the search for knowledge which are the foundation of many contemporary novels. The readings and discussions will focus on how such a struggle and such a search ultimately define the very nature of literature.

98. Directed Group Study. (2-4) Course may be repeated for credit. Hours to be arranged. Must be taken on a passed/not passed basis. Group study of selected topics not covered by regularly scheduled courses. (F,SP) Staff

Upper Division Courses

101A-101B. Advanced Grammar Composition and Conversation. (3-3) Three hours of lecture per week. Prerequisite: 1:4. Reading and grammatical analysis of representative texts; advanced written and oral composition. (F,SP) DiCarlo

103A-103B. Introduction to Italian Literature. (3-3) Three hours of lecture per week. An introduction to the chief currents and authors of Italian literature. Lectures, selected readings, and a written examination. (F,SP) Bottrell

103A-109B. Dante’s Divine Comedy. (3-3) Three hours of discussion per week. A close reading of Dante’s masterpiece. (F,SP) Stefanini

110A-110B. Literature of the 13th and 14th Centuries. (3-3) Three hours of lecture per week. A. Emphasis on the “Stil Novo” and Dante’s minor works. B. Emphasis on Boccaccio’s Decameron and Petrarch’s Rime.

111. Fifteenth Century Literature. (3) Three hours of lecture per week. Humanism and the Early Renaissance. (SP) Bottrell

112A-112B. Sixteenth Century Literature. (3-3) Three hours of lecture per week. A. The High Renaissance. B. The Late Renaissance.

113. Seventeenth Century Literature. (3) Three hours of lecture per week. The main trends in the prose and poetry of the age of the Baroque.

114. Eighteenth Century Literature. (3) Three hours of lecture per week. Emphasis on the works of Vico, Goldoni, Panini, Alfieri. (SP) Moses

115. Nineteenth Century Literature. Three hours of lecture per week.

115A. From Neoclassicism to Romanticism. (3) Monti, Foscolo, and early Leopardi. (SP) Perelli


115C. “Decadentismo” and “Verismo”. (3) Emphasis on Carducci, Pascoli, Verga, D’Annunzio. (F) Staff

117. Twentieth Century Literature. Three hours of lecture per week.

117A. Fiction. (3)

117B. Poetry. (3)

117C. Theatre. (3) (SP) Biasin

130. Dante’s Divine Comedy (In English). (3) Three hours of lecture per week. An introduction to Dante’s thought and works. Emphasis on a critical reading of the Divine Comedy.

140. Petrarch and Boccaccio (In English). (3) Three hours of lecture per week. Lectures, readings, and discussions of Petrarch’s Rime and Boccaccio’s Decameron.

150. Humanism and the Renaissance (In English). (3) Three hours of lecture per week. The waning of the Middle Ages, Humanism, and the rise of the Renaissance. Analysis and discussion of the main trends of Humanistic thought.

155. Machiavelli (In English). (3) Three hours of lecture per week. The political and literary works of Machiavelli in the context of the thought and culture of his age.

160. Italian Culture During the Fascist Period (In English). (3) Three hours of lecture per week. An examination of the politico-cultural climate of the fascist regime.

165. The Anti-Hero in the Contemporary Italian Novel. (3) Three hours of lecture per week. An analysis of the novelistic portrait of the anti-hero figure that pervades contemporary culture. (F) Biasin

170. The Italian Cinema: History, Genres, Authors (In English). (3) Course may be repeated for credit as top topic varies. Three hours of lecture, two hours of film viewing, and discussion per week. An analysis of Italian cinema as seen in the development of specific film genres such as neorealism, comedy, self-reflexive cinema. Occasionally the course will concentrate on a specific director and study his individuality through style, theme and personal development. This course fulfills a major film requirement in one of history, genre, auteur.

175. Film and Literature (In English). (3) Course may be repeated for credit as top topic varies. Three hours of lecture, two hours of film viewing, and two hours of 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 Italian film directors. Literature shaped by film experiences and films dealing with the essence of cinematic form will be studied. This course may fulfill the film major requirement in one of history, genre, auteur.

H195. Special Studies for Honors Candidates. (3) Individual conferences. Prerequisites: 3.3 overall GPA, 3.5 GPA in the major and must have completed at least 18 upper division units in the major. Limited to seniors. Honors candidates. Directed study relating to the writing of an honors thesis. (F,SP)

197. Field Studies. (1-4) Course may be repeated for credit. Two hours of fieldwork per week. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor. Supervised field programs involving experiences in Italian culture and school-related activities. Regular individual meetings with faculty sponsor and written reports required.

198. Directed Group Study. (2-4) Course may be repeated for credit. Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Students must have completed 60 units and have a minimum GPA of 2.0. Supervised group study of selected topics not covered by regularly scheduled courses. (F,SP)

199. Supervised Independent Study and Research for Advanced Undergraduates. (1-4) Course may be repeated for credit. Individual conferences. Must be taken on a passed/not passed basis. Prerequisites: Required to senior students with overall GPA of 3.0 or better. Enrollment restrictions apply; see the Introduction to the Courses and Curricula section of this catalog. (F,SP)

Graduate Courses

200. Italian Syntax, Lexicon and Composition. (3) Three hours of lecture per week. An analysis of Italian syntax and lexicon, with exercises in critical language and exposition. Required for the M.A. in Italian.

201. Historical Grammar. (3) Three hours of seminar per week. History of Italian phonology and morphology. The course fulfills the Philology requirement for the Ph.D. in Italian.

202. Bibliography and Methods of Research. (3) Three hours of seminar per week. A pragmatic inquiry into bibliography and the methodology of research.

203. Literary Criticism. (3) Three hours of seminar per week. Studies in the main currents of contemporary criticism and their application in the interpretation of literary texts.

205. Studies in Literary Genres and Poetics. (3) Course may be repeated for credit as top topic varies. Three hours of seminar per week. An analysis of significant questions related to poetic and literary genres.

208. Minor Medieval Authors. (3) Three hours of seminar per week. Lyric and religio-didactic poetry, chronicles, novels, and treatises.

209. Seminar on Dante. (3) Three hours of seminar per week. Studies in the Divina Commedia and Dante’s minor works.

211. Seminar on Petrarcha. (3) Three hours of seminar per week. Studies in Petrarch’s poetry.

213. Seminar on Boccaccio. (3) Three hours of seminar per week. Studies in the Decameron and the minor works. (F) Stefanini

217. Studies in the Renaissance. Three hours of seminar per week. (F,SP)

217A. Humanism. (3)

217B. Theatre. (3)

217C. Ariosto. (3) Clubb

217D. Tasso. (3)

217E. Machiavelli. (3)


221. Studies in the Nineteenth Century. Three hours of seminar per week.

221A. Literary Theory and Polemics. (3)

221B. Leopardi. (3) Biasin

221C. Manzoni. (3) (SP) Biasin

221D. Verga. (3)

223A-223B. Studies in the Twentieth Century. (3-3) Three hours of seminar per week. A. Poetry and Theatre. B. Prose. (F) Biasin

289. Special Study. (2-4) Course may be repeated for credit. Individual conferences. Prerequisites: Consent of the instructor. Required 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) Staff

299. Directed Research. (6-12) Course may be repeated for credit. Individual conferences. Must be taken on a satisfactory/unsatisfactory basis. Limited to students engaged in research for the doctoral dissertation. (F,SP)

601. Individual Studies for M.A. Candidates. (1-6) Course may be repeated for credit with consent of graduate adviser. May not be used for unit or residency requirement for the Master’s degree. Individual conferences. Must be taken on a satisfactory/unsatisfactory basis. Individual study in consultation with faculty member with a view to the M.A. comprehensive examination. May be taken only in the semester of the comprehensive examination. (F,SP)

602. Individual Studies for Doctoral Students. (1-6) Course may be repeated for credit with consent of graduate adviser. Course does not satisfy unit or residency requirements for doctoral degree. Individual
conferences. Must be taken on a satisfactory/unsatisfactory basis. Individual study in consultation with a faculty adviser. Intended to provide an opportunity for qualified students to prepare for the Ph.D. qualifying examination. May be taken only in the semester of the qualifying examination. (F,SP) Staff

from department to department and semester to semester. (F,SP) Staff

39AC. News and the Underdog in American Soci- ety. (3) Course may be repeated for credit. Three hours of lecture/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. Sections limited to 15 students. (F,SP) Staff

Upper Division Courses

100. Introduction to News Reporting. (4) Three hours of lecture/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. Sections limited to 15 students. (F,SP) Staff

101. Advanced Reporting for Journalists. (4) Course may be repeated for credit. Hours to be arranged. Must be taken on a passed/not passed basis. (F,SP) Staff

110. Colloquium (Undergraduate). (1) Course may be repeated for credit. One and one-half hours of lecture/discussion per week. Must be taken on a passed/not passed basis. 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) Staff

140. History of the American Press. (3) Three hours of lecture/discussion per week. Must be taken on a passed/not passed basis. 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) Staff

141. The Mass Media and Society. (3) Three hours of lecture per week. Critical analysis of the structure and dynamics of the mass media and their impact on society. (SP) Goldstein

151. Reporting as Literature. (3) Three hours of lecture/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/discussion per week. A survey, beginning in the 18th century, of the origins and effects of attempts at mass persuasion. Shifting concepts of public opinion, propaganda and public relations will be analyzed, and the impact of the print and broadcast media with regard to libel, privacy, prior restraint, fair trial/free press newsgathering and access to information. (F) Turner

175. The Critical Review. (4) Three hours of lecture/discussion/field work per week. Prerequisites: Consent of instructor. Weekly written assignments, readings and discussion in the field of critical review- ing (books, film, drama, music, art and architecture). (F) Littlejohn

403. Issues in Television Journalism. (3) Three hours of lecture/discussion/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) Bieder and 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. Independent meetings with faculty advisor and written reports required. See Additional Information, "Field Study and Internships." (F,SP) Staff

198. Directed Group Study in Journalism. (1-4) Course may be repeated for credit. Seminar with three hours of lecture and discussion per week. Must be taken on a passed/not passed basis. Prerequisite: Total grade point average of not less than 3.0 and consent of instructor. (F,SP) Staff

Graduate Courses

200. Reporting the News. (5) Five hours of seminar and fifteen hours of fieldwork per week. In this course, students are taught the fundamentals of reporting and writing news stories and of collecting information. Close student-teacher interaction is given to each reporting assignment. Required in the fall term of first year. Limited to first year graduate students in Journalism. (F) Chavez, Drummond, Henry, Rasky, MacDougal

201. Advanced News Reporting. (4) Three hours of seminar and eight hours of fieldwork in news reporting per week. Prerequisites: 200 or consent of instructor. Advanced study of more complex subject areas and more sophisticated writing styles. (F) Chavez, Cohen

205. News Editing. (3) Three hours of lecture/lab- oratory per week, plus outside assignments and read- ing. Must be taken on a satisfactory/unsatisfactory ba- sis. Study of principles and practice of news editing, copyediting, headline writing, and makeup, with some emphasis on creative editing and critiques of manuscripts. (F,SP) Staff

210. News Photography. (2) Two hours of lecture and four hours of laboratory per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisite: Priority to journalism graduate students. Fundamentals of photography and taking news photography. (F,SP) Staff

224. Reporting on Social Issues. (4) Three hours of lecture and eight hours of fieldwork per week. Prerequisites: For journalism students, 200 or all others consent of instructor. Work on a selection of major social problems in contemporary society, acquaintance with current developments in the social sciences relating to the problems, exposure to contrasting views, and writing of articles that will aid public understanding. (F,SP) Staff

225. Science Reporting. (4) Three hours of lecture/ discussion and eight hours of field work per week. Prerequisites: For journalism students, 200 or all others consent of instructor. Advanced study of methods of reporting developments in such fields as science, education, health, or the environment. (F,SP) Staff

227. Reporting of Cultural Events. (4) Three hours of lecture/discussion and eight hours of fieldwork per week. Advanced study of reporting and critical writing
Landscape Architecture

(College of Environmental Design)

Department Office: 202 Wurster Hall, 642-4022
Chair: James M. Laurie, M.L.A.

Professors:
Sally K. Fairark, Ph.D., Institutional and legal aspects of natural resource administration
Randolph T. Hestir, Jr., M.A., Community participation, neighborhood design
Allan B. Jacobs, M.C.P., Urban design and planning
Lisa L. Jewell, B.Arch., M.A., Relationship of design and construction technology
Michael M. Laurie, M.L.A. History, urban parks, design
Gina Cooper Marsh, M.A., M.C.P. Social behavior, housing and open space
Joe R. McAdams, Ph.D., Vegetation and ecological analysis
Martha Southworth, Ph.D., M.C.P., B. Arch. Urban design and planning
Piet H. Velle, Ph.D., Regional planning assessment, public land management

Graduate Adviser: Emeritus, M.L.A. Landscape design, design history
William Gernet (Emeritus), Landscape photography
Luna B. Leopold (Emeritus), Ph.D. Hydrology
Burton Ulton, Jr., Emeritus, M.L.A. Visual analysis and aesthetics
Richard L. Meyer (Emeritus), Ph.D. Third World environment, resource conservation
Wally Rosenquist (Emeritus), M.A. Videography
Franco Violini (Emeritus), B.S. City planning and design

Assistant Professors:
Timothy P. Duane, M.G., Ph.D. Energy and environmental planning
Walter J. Hoover, M.Arch., M.L.A., Community design
G. Mathias Konradt, Ph.D. Applied geomorphology and hydrology, environmental planning
Joel D. Radie, Ph.D., University of British Columbia: Geography, geographical information systems in landscape analysis and planning
Chip Sullivan, M.L.A. Landscape design and art, graphics

Lecturers:
Russel A. Beatty, M.L.A. Urban forestry, horticulture and planting design

The Profession

The profession of landscape architecture plays an important role in solving environmental problems. Landscape architecture is a broad practice that includes design of public spaces for recreation areas, schools, housing, neighborhoods, streets, and cities; planning for conservation of open space and natural amenities; land management and development; and assessment of the impact of projects and proposals on environmental quality and design of such projects to be environmentally compatible. Landscape design typically involves project programming; site planning of buildings and building complexes; and the analysis, planning, and detailed design of public and private exterior spaces and landscapes. It requires an understanding of visual and social factors, plant materials, construction techniques, cost, and ecology.

Environmental planning is concerned with the larger context of natural and urban environments including the study of ecology, conservation planning, environmental law, resource development, computer applications, recreation planning, and urban open spaces and transportation systems. The intent of all the emphases is the creation of delightful landscapes that are ecologically sound and socially informed.
Undergraduate Program

The four-year curriculum leading to the A.B. degree with a major in landscape architecture provides a general education in environmental design and serves as preparation for subsequent graduate education or entry-level work in the field. The emphasis is on design. Undergraduate students who earn the A.B. degree will become eligible to take the state examination after fulfilling a three-year apprenticeship under a licensed landscape architect.

Required core courses represent a minimum basic coverage in theory, design, and technology, but the program provides an opportunity to study more intensely all aspects of landscape architecture, including landscape analysis and planning, urban design, recreation, site design and development, graphics, construction, and planting design.

For more complete information, see the Announcement of the College of Environmental Design.

Graduate Program

The Master of Landscape Architecture Degree. The Master of Landscape Architecture degree is a professional degree accredited by the American Society of Landscape Architects. The program offers advanced work in landscape architecture from the scale of detailed form to that of the regional landscape. A common core of courses in the design part of the program is offered to all students, enabling them to understand the relationship between the design and the environmental planning aspects of the field. This core forms the foundation for extended course work in landscape design, urban and community design, and environmental planning.

Current faculty research and professional involvement include growth impact and land use planning, human factors and design, environmental simulation, landscape visual and scenic assessment, regional planning, regional and urban development, natural resources management, hydrology and planning, cultural geography, the educative city, energy conservation in landscape and community design, urban forestry, and community participation in design and planning.

Concurrent Program in Urban Design and Environmental Planning. The departments of Landscape Architecture and City and Regional Planning jointly offer a program of studies in urban design or in environmental planning, leading to both the Bachelor of Science degree and Master of City Planning degrees. Applicants must be admitted separately by both the Department of Landscape Architecture and the Department of City and Regional Planning.

The usual procedure is for applicants to apply to either department, and then submit an application to the other department by February 1 of the first academic year in residence. Acceptance into a concurrent program is not automatic and is limited to outstanding applicants. More information may be obtained from the graduate assistant in 206 Wurster Hall.

The Ph.D. Degree in Environmental Planning. The Doctor of Philosophy program in environmental planning is offered for students who want to pursue doctoral level research and teaching work beyond the master's level. The program emphasizes the development of theories and methods that underlie the fields of environmental planning or urban design, and the processes of planning and design as they relate to the solution of problems in the natural and urban environment. The Ph.D. degree in environmental planning is appropriate for those seeking careers in teaching, research, or planning as well as in environmental planning or urban design, or in specialized roles in government or professional consultation.

The program is centered around a core field of environmental planning and design. Students (in consultation with their program advisor) build upon this basic core through additional course work and research designed to develop an individual area of specialization within the field of environmental planning.

There are no required courses for the Ph.D. degree. Students and their advisors design each program individually. Ph.D. requirements are as follows: 32 units of upper division and graduate course work, two-year academic residency, reading knowledge of a departmentally approved design language, successful defense of a qualifying examination, and a dissertation. Progress toward the degree is evaluated annually by the Ph.D. Committee.

Admission is granted to a small number of individuals each year. It is anticipated that most applicants have a master's degree before entering. Students with only a bachelor's degree should apply to the M.L.A. program first, or otherwise complete an appropriate master's degree before applying.

For information about this program, please consult the graduate assistant, Department of Landscape Architecture, 206 Wurster Hall, or the Announcement of the College of Environmental Design.

Lower Division Courses

10. Ecology in the Design of the Physical Environment. (3) Three hours of lecture and one hour of discussion per week. The course is designed to promote an understanding of the various forces that shape the human environment, with a particular focus on ecological determinants. Topics included in the course will be selected from environmental issues at local, regional, national and global scales; the interrelationships between human activities, environmental considerations and built form; and a consideration of future trends and possibilities. Staff

24. Freshman Seminars. (1) Course may be repeated for credit. Four or five credits for seminar per term. Sections 1-2 to be graded at a letter-grade basis. Sections 3-4 to be graded on a passed/not passed basis. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP) Staff

38. Freshman/Sophomore Seminar. (2-4) Course may be repeated for credit as topic varies. Seminar format. Prerequisites: Priority given to freshmen and sophomores. Freshman and Sophomore seminars offer an opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. (F,SP) Staff

Upper Division Courses

101. Fundamentals of Landscape Design. (5) Two hours of lecture and six hours of studio per week. Prerequisites: 30 or permission of instructor. This course is designed to introduce students to the basic concepts of landscape planning, major types of planning, and environmental design. (SP) Staff

102. Case Studies in Landscape Design. (5) Two hours of lecture and six hours of studio per week. Prerequisites: For majors: 101. Architecture and planning majors without 101 admitted by consent of instructor. This studio course provides an opportunity to pursue specific design ideas from initial concept to complete design product. Definitions of collective comfort, meaning, and delight will be studied in projects of an intermediate scale and complexity such as a park, plaza, museum sculpture, garden, playground, office park, or housing project. Lecture modules on selected professional topics are integrated into the course. (SP) Staff

103. Design of Urban Landscapes. (5) Two hours of lecture and six hours of lab per week. Prerequisites: 30 or permission of instructor. For majors: 102. Architecture and planning majors without 102 admitted by consent of instructor. This studio course focuses on larger scale urban problems, including design of streetscapes, pedestrian and automobile, a waterfront, town center, streetscape, or reuse of derelict space. Lecture modules on selected professional topics are integrated into the course. (F) Hubbard

110. Ecological Analysis. (4) Three hours of lecture and four hours of field laboratory per week. Analysis of environmental factors and ecosystem dynamics, as related to decision-making for landscape planning and design. (F) McBride

111. Introduction to Landscape Plants in Design. (2) Two hours of lecture per week. Prerequisites: Botany 10 or equivalent. Fundamentals of plant growth, nutrition, water relations, soil characteristics, cultural influences of climate and soils; historic and contemporary uses of plants in design; planting design principles. (F) Beatty

112. Landscape Plants and Horticulture. (3) Two hours of lecture and six hours of laboratory per week. Prerequisites: 111; Introduction to Horticulture 15, 15L. Field observation and identification of plant species most suitable for use in Central California; horticultural techniques for landscape plantings including plant selection, spraying, pruning, and transplanting. Emphasis on planning and management. Individual graphic exercises and reports. (SP) Beatty

113. Regional Landscape Plants (Special Schedule Course). (2) Six hours of field laboratory per week for seven weeks. Field observation, identification and discussion of native and introduced plants for landscape design; emphasis on water conservation, ecological adaptation and landscape management; individual graphic exercises on selected topics. (SP) Beatty

120. Topographic Form and Design. (4) Two hours of lecture and six hours of studio per week. Prerequisites: Recommended: Civil Engineering 26. Theory, methodology, graphics, and controls for topographic site alteration. Drainage and topography. Exercises and reading. (SP) Jewell

121. Design of Landscape Structures. (4) Two hours of lecture and six hours of studio per week. Prerequisites: 120. Theory and materials; design of landscape structures and utilities. Studio problems in design detailing. (F) Jewell

130. Introduction to Landscape Architecture. (3) Three hours of lecture per week. Survey of landscape architecture as it has affected the social, physical, and cultural aspects 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. (SP) Staff

131. Design Implications in Forestry and Resource Management. (2) Two hours of lecture and two hours of fieldwork per week. An exploration of wilderness as a landscape resource, stressing visual composition as a basis which foresters and resource managers may use in making decisions and policies. (SP) Staff

134. Advanced Graphics for Landscape Architecture. (3) Six hours of studio per week. Prerequisites: Environmental Design 11A or 11B or Landscape Architecture 230 or consent of instructor. Freehand and formal, formal perspective approaches to graphic representation of design concepts. Pencil, ink, and color media. (SP) Hubbard

140. Social and Psychological Factors in Open Space Design. (3) Three hours of lecture and one hour of design presentation per week. An introduction to the influencing factors on the design process to design. Post-occupancy evaluation as a tool for understanding use of designed open spaces. Design as a communication process. Environmental needs of vulnerable populations—children, elderly, disabled, low-
203. Communications In Landscape Architecture. (1) Three hours of lecture per week. Prerequisites: 201 or consent of instructor. Exposure to the theory and practice of communication in landscape architecture with primary emphasis on graphic presentation, but also including photography, videoworks, workshops, the spoken and written word, reports, and models. (F) Sullivan

232. The Landscape As a Visual Resource. (3) Three hours of lecture per week and two field trips (total of three days). Visual analysis of wildlands landscapes, inventory procedures, problems in landscape management, and design strategies in relation to the visual object. Students are expected to work daily related to public wildlands. (SP) Laurie, McBride

234. Computer Applications In Landscape Architecture. (3) Three hours of lecture and three 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 the use of computer aids. Emphasis on the use of wildlands landscapes in film-making, script writing, and presentation design. Exercises and projects. (SP) Bosselman

236. Advanced Seminar In Land Use and Environmental Planning. (3) Three hours of lecture/discussion per week. A review of the techniques used in environmental planning, and evaluation of alternate means of implementation in various environmental and social situations. The class will examine and critique a number of well-known environmental planning programs and plans. Lectures and discussion will address recurrent planning problems as well as the limits of available natural and political constraints on plans, conflicts among specialists. (F) Cross, Duane

237. The Process Of Environmental Planning. (3) Three hours of lecture/discussion per week. A review of the techniques used in environmental planning, and evaluation of alternate means of implementation in various environmental and social situations. The class will examine and critique a number of well-known environmental planning programs and plans. Lectures and discussion will address recurrent planning problems as well as the limits of available natural and political constraints on plans, conflicts among specialists. (F) Cross, Duane

238. Environmental Policy Planning. (3) Three hours of lecture 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. Discusses approaches to steady state and resource-conserving lifestyles. Employs communication design compatible with conservation policies. Staff

239. Public Land and Resource Planning and Administration. (3) Three hours of lecture/discussion per week with occasional seminars. Prerequisites: CRS 130 or graduate standing. Covers history of federal lands policy and institutions, legislation, case law and federal/state relations vis-a-vis planning for major public resources: wilderness, wildlife, recreation, timber, water, and minerals. Analysis of U.S. Forest Service planning processes; critical issues in planning practice; and developments in resource management and planning. Occasional laboratories will provide opportunity for formal and informal discussion and field observation. (SP) Staff

240. Social, Cultural, and Psychological Factors In Design. (3) Three hours of lecture per week. Prerequisites: Graduate standing in the College of Environmental Design. A survey course to introduce designers to the basic approaches, concepts, and
research findings in the field of people/environment re-
stations. Let's focus on the application of rele-
vant issues in the design process and how to evaluate
environments from a user's perspective. Guest lec-
tures will introduce students to a range of faculty
and design practitioners who deal with sociocultural issues as
well as the design and use of the physical environment. (SP) Marcus

251. History and Theories of Landscape Archi-
technique and Environmental Planning. (2) Two hours
of seminar per 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: ecolog-
ical determinism, rationalism, ethics, social and econ-
omic values, limits, aesthetics, preservation/con-
servation, and the role of the professional. (F) Hester,
Twiss

252. Thesis and Professional Project Research
Seminar. (2) Two hours of lecture/discussion per
week. Approaches to research methods, including
the case study, the survey, the experiment, and the his-
torical or theoretical study. The course will include a
number of brief writing exercises directed toward
the development of a thesis or professional project pro-
posal. (SP) Southworth

253. Landscape Architecture and Environmental
Planning Colloquium. (1) Course may be repeated
for credit. Hours of lecture per week. Research seminar.
Must be taken on a satisfactory/unsatisfactory basis.
Invited lectures on current research, planning, practice,
and design projects. Out of approximately 14 pre-
sentations, five or 10 would be by faculty department,
two or three by graduating stu-
dents, the remainder by outside speakers. (F,SP) Kon-
doff

254. Topics in Environmental Planning. (2) Course
may be repeated for credit. Two hours of seminar and
one hour of consultation per week. Examination of
selected topics in environmental planning. Sem-
inars will include some guest lecturers, presentations
by instructors, and presentations by students. Read-
ings and requirements vary with the year, depending
on topic and staff. (F) Kondolf, Staff

255. Doctoral Seminar in Environmental Planning.
(1) Course may be repeated for credit. Must be taken
on a satisfactory/unsatisfactory basis. Prerequisites:
Doctoral student or consent of instructor. Designed to
be a forum for presentation of doctoral student re-
search, discussions with faculty researchers and en-
vironmental planning practitioners, and examination
of topical issues in environmental planning. Topics will
be announced at the beginning of each semester. (F,SP)
Staff

270. The Urban Park. (2) Two hours of seminar/di-
scussion per week. Review of the origins and de-
velopment of the public park as a component of cities.
Particular emphasis will be given to contemporary is-
sues of conservation, changing uses and expectations, and
future directions. Offered in odd-numbered years.
(SP) Laurie

295. Supervised Research in Landscape Archi-
technique and Environmental Planning. (2) Any com-
bination of 295 or 297 may be taken for a total of six units.
A degree or the equivalent must be arranged. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Graduate standing and consent of in-
spector and sponsor. Supervised experience relative to
specific areas of practice in landscape architecture
and/or environmental planning. Regular meetings
with faculty sponsor as well as final report
required. See departmental information sheet for other
limitations. (F,SP) Staff

297. Supervised Field Study. (2-3) Any combination
of 295 or 297 may be taken for a total of six units max-

um toward the M.L.A. degree. Hours to be arranged.
Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Graduate standing and consent of in-
spector and sponsor. Supervised experience relative to
specific areas of practice in landscape architecture
and/or environmental planning. Regular meetings
with faculty sponsor as well as final report
required. See departmental information sheet for other
limitations. (F,SP) Staff

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.
Prerequisites: Group study. (F,SP) Staff

299. Individual Research. (1-6) Course may be re-
pet for credit. Hours to be arranged. Prerequisites:
Graduate standing and consent of instructor. Research
work conducted preparatory to completion of the the-
ual or professional project as well as other approved
research. A maximum of six units will be counted to
ward the M.L.A. degree. The six units allows for four
units maximum for thesis or professional project re-
search, and two units maximum for other approved re-
search. See departmental information sheet for other
limitations. (F,SP) Staff

601. Individual Study for Master's Students. (1-3)
Course does not satisfy unit or residence requirements
for master's degree. Hours to be arranged. Must be taken
on a satisfactory/unsatisfactory basis. Prerequisites:
Last semester of residence in M.L.A. program.
Individually study for final degree requirements in con-
sultation with adviser. (F,SP) Staff

602. Individual Study for Doctoral Students. (1-6)
Course may be repeated for credit. Course does not
satisfy unit or residence requirements for doctoral de-
gree. Hours to be arranged. Must be taken on a sat-is-
factory/unsatisfactory basis. Prerequisites: For can-
didates for doctor's degree. Individual study in consul-
tation with the major field adviser, intended to pro-
vide an opportunity for qualified students to prepare
for themselves for the various examinations required
of candidates for the Ph.D. (F,SP) Staff

Professional Courses

300. Supervised Teaching in Landscape Archi-
technique and Environmental Planning. (2) Course
may be repeated for credit. Hours to be arranged.
Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: Graduate standing and appointment as a
Teaching Assistant. Supervised teaching experience
in undergraduate courses. Regular meetings with fac-
ulty sponsor. See departmental sheet for other limi-
tations. (F,SP) Staff

Graduate Courses

IDS 233. Environmental Law and Resource Man-
agement. (3) Three hours of seminar per week. Pre-
erequisites: Consent of instructor. Formerly Landscape
Architecture 233. An introduction to the American la-
gal system governing the utilization and management
of natural resources; and an overview of the major
legal and ethical techniques that have developed by courts, legis-
latures, and administrative agencies for environ-
mental protection. Topics will include: nuisance law,
constitutional constraints, environmental impact as-
seessment, permit systems for development control,
pollution control, natural resources planning law. Spon-
soring departments: Landscape Architecture and City
and Regional Planning. (F) Twiss

IDS 235. Community Scale Energy Systems. (3)
Three hours of lecture/discussion per week. Prereq-
ts: Consent of instructor. An introduction to how the
community scale through development of locally avail-
able renewable energy resources (solar, wind,
biomass). Architecture, site planning and urban de-
velopment, and appropriate planning and supply tech-
nologies. For students in design, planning, energy,
policy, and related fields. Term project. Spon-
soring departments: Architecture, Landscape Archi-
technique and Energy and Resources Group.

Latin American Studies

(College of Letters and Science)

Undergraduate Group Major in Latin American Studies

Group Major Office: International and Area Studies, 207
Moses Hall, 842-4466
Adviser: Mr. de Janvry (Agricultural and Resource Economies), Ms. Slater (Spanish and
Portuguese, Latin American literatures)

At the time this catalog went to press, sub-
stantial revisions were under consideration.
Please check with the Group Major Office re-
garding current eligibility requirements and ap-
plication procedures.

The group major in Latin American studies is
designed to present a balanced curriculum of the his-
tory, 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 consists of one of interest to (1) students desiring a general education focused
on the Latin American cultural regions; (2) students
planning to enter business, government, or inter-
national agency service; and (3) students prepar-
ing 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
or 8B.

Upper Division. A minimum of 30 upper divi-
sion units, but not more than 36, distributed as follows:
Portuguese 101A (or the equivalent); Spanish
104A-104B or Portuguese 104 and 128; two ap-
propriate upper division courses in the department
of History; and five upper division courses, at least
one 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 se-
lected in consultation with a group major adviser.

List of approved courses: Anthropology 175, 176,
177, 179; Geography 131, 154, 185, 157, 158;
History 103E, 140, 141A, 141B, 142, 143,
within the confines of traditional departments, and dependence. Students in this program have well-defined interdisciplinary interests that do not fit places allotted to the program. Only very few students in most cases do not plan to pursue traditional proficiency in Spanish or Portuguese and a broad methodological focus that contribute to students' intellectual concerns. Students must also be enrolled in a graduate school for writing a senior thesis. Admission is limited by the number of places allotted to the program.

Master's Degree. The M.A. program in Latin American Studies provides an opportunity for interdisciplinary work on Latin America at the intermediate post-baccalaureate level. Candidates must have a bachelor's degree and some knowledge of either Spanish or Portuguese, and adequate grade standing. Applicants from the United States must take the Graduate Record Examination (GRE) and foreign students must take the Test of English as a Foreign Language (TOEFL). 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 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. 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 in the major, and the remaining units will 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 consist of an interdisciplinary exploration of Latin America-related topics in subject matter not covered in available course offerings. The course will involve directed readings and writing of a report.

Upper Division Courses

10. Introduction to Latin American Studies. (4) Three hours of lecture and one hour of discussion per week. This course is intended as a survey course, interdisciplinary core course for students planning to pursue the Latin American Studies major, as well as other interested students. The aim is to provide an introduction to the field that integrates the offerings from different disciplines. Prerequisites: Consent of instructor. Three hours of seminar per week. Seminars will take a multidisciplinary approach. Topics change each semester. (F, SP) Staff

20. Latin American Studies Seminar. (1) Course may be repeated for credit. One and one-half hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Mandatory for Latin American Studies graduate students. Seminars by faculty and advanced graduate students on their current research on Latin America. (F) Staff

250. Selected Topics in Area Studies. (4) Course may be repeated for credit with different instructor. Three hours of seminar per week. Seminars will take a multidisciplinary approach to specific geographical areas with appropriate comparative material included. Topics change each semester. (F, SP) Staff

299. Individual Study. (1-4) Course may be repeated for credit. Three hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Individual study for graduate students in Latin American Studies. Topics for graduate students engaged in an interdisciplinary exploration of Latin America-related topics in subject matter not covered in available course offerings. The course will involve directed readings and writing of a report.

H195. Honors in Latin American Studies. (3) Individual conferences. Prerequisites: Senior standing with a minimum of 3.3 in the major, and for all work completed in the University. Consent of group major adviser: Honors thesis. (F, SP) Staff

197. Final Studies. (1-4) Course may be repeated for credit. One to three hours of lecture. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor: upper division standing. Advanced research in current issues or regions of Latin American Studies. The course will focus on specific areas or topics with appropriate comparative material included. Topics change each semester. (F, SP) Staff

198. Directed Group Study. (1-4) Groups of students are to be announced. Must be taken on a passed/not passed basis. Prerequisites: Upper division standing and consent of instructor: topics vary from semester to semester. (F, SP) Staff

199. Supervised Independent Study and Research for Undergraduates. (1-4) Course may be repeated for credit. Individual/meeting to be announced. Must be taken on a passed/not passed basis. Prerequisites: Written proposal must be approved by faculty adviser; consent of instructor. Enrollment restricted by regulations of the college. (F, SP) Staff

Graduate Courses

200. Latin American Studies Seminar. (1) Course may be repeated for credit. One and one-half hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Mandatory for Latin American Studies graduate students. Seminars by faculty and advanced graduate students on their current research on Latin America. (F, SP) Staff

299. Individual Study. (1-4) Course may be repeated for credit. Three hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Individual study for graduate students in Latin American Studies. Topics for graduate students engaged in an interdisciplinary exploration of Latin America-related topics in subject matter not covered in available course offerings. The course will involve directed readings and writing of a report. (F, SP) Staff

299. Individual Study. (1-4) Course may be repeated for credit. Three hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Individual study for graduate students in Latin American Studies. Topics for graduate students engaged in an interdisciplinary exploration of Latin America-related topics in subject matter not covered in available course offerings. The course will involve directed readings and writing of a report. (F, SP) Staff

Graduate Courses

200. Latin American Studies Seminar. (1) Course may be repeated for credit. Three hours of seminar and one hour of discussion per week. Prerequisites: Consent of instructor. Field methods and techniques, emphasizing Latin America as an area of research. Proposal writing, research design, ethical considerations, interviewing, participant observation, quantitative methods, analysis and write-up of field data. Supervised field exercises. (F, SP) Staff

250. Selected Topics in Area Studies. (4) Course may be repeated for credit with different instructor. Three hours of seminar per week. Seminars will take a multidisciplinary approach to specific geographical areas with appropriate comparative material included. Topics change each semester. (F, SP) Staff

299. Individual Study. (1-4) Course may be repeated for credit. Three hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Individual study for graduate students in Latin American Studies. Topics for graduate students engaged in an interdisciplinary exploration of Latin America-related topics in subject matter not covered in available course offerings. The course will involve directed readings and writing of a report. (F, SP) Staff

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Law
(School of Law)
Office: 225 Boalt Hall, 642-1741
Dean: Herman Hill Key, J.D.
Professors:
Thomas G. Barnes, D.Phil. English legal history
Shin F. Shi, Ph.D. (Joint Professor) California Supreme Court, media, Intellectual property
Babette B. Barlow, LL.B. (Adrian Kragen Professor)
Taxation
Frederick C. Bering, J.D., M.S.S. (Law Librarian) Chinese law, legal research
John K. McHugh, LL.B. (Jackson H. Ralston Professor) Corporations, international business transactions
David G. Caron, J.D. Dipl., Drs., Drj., international law
James E. Chipman, Jr., J.D. (Earl Warren Professor) Constitutional law, corporations
Rachel S. Goetz, LL.B. (Jackson H. Ralston Professor) Administrative law, torts, ethics
John E. Coons, J.D. (Robert L. Bridges Professor) Law and education, contracts
Robert Cooter, Ph.D. Law and economics, financial law
James E. Crawford, J.D. Bankruptcy, contracts
Meri Dohen, LL.B., LL.M. Criminal law, jurisprudence
John P. Norton, Ph.D. (Askan) Economic, environmental law, and science, property
Melville B. Nisenholtz, J.D. (Hans K. Lunden Professor) Corporations, commercial law, contracts, legal process
Einer R. Elhauge, J.D. Antitrust, corporations, health care policy
Malcolm M. Feeley, Ph.D. Court reform, criminal justice
Walter Hauberg, LL.B. (Hans K. Lunden Professor) Conflict of laws, family law
G. Edward Grathwol, J.D. (Frank D. Porter) Estate and trust taxation, trusts and estates
Angela P. Harris, J.D. Criminal law, civil rights
Sachs, M. Seligman, Ph.D. (Melvyn J. Aronson and Norman F. Selvin Professor) Land use planning, state and local government law
Philip E. Johnson, J.D. (Jefferson E. Peyster Professor) Global law and government
Thomas A. Jonas, J.D. Antitrust
Robert A. Kagan, Ph.D. (Richard W. Kennig Professor) Jurisprudence
Kim J. Kwon, J.D. Conflict of laws, family law
Kris S. Karst, J.D. (Michael J. Aronson Professor) Constitutional law, civil rights
Krisitn Luther, Ph.D. Social movements, social policy and politics
Laurel Mayall, J.D. (Director of Roberts Canvon Law Collection)
John K. McNulty, LL.B. (Roger J. Traynor Professor)
Paul J. Mishkin, L.L.B. (Emmanuel S. Heller Professor) Constitutional law, federal courts
Rachel Morin, J.D. Criminal procedure, problems of linguistic minorities, torts
Philip S. Moreland, R.D. (Droit, Ph.D. Jurisprudence, law and society
Leslie R. Miller, J.S.D. (Askan) Land use planning, property
Andrea Peterson, J.D. Land use planning, property
Robert C. Post, Ph.D. Constitutional law, jurisprudence, professional responsibility
Edward L. Rubin, J.D. Administrative law, entertainment law, regulation
Daniel L. Rubinfeld, Ph.D. Law and economics, public policy
Joseph L. Sax, J.D. (James H. House and Hiram H. Hurd Professor) Environmental law
Harry N. Scheiber, Ph.D. (Askan) American legal history, law and government
Ann Ackerson, J.D. (Asakan) Constitutional law, law and government
Sue Ann Scott, J.D. (Askan) Constitutional law, law and government
Martin M. Stepp, Ph.D. (Askan) Constitutional law, law and government
Marina M. Shultz, M.A.T., J.D. Biological ethics, contracts
Jerome H. Stein, J.D. (Clerike Jean de Lattes) Constitutional law, judicial ethics, professional responsibility
Michael E. Smith, J.D. Constitutional law, criminal law
Stephen Sugarman, J.D. (Agnos Rody Hopf Professor) Education, social welfare legislation, torts, community law
Layal E. Henning, J.L. (John Boalt Professor) Construction law, contracts
Eleazar E. Jeffs, Ph.D. Civil procedure, evidence, professional responsibility
LUjana Treedwell, J.D. (Askan)Jurisprudence
Jeremy J. Waldron, LL.B., D.P.H. Legal philosophy, political theory
Oliver E. Williamson, M.B.A., Ph.D. (Transamerica Professor of Economics) Law and economics
Franklin E. Zimring, J.D. (Director, Earl Warren Legal Institute and William G. Simon Professor) Criminal justice, family law
Property
David Deubert, Dr. Jur., Ph.D. D.C.L., LL.D., Dr.h.c.
David E. Keller, J.L. (Hans K. Lunden Professor) (Emeritus)
Richard G. Long, J.D. (Atkins) Property, international law
John G. Fleming, D. Phil., D.C.L. (Shannon Cecil Turner Professor) Property, comparative law, torts
Carlos Post, J.D., L.L.B. (Elizabeth Josephsson Professor) (Emeritus) Criminal law, family law
John G. Hoppe, J.L. (Atkins) Corporate law, estate law
Richard W. Jennings, J.D. (James W. and Isabel Coffron Professor) (Emeritus) Securities regulation
Sanford H. Kadish, LL.B., LL.D., Dr.Jur.h.c. (Alfred F. and May T. Morrison Professor) (Emeritus) Constitutional law, jurisprudence
Frederick C. Bering, J.D., Dr.Jur.h.c. (Emeritus) Contracts
Adrian A. Kragen, J.D. (Shannon Cecil Turner Professor) (Emeritus)
Stephen G. Kuttner, Diploma in Law, J.U.D. (Emeritus) Canon and medieval law
William T. Rehnquist, J.D. (Alfred F. and May T. Morrison Professor) (Emeritus) Contracts, bankruptcy
Sheldon L. Messinger, J.D. (Hans K. Lunden Professor) (Emeritus) Criminal sentencing, prisons
Frank A. Newman, J.D. (Hans K. Lunden Professor) (Emeritus) International law
John T. Noonan, Jr., L.L.B., Ph.D. (Milb Rees Robbins Professor) (Emeritus) Jurisprudence
Stefan A. Riesenfeld, Dr. Jur., Dott. in, gyr., S.D.J., Dr. Jur.h.c. (Emancius H. Haldeman Professor) (Emeritus) Bankruptcy, international law
Philip Selznick, Ph.D. (Emeritus) Law and sociology
Pelea Stoll, J.D. (Stassen-Arzen Professor) (Emeritus) Jurisprudence
Lawrence A. Sullivan, L.L.B., (Earl Warren Professor) (Emeritus) Antitrust, unfair competition
Acting Professors:
Bryan W. Ford, J.D. Corporations
William A. Fletcher, J.D. (Hans K. Lunden Professor) Administrative law, evidence, torts
Eric F. Ratemak, P.d. (Ph.D. Jurisprudence, law and society, political theory
Daniel B. Rodriguez, J.D. Administrative law, evidence, torts
Reva B. Siegel, J.D. Contracts, sex-based discrimination
Programs
For a description of the graduate programs in law, see page 96.
For further information and admission requirements of the School of Law, see the Announcement of the School of Law, available without charge from the Law School Admissions Office, 225 Boalt Hall, Berkeley, CA 94720.
Graduate Courses
First Year
The first semester program is composed of four prescribed courses. Three of the classes are in large sections with approximately 110 students in each. The fourth is a small section of 25 to 30 students. In the second semester, four courses are prescribed. There are large sections and small sections in each of the first-year courses except Law 205, which is all small sections.
Civil Procedure. (5) The principles of pleading under the code system and the federal rules; modern trial practice, including venue, process, the jury, sufficiency of evidence, instructions, verdicts, new trials, judgments; appellate procedure. Bundy, McGlashé, Swift, Vetter
Constitutional Law I. (3) Introduction to the subject covering judicial review and justiciability, federalism, separation of powers, and economic rights. Post, Shapiro, Smith
Contracts. (5) The law of contracts, dealing with the problems of formation, performance, remedies and termination. Coons, Eisenberg, Goryl, Schutz, Sweet
Criminal Law. (4) An introduction to criminal law with primary emphasis on the general principles of criminal liability. Harris, Johnson, Kadish, Smith
Introduction to Legal Research, Writing, and Advocacy. (2-1) Instruction in legal research and writing in the fall semester, and Gordon Johnson Moot Court Program in the spring. Staff
Property. (4) An introduction to the law of real property, including topics of ownership, possession, possessory estates in land, future interests, marital property, landlord-tenant law, concurrent estates, easements and covenants, and land-use planning. Heyman, Pensa,
The Legal Profession. (2) This course is an introduction to the American legal profession. Among the topics covered are the concept of a profession; the role of the lawyer in the adversary system as advocate, consultant, and legal counselor; the relationship between the principles and presuppositions of the adversary system and American legal and political culture; the tension between the lawyer's professional role and personal and public setting of legal practice: markets, organizations, and hierarchies and their influence on professional performance and ideals; the changing demographic structure of the profession; the effects of professionalism on professional norms and institutions; and the delivery of legal services in the United States through market and non-market mechanisms. Berring, Bundy, Post, Rubin, Shultz
Torts. (6) The law of torts, civil injuries, including both intentional and unintentional interference with persons and property interests as well as liability without fault. Barnett, Fleming, Ford, Moran
Second and Third Year
Administrative Law. (3) Administrative law is the study of the dominant form of law in modern government. This is a basic course on the subject. We will study the basic legal tasks of administrative agencies, including policy formation, benefit administration, liability, and the organization and function of administrative courts. We will then proceed to examine the legislative, executive and judicial constraints on regulatory agencies. Fletcher, Rubin
Advanced Criminal Law. (2) Workshops, lectures, and interviews in the more sophisticated areas of criminal evidence, valuation of evidence, confession, search, seizure, grand jury, indictment, jurisdiction, plea bargaining, and other related topics. Barring, VandenHeuvel
Advanced Legal Research. (3) This course will explore the structure and use of legal materials. The history and development of research tools will also be covered. The materials will range from early nominative reporters to law-related computer data bases. The course will require the preparation of a research guide for a specific area of the law. Berring, Vand enHeuvel
Advanced Readings in International Law. (1) Prerequisite: International Law. This seminar will bring together a limited number of students to discuss major contemporary themes in international law. We will read and discuss one classical 20th century international law text and several recent, topical and intractable areas all centered in business practice. There will be two types of sessions. Six to eight of the sessions will be concerned with problems of practical importance in the business context. Problems encountered in business practice will have been drafted by leading tax practitioners from San Francisco, Oakland, or Los Angeles. The class in teams of two or three will research the problem. The team will be responsible for finding out what the legal position is, and the legal remedies and other solutions to the problem. The other classes sessions will be concerned with particular areas of business taxation not covered in the written

*On leave, spring
+On leave, fall
#Recalled to active service
$Recipient of Distinguished Teaching Award
paper sessions and will not involve the preparation of a paper. Enrollment
Advanced Topics in Jurisprudence Seminar. (2) Topics to be determined. None
Alternative Dispute Resolution. (3) This course will consider alternatives to formal adjudication for the res- solution of civil disputes. The first third of the course is an Introduction to the theory and practice of negotiation, and students will be expected to complete a negotiation project in the settlement of litig- iated and non-litigated disputes. We will then look at formal adjudication and will consider various reforms aimed at rendering adjudication less formal, less ex- pense, and more accessible. Finally, we will briefly ex- aminate the alternatives of third party intervention—primarily mediation and arbitration—which are increasingly be- ing proposed as replacements for or supplements to formal litigation.
American Federalism Seminar. (3) Historical and ju- risprudential perspectives on American federalism, with attention to “the original understanding” of 1787, nine- teenth-century constitutional issues in light of gov- ernmental practice and law in the individual states, the modern phase of intergovernmental relations, and the radical, conservative, and technocratic critiques of con- temporary federalism. Schelber
American Legal History. (3) Development of the American legal system from the colonial era to the pre- sent. Among topics to be considered are constitu- tional law (principally the Bill of Rights); the operation of the courts through law, federalism in theory and practice, slavery and civil rights, the promotion and control of economic change through uses of law, origins of the modern criminal justice system, and the modern regu- latory and welfare state. Schelber
American Legal History: The Modern Era. (3) The course will deal in considerable depth with topics in le- gal history of the United States from the Great De- pression to the New Deal period to the present. Among subjects that will be covered are the New Deal legacy in constitutional law, the civil rights movement and its consequences, modern developments in civil liberties law, and problems in the history of law and technology. Schelber
Antitrust Law. (3-4) Antitrust Laws embodies our na- tion’s competition policy. This course covers the fun- damentals of antitrust as well as underpinning legal and economic theory. It includes monopolies (monopoly; cartels, oligopolistic interde- pendence, and competitive cooperative activities among competitors) and vertical restraints of trade between suppliers and customers (including resale price agreements; exclusive dealing, and requirements contracts); horizontal, vertical and conglomerate merg- ers; price discrimination, and federalism doctrines lim- iting the scope of antitrust laws. Eliahu
Antitrust Seminar. (2) This course will permit students to develop in depth a variety of advanced topics in an- trust. Jorde
Appellate Advocacy. (3) Open to second-year stu- dents only. The objective of the course is to combine teaching by faculty, experienced practitioners, and judges in the art of written and oral appellate ar- guments and practice skills. In writing and oral argu- ment under the supervision of members of the Moot Court Board and the faculty. Completion of the course is a prerequisite for candidacy for the Moot Court Board. This course covers appellate prac- tice, brief writing and oral argument. These will be given by the instructor, distinguished practitioners and appellate judges. DeGoff
Art Law. (8) This is a seminar about many of the con- temporary legal, ethical, and public policy issues that involve visual artists (mainly painters and sculptors) and art collectors, dealers, auction houses, and mu- seums. The course will cover such areas as: artists’ continuing rights in works they create; how theft, forgery, contracts, and taxes affect the art market; museum administration; government subsidy and control of art; protection and encouragement of regu- lation of the international market in art. Frankel
Asian Americans and the Law. (2) Asian Americans are the fastest growing ethnic group in the United States. This course will cover some of the legal issues that Asian Americans have encountered and some that they face today as a community of color. The course will explore how laws and policies have helped to shape popular images of Asian Americans, as well as issues relating to identity (given the diversity of Asian American identity, e.g., race, class, religion, disc- crimination, tension) with other communities. What it means to be a lawyer in an Asian American commun- ity is an issue which is also central to the course. Hing
Bankruptcy. (4) A comprehensive survey of bankruptcy law, its processes, policies and politics, de- voting attention to the following topics among others: Bankruptcy courts and their jurisdiction; property of the bankruptcy estate; claims and discharge; voluntary and involuntary bankruptcy; the automatic stay; adequate protection; avoiding actions; void validated, voidable; preferences; fraudulent transfers; rehabilitation and re- organization under Chapters 11, 12 and 13. Concent- ration will be upon those areas essential to the un- derstanding of the bankruptcy code. This course and Commercial Transactions, not a prerequisite, constitute our basic coverage of this area of law. Crawford
Basic Social Science Research Methods. (4) This course will introduce hands-on multi-method and in- terdisciplinary approaches to behavioral and social pol- icy research. Students will be expected to undertake a literature review, consider sampling and its logic, re- view descriptive and inferential statistics, formulate re- search hypotheses, conduct interviews, make system- atic observation, and learn how to trace an archival measures, and attempt to draw inferences from all of the above. Obviously, the course proposes to develop research skills particularly for advanced graduate students who are considering writing dis- sertations. We shall attempt to develop a joint research project, which will enable students to practice their newly found skills. Luker, Skönnick
Bible and Talmud Law. (2) Historical survey and some selected branches. No Hebrew or Aramaic re- quired. Daube
Billingualism and the Law. (2) This course will begin with an exploration of the language and the charac- teristics of language diversity in the United States. The class will then examine how the federal government has regulated language use in different areas, in- cluding education, voting, courtroom proceedings, and social services. Where appropriate, state regulation of language will also be discussed. The course will close with a brief survey of language policy in other coun- tries. Moran
Business, Law, and Ethics. (3) A course in applied ethical theory. The limits of conventional ethical theo- ries, and the normative ethical foundations for the systems of market capitalism and the legal pro- fession, by reference to which one might attempt to justify one’s conduct; and the place of larger ethical theories in business today. The course will focus on one con- duct within systems and roles. Readings and class discussions are organized around some classical writ- ings in ethics and around problems, including selected issues in legal ethics, testing in third-world countries, investment in South Africa, affirmative action, em- ployee privacy and loyalty, whistle-blowing, responsibil- ity of corporate counsel for law-abidingness and morality in the organization. Coles
Business Planning Seminar. (2) Prerequisite: Cor- poration law. This course was designed for students who, as corporate representatives, had to deal with the problems of entrepreneurs, and for students who represented or were counsel for the privately held business enter- prise, through case studies of situations such as or- ganization, financing, purchase or sale and liquidation. The course will focus on the interaction, in each of
these contexts, among corporate, tax and securities laws. Kline
California Marital Property. (3) The study of Cali- fornia law governing the property rights of married cou- ples. The course includes an analysis of the general principles governing classification of community prop- erty and separate property, the management and con- tinuation of community property and its distribution for the debts of the spouses, division of community property on dissolution or death, plus some treatment of the rights of cohabiting nonspouses. Kay
Children and the Law. (2) This course includes, but is not limited to, a discussion of public and private ed- ucation of juvenile children, child abuse and neglect, child-parent relationships, child-parent relationships, foster care, medical management, divorce custody disputes, and adoption. There is a heavy emphasis on constitu- tional, social, and moral issues posed by the dislo- cation of power among child, parent and state. Coons
Chinese Investment Law. (2) An examination of the effects of foreign capital and its interaction with Chi- nese government and society. Berring
Civil Liberties, Civil Rights, and Human Rights. (2) When their liberties and rights are being violated, how can people be helped? And how might they be helped more effectively by lawyers, other activists, and non- governmental organizations organized and supported by international human rights lawyers be taught to U.S. civil liberties and civil rights lawyers, and vice versa? Newman
Civil Rights Law. (3) This course has two aims. First, the course will serve as a general introduction to fed- eral constitutional and statutory law in pursuit of the protection of Individual liberties. Topics will include the Reconstruction civil rights acts and the Civil Rights Acts of 1954 and 1968, and may also include the Vot- ing Rights Act of 1965, the Housing Act of 1968, and the Americans with Disabilities Act of 1990. The goal is to provide students with a basic doctrinal foundation for later, more specialized course offerings such as the law of Discrimination, Exclusion and Discrimination. The second goal of the course is to introduce students to civil rights theory. How have issues of gan- der, race, and class domination historically been ad- dressed in the law? What is the relationship of civil rights law to the social movements that gave birth to them? Is the civil rights approach the best approach to making America a more just society? Are there costs to a civil rights orientation to social justice? Harris
Commercial Transactions. (4) The major focus of this course is on commercial financial mechanisms for the sale, distribution, and payment of goods, including floor plan arrangements, using in- ventory, accounts receivable or other personal property as security. Although there is brief coverage of docu- ments and instruments (Article Three: Bankruptcy Code; Article Five) and bulk sales (Article Six), most of the course will be devoted to security interests in personal prop- erty (U.C.C. Article Nine) and to those portions of the Bankruptcy Code which interact with state commer- cial laws, including leveraged buyouts as potential fraudulent transfers in bankruptcy. (Detailed coverage of bankruptcy problems will be offered in the course on Bankruptcy). Crawford, Rubin
Community Law Practice at BCLC. (2) Enrollment is open to students who are in their second year and who have completed (or is in the process of completing) courses covering legal research, writing and oral argument. This course will be given by the instructor, distinguished practitioners and appellate judges. DeGoff
Comparative Constitutional Law Seminar. (2-3) A research seminar for students wishing to do an extended paper on some aspect of constitutional law outside the United States. Shapiro

Comparative Environmental Law. (2-3) The Law School draws on visiting scholars to offer a course in comparatively analyzing environmental law. One recent offering was on "Asian Environmental Law and Management." This seminar, taught by a prominent Japanese environmental law scholar, not only introduced basic environmental law and management in southeast Asian countries but also compared social, cultural, economic, and environmental phenomena in exploring efforts at international cooperation. Another seminar, taught by a leading French scholar, focused on environmental law and policy in the European Economic Community. The seminar included case studies of major chemical accidents, trans-boundary pollution, citing of hazardous industries, and the role of the EEC in dealing with environmental problems.

Comparative Family Law. (3) This course provides a comparative overview of the family law systems in the major countries of the world. The seminar is designed to acquaint students with the legal and social systems adhering to continental European traditions, so-called civil law countries. Emphasis is placed on the scope of judicial power, review of other substantive interests. The concept of "state action" includes some constitutionality; protection against unjustifiable forms and types of construction contracts; sureties, contracts, which deal with the legal aspects of architecture, engineering, and the construction process. The first weekly session of two hours will be augmented by visitors who play active roles in construction, such as architects, engineers, attorneys, contractors, etc. Some topics covered are: the nature of the relationship between real and personal property; the role of the courts as quasi-judicial arbiters of the law and legal aspects of the comparative bidding process; forms and types of construction contracts; sureties, construction document interpretation; changes; delays, sub-surface conditions; payments; subcontractors; risk allocation; unforeseeable circumstances; termination; dispute resolutions; remedies for breach of a construction contract; construction accidents; indemnification; and, professional liability. Shapiro

Contemporary Legal Theory. (2) The general subject of this course is the relationship of philosophy and world-view to law. The opening sessions will discuss classic legal articles dealing with classical jurisprudence topics such as formalism, positivism, legal realism, and natural law and morality. We will also take up the role of differing religious and world-view perspectives in shaping the values that lie behind legal decisions. Additional subjects will include the continuing importance of traditional religious perspectives, libertarian and egalitarian versions of liberalism, and radical alternatives to liberalism such as critical theory and nihilism. The reading will consist mainly of original articles, and concepts that there will also be some cases and other legal materials. Johnson

Contemporary Problems in International Law. (2) Prerequisite: International Law I. This seminar focuses on a number of current problems in international law, with an emphasis on international trade, terrorism, internal conflict, and economic development. The seminar will discuss the recent developments in the International Court of Justice in Nicaragua v. United States and its significance for international adjudication and the use of force. Literature addressing the restructuring of world legal order, the Marxist approach to international law and international regime theory (a current endeavor of political science) will also be discussed.

Contract Drafting and Analysis. (2) The purpose of this course is to expose students to the process of contract analysis involving in the writing and negotiation of contracts. Writing skills will be emphasized and developed. A viable agreement will be drafted. Roesker, Topinka

Copyright and Unfair Competition. (3) This is an in-depth course in Copyright, covering the rights of authors, artists, musicians, and other creators under the Federal Copyright Act and related state laws, and providing an overview of the major issues involved in the law of trademarks and unfair competition. Barnett

Corporate Finance Seminar. (2) This is an interdisciplinary seminar, to be taught by Professor Melvin Eisenberg of the Law School and Professor Baruch Leibowitz of the Law School. The seminar will be open to both Business and Law students, but enrollment will be limited. Seminar topics will fall into three major categories: Analytical Tools and Theory; Transactions in Courts and the调节 of Corporate Actions; and, Enforcement of the Law. Topics within the category of Analytical Tools and Theory will include the efficient market hypothesis, the capital asset pricing model, everyday option theory, financial statements analysis, valuation of business enterprises, the separation of ownership and control, and conflicts of interest and agency costs. Topics within the category of Transactions in Courts will include objectives of corporate control, the privatization of regulatory hearings, managerial incentives in corporate control transactions, anti-takeover defensive measures, the regulation of corporate control transactions, and restrictions on leveraged buyouts, and so forth. Topics within the category of Enforcement of the Law will include the impact of ownership structure on firm performance, management compensation, and ownership, voting behavior, and monitoring. Eisenberg, Leibowitz

Corporate Legal Theory. (4) This is a year-long research seminar on topics of corporate law. Eisenberg, Eliahu

Corporations I. (2-3) Course will cover: forming corporations; liabilities of shareholders; authority, responsibilities, and compensation of managers, directors, and controlling stockholders; corporate control arrangements; special problems of close corporations. The course may also briefly cover the formation and operation of other business organizations including general and limited partnerships, limited liability companies, and the like. Eliahu, Eisenberg, Eliahu, Ford

Corporations II. (3) For students who have taken Corporations I. It will emphasize the relationships among the participants in the corporate venture, with particular attention to the fiduciary principles governing those relationships in a detailed, transaction-specific context. The course will also deal with litigation concerning the corporate, particularly but not exclusively with derivative suits. It will not cover financial structure matters in detail, though some background material is provided. Eliahu, Eisenberg, Eliahu, Ford

Courts and the Image of Justice in Cinema. (2) This seminar will examine the social perception of justice and its cultural function, both as a value and as a legal institution, as expressed in the depiction of trials and judgements in films. The reason for the film material as a basis for an analysis of the judicial system and the images of justice is that cinema serves a normative function in the production, reproduction and redefinition of cultural values. This film course and trial studies share common characteristics as narrative and representation of events, real or imagined. Films selected for the class will cover various countries and periods, and the seminar will be for a comparative study of judicial systems. Mayall

Courts and Social Policy. (3) This seminar treats courts as policy-making institutions. Its focus is twofold: to examine the capacities of courts to formulate and oversee change in complex institutions. And to examine the nature of those organizations whose courts must penetrate in order to effect change. In pursuing these interests, students will read legal and social science literature on courts, evaluate claims of critical legal scholars who write about the limits of the law, and assess empirical studies of the impact of courts in effecting social change. The first part of the semester explores competing theoretical debates about the role and function of courts and explores empirical features of the modern judiciary. The second part focuses in more depth on selected issues, e.g. the impact of school desegregation and prison conditions litigation. Klevor

Criminal Justice System. (3) This course has three units: An Introduction to the Criminal Justice System; A Study of Adult and Juvenile Justice Institutions; and a Case Study of One Criminal Justice Institution. It is a study of the attempt to reform the legal institutions. It is a sustained analysis of the criminal justice system. And it is an attempt to make the students familiar with quantitative approaches to policy problems, major topics in criminal law and process, and definition of crime, police, pretrial processes in criminal justice, plea bargaining and criminal sentencing. Some background in criminal law is strongly recommended but not required. Zimring

On leave, spring
*Recalled to active service
Recipient of Distinguished Teaching Award
Disability Rights. (2) This course will teach disability rights law, including the substantive law and federal and state laws have been enacted in the last decade to ensure equal opportunity for disabled adults and children. These landmark laws are the subject of increased attention. This course will explore the substantive areas of employment, housing, education, and access rights, as well as teaching practical skills for litigating these civil rights cases. The course can also be taken without the clinic. Those who enroll in the clinic will focus on disability rights litigation.

Domestic Violence Law Seminar. (2) This course will examine the legal system’s response to domestic violence and is a prerequisite to the Domestic Violence Law Clinic. Using an interdisciplinary approach, we will cover historical and psychological materials as well as topics in criminal, family, tort, immigration, welfare, and constitutional law. Ethical and policy issues will be included throughout. Evaluating the effectiveness of various new statutory schemes will be one of the concerns of the class. This will include discussion of problems of protective orders, and the efficacy of new approaches such as “mandatory arrest” or “no-prosecution” policies, which have been adopted in some jurisdictions. The constitutionality of provisions such as ex parte orders removing abusers from the family home is also covered.

Economics and Public Policy Analysis. (3) This course will provide a broad introduction to the fundamental tools of economic analysis. The focal point of discussion will be the principles of microeconomics as they help one to evaluate the effect of legal regulations on the allocation of resources in our economy. The material will examine how markets work in terms of the basics of supply and demand, and how markets fail in terms of externalities and noncompete behavior. The selection of material is chosen to serve as a foundation for economic materials appearing in business law (corporations, antitrust, and taxation), labor law, environmental law, and administrative law. Specific topics and applications to be discussed include: the economics of rent control, measuring economic damages, oligopolistic and monopolistic behavior, tax shifting and incidence, the effectiveness of economic regulation, the use of fees, subsidies, and marketable permits to regulate the environment, and the theory of public choice.

Rubinfeld Economics of Legal Rules and Institutions. (2-2) This seminar uses economics to study law and legal institutions. The focus will be placed on the economics of the common law and crimes, but other topics may be covered. In the spring semester, emphasis will be placed upon constitutional law, regulation, administration, federalism, and corporations. A number of outside speakers will participate on a monthly basis.

Cooter Education and the Law. (2) This course will first examine how the State came to dominate the provision of elementary and secondary education, the functions that private schools play in modern society, and how these functions influence the construction of the curriculum. Having considered the important socialization objectives inherent in State-sponsored education, the class will consider the role of the courts, students, parents, and teachers who dissent from curricular choices. Building on this framework, the course will next evaluate how schools have coped with the increasingly diverse student body. In particular, the course will study rights-based campaigns for equal access to education, their limitations, and possible alternatives.

Moran EEC Institutions and the Law of Economic Integra- tion. (4) This course will focus on the interactions of communities and the community law of the common market economic integration. Readings and discussions will deal with EEC law-making and adminis- trative institutions and processes and with selected topics from competition law; non-tariff barriers; harmonization; and the use of state aid. The course will be aimed at domestic enterprises and state enterprises.

Employment Discrimination. (3) This survey course examines state and (principally) federal law prohibiting discrimination in employment, for the most part discrimination on the basis of race, color, sex, religion, or national origin. Coverage includes concepts of discrimination—e.g., disparate impact and disparate treatment—procedure and remedies, as well as a brief introduction to the role of statistical applications. Vetter

Energy Law and Policy. (3) This seminar focuses on the development of energy policy. We will begin with the course with an overview of the role of energy consumption on environmental quality, including air pollution and global warming. We will then look at the regulatory framework for energy markets, including energy policy, markets, pro- duction subsidies, and conservation policies (including economic incentives). For part of the course, we will study pending energy policy proposals. Dwyer

English Legal History. (2) A topical introduction to English legal developments, both common law and equity, 1200-1700. Major emphasis on the growth of legal institutions, the profession, and substantive and adjudicative law concerning petitions and the law of property. Ryan

Entertainment Law. (2) This course will explore some of the major legal issues in the entertainment industry. It will be organized around the basic transactions in which entertainment lawyers are involved: rights acquisition, financing, production, employment, and distribution. In addition to discussing the transactions themselves, the course will consider the insights that these transactions provide into the development of legal doctrine, such as contract law, tort law, labor law, antitrust, and copyright. Rubin

Environment and Culture: Protection of Our Heritage. (2) This course seeks to look across a range of preservation issues, beginning with endangered species, wilderness, and parks, and moving on to the legal protection of historic sites and art treasures. The course concludes with the study of efforts to protect traditional communities and living traditions, ranging from ethnic neighborhoods to the culture of Alaska natives. Sax

Environmental Enforcement and Compliance Seminar. (3) This seminar focuses on the administrative, civil, and criminal enforcement mechanisms available under environmental statutes and the conditions that affect compliance. In the spring, the course, students will read widely in the political science and legal literature to understand the effectiveness and secondary consequences of various enforcement schemes and strategies. Many of the readings will explore the internal dynamics and strategies of agencies and industry decision-making. Some of the readings will consider environmental enforcement in other countries. The course will also study actual enforcement problems in the Bay Area. Past projects have included a study of the development of an enforcement program for pollutants from small boatworks in the Bay and a study of citizen group enforcement of the Clean Air Act against state agencies.

Dwyer, Kagan

Environmental Law and Policy. (4) This introductory course is designed to equip fundamental legal and policy issues in environmental law. By focusing on a limited number of topics, including the Clean Air Act, the hazardous waste statutes, and the National Environmental Policy Act—students are able to study in detail important environmental issues, such as the effects of pollution on health, the role of citizens in enforcement, the role of professionals in advance policy, the role of judicial review, and the optimal allocation of regulatory authority between the federal and state governments. The course covers not only traditional regulation, but also market-based al- ternatives such as tradable permits and effluent taxes. Dwyer, Menell

Environmental Law Writing Seminar. (3) This seminar is designed for third-year students who have a demonstrated background in environmental law and policy. The purpose of the seminar—which is organized around writing a publishable paper—is to expose students to fundamental philosophical and theoretical readings and ideas often glossed over in more law courses and to provide students with a structured opportunity to prepare and pre- sent a publishable paper in environmental law. The seminar will be organized around a series of readings related to ethical questions in environmental law and policy—ranging from the evolution of western attitudes about nature (rough), the role of economics to new impulses to action (a new environmentalism) to the modern challenges of risk regulation. Dwyer, Menell

Equality Seminar. (2) Are humans equal, and if so, does it matter? The readings and discussion will emphasize a distinction between equality as an aspiration and equality as a description of existing reality. What could it mean (if anything) to seek equality? What could it mean (if anything) to be equal? What interpretation of the usage "created equal" approximate this? What is the role of that term for modern equality? What are the implications of the interpretation? Coons

Estate and Gift Taxation. (1) A basic study of the federal estate and gift taxes designed for students with little or uncertain interest in probate practice and estate planning. Those who recognize the importance of estate and gifts exposure to the subject. Coverage will be less detailed and the treatment of planning much less than in Estate Taxation and Planning but provides some background for students who may later decide to practice in the field.

Halbach

Estate Planning Seminar. (2) Classes will meet to discuss papers and projects. Each student will plan and draft a document or two for a "small" estate and a "substantial" (i.e., tax-planned) estate, and will write either an office memo or a more scholarly re- search paper.

Estate Taxation and Planning. (3) A basic study of federal estate and gift taxation, plus some aspects of income taxation, and how these taxes and others factors operate on and affect inter vivos and testamentary estate planning. Assignments and class discussion concentrate on the application of statutory and adminis- trative materials to problem solving and planning, some of policy and reform. Halbach

Estates and Trusts. (3) This course is basic and should be taken by most students. It covers intestate succession; the role and execution of wills; the nature, purposes, creation and termination of trusts; problems of construction; role of state energy policies, markets, pro- duction subsidies, and conservation policies; and fiduciary administration, with particular at- tention to trusts and decedents' estates, including in- vestment and management functions and principal- and-income accounting. A 4-unit section of this course is occasionally offered, combining it with the material mentioned in "Future Interests," below.) Halbach

Evidence. (3) This course covers most of the more frequently encountered problems of Evidence law: relevance, the hearsay rule and its exceptions, privi- leges in inclusion self-incrimination, and the technology of the modern challenges of risk regulation. Dwyer, Menell

Evidence Advocacy. (2) This course can be taken in conjunction with the substantive Evidence course taught by Professor Swift. It is intended to in- tegrate the study of Evidence doctrine and policy with the practical aspects of evidence law. Students will demonstrate and discuss their skills in the context of the examinations of 12 students, and will review videotapes of their own examinations each week. Participation in a half- day final trial is required. Swift, staff

Evidence Advocacy. (2) This course can be taken in conjunction with the substantive Evidence course taught by Professor Swift. It is intended to in- tegrate the study of Evidence doctrine and policy with the practical aspects of evidence law. Students will demonstrate and discuss their skills in the context of the examinations of 12 students, and will review videotapes of their own examinations each week. Participation in a half- day final trial is required. Swift, staff
Family Law. (3) This course examines common law, statutory and constitutional principles relating to the formation and dissolution of families. A major focus will be on the evolving constitutional law of the family—a remarkable, recent, and pervasive body of doctrine limiting and defining state power to regulate family life. Major topics include the regulation of sexual and reproductive behavior, adoption, marriage and marital choice, divorce and its consequences, the doctrine of family privacy, the public law of child welfare, illegitimacy, and child neglect. Zimring

Family Law Seminar. (2) This seminar provides a structured opportunity to examine current scholarship on child custody, the economics of marriage and divorce, abortion law, and the impact of law on child welfare. Students will be introduced to key writings in their specific area of interest and will write reports and lead class discussion. Zimring

Food and Drug Regulation. (3) The course covers the basic principles of food and drug regulation, emphasizing food safety, economic regulation, the new drug approval process, drug labeling and advertising, and enforcement of FDA regulatory statutes. Students will develop research and legal analysis skills; to improve sophistication in incorporating scientific information in legal decision-making; and to promote recognition of the role and limits of public understanding in regulatory policy. Study

Foreign Relations Law. (2) Prerequisite: Constitutional Law. This course examines the constitutional constraints on the conduct of United States foreign relations. We will consider the distribution of plenary and shared powers between the President and Congress, techniques of Congressional control (including consideration of international agreements as emergency economic powers and international trade), the war power, and the power to make, break, and interpret international agreements. We will then examine doctrines that regulate Presidential actions from judicial review (e.g., the political question doctrine, Congressional standing, and the act of state doctrine) and the role of international law in the U.S. legal system, including the President's authority to violate international obligations. Donoghue

Future Interests. (1) This course covers most of the main issues of modern future interest law. Topics covered include types of future interests and their characteristics; construction of class gifts and other dispositive language; the rule against perpetuities; and powers of appointment. Mayer

Global Law: The Search for Common Principles. (3) Studying law has usually meant studying the law of a particular country. As national boundaries become less important, some scholars are beginning to look for legal principles that transcend national boundaries, principles that are applicable in the law of many countries. Do such principles exist? In this course, we will try to answer that question by looking at the way different countries approach some fundamental problems of private law, such as the law of contracts, property, torts, and restitution. Gordley

Guggenheim Crime Policy Seminar: The Regulation of Vice. (2-3) This seminar will address both theoretical and policy issues regarding various so-called 'deviant' behaviors (such as drug use and sale, gambling, pornography, prostitution, and homosexuality) which the criminal law has variously forbidden. Does society's conception of what constitutes a vice shift over time, and why? Which social and cultural factors lead to reassessing the moral blameworthiness inhering in the behavior? Mishkin

Health Care Law and Market Policy. (3) The health care industry now consumes one-eighth of our gross national product and is still growing. This course examines the various fields of law that combine (and conflict) to form the overall legal framework for health care decision-making. The focus is on the incentive created by that framework and on the various strategies used to structure health care decision-making, including professional self-regulation, government regulation, and market discipline (via consumer choice and/or corporate intermediaries such as hospitals or insurance companies). The fundamental question the course poses is whether any of these strategies can prevent or ameliorate the problems of decision-making that would combine both the knowledge and incentives necessary to make case-by-case microdecisions concerning when the social costs of health care exceed its social value; when healthcare exceeds its social value; and affordable, accessible, and adequate health care for all. Ford

Housing Law. (2) This seminar will examine laws, policies and programs, on a national, state and local level, that affect housing for the urban poor. Since the majority of the urban poor are renters, we will spend some time discussing the law relating to the creation of tenancies; affordability, habitability and security issues in existing tenancies; and issues surrounding the termination of tenancies, including evictions, displacement and gentrification. The remainder of the class will be devoted to issues concerning the development and preservation of affordable housing; access to health care, daycare, and other social services; and legal aid for underserved groups; and homelessness. Particular attention will be given to litigation and legislative approaches to housing problems. Reagan

Immigration Law. (2) This course examines the interrelationship between the immigration and nationality laws. Students will be empowered to execute its mandate, and the Constitutional constraints on its meaning and breadth. The course takes a topical approach and focuses on the immunities of physicians, asylum, and refugees, and the exclusion and deportation of non-citizens. Cases with important historical and/or political significance and recent U.S. Supreme Court cases are utilized. The policy implications of judicial interpretations are a focus of class discussion. Blum

Income Taxation I. (3 or 4) This course uses statutory, judicial and administrative materials to study the federal income tax as it applies to the individual. The course is directed toward understanding the basic problems and policies with which an income tax must deal, comprehending the problems created by possible solutions and by the actual solutions found in pertinent statutes and regulations. Income Taxation I. (3 or 4) This course examines the federal income tax law, with a focus on the taxation of business enterprises—particularly partnerships and corporations. Although the course begins with a review of the first semester course in federal income taxation, it becomes more detailed and complex (as has the law) and places greater emphasis upon the present statutes and regulations. Society of Comptrollers

Insurance Law. (3) The first two-thirds of the course are devoted to an in depth study of the insurance business. The emphasis is upon the law and regulation of the business, the economics of the business, and the regulation of state insurance departments. The last part of the course will be devoted to an in depth study of insurance coverage and the various kinds of insurance. The course will be conducted by Professor Sweet. contract, policy, and other techniques, in addition to the study of technical and other legal and business principles. The course is designed for students who plan to do tax work or to undertake further study of income taxation. Barton, McNulty, Rakowski

Indigenous Americans and U.S. Law. (3) What popularly is called "Feder Indian law" is an extraordinary complex area of law, encompassing unique legal doctrines in such diverse areas as criminal and civil law, foreign relations law, and treaty rights. The course will survey United States law and policy as both have been applied to the indigenous peoples of this country. From an original status of full tribal sovereignty, the course will trace the impact of the panoply of treaties, federal statutes, Presidential orders, common law, and administrative action, in defining the relationships of the various tribal governments with America's native peoples. Fassett

Insurance Law. (3) The first two-thirds of the course taught by Professor Sweet will focus upon materials which expose the arcane and almost unintelligible language of the insurance policy. Also, it will explore the basic actuarial operation of the insurance industry and its implications for the growth 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 Litigate. The material will be illustrated by problems discussed in class. The final third of the course will be taught by Stephen Ashley, Esq. It will deal with claims that the insurer has acted in bad faith. Sweet

International Business Transactions. (2-3) This seminar will run on an office structure, with weekly or bi-weekly meetings. The course will cover the law of international transactions, with an emphasis on the law of contracts. Students will be expected to prepare substantial written work. The seminar will focus on the law of sales, international trade law, and international investment law. Students will be expected to work together in small groups to prepare a comprehensive written analysis of an international transaction. The seminar will meet for the duration of the semester. The seminar will be taught by Margaret Baker, Esq. Reimann
the University of Pennsylvania Law School

weekly memorandum

on narrowly defined specific topics

on the Americans. The focus will be on the attorney for a United States business enterprise with interests abroad, but occasionally with the interest of a host government to foreign investment (particularly in the context of tax treaties).

in the United States and international law as distinct disciplines. Topics to be covered, with varying degrees of emphasis, are: dispute resolution; planning and litigation (with particular emphasis on the role of judges in resolving disputes); technology transfer (industrial property in the transnational context, substantive law controlling industrial property, licensing procedures, drafting of licenses); joint ventures and other forms of international operations; foreign investment (investment facilitation legislation, investment control legislation, tax aspects of foreign investments, forms of investment, with particular emphasis on the implementation of incentive and other special programs affecting aspects of foreign investment).

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International Development Policy and Law. (3) This seminar will consider the recently issued Club of Rome report on the interactive problems of development, environment, population, economics and security which, in their aggregate, comprise the current world situation. It will then explore in greater depth some of these problems particularly by setting third world societies including, in addition to those addressed above, the role of international organizations in these areas, including, in addition to those already mentioned, the role of international organizations in the making process of the law in the international community. The seminar will consist of lecture-discussions, panels, and films on various aspects of international law.

International Environmental Law. (2) This seminar will consider the law and institutions relevant to international environmental problems, particularly in light of the global climate change conference. Topics include international agreements and regulations relating to the environment, the role of international organizations, the relationship between international and national law, the necessity for the development of an international environmental law system, and the limits of international governance.

International Human Rights: Law, Policy, and Process. (2) Problems examined in recent years will stress development that includes (1) increased use of International human rights law in national and state courts; (2) militant concerns in the United Nations and international issues concerning human rights violations; (3) radical perspectives in U.S. law and international law; (4) Gulf War residue, the Soviet Republic's claims to human rights, and world human rights issues (e.g., those involving armed conflict).

International Law. (3) The course deals with the basic rules governing the international community, including customary international law, rules established by treaties. A substantial portion of the course focuses on the role of international and national tribunals in the law-making process of the international community. Emphasis is placed on modern developments in the fields of jurisdiction and immunity from jurisdiction, international agreements, trade, peace, and international economic law. In addition, special consideration is given to the impact of the United Nations on the development of international law. Carroll

International Taxation Seminar. (2) Prerequisite: Income Taxation I and II or equivalent. A study of the law of International taxation, the taxation of foreign-source income of U.S. persons and of foreign persons having domestic-source income. Emphasis will be placed on the underlying problems with which the law attempts to deal and on present or proposed solutions. Special attention will be paid to the tax problems faced by U.S. citizens and residents investing or doing business in foreign countries ("outbound investment"), especially by U.S. taxpayers abroad. The course will also cover the U.S. taxation of foreign persons on U.S. source income ("inbound investment."). With use of international and comparative materials, consideration will be given to those aspects of income that are permitted to be considered foreign by the United Nations, the American law system, and the international system of taxation, and the international tax aspects of international organizations, multinational corporations and proposals for reform or advancement. McAuliffe

International Trade Law. (2) This seminar studies the present structure and operation of the world trading system as governed by the General Agreement on Tariffs and Trade and the interpretative codes adopted at the Tokyo Round. Since the world system is complemented and subjected to tensions—by regional systems, the seminar also focuses extensively on regionalism, including the role of the European Communities, the Latin American systems of integration, and the U.S.-Canada Free Trade Area Agreement. Special attention is given to the provisions of the Omnibus Trade and Competitiveness Act of 1988 and their counterparts in the EEC. The seminar also studies the transformation of the Community into a European Union. Helenfield

Japanese Legal System. (2) This is a basic, introductory course in another legal system. It is concerned with the fundamental structure of Japanese Law, which covers mainly the constitutional law based on not only legal documents including translated court cases, but historical documents, in addition to the administrative law, which helps participants to understand how government-citizen relations in various fields are dealt with. The course will seek to promote understanding of the Japanese legal system as it existed before the catastrophe of the second World War, and was largely influenced by American law after WW II.

Jurisprudence. (4) The law in philosophical perspectives. Topics include the relation between law and morality; legal reasoning; the justification of sanctions; rights and wrongs, obligation and duty, in light of the jurisprudential methods of policy implementation and dispute resolution. DeLeo

Jurisprudence and Social Policy Seminar. (3-4) A seminar for students in the Graduate Program in Jurisprudence and Social Policy. Through intensive reading and discussion this seminar will be an introduction to the field of jurisprudence and social policy for degree candidates, will provide them with a common core of theoretical and empirical materials and will acquaint them with options for specialization. Each week, Enrollment will be limited to students in the Jurisprudence and Social Policy Program except with the special permission of the Instructors. JSP faculty

Labor Law. (3) This course deals primarily with the establishment and conduct of collective bargaining relations and the regulation of collective bargaining in the United States. The course will cover the history of labor law and the development of the law from the NLRB and the National Labor Relations Act. Vetter

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 local and regional efforts. Topics will include comprehensive land-use plans, zoning, subdivision controls, aesthetic regulation, the regional obligations of municipalities, constitutional issues raised by land-use regulation.

Law and Anthropology Seminar. (2) This seminar begins by reviewing the leading anthropological theories of law and asking such questions as "What is law?", "How does law differ from custom or morality?", "How does the law of one country differ from the law of another? Do very different societies be compared?" Subsequently the seminar will examine field studies, research on American Indian tribal courts and Papua New Guinea's customary law courts. The field studies concern both substantive law and procedures for settling disputes. This seminar will give students a different view of comparative law. Coetter

Law and Literature. (2) This seminar explores visions of legal order and disorder in literature. Topics include competing systems of moral and legal order that exist in the works of St. Augustine, Shakespeare and Hamlet; and the ambivalence concerning procedure found in Bleak House, Bartleby the Scrivener and The Trial; and the modern quest for identity-in-work as illustrated by the depiction of the lawyer in John Updike's The Paper Chase.""To Kill a Mockingbird,"" Inherit the Wind,"" The Verdict,"" and ""True Believer."" Oberman

Law and Modern Social Thought. (3) An historical survey of leading attempts to construct social explanations and to use a legal materials for systematic social theory, from the 18th to the early 20th century. Course includes discussion of the following theorists: Montesquieu, Beccaria, Savigny, Maine, Marx, Durkheim, Weber, Liebmann

Law and Technology Workshop. (3-6) This workshop is designed to provide students who are interested in a high technology legal career with a rich appreciation of the challenging legal, economic, and social issues raised by the broad array of new technologies. It will also provide students with an opportunity to pursue an in-depth research project. The specific issues will vary based on cross-cutting technological areas. The more general technology areas include: artificial intelligence; networking and computer technology; biotechnology; the human genome initiative; and high definition television. Other technologies may be added in response to student interests. Jordan, Mallin, Moran

Law, Love, and Justice. (2-3) Love and justice are recognized as being among the most important of the social values. How can the law accommodate, respect, and indicate opposing attitudes to it. In the seminar we'll explore these two paths and consider which of them should be followed. Dan Cohen

Law, Society, and Social Control. (2) This seminar will review theories of law, society and social control (Durkheim, Marx, Foucault, Goffman, Elias, Gussfield, Garfield, Cohen, Erikson, Critical Legal Studies) and consider how they might be applied to understanding and implementing the role of law in contemporary society (corporations, mines and factories, gambling casinos, police) and of deviance (drugs, smoking, prostitution, pornography, and white collar and organized crime). Sokol

Legal Accumulation. (3) This seminar is designed to help students to grasp the law as a machine, to understand the principles of financial accounting, as they interrelate with the practice of general business law. The course is geared especially to the law student who does not have a significant business or accounting background and will cover the concepts of financial reporting and valuation. DeLeo

Legal Institutions. (2) In comparison to other industrialized democracies, Americans seem more likely to seek out alternative forms for the resolution of disputes, for dispute settlement, and for political action. American methods of policy implementation and dispute resolution generally seem more legalized and costly than those of their European counterparts. Is this a reassessment? If so, why do these patterns recur? And are they a bad thing? Kagan

Legal Issues in Biomedical Ethics. (3) This seminar will survey a selection of legal issues within the realm of medical science and the physician-patient relationship. These issues, such as the following will be included: death and dying decisions, reproductive technology, fetal tissue transplant therapy, experimentation on human subjects, allocation of medical care, and various ethical problems of a hypothetically and patient's, ownership and control of human tissue and organs, etc. (These are illustrative issues only; it may be that not all will be covered in a particular semester). Shultz
preparing a press release. Hands-on experience in conducting public relations programs is also offered in conjunction with a nonprofit organization. Gee, Rosenbaum

Public Sector Labor and Employment Relations. (2) Labor Law recommended. This course will consider the constitutional and statutory rights of public employees to participate in unions and to engage in collective bargaining with public employers. Among the subjects reviewed are due process and free speech rights, organizing activity, collective bargaining, public employee strikes, union security clauses, and the duty of fair representation. California and U.S. Supreme Court decisions. Winograd

Public Trust Seminar, (3) Stewardship of natural resources is one of the core ideas of environmental law. The Public Trust Doctrine, founded on public rights in navigable waters, and the state fiduciary responsibilities to protect those rights, is the basis for an in-depth study of the stewardship concept. Sex

Punishment. (2) A comparison of the views of punishment currently prevailing among American and English commentators with three sets of rather different views—Ancient Greek, Ancient Hebrew, and Medieval Christian. Smith

Quantitative Methods in Law. (4) The primary objective of this course is to train students in the use of multivariate statistical techniques in legal research. A secondary goal is to evaluate, normative and positive, the results of the research methods that are used in the legal process, and in litigation in particular. Students are expected to have taken a previous course of courses on probability and statistics. Methodological objects to be covered include experimental design, hypothesis testing, simple regression, multiple regression, and analysis of variance. The discussion of statistical methods in law will focus on employment discrimination and antitrust. Practical uses of statistical methods and computer applications will be emphasized. Rubinfeld

Race and American Law. (2) This course will examine the status of national-minority people—mostly but not exclusively, African-Americans—before the state and federal legislatures, and courts, from the colonial era to the present. Questions of slavery, Jim Crow, peonage, and the struggle against these will be analyzed from the origins of the first institution to present-day affirmative action efforts. Historical context will be emphasized. Rangan

Real Estate Secured Transactions. (3) This is a course on security transactions in land. It covers real property security devices (installment land contracts, mortgages, deeds of trust, and possessory security interests) and the problems connected with real estate sales. It also covers the subordination of judicial and nonjudicial foreclosure; antideficiency provisions, multiple security and mixed collateral loans, the transfer of debentures or creditors’ interests, state and federal regulation, and allocation of ultimate loss. Hetland

Real Estate Transactions. (2) This course involves the legal, practical, and commercial aspects of land transfer. It covers the introductory real property course to its next step, conveying and commercial real estate law. It covers the transfer of land and its transactions matters such as agency, land contracts, options, commercial leases, escrows, execution and delivery, deeds and other title documents, recording, title insurance, and the regulation to secured real estate financing. Holmes, Hetland

Real Property; Real and Personal Property Security; Financial Litigation. (2) Prerequisite: Real Estate Secured Transactions, which may be taken concurrently. This seminar considers—usually in a litigation context—current complex and unresolved problems involving real property, real and personal property security, finance, and professional responsibility. Hetland

Refugee Law. (2) This course will examine the root causes of refugee flight and the existing international norms that address human rights abuses and civil strife. We will look at the responsibility of nations to accept refugees from both an international and domestic perspective, and the extent and nature of the nonenforcement and repression of refugee law doctrine in the United States, with a particular focus on the assessment of the individual claims for asylum status. The course will also address issues of detention and due process rights of refugees. Blum

Remedies. (3) Special problems of damages; injunctive relief and contempt; specific performance; reformation; declaratory relief; restitutionary remedies; comparative and partial equitable indemnity; procedural issues in enforcement; remedies in general problem areas; effect of legislation; and issues of federalism and choice of law in remedies. Reimber

Representing Japanese and Other Foreign Investors in the United States. (2) This seminar will present a practitioner's view of some of the key issues which arise in the representation of foreign investors in the United States. The primary focus will be on issues faced by investors from Japan, although many of these issues will be relevant to investors from other countries as well. The areas of practice to be discussed will include regulation of foreign Investment, Intellectual property, tax, bankruptcy, labor, immigration, antitrust and dispute resolution. The goal will be to both highlight the issues which are most often encountered under U.S. law, as well as to suggest different approaches to the same problems under Japanese law which may influence the expectations of a typical Japanese investor. The seminar will also include information concerning the promotion of outward investment, as well as issues often encountered in negotiations between Japanese and American firms. Moyle

Resolution of Private International Disputes. (2) This course explores the more prominent issues faced in resolving a transnational dispute. The course is structured around a court dispute and a tort claim. Throughout the course, we shall consider these problems in the contexts of international arbitration and litigation. The emphasis will be on pre-arbitration and pre-arbitration issues such as service of process, jurisdiction, forum non conveniens, forum selection clauses, sovereign immunity, enforceability of arbitration agreements, and arbitrability. The second part of the course will consist of an analysis of the proceedings, in particular arbitral proceedings, including counterclaims, evidence and expert testimony, multiparty arbitration and choice of law. Certain aspects of enforcement of arbitral awards, including discovery orders and letters rogatory will be examined. Post-proceeding issues to be covered include challenging arbitral awards, appeals, and the recognition and enforcement of foreign judgments and arbitrations awards. Caron

Resources and Law of the Sea. (2) The Law School has an active research program on ocean resources and the Law of the Sea, which has involved several students in work on Japan, Pacific resources, and international law. The project is sponsored principally by the Sea Grant College Program, with funding from the federal government and the state. Scheibler

Roman Law. (2) Introductory course on Roman Law. Survey of history and sources, persons, property, obligations, succession, actions, and a few general topics. Daube

Securities Regulation I. (2) Prerequisite: Corporations I and II or equivalent. This course concentrates on the regulation of the distribution of securities and corporate finance transactions under the Securities Act of 1933 and under state Blue Sky laws, including the registration under the 1933 Act, exemptions from registration, practice before the Securities and Exchange Commission, and the underwriting process of private and public distributions of securities. Sorsini

Securities Regulation II. (2) Prerequisite: Corporations I or their equivalent. Securities Regulation I is not a prerequisite. This course focuses on the regulation of trading of securities on stock exchanges and in the over-the-counter market; the regulation of tender offers and antitakeover measures, including advising the Board of Directors; disclosure obligations in securties transactions; broker-dealer regulation; insider trading; and federal and state securities acts. Sorsini

Self-Interest and Morality. (3) Explores the nature of individual well-being, the extent to which a present or potential capacity for enjoying certain types of welfare can ground moral claims, and the degree to which a person's preferences and interests are consonant with what they appear contrary to that person's best interests. Topics are likely to include: preference-based and deontic theories of individual welfare; posthumous harms and beneficence; personal identification and moral responsibility; the moral status of nonhuman animals and human infants; harms to future generations; paternalism; and euthanasia. Readings will be drawn from contemporary philosophical work. Rakowski

Separation of Powers in American Government. (1) This course addresses the nature and significance of separation of powers in American government. It will be presented in the form of a general survey of selected issues. We will begin by briefly considering the theoretical underpinnings of the doctrine of Separation of Powers. The primary aim of the course, however, will be to examine and discuss these principles through studying judicial decisions that elaborate the distribution of powers within each branch of the federal government. The course will be a seminar on separation of power to the judicial branch. Cappuccio, Cordray, Litman

Sex-Based Discrimination. (3) The course will examine and assess the response of the American legal system to claims of sex discrimination since the 1960s. Part I will survey anti-discrimination law, both constitutional and statutory, particularly cases involving sex discrimination in employment. Discussion of laws and defenses, as well as problems of proof and remedy, will move frequently between issues of sex and race discrimination. Part II will address state regulation of reproductive and sexual relations as it may pose issues of privacy and/or equality. Siegel

Sexual Harassment. (2) This is a combined academic and clinical course offering two credits for the classroom component and four credits for the clinical work. Students are encouraged to take both the classroom and clinical components. Students who wish to take only the classroom component must obtain approval of the instructor. Bryant

Sexual Orientation and the Law. (2) This course explores the relationship between sexual orientation and law. It begins by looking at the question of what we mean by sexual orientation, and then exploring the legal issues that arise in discussing same-sex relationships. Students are encouraged to take both the classroom and clinical components. Students who wish to take only the classroom component must obtain approval of the instructor. Bryant

Social Welfare Legislation. (5) The subject of this course is the American income maintenance system—what are sometimes called the public benefits or entitlement programs. Both the social insurance programs, including Social Security, the Aid to Families with Dependent Children program, and Medicaid, and the cash benefit programs, such as Aid to Families with Dependent Children (welfare), will be covered. The material is presented in a historical and comparative framework, and begins with a discussion of the theoretical underpinnings of the policy of income maintenance and the development of the American social welfare system. A primary focus will be on the relationship between federal and state social welfare acts. Alley

Soviet Law: Comparative Aspects. (2) One focus of the course is the rights and obligations of citizens vis-a-vis the state. Examples of other topics are the status of the CPSU under law, business law in a planned economy, and laws for the so-called national minorities. Other topics include the court system, foreign investments, and foreign trade. Turok, Turok
economy, and conflicts of law. Emphasis is placed on the actual operation of the law and on problems it raises. A major concern throughout is an understanding of why and how Soviet law differs from "bourgeois" law, comparisons are also made with the law of other communist ruled countries.

Survey of Intellectual Property Law. (3) This course offers an introduction to the various fields of intellectual property law, including patents, copyrights, trademark law, and anti-trust laws. Students will gain an understanding of the basic principles governing these areas.

Water and Other Armed Conflicts: The International and National Legal Controls. (2) Study of efforts to regulate armed conflicts via law, diplomacy, politics, and good sense. The law appears in treaties, statutes, rules, precedents. The roles of supranational bodies (e.g., United Nations, World Court, NATO), of branches of national governments (e.g., Congress, White House, Pentagon), and of lawyers and non-lawyers are discussed.

Welfare, Social Security, and the Law. (3) The subject of this course is the American income maintenance system—what are sometimes called the "public benefits" of modern society. The legal insurance schemes, especially Social Security and Unemployment Compensation, and the public assistance programs, especially Aids to Families with Dependent Children. The Supreme Court's role in defining the meaning of these programs is emphasized.

Work and Worker Rights Education and Defense Fund (DREDF), the Berkeley Community Law Center. (4-9) The Berkeley Community Law Center provides legal services to residents of Oakland and Berkeley. Students primarily will be assisting refugees from Guatemala in the preparation of applications for political asylum. Students meet with the Boalt Hall clinic supervisor in regular sessions during which case strategy, underlying legal issues, ethical considerations or other issues are discussed. Blum

Domestic Violence Law Clinic. (2) Prerequisites: Prior or concurrent enrollment in Domestic Violence Law Seminar. Students also must also be certified under the California State Bar Practical Training of Law Students Program, which requires prior or concurrent enrollment in Civil Procedure and Evidence. There will be several different domestic violence legal agencies in the greater Bay Area where Interns may work. Interns will be certified so that they can represent clients at restraining order hearings, represent clients and draft restraining orders. They may also attend meetings with their supervising attorneys if the attorney is discussing domestic violence legal issues with law enforcement, DAs, Family Court Services, judges, legislators, etc. (up to eight hours of the total field work hours). Leman

Editorial Work on Law Journals. (Maximum 2) For second-year students. Oster

Editorial Work on Law Journals. (Maximum 4) For third-year students. Oster

Group Research Projects. 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 to the subject matter areas not covered by the regular curriculum. Requires a member of the faculty to serve as supervisor and the approval of the dean. Oster

Immigration and Asylum Clinic. (3-10) Prerequisites: Prior or simultaneous enrollment in Immigration Law or Refugee Law. The Immigration and Asylum Clinic facilitates student work directly with lawyers and their clients in law firms, legal service agencies and pro bono organizations in the Bay Area. Students will be placed at the office of their choice, after consultation with the Boalt Hall clinical supervisor. These offices supervise field placement work, under the name of this clinic. Students primarily will be assisting refugees from Guatemala in the preparation of applications for political asylum. Students meet with the Boalt Hall clinic supervisor in regular sessions during which case strategy, underlying legal issues, ethical considerations or other issues are discussed. Blum

Independent Research, Writing, and Study Projects. Open to students who have completed the first-year curriculum. A program to enable individual self-instruction, study or research in subject areas of interest, often with the goal of producing an original paper or report. Requires a member of the faculty to serve as supervisor and the approval of the dean. Oster

Judicial Externships. (4-10) Prerequisites: As specified by each judge. Also, depending on the externship, prior or concurrent enrollment in Evidence and Criminal Procedure may be advisable. Students work 16-40 hours per week for 15 weeks for a state or federal court judge. Schiff

Practitioner-Supervised Clinical. (2-4) Prerequisites: As specified for each externship. Prior or concurrent enrollment in Evidence and Criminal Procedure may be advisable, so students may be certified under the California State Bar Practical Training of Law Students Program, which requires prior or concurrent enrollment in Civil Procedure and Evidence. There will be several different domestic violence legal agencies in the greater Bay Area where Interns may work. Interns will be certified so that they can represent clients at restraining order hearings, represent clients and draft restraining orders. They may also attend meetings with their supervising attorneys if the attorney is discussing domestic violence legal issues with law enforcement, DAs, Family Court Services, judges, legislators, etc. (up to eight hours of the total field work hours). Leman

Practitioner-Supervised Clinicals. (5-10) Prerequisites: As specified for each placement. Depending on the placement, prior or concurrent enrollment in Evidence and Criminal Procedure may be advisable, so students may be certified under the California State Bar Practical Training of Law Students Program, which requires prior or concurrent enrollment in Civil Procedure and Evidence. There will be several different domestic violence legal agencies in the greater Bay Area where Interns may work. Interns will be certified so that they can represent clients at restraining order hearings, represent clients and draft restraining orders. They may also attend meetings with their supervising attorneys if the attorney is discussing domestic violence legal issues with law enforcement, DAs, Family Court Services, judges, legislators, etc. (up to eight hours of the total field work hours). Leman

*On leave, spring
+Recalled to active service
Recipient of Distinguished Teaching Award
Street Law. (3) The Street Law Project operates in conjunction with 40 Day School, 30 public schools and their respective school districts. Law students, working under faculty supervision, serve as student instructors and teach a course entitled "Street Law" which reaches 50,000 high school seniors annually. The program seeks to promote legal literacy among young people to ensure that they possess that minimum amount of practical, legal knowledge needed to understand the system as a whole and how it can work for them. The program is based at the high school sites. They also participate in weekly seminars and research and development of material on California law to be used in the classes. Nazario

Legal Studies Courses

American Legal and Constitutional History. (4) History of American law and constitutional system. Topics include: the colonial heritage, the foundations and stages of American federalism, the role of the law in the imposition of social control and the regulation of economic transactions, law and social theorizing, and the common-law tradition. McCloan

Courts and Social Policy. (4) This course examines controversies over the capacity of the courts. These issues will be examined by tracing changes in the business of the courts and the emerging of these issues in their social context. Shapiro

Crime and Criminal Justice. (4) This course examines legal and social aspects of the criminal justice system. Students will analyze the causes of crime and assess strategies for crime prevention that are used and limits of the criminal justice system in dealing with it. We will consider competing explanations of the causes of crime, and assess strategies for crime prevention and control within the criminal justice system and beyond it. Our central focus will be on the criminal justice system including: the police; constitutional rights and the exclusionary rule; the role of the defense attorney and the prosecutor; bail; the trial; the guilty plea; sentencing and corrections; and the penalty of death. Skolnick

Foundations of Law: The Quest for Justice. (4) Introduction to law for students interested in law as part of their general education. It discusses major legal ideas, legal institutions, and legal reasoning; introduces the legal profession; provides some insight into legal thought and comparative perspective; and highlights basic philosophical and moral problems in the quest for justice. None

Law and Bureaucratic Organizations. (3) Legal theory is usually presupposed only individual actors and ideas not of bureaucratic legal actors like General Motors. This course explores the implications of taking organizations seriously as legal actors. Issues include the legal rights of organizations, legal control of organizational behavior, and ethical questions. Dän-Cohen

Law and Economics I. (4) This course uses the concepts and tools of economics to analyze problems in law, focusing on contract, property, and tort. Students will be expected to apply the analysis to legal issues and to critique the use of economics in law. Ogus

The Making of Modern Constitutionatism. (4) Historical examination of the development of constitutionatism as an authoritative approach to the study of law and politics; coverage from the 16th to 18th centuries, concluding in discussion of the debate over ratification of the U.S. Constitution. Lieberman

Theories of Justice. (4) This course examines the idea of justice as understood in law and politics. The main emphasis will be on social justice and the distribution of wealth, power and liberty in society. The course will cover both ancient and modern theories which relate distributive justice to ideas about equality, need, desert, efficiency, class, state, power and freedom. In particular, it will involve a detailed discussion of John Rawls' book, A Theory of Justice. Waldron

Topics in Law and Society Seminar. (3) This seminar offers the opportunity for intensive discussion with the instructor of the same material as covered in Courts and Social Policy, but in a small group setting, with the writing of some short papers and the reading of some additional material. Shapiro

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 course work is focused on the view that the study of law and justice has a rich humanistic tradition and that its pursuit can encourage sustained reflection on fundamental values.

Legal studies courses are taught by members of the Law 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, and critical theory, which are the bedrock for the study of law.

Legal studies courses in the major are divided into four groups: A. Legal and Social Theory; B. Historical/Comparative; C. Principles and Problems of Substantive Law; and D. Administration of Justice. The remaining units may be either legal studies courses or courses from an approved list of law-related courses offered outside of the program.

The rationale for the structure of the legal studies curriculum becomes apparent if a few words are said about each of the course groupings referred to above. The Group A requirement insures that students in the major have the opportunity to study law and to develop a critical perspective, that the Group B requirement assures that students have the capacity to draw on the insights of legal traditions other than their own. The courses from Group C are meant to acquaint students with selected forms of legal ordering—e.g., the substantive law of crime, 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 issues of current 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.

Honor Program. With consent of the major advisor, a student majoring in legal studies with an overall GPA of 3.5 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 major in legal studies may be obtained from the program office.

Lower Division Courses

24. Freshman Seminars. (3) Course may be repeated for credit as topic varies. One hour of seminar per week. Section 1 to be graded on a pass/fail basis. Section 2 to be graded on a passed/not passed basis. The Berkeley Seminar Program has been designed to provide new students with the opportunity to interact with an intellectual community under the guidance of undergraduate instructors in a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester.

39. Freshmen/Sophomore Seminar. (2-4) Course may be repeated for credit as topic varies. Seminar format. Prerequisites: Priority given to freshmen and sophomores. Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments, and topics vary from department to department and semester to semester.

Upper Division Courses

100A-100B. Foundations of Law: The Quest for Justice. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 100A is prereq to 100B. Introduction to law for the liberal arts student. The purpose is to familiarize students with major legal ideas, legal reasoning, and legal processes; to provide a comparative and historical perspective on law; and to highlight basic philosophical problems in the quest for justice.

101. Legal Theory. (4) Three hours of lecture and one hour of discussion per week. This course examines the ideas and concepts in the legal framework within which legal actors operate. Topics include the purposes and functions of legal institutions and doctrines, the theory and practice of judging, the nature of law, law and morality.

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 16th and 18th centuries including the writings of Marx, Maine, Durkheim, Weber and other contemporary figures.

107. Theories of Justice. (4) Three hours of lecture and one hour of discussion per week. Major perspectives in social and economic thought, e.g., natural law, natural right, laissez faire, 'possessive inclu-
vulgarism," contractualism, pluralism, and social equality as they affect 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. The course is designed to deal with contemporary legal issues on which philosophical techniques and arguments bear.

109. Alms 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 disproportionate activities through criminal laws?

110. Legal and Political Obligation. (4) Three hours of lecture and one hour of discussion per week. The course will focus on the perennial question 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.

111. The Making of Modern Constitutionalism. (4) Three hours of lecture 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 sixteenth to eighteenth centuries, concluding in discussion of the development of the U.S. Constitution.

112. Historical Introduction to the Philosophy of Law. (4) Three hours of lecture and one hour of discussion per week. The purpose of this course is twofold: first, to survey some of the most important theories of law developed since antiquity through the 20th century; and second, to acquaint students with a historico-analytical analysis of the law and the state for the daily setting of legal mechanisms in modern society.

120. Conceptions of Punishment: Ancient and Modern. (3) Three hours of lecture per week. A comparison of the ancient and modern understanding of punishment prevailing in Anglo-American thought and in former cultures such as Medieval Europe, Ancient Israel, and Ancient Greece. The topics include: wrongdoing; suffering; deterrence, vengeance, purgation; excusal justifications; idolatry, fate; collective responsibility. Most of the readings are in literary works such as the Greek tragedies.

140. Property and Liberty. (3) Two hours of lecture and one hour of discussion per week. Topics include ways in which "property" may be defined; manner in which law regulates and protects property interests; arguments for and against redistribution of wealth and greater public control of private property. Readings include legal cases and essays by philosophers, economists, etc.

142. Law and Bureaucratic Organizations. (3) Two hours of lecture and one hour of discussion per week. Legal theory usually presupposes only individual actors and does not recognize organizational giants like, e.g., General Motors. This course explores the implications of taking organizations seriously as legal actors, issues include the legal rights of organizations, legal control of organizational behavior, ethical questions.

145. Law and Economics I. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Together Law and Econ I and if provide comprehensive coverage of economic analysis of law. Courses need not be taken in numerical order; nor is one a prerequisite to the other. The course will apply microeconomic theory to legal rules and procedures and to the judicial resolution of various sorts of factual issues, 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) Three hours of lecture and one hour of discussion per week. Law and Econ I and II are a foundational two-course study of the American legal system, from both behavioral and normative perspectives. Topics covered include: the nature of judicial decision making, the nature of judicial review, the systematic comparison of the judicial role with other political roles.

149. Lawmaking. (3) Three hours of lecture and one hour of discussion per week. This course traces the law-making process from the generation of ideas for new laws and the entry of individuals and groups into politics to push such laws, through drafting of bills, to the deliberations of Congress in changing them symbol, and the ultimate implementation of them by administrative agencies and courts and then to the next round of proposals for changes in the laws that their implementation suggests. Specific topics include: administrative law-making by administrators and judges.

150. Legal and Moral Responsibility. (3) Two hours of lecture and one hour of discussion per week. Examination of the conditions of moral and legal responsibility. Discussion of the concepts of cause, blame, guilt, punishment, fault, liability. Topics to be examined: role of excuses in a theory of responsibility; justification for holding one person responsible for the actions of others.

153. Seminar on Social Science in Law. (4) Three hours of seminar and one hour of conference per week. Prerequisites: Together Seminar in Social Science and seminar in Economics. Enrollment is limited. In this seminar we shall examine actual and potential uses of social science research in the American legal process. Topics will include: origins of social science in law; the application of social science methods to such legal and policy issues as race and sex discrimination in education and employment; obscenity; parole and sentencing prediction; eyewitness testimony; insanity; and the role of law in the regulation of medical and psychological activity; the exclusionary rule; criminal sanctions; and court reform.

155. Government of the Family. (3) Three hours of lecture per week. The course examines state regulation of conventional family formation and dissolution and focuses on issues of child welfare law. Topics include: the state role in reproductive decisions, entry into marriage, divorce, economic consequences of divorce and child custody decisions.

156. 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 current trends.

161. Law in Chinese Society. (4) Three hours of lecture and one hour of discussion per week. The course examines the Chinese concept of the legal system, traditional theories and institutions of pre-1911 society, and the expression and rejection of the traditional concepts in the laws of the Nationalist period and the PRC today.

162. Courts and Social Policy. (4) Three hours of lecture and one hour of discussion per week. The course examines controversies over the capacity of the courts. These issues will be examined by tracing changes in the business of courts and exploring the importance of context.

163. Juvenile Delinquency and Juvenile Justice. (4) Three hours of lecture and one hour of discussion per week. This course examines the premises, doctrine, and operational behavior of juvenile courts, particularly in relation to the commission of seriously anti-social acts by mid-adolescents. Topics include the history of theories of delinquency; the jurisprudence of juvenile courts; the standards of evidence and severity of punishment; policy response to juvenile delinquency; and reforms or alternatives to the juvenile court system.

167. Libel and Privacy. (4) Three hours of lecture and one hour of discussion per week. This course examines concepts of libel and privacy in the law. The law balances the individual's interests against the interests of society and the rights of free speech. Materials from history, sociology, philosophy and law cases and commentary will be used.

168. Sex, Reproduction and the Law. (4) Three hours of lecture and one hour of discussion per week. This course examines Anglo-American legal history in terms of the lives and judicial opinions of leading English and American judges. Topics include: colonial heritage, foundations and "stages" of American federalism, role of the law in the imposition of social control, and regulation of economic interests, styles of judicial reasoning and the common-law tradition.

171. Seminar on American Legal and Constitutional History. (3) Three hours of lecture and one hour of discussion per week. History of American law and the constitutional system. Topics include: colonial heritage, foundations and "stages" of American federalism, role of the law in the imposition of social control, and regulation of economic interests, styles of judicial reasoning and the common-law tradition.

175. Comparative Constitutional Law. (3) Three hours of lecture per week. An examination of constitutions and constitutional decision-making in a number of countries selected on the basis of high court opinions.

176. Seminar on American Legal and Constitutional History. (3) Two hours of seminar per week. Prerequisites: Consent of Instructor. Enrollment is limited. This seminar will provide students with independent research in the history of American law. Preference may be given to students who have taken 177.

177. Comparative Constitutional Law. (3) Three hours of lecture per week. An examination of constitutions and constitutional decision-making in a number of countries selected on the basis of high court opinions.

181. Mental Health Issues and the Law. (3) Two hours of lecture per week. Application of the behavioral sciences to criminal and civil law. Legal regulation of mental health practices.

182. Law, Politics and Society. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Either Econ 101 or English 101. Focus on selected topics in the behavior of American society, political institutions, and legal institutions. The course examines the role of political institutions, law as symbol and provider of social control, the interaction of law and society, and the relationship of law to larger cultural and societal changes.

187. Law and the Evolution of the State. (3) Four hours of lecture and one hour of discussion per week. The course is an examination of the historical development of the state as a political institution. It will focus on the role of law in the evolution of the state, particularly in the subseque
Library and Information Studies
(School of Library and Information Studies)

Office: 102 South Hall, 642-1464
Assistant: Nancy A. Van House

Programs

For a description of the programs in Library and Information Studies, see page 101.

Lower Division Courses

1. Bib 1: Methods of Library Use. (2) Hours of lecture per week. Formerly Bibliography 1. Students will learn the UC Library's resources in a systematic way to meet their needs. Includes lectures, assignments, examinations, and a term project. They will learn to extend these techniques to future independent research. (F,SP) Staff

16. Computers and Information. (3) Three hours of lecture per week. Prerequisites: Consent of Instructor. A nonmathematical introduction to computer concepts, programming, information retrieval, and databases (e.g., MELVYL). Reading, writing, and running of BASIC programs on a microcomputer. Output ranking; logic, and cognitive science. (SP) W. Cooper

39. Freshman/Sophomore Seminar. (2,3) Course may be repeated for credit as topic varies. Seminar format. Prerequisites: Priority given to freshmen and sophomores. Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from semester to semester. (F,SP) Staff

Upper Division Courses

101. Information Systems. (3) Three hours of lecture per week. Introduction to Information and Information Systems: Concepts (information, data, documents); processes (inquiry, retrieval, use); social context (demand, provision, control, influence on social values). Retrieval-based information services such as archives, databases, libraries, information centers, MIS. Not acceptable towards fulfillment of requirements for the Master of Library and Information Studies degree. (SP) W. Cooper

210. Survey of Children's Literature. (3) Three hours of lecture per week. Formerly Bibliography 128. 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,SP) Staff

211P. Practicum in Organization of Materials. (1) One hour of lecture per week. Introduction to Information and Information Systems: Concepts (information, data, documents); processes (inquiry, retrieval, use); social context (demand, provision, control, influence on social values). Retrieval-based information services such as archives, databases, libraries, information centers, MIS. Not acceptable towards fulfillment of requirements for the Master of Library and Information Studies degree. (SP) W. Cooper

217. Analytical and Descriptive Bibliography. (2) Two hours of lecture per week. Prerequisites: 200 or consent of instructor. Analytical bibliography as a method of investigation of the book as a physical object. The method of descriptive bibliography based upon Bowles. A critical survey of the state of analytical and descriptive bibliography. (SP) Staff

220. Systems Analysis in Information Services. (3) Three hours of lecture per week. Formerly 230. 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. (SP) S. Braunestein

223. Subject Access Systems and Methods. (3) Three hours of lecture per week. Prerequisites: 210, or consent of instructor. Theory and technique of providing subject or topical access to recorded information. Emphasis is on the examination of a number of indexing languages and classification schemes, automatic indexing and retrieval methods, and the design and evaluation of subject access techniques. (F) Larson

226. Introduction to Archival Administration. (3) Three hours of lecture per week. Principles and practice of archival administration in libraries and museums, including relevant aspects of current records management. Focus on archival methods for preservation, organization, and use of historical and administrative records in textual, visual, audible, or machine-readable form. (F)

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, classification techniques, vital records control, forms management, correspondence systems, micrographics and storage, reports management, personal privacy protection, and rights of public access to information. (SP)

228. Information Systems and Management in Organizations. (3) Three hours of lecture per week. Pre-
226. Networks and Networked Information. (3) Three hours of lecture per week. Prerequisites: 235 or equivalent; consent of instructor. Course examines the technical components of data communications and networks from local area networks to interconnected networks. Examines the historical factors and trends which have caused the development of interorganizational networks. Surveys problems and opportunities in providing remote access to electronic information sources. (SP)

225. Data Processing for Libraries and Information Management. (3) Three hours of lecture and two hours of laboratory per week. An introduction to computer programming with emphasis on algorithm development and structured programming techniques for solving library and information center data processing problems, using the PASCAL programming language. (F)

236. Computer File Organization. (3) Three hours of lecture per week. Prerequisites: 235 or equivalent, or consent of instructor; 220 recommended but not required. Development of computer programs for manipulation of bibliographic records using the MARC format. Computer file maintenance including sequential files, direct access files, and B-tree indexes. (SP)

237. Design and Implementation of Information Systems. (4) Six hours of lecture per week. Prerequisites: 235, 236 or consent of instructor. Class jointly develops functional specifications and design for an automated library subsystem such as acquisition, circulation, or cataloging. Class then writes and tests computer programs to implement system design. (F)

238. Use of Database Management Systems. (3) Three hours of lecture per week. Prerequisite: 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 data models. Design and implementation of a database on several commercial DBMS. Selection and evaluation of DBMS. (F,SP) Larson

239. Implementation of Database Management System Applications. (3) Three hours of lecture per week. Prerequisite: 235 or equivalent, or consent of instructor. Examination of bibliographic or administrative application using a database management system. (F)

241. Information Services for Multicultural Populations. (3) Three hours of lecture per week. Prerequisites: 235 or equivalent, or consent of instructor. Examination of information needs of multicultural communities and design of information services to meet those needs. Discussion of related issues in different types of libraries (school, public, academic, special and other information providers) as well as different aspects of library services (reference, collection development, cataloging, management). (SP)

242. Information Skills for Professionals in the Public and Not-for-Profit Sectors. (3) Three hours of lecture per week. Information-related skills for policy formulation and decision-making. Topics include the role of information in decision-making and policy-formulation processes; information requirements for government agencies, public and non-profit social service agencies, libraries, and private corporations. (SP) Weedman

244. Information in Society. (3) Three hours of lecture per week. Information in its social context. The place of library and information centers in information-gathering behavior and use. Societal and clientele needs and demands. Application of behavioral and social sciences to study and evaluation of information services. (F) Braunstein

246. Comparative and International Study of Information Systems. (3) Four hours of lecture per week. Examination of library and other information services in relation to their cultural contexts. Influence of cultural, economic, educational, political, sociological, and historical factors on the development and management of information systems. Emphasis on international comparison. (SP) Buckland

250. Bibliography and Information Service. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 200. Exploration of bibliographical organization in specialized subject fields. Printed and online sources of bibliographic and nonbibliographic data. Information analysis, evaluation, and synthesis. Studies of literature use. Information service problems and policies. (SP)

250P. Practicum in Information Services. (1) One hour meeting every other week plus sixty hours of on-site activity. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor; 200; 250 must be taken concurrently. Sixty hours per semester of approved on-site activity in an agency providing reference service, plus bi-weekly meetings to be arranged. Intended for students without significant experience in reference work. (SP)

251. Bibliography and Information Service: Health Sciences. (2) Four hours of lecture per week for fifteen weeks, plus thirty hours of on-site activity for fifteen weeks. Prerequisites: 200. Formerly 251D. Search strategies, selection, and evaluation of information sources in health sciences. (SP)

253. Bibliography and Information Service: Law. (2) Four hours of lecture and two hours of laboratory per week for fifteen weeks. Prerequisites: 200. Formerly 251F. Search strategies, selection, and evaluation of information sources in law. (SP)

260. Management of Libraries and Information Services. (3) Three hours of lecture per week. Three hours of laboratory per week, may be taken concurrently or consent of instructor. Introduction to management issues and practices in libraries of all types and other information organizations. Must be taken for letter grade to meet the requirements for the M.L.I.S. degree. (F)

261. Information Services in Organizations. (3) Three hours of lecture per week. General introduction to the provision of specialized library services and other information management activities in both private and public sectors, government agencies, non-profit organizations, and private corporations. Mission, problems, opportunities. Management functions as applicable: planning, organizing, staffing, budgeting, controlling. Must be taken for letter grade to meet the requirements of the M.L.I.S. degree. (SP) Weedman

262. Public Libraries. (3) Three hours of lecture per week. General introduction to public libraries: functions, services, and relationship to the community. Management of public libraries: planning, organizing, staffing, budgeting, controlling. Must be taken for letter grade if taken to meet the requirements for the M.L.I.S. degree. (SP) Van Houze

263. College and University Libraries. (3) Three hours of lecture per week. General introduction to the organization and administration of college and university libraries and their place in the institutions they serve. Problems and practices with respect to governing functions, collections, and building. Management functions as applicable: planning, organizing, staffing, budgeting, controlling. Must be taken for letter grade if taken to meet the requirements for the M.L.I.S. degree. (SP) Van Houze

264. Work with Children and Young Adults in School and Public Libraries. (3) Three hours of lecture per week. Prerequisites: 210. Systematic planning, implementation, management, and evaluation of multi-media library programs in school and public libraries. Prerequisites: Three hours of lower level courses in reading ability, library skills, instructional design. Must be taken for letter grade if taken to meet the requirements for the M.L.I.S. degree. (SP) Buckland

264P. School Library Media Practicum. (2,4) Six or twelve hours of practicum and consultation per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: 200, 210, 264, 265, of which 264 may be taken concurrently; consent of instructor; open only to those holding or eligible for a standard teaching credential. Formerly 384. Satisfies field work requirement for the California, district Media Teaching Credential. Placement required in both elementary and secondary schools. May be done in two semesters at 2 units each semester or in one semester at 4 units. (F,SP) Weedman

265. Children's Literature. (3) Three hours of lecture per week. Prerequisites: 200 (may be taken concurrently) or consent of instructor. Historical background and development; twentieth-century trends; criticism and evaluation; trends in use of illustration. (F)

266. Oral Interpretation of Imaginative Literature. (1) Formerly 265B. Two hours of lecture per week. Prerequisites: 265 or consent of instructor. Historical development and critical analysis of folklore, legends, myths, and modern imaginative literature; Their role in library programs. (SP)

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 media center as an educational center, and some aspects of media technology. (F)

271. Management of Information Technology. (2) Two hours of lecture per week. Prerequisites: 235 (may be taken concurrently) or consent of instructor. Implementation and management of computerized systems in libraries and information centers; planning, selection, procurement, staffing, supervision, cost, evaluation. Concepts of hardware, operating systems, programming languages, database management systems, telecommunications, data processing, and networks. Technological trends. (F)

272. Measurement and Evaluation of Library and Information Services. (3) Three hours of lecture per week. Prerequisites: Any of 220, 225, 261, 262, 263, 264, or consent of instructor. An introduction to the measurement and evaluation of library and other information services and systems. Topics include introduction to evaluation research; measurement of organizational performance; evaluation of library performance, library systems (e.g. reference, bibliographic, non-bibliographic information systems; and cost, cost-effectiveness, and cost-benefit analysis. (F) Van Houze

274. Economics of Information. (3) Three hours of lecture per week. Prerequisites: Course in economics or instructor's consent. Analysis of the role information plays in the economy and in the production and distribution of information. Topics include the functioning of information markets and the reasons for market failure. Braunstein

275. Information Policy. (3) Three hours of lecture per week. An examination of what a nation should have an information policy and, if so, what the components of that policy might include. Areas covered include intellectual property, proper rights, the production and dissemination of information, the establishment of property rights in information, and the possible tensions between privacy and freedom of access to information. Specific topics may vary from offering to offering. (SP) Braunstein

276. Collection Development. (2) Two hours of lecture per week. Prerequisites: 200. General principles and procedures relative to selection of materials: assessment of user needs, resource allocation, selection, and procedures relative to selection of materials. (SP) Weedman

277. Development of the Book. (3) Three hours of lecture and one hour of laboratory per week. A survey of the development and production of books. Emphasis on the evolution of writing to today's computerized production methods. Emphasis placed on all aspects of the printed book. (F)
Linguistics
(College of Letters and Science)

Department Office: 2337 Dwinelle Hall, 642-2787
Chair: Larry M. Hyman, Ph.D.

Professors:
Charles J. Fillmore, Ph.D. University of Michigan. Syntax, semantics.
Paul Kay, Ph.D. Harvard University. Syntax, semantics, pragmatics, variation.
Larry M. Hyman, Ph.D. University of California at Los Angeles. Phonology, African linguistics.
Robert Lakoff, Ph.D. Harvard University. Semantics, syntax, pragmatics, sociolinguistics.
George Lakoff, Ph.D. Indiana University. Syntax, semantics, cognitive linguistics.

Associate Professors:
Learnie L. Hinton, Ph.D. University of California at San Diego. American Indian languages, sociolinguistics, language change.
Richard A. Rhodes, Ph.D. University of Michigan. American Indian languages, grammatical theory, phonology and the lexicon.
Michael J. Ladd, Ph.D. University of California at Berkeley. Semantics, syntax, historical linguistics.

Assistant Professors:
Gary B. Holland, Ph.D. University of California at Berkeley. Indo-European languages, history of linguistics.
Shelley Luce, Ph.D. Stanford University. Phonology, morphology.

Sam Mchombo, Ph.D. University of London. Syntax, African linguistic structures. Swahili.

Adjunct Professor:
Arthur J. Bronzeit

Associate Adjunct Professor:
Steven Greenberg

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 this major are strongly urged to achieve a more than superficial acquaintance with some related but independent field: cognitive science, anthropology, mathematics, computer science, philosophy, rhetoric, English literature, philosophy, etc. 

Prerequisites: Completion of Linguistics 5 and Linguistics 100 with a minimum grade of C.

Requirements: Upper Division. The major consists of a four-course core (Linguistics 110, 115, 120, 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 advisors 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.

Student advisors must submit a request for the major's approval. A student must have already been approved as related is available from the Linguistics Department office (2337 Dwinelle Hall). Many other related courses are in the catalog, but not necessarily in the board's study. A change in the student's major advisor is to be requested 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 advisor and to see the advisor on a regular basis (at least once a semester).

Graduate Programs

Preparation for Graduate Study In Linguistics. Graduate students in linguistics should have had an undergraduate major in linguistics, a foreign language, or some equivalent acceptable to the department. They should have had completed the required foreign language reading examinations early in their graduate career.

Master's Degree In Linguistics. Students may follow either Plan I or Plan II for the master's degree. Plan I requires 25 units plus a thesis. (No course units are granted for the thesis itself.)

Plan II requires 30 units. Both plans include at their culmination, normally at the end of the second year, a three-hour comprehensive examination. Required courses for the linguistics M.A. are 110, 111, 120, 200, 230, one course from the set [105, 123, 180, 181], one course from the set [210, 211, 215], and one course from the set [305, 220]. Students are encouraged to supplement the core courses with a coherent battery of courses in a particular language or language family, in general linguistics, or in some allied field such as cognitive science, anthropology, or literature. These supplementary courses are to be chosen in consultation with the student's advisor.

Doctoral Degree In Linguistics. The program follows Plan B, as described in the doctoral degree section (Advanced Index). Graduates must pass the required foreign language reading examinations early in their program for 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 (1565 18th Street N.W., Suite 211, Washington, D.C. 20036-6501, telephone (202) 835-1714), sponsors a six- or eight-week biannual 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 in seminars, conferences, workshops, and lecture series, covering developments in the field and areas of interest which no single university can offer.
duction to the scientific study of language. (F,SP) Matsisoff, Mchombo

5W. Linguistics Writing Workshop. (2) Two hours of workshop per week. A 2-unit writing workshop which must be taken concurrently with Linguistics 5. Satisfies the second half of the Reading and Composition requirement. Two additional 1-hour meetings with a composition tutor. Additional readings, exercises in writing and in the analysis of writing passages and two hours of discussion per week. This counts toward topics related to language and linguistics. (F,SP) Matsisoff, Mchombo

10A. Intermediate Swahili. (3) Three hours of lecture and one hour of laboratory per week. Prerequisites: 10A or equivalent. Continuation of 10A. Emphasis on listening comprehension, pronunciation accuracy and speaking fluency by means of oral expression practice: (SP)

11. Writing Systems. (3) Three hours of lecture 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 hours of lecture per week. The sources and the resources of the English vocabulary, meaning and historical principles, and pronunciation of complex words in English. Native and borrowed word-formational processes. The development of technical terminologies, Etymology and semantic change. (F,SP) Holland, Ohala

21. Languages and Peoples of the World. (4) Three hours of lecture and one hour of discussion per week. An evolutionary perspective on the unity and diversity of languages and peoples of the world. Also listed as Anthropology 21 and Linguistics 21. (F,SP) Sarath, Wang

39. Freshman/Sophomore Seminar. (2-4) Course may be repeated for credit as topic varies. Seminar format. Prerequisites: Priority given to freshmen and sophomores. Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from semester to semester and from department to department per semester or between semesters. (F) Rhodes

51. The Politics of Language. (3) Three hours of lecture per week. The political uses of language. Dictates, prestige forms, bureaucratic, male and female language, politeness and indirectness, language planning, bilingualism, language attitudes. Enrollment limited to twenty-five students. (F,SP) R. Lakooff

55. The American Languages. (3) Three hours of lecture and one hour of laboratory per week. A linguistic view of the history, society and culture of the United States. The variety of languages spoken in our country, and the issues surrounding them: language and ethnicity, politics of linguistic pluralism vs. societal monolinguism, language and education, language shift, loss, retention and renewal. Languages include English (standard and nonstandard; Black English), pidgins and creoles, Native American languages, Spanish, French, and immigrant languages from Asia and Europe. This course satisfies the American cultures requirement. (F,SP) Hinton, R. Lakooff

71. Development of the Chinese Language. (3) Three hours of lecture per week. The history of the Chinese language from a historical viewpoint, with reference to its early development and present diversity. Special attention will be devoted to some of its most remarkable features such as the tones and the writing system. Knowledge of Chinese useful but not required. (SP) Wang

80A-80B. Lower Division Seminar. (2;2) Course may be repeated for credit. Two hours of seminar per week. A seminar style class for freshmen and sophomores.

98. Directed Group Study. (1-5) Course may be repeated for credit. Must be taken on a pass/no pass basis. Group study of a topic not included in the regular department curriculum. (F)

Upper Division Courses

100. Introduction to Linguistic Science. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 9 or concurrent enrollment. A basic technical introduction to linguistic science. Practice in phonetics, production, and transcription; practice in phonological and morphological analysis; basic steps in grammatical parsing and textual analysis. (F,SP) Rhodes, Sweestcer

105. The Mind and Language. (4) Three hours of lecture and one hour of discussion per week. Conceptual systems and language from the perspective of cognitive science. How language gives insight into conceptual structure, reasoning, category-formation, metaplastic understanding, and the framing of experience. Cognitive versus formal linguistics. Implications from and for philosophy, anthropology, literature, artificial intelligence, and politics. (SP) G. Lakooff

106. Metaphor. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Lower division Introduction to Linguistic Science. Formerly 185. The role of metaphor in structuring our everyday language, conceptual system, and world view. Topics include cross-cultural differences, literary metaphor, social construction, and related theoretical issues in philosophy, linguistics, psychology and anthropology. (SP) G. Lakooff

110. Introduction to Phonetics and Phonology. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 100 or concurrent enrollment. Description 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. Emphasis on acquisition and comprehension. (SP) Inkelas

111. Phonological Theory. (3) Three hours of lecture per week. Prerequisites: 110. Introduction to the principles of classical generative phonology and non-linear phonology, with extensive data analysis involving a wide range of phonological phenomena. (SP) Hyman

112. Phonological Theories. (3) Three hours of lecture per week. Prerequisites: 110. A survey of the most significant theories and issues in phonology in the twentieth century.

115. Morphology. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 110. Analysis of word structure, derivation, and compounding, in various languages. (SP) Inkelas

120. Introduction to Syntax and Semantics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 100 or graduate status. Formerly 120A. An introduction to the study of the structural properties of sentences and the connections between sentence structure and sentence meaning. (F) Fillmore

121. Logical Semantics. (3) Three hours of lecture per week. Prerequisites: 120. Basic logic for linguists. Basic speech act theory and pragmatics. Issues in compositional semantics. Staff

122. Language Typology and Linguistic Universals. (3) Three hours of lecture per week. Prerequisites: 120. Issues in language typology and linguistic universals. An examination of various linguistic sub-systems in different languages. Topics will include intransitive, ergative, ditransitive, absolutive, transitive, implicational, negative, possession, existential, free and bound pronouns, pronominal, case, system, etc. (SP) Holland

123. Pragmatics. (3) Three hours of lecture per week. Prerequisites: 120 and 105. Formerly 180. The relation between language use and human actions. Some topics to be emphasized are: conversational logic, speech acts, meta-linguistic, social, psychological perception of oneself and language, and the framing of experience. (SP) R. Lakooff
200. Graduate Proseminar In Linguistics. (1) Two hours of seminar per week. Required of graduate students during first year in program. An introduction to linguistics as a profession, its history, subfields, and methodologies. (F) Hymans

205. Advanced Cognitive Linguistics. (3) Three hours of lecture per week. Prerequisites: 105 (formerly 180) or consent of instructor. This will be an advanced course in cognitive linguistics. Among the topics covered will be cognitive bases for aspects of grammatical structure, meaning of word morphology, and motivations for linguistic universals (i.e., constraints on variability). (F) Sweetser

210. Methods In Phonological Analysis. (3) Three hours of seminar per week. Prerequisites: 110. Field laboratory, and "pencil and paper" methods of analyzing phonological data from many languages. (SP) Ohala

211. Advanced Phonological Theory. (3) Three hours of seminar per week. Prerequisites: 111. Extensive readings and discussion of current issues in phonological theory. (F) Inkels

212. Advanced Phonetics and Phonology. (3) Three hours of lecture per week. Prerequisites: 210. The neurophysiological and acoustic basis of speech production and perception.

214. Language and Music. (3) Course may be repeated for credit. Three hours of seminar per week. A seminar of selected problems in the realm of language and music.

215. Advanced Morphology. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 110 or consent of instructor. Examination of complex morphological systems. Issues in the theory of word morphology. (F) Inkels

216. Word Formation. (3) Three hours of lecture per week. Prerequisites: 115 and 120. An investigation of selected problems in derivation and compounding and their relevance to grammatical theory.

220. Syntax and Semantics. (3) Three hours of lecture per week. Prerequisite: 120. The constructional and unification approaches to sentence form and meaning introduced in 120 and 122 are pursued in greater depth. Various unification approaches to syntax are compared and contrasted. (SP) Filmore, Kay

230. Historical Linguistics. (3) Three hours of lecture per week. Prerequisite: 110 or consent of instructor. The scholarly tradition of historical and comparative linguistics. Methods of reconstruction. (SP) Holland

231. Historical Semantics. (3) Three hours of lecture per week. Prerequisite: 200. Syntrophic variation and diachronic change in the realm of meaning.

235. History of Linguistics. (3) Course may be repeated for credit. Three hours of lecture per week. 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, continuities of relevance today: Bopp, Rask, Humboldt, Schleicher, Whitney, Breal, Saussure, and Jespersen. (F) Holland

236. Major Schools of Structural Linguistics. (3) Three hours of lecture per week. Prerequisites: 111, 120, and 200. The linguistic theories of Saussure, the Prague School, lexicostatistics, and American Structuralism. (F) Staff

237. History of Linguistics. (3) Three hours of lecture per week. Prerequisites: 200. Formerly 238. An examination of the ideas, claims, methods, and philo-sophy-of-science stances associated with the American "Generative Linguistics" tradition that began with Noam Chomsky's 1957 Syntactic Structures. Readings will include works from the generativist period, several diachronographic treatises of the period, and representative modern writings from current journals.

238. The Generativist Tradition. (3) Three hours of seminar per week. Prerequisites: 200, 111, 120. Formerly 201. An examination of the ideas, claims, methods, and philosophy-of-science stances associated with the American "Generative Linguistics" tradition that began with Noam Chomsky's 1957 Syntactic Structures. Readings will include classic works from the early generativist period, several diachronographic treatises of the period, and representative modern writings from current journals.

240A. Field Methods I. (3) Course may be repeated for credit. Four hours of session per week. Credit and grade to be awarded on completion of sequence. Prerequisites: 205 or 220, or either 210, 211, or 215. Formerly 240. Training in elicitation and analysis of linguistic data in a simulated field setting. The same language is used throughout the year. (F) Matteo

240B. Field Methods II. (3) Four hours of session per week. Credit and grade to be awarded on completion of sequence. Prerequisites: 240A. Formerly 241. Training in elicitation and analysis of linguistic data in a simulated field setting. The same language is used throughout the year. Continuation of 240A. (SP) Matteo

244. Micro-Computational Text Analysis. (3) Three hours of lecture per week. Prerequisites: 100 or equivalent. This course is designed to teach the skills and theory required for analysis of linguistic textual materials using a micro-computer. To train in the use of specialized programs to handle linguistic fonts, multi-lingual interlinear text processing, and concordance and index generation for text analysis.

250. Structure of a Particular Language. (3) Course may be repeated for credit. Three hours of session per week. Prerequisites: 210 and 221. An analysis of the language structure of a particular language. The language investigated changes from year to year. (F) Filmore

261. Linguistics of Southeast Asia. (3) Course may be repeated for credit. Three hours of session 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. (F)

272. Tibeto-Burman Linguistics. (3) Three hours of lecture per week. Prerequisites: 220. An examination of the phonological, grammatical, and semantic characteristics of the various sub-groups of Tibeto-Burman: Lolo Burmese, Kham, Kachin, Karen, Kuki-Chin, Kamaiyal, and Himalayish. Reconstruction of Tibeto-Burman. (F) Matteo

273. Theoretical Topics In Chinese Linguistics. (3) Course may be repeated for credit. Three hours of lecture 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. Three hours of lecture per week. Prerequisites: 250 and either 210, 211, or 215. An examination of the classic works on American Indian languages, and detailed examination of one North American language family. (SP) Rhodes

290. Topics in Linguistic Theory. Course may be repeated for credit. Prerequisites: Consent of Instructor. Seminars or special lecture courses.

290A. Syntax. (3)

290B. Semantics. (3)

290C. Morphology. (3)

290D. Pragmatics. (3)

290E. Phonology. (3)

290F. Diachronic Linguistics. (3)

290G. Language Variation. (3)

290H. Linguistic Reconstruction. (3)

290I. Typology and Language Universals. (3)

290J. Lexicology. (3)

290K. Etymology. (3)

290L. Additional Seminar on Special Topics to be Announced. (3) Course may be repeated for credit. Hours to be arranged. Prerequisites: Consent of instructor. Seminar or special lecture courses on linguistic topics. (F) Greenberg

298. Special Group Study. (2-4) Course may be repeated for credit. Hours to be arranged. Prerequisites: One full year of graduate study at Berkeley or consent of graduate adviser. (F,SP)

299. Special Individual Study. (2-4) Course may be repeated for credit. Hours to be arranged. Must be taken on a satisfactory/unsatisfactory basis. (F,SP)

301. Individual Study for Master's Students. (1-6) Course may be repeated for credit. Course does not satisfy unit or residence requirements for master's degree. Hours to be arranged. Must be taken on a satisfactory/unsatisfactory basis. Individual study for comprehensive or language requirements in consultation with the field adviser. (F,SP)

302. Individual Study for Doctoral Students. (1-6) Course may be repeated for credit. Course does not satisfy unit or residence requirements for doctoral degree. Hours to be arranged. Must be taken on a satisfactory/unsatisfactory basis. 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. (F,SP)

Professional Courses

301. Teaching Practice and Instruction. (2,4) Hours to be arranged. Must be taken on a satisfactory/unsatisfactory basis. Course may be repeated for credit, but only for the instructional training portion to be given only once for each individual course taught by a T.A. For graduate students currently serving as T.A.'s in the Department's undergraduate courses. Two units of credit are given for the teaching experience each time a student serving as T.A. enrolls in this course; two more units are given for teaching instruction, taking this the form of weekly consultations between instructors and their T.A.'s. (F,SP)

302. Training for Linguistics Teaching Assistants. (2) Two 90-minute sessions per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: 110, 120 or 130 or consent of instructor. A teaching-methods clinic for first-time Linguistics G.S.F.'s. Sessions deal with the presentation of linguistic concepts in each of the foundation courses, the creation of homework assignments and examination, policies and practices regarding correction of students' work, grading, and feedback. (F,SP)

Interdepartmental Studies Courses

Graduate Courses

IDS 236. Cognitive Science Research Discussion. (1) Course may be repeated for credit. One and one-half hours of discussion per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Student must be the 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 car-
Logics and the Methodology of Science

(College of Letters and Science)

Group Office: 731 Evans Hall, 642-2085
Chair: Leo Harrington, Ph.D.
Professor, Logic
John W. Addison, Jr., Ph.D. (Mathematics), Logic, theory of definability
Robert M. Anderson, Ph.D. (Economics), Mathematics, Nonstandard analysis
Michael Blum, Ph.D. (Electrical Engineering and Computer Science), Recursive functions, computational complexity
Dale N. Chitra, Ph.D. (Philosophy), Philosophy of mathematics, language, and mind
Leo A. Harrington, Ph.D. (Philosophy), Recursion theory, computability theory, set theory
John C. Harsanyi, Ph.D. (Business Administration, Economics), Mathematical economics, game theory, methodology of economics
Martin J. Herson, Ph.D. (Philosophy), Philosophy of science, epistemology of science
Richard M. Karp, Ph.D. (Electrical Engineering and Computer Science, Industrial Engineering and Operations Research, Mathematics), Computational complexity
Paul E. Klement, Ph.D. (Philosophy), Semantics, pragmatics, syntax, and lexicon
Elisabeth A. Lloyd, Ph.D. (Philosophy), Philosophy of language, logic and methaphysics
Jack H. Silver, Ph.D. (Mathematics), Set theory, model theory
Stephen Neale, Ph.D. (Philosophy), Philosophy of language, logic and metaphysics
N. J. Shiga, B.A. (Psychology), History of logic, philosophy of mathematics
H. Blaaock, Ph.D. (Philosophy), Philosophy of science, scientific methodology, confirmation theory
W. W. Wootton, Ph.D. (Philosophy), Large cardinals, determinacy, and set theory
Ernest W. Adams, Ph.D. (Emeritus) (Philosophy), Philosophy of science, philosophical logic
David Blackwell, Ph.D. (Emeritus) (Statistics, Mathematics), Bayesian statistics, game theory
William Craig, Ph.D. (Emeritus) (Philosophy), Foundations of logic, mathematical logic
Donald Davidson, Ph.D. (Emeritus) (Philosophy), Philosophy of language, theory of action, philosophy of mind
Leonard Lichtenstein, Ph.D. (Emeritus) (Mathematics, Statistics), Probability
Leonard L. Levin, Ph.D. (Emeritus) (Mathematics), Combinatorics, models
Bernard M. Marcus, Ph.D. (Emeritus) (Philosophy), Philosophy of science, logic and theory of models
Leif A. Kallul, Ph.D. (Engineering and Computer Science), Artificial intelligence, knowledge-based systems, fuzzy logic, and decision analysis

Graduate Adviser: Mr. Chihara.

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, these dissertations are rarely solely mathematical or philosophical. A Ph.D. degree 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 a group with which Che plays 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 in computation science. A student who has completed 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 of the Group in Logic and the Methodology of Science, which is available upon request from the Group Office.

Courses. Courses are chosen with the advice of the graduate adviser from among the offerings of the various departments of the University. In addition to the offerings of Mathematics and Philosophy, attention is especially directed to courses in the various science departments, in statistics, and in linguistics.

Logic Colloquium (no credit). Reports on current research and scholarly work by members of the staff, visitors, and graduate students. Addition (F,SP)

Other Departments with Related Programs
Mathematics and Philosophy

Manufacturing Engineering

(College of Engineering)

Office: 4135 Etchecheverry Hall (IEOR) or 6189 Etchecheverry Hall (ME)

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 quality assurance, process and line design, manufacturing process and control, and manufacturing economics. 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:
Six courses of at least 3 units each in humanities and social studies selected from an approved list of courses will be required. Of these, at least one course must be an English composition course equivalent to English 1A. One must be from a list of selected courses in History and Cultures, one must be from a list of selected courses in Literature and Values, and two must be upper division courses. The English composition course and either the course in History and Cultures or that in Literature and Values must be taken for a letter grade. A minimum of two courses, at least one of which is in the upper division, must be taken from a single department.
1. History 7B, History 124A, History 124B or History 131B;

2. Political Science 1;

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 communications:
   - Mass Communications 101; Mass Communications 102; Mass Communications 103.

B. One of the following methods courses:
   - Anthropology 190A; Political Science 3; Political Science 132A-132B; Psychology 101; Sociology 5; Sociology 105.

C. Five courses (totaling at least 15 units) from the following list:

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 advisor.

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 with the supervision of the thesis director and the advisor is characterized by superior distinction. An honors thesis must be a thesis that has been developed in consultation with the major advisor. The honors thesis must be based on an original research project. The honors thesis must be written under the supervision of the thesis director and the advisor.

Honors Colloquium. (3) Three hours of seminar per week. Prerequisites: Open only to honors seniors in the 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. (SP) Staff

198. Directed Group Study for Advanced Undergraduates. (1-4) Course may be repeated for credit. Pre-requisites: Consent of instructor. Normally open only to mass communications majors who have already completed 12 units of upper division work in the major. Among the topics of mass communication with topics to be announced each semester. (SP) Staff

199. Supervised Independent Study for Advanced Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisites: Regulations set by College of Letters and Science. Seminars for the group study of selected topics not covered by regularly scheduled courses. Topics will vary from year to year. (F,SP) Staff

Materials Science and Mineral Engineering (College of Engineering)

Department Office: 210 Hearst Mining Building, 642-3901

Chair: Ronald Grimes, Ph.D.

Professors:
- Alex Becker, Ph.D., McGill University. Explorations in geophysics.
- George H. Brilealh, Jr., Ph.D., University of California at Berkeley. Applied physics.
- R. E. D. Cook, Ph.D., University of California at Berkeley. Electrical engineering.
- Oscar J. Santry, Ph.D., Massachusetts Institute of Technology. Geophysics.
- Eugene E. Hailer, Ph.D., University of California at Berkeley. Materials characterization.

Department Office: 210 Hearst Mining Building, 642-3501

Professor:

Assistant Professors:
- Mauro Ferrari, Ph.D., University of California at Berkeley. Explorations in geophysics.
- Tadeusz Patzek, Ph.D., St. Sileisian Technical University. Petroleum engineering.
- James W. Rector, Ph.D., Stanford University. Applied geology.

The Department of Materials Science and Mineral Engineering administers undergraduate programs in materials science and in earth resources engineering. In addition, students can be admitted to a double major program. Graduate programs are offered in materials science, mineral engineering, petroleum engineering, and engineering geology.

Materials science deals with natural and man-made materials—their extraction, development, and characterization for use particularly in advanced applications such as solid state electronics, automobile electronics, and magnetic and optical media. Students in the materials science and engineering curriculum is provided a basic background in chemistry, physics and engineering and applies this background to the field of materials science, for example, electronic materials, ceramic engineering, extractive metallurgy, or physical metallurgy.

Ceramic Engineering. The ceramic engineers study the physical and chemical properties of the raw materials and products of the ceramic industry and fundamentals of ceramic processing. Ceramics are nonorganic nonmetallics which are subjected, either in their production or use, to high-temperature environments. Such materials include rocket nozzles, electrical insulators, pressure vessel materials, and electrical and electronic devices, etc.

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, computer memory devices, and magnetic and optical mass storage media. In intimate contact, the various materials, with precisely controlled properties, perform numerous functions, including the passage of electric and magnetic signals. The subject includes mineral processing as well as smelting, leaching, electrochemical methods of extracting and refining metals, and crushing of materials, and requires using most recent advances in chemistry and physics.

Physical Metallurgy. Primarily studies the relationships between the chemical and physical structures of materials and their properties. The impurities and other naturally occurring impurities for advanced applications is a broad field within which primary emphasis can be directed toward fundamental physics, chemistry, or engineering. There is an extensive literature on the subject, but little of it is characterized by standards and practicality materials, and fundamental and applied research in the field is extremely active, permitting a wide choice of rewarding career opportunities.

Earth Resources Engineering. The undergraduate curriculum in earth resources engineering provides students with a background for professional careers or graduate study. The program is designed to give students a fundamental and durable
Materials Science and Engineering

Students in all programs in materials science and engineering must complete a total of 120 units, including units in humanities and social studies.

Lower Division. Required: Mathematics 1A-1B, 50A-50B; Chemistry 1A-1B; Physics 7A-7B-7C; Engineering 77, 36, 45, 50; Geology 50, 50L.

Upper Division. Required: Mathematics and Engineering 145, 145L, 148, 150, 172 (or Civil Engineering 172), 176, 180, 190; Electrical Engineering 100; Engineering 115, 150, 190; Civil Engineering 100 or Mechanical Engineering 106; Civil Engineering 130; plus elective units to meet the technical elective and humanities and social studies requirements.

Beginning in their junior years, students may choose one of the following emphases: Environmental Engineering; Mining Engineering; Petroleum Engineering.

Environmental Engineering—Required Courses: Materials Science and Engineering 160, 181; Energy and Resources 102; Civil Engineering 111.

Mineral Engineering—Required Courses: Materials Science and Engineering 146, 161, 170; Geology 106.

Petroleum Engineering—Required Courses: Materials Science and Engineering 146, 149; Geology 111.

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 chemical engineering can all successfully undertake graduate study in materials science.

Graduate Study in Extractive Metallurgy/Mining Processing

Holders of bachelor's degrees in metallurgical, mineral engineering, materials science, chemical engineering or chemistry would find this program of interest. A number of introductory and advanced level courses related to metallic and nonmetallic mineral deposits and processing are offered. Students may choose one of the following emphases: Environmetal Engineering; Mining Engineering; Petroleum Engineering.

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 deals with the minerals of the U.S. as well as the world's most valuable resource—the environment.

Graduate Study in Engineering Geoscience

This program is directed toward graduate education and research in applied geophysics. The core of this study is to develop an understanding of the geophysical and engineering sciences, including geological and geophysical methods. This program contains courses in geohydrology, geology, physics, and mathematics. An M.S. degree is available for students in industry or government who wish to undertake graduate work in the geosciences. The program currently stresses study in mineral and oil exploration, engineering geology, and applications of geophysical techniques in mining engineering and mapping, ocean engineering, and ground water hydrology.

Materials Science

Upper Division Courses

100. Field Trips. (1) Four hours of field trip per week. Prerequisites: Undergraduate standing in materials science or consent of instructor. Visits to factories and industrial laboratories concerned with metallic, ceramic, or electronic products, with emphasis on the materials aspects. Lectures by engineers and managers from material industries. Written trip reports. (SP Staff)

102. Bonding, Crystallography, and Crystal Defects. (3) Three hours of lecture per week. Prerequisites: Undergraduate standing in materials science or consent of instructor. A study of the structure of metals, semiconductors, and insulators; crystal symmetry, lattice, and planar defects in crystals; examples of crystallographic and defect analysis in engineering materials; relationships to physical and mechanical properties. (F) de Fontaine

103. Phase Transformations and Kinetics. (3) Three hours of lecture per week. Prerequisites: Undergraduate standing in materials science or consent of instructor. A study of the structure of metals, semiconductors, and insulators; crystal symmetry, lattice, and planar defects in crystals; examples of crystallographic and defect analysis in engineering materials; relationships to physical and mechanical properties. (F) de Fontaine

104. Materials Characterization. (4) Three hours of lecture and three hours of 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 methods development and characterization techniques. (SP) de Fontaine

111. Electrical and Magnetic Properties of Materials. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Physics 7A-7B-7C or Physical Materials Science 111. A study of the magnetic and electrical properties of materials, semiconductors, and insulators. (SP) de Fontaine

*On leave, spring
†Recipient of Distinguished Teaching Award
112. Corrosion (Chemical Properties). (3) Three hours of lecture per week. Prerequisites: Engineering 45. Study of microscopic aspects of deformation including ideal strength, elementary dislocation theory, deformation at high and low temperatures. Macroscopic and microscopic aspects of fracture, fatigue, and environmentally influenced failure using fracture mechanics. Analysis of engineering failures. (F) Ritchie

115. Phase Diagrams. (2) Two hours of lecture per week. Prerequisites: Engineering 115 or an equivalent thermodynamics course or consent of instructor. Phase diagrams for one-, two-, and three-component systems. Fundamental thermodynamic relationships relevant to phase equilibrium. Relationships between solid solution behavior, free energy curves, and phase diagrams. (SP) Glasser

120. Materials Production. (3) Three hours of lecture per week. Significance of materials. Occurrence of raw materials. Scientific and engineering principles relevant to materials production and processing. Methods for production of major materials. (F) Evans

121. Metals Processing. (3) Three hours of lecture per week. Principles of metals processing with emphasis on the use of processing to establish microstructures which impart desirable engineering properties. The techniques discussed include solidification, thermal and mechanical processing, powder processing, welding and joining and surface treatments. (F) Staff

122. Ceramic Processing. (3) Three hours of lecture per week. Prerequisites: 101 and Engineering 45. Powder fabrication by grinding and chemical methods, rheological behavior of powder-fluid suspensions, forming methods, drying, sintering and grain growth. Reaction of processing steps to microstructure development. (F) Glasser

123. Semiconductor Processing. (2) Two hours of lecture and one hour of discussion per week. Prerequisites: 111 or Physics 7A-7B-7C and consent of instructor. Introduction to crystal growth and crystal growth techniques; impurity by diffusion, ion implantation and alloy regrowth; contact formation, mechanical and chemical processing; semiconductor analysis. (SP) Weber

124. Glass and Crystalline Ceramic Materials. (3) Three hours of lecture per week. Prerequisites: 101 and Engineering 45. Theory of glass formation relevant to glass and ceramics, conditions for glass formation, atomic structure of glasses, phase separation mechanisms. Mechanical properties of glasses, strengthening mechanisms. Defects. Examples of dislocation of glasses and powder fabrication of crystalline ceramics. Mechanical behavior of crystalline ceramics relevant to structural applications. Ceramics for optical, magnetic, and electronic applications with emphasis on microstructure-processing relationships. (SP) De Jonghe, Glasser

130. Materials Engineering. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: 111, 112, 113 and Engineering 45. Case studies course concerned with materials development, materials selection, and failure analysis; examples relate to mechanical behavior, electrical properties, and corrosion. (SP) De Jonghe

198. Directed Group Studies for Advanced Undergraduates. (1-4) Must be taken on a pass/failed 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. Individual conferences. Must be taken on a pass/failed basis. Prerequisites: Consent of Instructor and major advisor. Supervised independent study. Education to be taken for education and not for degree. 250-256. Introduction to Courses and Curriculum section of this catalog. (F,SP) Staff

Graduate Courses

201A-201B. Thermodynamics and Phase Transformations in Solids. (4-4) Four hours of lecture per week. Prerequisites: 101, 102, 103 or equivalent. 201A is a prerequisite to 201B. The laws of thermodynamics, fundamental equation for multicomponent elastic solids, heat of transformation. Application to solution thermodynamics, point defects in solids, phase diagrams. Phase transitions, Landau rules, symmetry rules. Interfaces, nucleation theory, elastic kinetics. Diffusion of heat, mass and charge; coupled flows. (F,SP) Morris

202. Crystal Structure and Bonding. (3) Three hours of lecture per week. Regular, irregular arrays of points, spheres, lattices, direct, reciprocal; crystallographic point and space groups; atomic structure; bonding and bonding in solids; ionic (Pauling rules), covalent, metallic bonding; structure of elements, compounds, minerals, polymers. (SP) de Fontaine


204. Theory of Electron Microscopy and X-Ray Diffraction. (3) Three hours of lecture per week. Prerequisites: 102, 103 or equivalent. Basic principles of image formation. Techniques of engineering of electronic materials by electron microscopy, diffraction, and spectroscopy; emphasis on detailed analysis of defects responsible for materials properties. Modern electrical, optical and particle beam techniques for characterization of bulk single crystals and their crystalline and amorphous layers. Examples Hall effect, Deep Level Transient Spectroscopy, IR-Spectroscopy, (SP) Thomas

205. Defects in Solids. (3) Three hours of lecture per week. Prerequisites: Physics 7C or consent of instructor. Many properties of solid state materials are determined by lattice defects. This course treats in detail the structure of crystal defects, defect formation and annihilation, and the physical and optical properties of crystal defects. (F) Staff

210. Materials Chemistry. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisite: 101 or equivalent. Thermodynamics and kinetics of solid state reactions; structures of inorganic solids and alcohols; effects of surfaces, interfaces, temperature, and temperature gradients on compositions and properties. (SP) Smith

211. Mechanics of Solids. (3) Three hours of lecture per week. Prerequisites: Graduate standing or consent of Instructor. Formerly Civil Engineering 211A-211B. Mechanical response of materials: Simple tension in elastic, plastic and viscoelastic members. Continuum mechanics: The stress and strain tensors, equilibrium, compatibility. Three-dimensional elastic, plastic and viscoelastic problems. Thermal, transformation, and developing stresses. Applications: Plane problems, stress concentrations at defects, metal forming problems. (F) Staff

212. Deformation, Fracture, and Fatigue. (4) Four hours of lecture per week. Prerequisites: 113 or equivalent. Mechanics of elastic and inelastic (including rate-dependent) constitutive behavior. Macro- and microscopic aspects of failure by monotonic fracture, creep, fatigue, and environmentally-enhanced failure. Fracture mechanics, fracture statistics of brittle materials. (SP) Ritchie

213. Environmental Effects on Materials Properties and Behavior. (3) Three hours of lecture per week. Prerequisites: MSE 112 or equivalent. Review of electrochemical aspects of corrosion; pitting and crevice corrosion; active/passive response of some common materials to corrosion; corrosion passivation; stress corrosion cracking; hydrogen embrittlement; liquid metal embrittlement; corrosion fatigue; testing methods. (SP) Devine

214. Microstructured Materials. (3) Three hours of lecture per week. Prerequisites: Consent of instructor: Introduction to the mechanical behavior of heterogeneous materials (polycrystals, composites, porous and damaged media) and structures. The homogenization and the microstructured continua approaches. Effects on phase transformations. Microstructure evolution and the response of thin films and micromechanized devices. Also listed as Civil Engineering 236. (F) Ferrari

220. Rate Phenomena in the Synthesis and Processing of Materials. (3) Three hours of lecture per week. Prerequisites: Graduate standing in Engineering. Fluid mechanics, heat and mass transport, and chemical reaction kinetics relevant to the synthesis and processing of metals, ceramics, electronic materials and composites. (SP) Evans

221. Metals Processing. (3) Three hours of lecture per week. Prerequisites: MSE 202, MSE 211. Treatment of common techniques in the processing of metals from the perspective that these involve the manipulation of phase transformations and defect interactions to establish desirable combinations of deformation and microcompositional, phase content, grain size and shape, and precipitate and defect type and distribution. (F) Staff

222. Powder Processing and Sintering. (3) Three hours of lecture per week. Prerequisites: MSE 101 or MSE 103 or equivalent. Formerly 248 and 248. Introduction to surface and cold die chemistry, interactions to ceramic forming, densification mechanisms; microstructural evolution, relationship to forming operations, grain boundary migration, grain growth. (SP) De Jonghe

223. Semiconductor Materials. (3) Three hours of lecture per week. Prerequisites: Physics 7C or consent of instructor. Semiconductor purification and crystal growth techniques. Doping, radiation damage, and annealing, Metal-semiconductor interfaces and reactions, interactions between defects and impurities during processing of devices. Major electronic and optical methods for the analysis of semiconductors. (F) Haller

231. Advanced Electron Microscopy. (3) Three hours of lecture per week. Prerequisites: 204 or consent of instructor. Advanced treatment of instrumen tal aspects and technique including high voltage materials, innovative methods for the analysis of semiconductor microstructures, optical transmission microscopy, atomic resolution microscopy and computer methods for image simulation and reconstruction. (F) Gronsky

241. Electron Microscopy Laboratory. (2) Six hours of laboratory per week. Prerequisites: 204 (can be taken concurrently). Basic techniques and applications of transmission electron microscopy. Control and acquisition of images; x-ray microanalysis, energy loss spectroscopy; specimen preparation, interpretation of data; individual projects in materials science. (SP) Thomas

242. Advanced Characterization Techniques. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: 204 or 205, or consent of instructor. Advanced electrical, optical, magnetic and ion beam characterization techniques including deep level transient spectroscopy. Photo-luminescence, electron paramagnetic resonance, x-ray Rutherford backscattering, are used to characterize crystalline materials (with emphasis on semiconductors). (F) Weber

288A. High Temperature Oxidation and Corrosion. (2) Two hours of lecture per week. Prerequisites: Consent of Instructor. Thermodynamics of metals and alloy oxidation in single and mixed oxidizing atmospheres and
fused salts. Defects in ices and sulfides; rates and theories of scale growth. Stress generation and relief in ground water. Deformation, fracture, and oxidation resistant alloys; accelerated attack and hot corrosion in energy applications. Staff

290M. Special Problems in Materials Science. (3) Three hours of lecture per week. Prerequisites: 201A-202. Consent of instructor. Selected topics including the thermodynamic, kinetic or phase transformation behavior of solid materials. Topics will generally be selected based on student interest in Mat Sci 201A-202. This course provides an opportunity to explore subjects of particular interest in greater depth. (SP) Morris

290X. Optical Properties of Materials. (3) Three hours of lecture per week. Prerequisites: Physics 7C or consent of instructor. Interaction of electromagnetic radiation with optical materials, thin-film materials. Methods of measurement of optical properties. Thin-film growth techniques for optical materials. Applications to optical components and photonic devices. (SP) Staff

293. Group Studies, Seminars, or Group Research. (1-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Advanced study in various subjects through special seminars on topics to be selected each year. Informal group studies are approved by the department chairman and the graduate adviser. (F,SP) Staff

299. Individual Study or Research. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing or consent of instructor. Individual study in engineering. Individual investigation of advanced materials science problems. (F,SP) Staff

601. Individual Study for Master's Students. (1-8) Course may be repeated for credit. Course does not satisfy unit or residence requirements for master's degree. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing in engineering. Individual study for the comprehensive or language requirements in consultation with the field advisor. (F,SP) Staff

602. Individual Study for Doctoral Students. (1-6) Course may be repeated for credit. Course does not satisfy unit or residence requirements for doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing in engineering. Individual study in consultation with the 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

Mineral Engineering

Note: The undergraduate Mineral Engineering Program has been replaced by the Earth Resources Engineering Program. The courses under the new program had not yet been approved when this catalog went to press. Students should refer to the Announcement of the College of Engineering for up-to-date information.

Graduate Courses

200. Mining of Bedded Deposits. (2) Two hours of lecture per week. Prerequisites: 100 or consent of instructor. Techniques used for mining bedded deposits, including coal, oil shales, salt. Underground techniques including longwall and room and pillar layouts. Surface mining practices including strip mining, Principles of mine safety and health. Impact on living systems. Environmental impacts. (SP) Staff

202. Field Characterization of Subsurface Fluid Flow Systems. (3) Three hours of lecture per week. Field experiments on occasional Saturdays. Prerequisites: Graduate standing in science, engineering or consent of instructor. Describe established and evolving field methods to characterize steady-state and transient flow (water, oil, gas), and chemical transport processes in hydro-geologic systems. Provide a unified view of techniques from soil science, geotechnical engineering, groundwater hydrology and petroleum engineering. Field laboratory. Term paper to critically review topic area. (F) Staff


204. Analytical Methods for Fluid Flow in Soils and Rock Systems. (3) Three hours of lecture per week. Prerequisites: Engineering 230A or consent of instructor. Analytical methods of solving steady state and non-steady flow problems in idealized and real rock systems. Applications to field problems of practical interest. (SP) Staff

206. Advanced Mine Planning. (2) Two hours of lecture per week. Prerequisites: 106 or consent of instructor. Techniques used in mine planning using a PERT network. Use of the project evaluation and review technique in mine planning. (SP) Staff

210. Advanced Rock Mechanics. (3) Three hours of lecture per week. Prerequisites: 110 or Civil Engineering 116. Rock mechanics is applied to the design of underground and open pit mines. Design methods and support requirements for shafts, tunnels, and stopes are developed, including the use of life. Settlement, tension is confined to the questions of stability and safety. (SP) Cook


223. Environmental Engineering. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Basic principles of thermal and chemical processes. Thermodynamics of solids, surfaces and phase boundaries, surface tension of solids and liquids, surface activity, adsorption, phase equilibrium and transport phenomena. Chemical double layers at interfaces, theory and applications. (F) Freystau

224. Electrical Methods in Applied Geophysics. (2) Two hours of lecture per week. Prerequisites: Graduate standing, FORTRAN programming language. Theory of dc current flow in isotropic, layered, and inhomogeneous earth models with emphasis on the development and interpretation of field measurement systems. Mechanisms of electric current flow in porous media, induced polarization, and coupled flow phenomena. (SP) Morrison

226. Seismic Methods in Applied Geophysics. (2) Three hours of lecture per week. Prerequisites: An introductory course in seismology; Digital signal processing in applied mathematics. This course gives an overview of seismological methods used to image the subsurface. Reflection, refraction, and borehole methods are introduced. Acquisition, processing, and interpretation of seismic data as discussed with application to petroleum production, environmental site characterization and groundwater problems. (F) Rector

260. Surface Properties of Materials. (3) Three hours of lecture and two hours of laboratory per week. Prerequisites: Consent of instructor. Considerations for digital signal processing and data analysis. Fourier Transform, wavelet transform, and discrete linear systems. Z transforms. Digital processing of seismic reflection data, deconvolution and migration. Introduction to 3-D seismic data. (F) Rector

261. Numerical Methods in Materials Science and Engineering. (2) Two hours of lecture per week. Prerequisites: Advanced graduate standing. Present methods for drilling and evaluating hydrocarbon wells. Examination of the physics and mechanics underlying the various processes with an emphasis on the drill bit and the various rock formations. (F) Cooper

262. Surface Properties of Materials. (3) Three hours of lecture per week. Thermodynamics of surfaces and phase boundaries, surface tension of solids and liquids, surface activity, adsorption, phase equilibria, contact angles, and chemical double layers at interfaces, theory and applications. (F) Freystau

263. Applied Colloid Phenomena. (2) Two hours of lecture per week. The characterization of colloid materials and the physical chemistry of colloid systems. Emphasis will be placed on the properties of colloid particles, particularly in aqueous environments; flocculation, coagulation, and dispersion phenomena, selective flocculation. (SP) Freystau

264. Surface Chemistry of Flotation. (2) Two hours of lecture per week. Application of physical and chemical knowledge to the separation of minerals by flotation; selective adsorption of surfactants; natural floatability; flotation of fine particulates, precipitates, oil droplets. (F) Freystau

265. Modeling of Particulate Rate Processes. (3) Three hours of lecture per week. Prerequisites: Graduate standing in engineering. Fundamental principles of process modeling; introduction to particulate systems in mineral, metallurgical, ceramic, and chemical industries; quantitative description of particulate systems.
Mathematics

(College of Letters and Science)

Department Office: 870 Evans Hall, 642-6500

Professors:
John W. Addison, Jr., Ph.D. University of Wisconsin. Logic, descriptive set theory
Richard M. Arratia, Ph.D. Yale University. Mathematical economics, non-standard analysis
William E. Arveson, Ph.D. University of California at Los Angeles. Functional analysis, operator algebra
George M. Bergman, Ph.D. Harvard University. Rings, universal algebra
E. Berlekamp, Ph.D. Massachusetts Institute of Technology. Algebraic coding theory
Andrew J. Casson, B.A. University of Cambridge. Topology
Paul R. Chernoff, Ph.D. Harvard University. Functional analysis
Alexandre G. Chorin, Ph.D. New York University. Applied mathematics, numerical methods
Robert F. Cochrane, Ph.D. Princeton University. Algebraic geometry
James W. Demmel, Ph.D. University of California at Berkeley. Applied mathematics
L. Craig Evans, Ph.D. University of California at Los Angeles. Partial differential equations
David A. Fishman, Ph.D. Princeton University. Probability theory, statistics
F. Alberto Grünbaum, Ph.D. Rockefeller University. Applied mathematics, medical imaging
Gottfried Helms, Ph.D. University of California at Berkeley. Topology
Lee A. Harrington, Ph.D. Massachusetts Institute of Technology. Recursion theory, model theory
Robert C. Hartshorne, Ph.D. Princeton University. Algebraic geometry
Wu-Yi Hsiang, Ph.D. Princeton University. Transformation groups, differential geometry
Victor K. Josic, Ph.D. Queens College, City University of New York. Numerical analysis
S. Richard Karp, Ph.D. Harvard University. Applied mathematics, computational complexity
Robert C. Kirby, Ph.D. University of Chicago. Topology
Michael J. Klais, Ph.D. University of California at Los Angeles. Probability theory, combinatorics
Shoshichi Kobayashi, Ph.D. University of Washington. Differential geometry, complex manifolds
Tak-Tsen Lee, Ph.D. University of California. Algebra
R. Sherman Lehmann, Ph.D. Stanford University. Number theory
Hendrik W. Lenstra, Jr., Ph.D. University of Amsterdam. Number theory
James E. McMillan, Ph.D. Pennsylvania State University. Analysis
H. Jerome Keisler, Ph.D. University of Michigan. Algebra, logic
Shelah, Ph.D. Washington University. Mathematical physics and engineering
Byron D. McKay, Ph.D. University of Colorado. Algebra, lattice theory
Curds T. McKee, Ph.D. Harvard University. Complex analysis, topology, dynamics
C. Keith Miller, Ph.D. Rice University. Partial differential equations
Calvin C. Moore, Ph.D. Harvard University. Representations of topological groups
John C. Neu, Ph.D. California Institute of Technology. Applied mathematics
Andrew R. Ogil, Ph.D. Harvard University. Number theory, algebraic geometry
Arthur E. Ogus, Ph.D. Harvard University. Algebraic geometry
Bereford N. Parlett, Ph.D. Stanford University. Numerical analysis
Charles C. Pugh, Ph.D. Johns Hopkins University. Dynamics
Mark S. Rudin, Ph.D. Harvard University. Analysis
John P. Roe, Ph.D. Massachusetts Institute of Technology. Algebra, finite semigroups, automata
Kenneth A. Ribet, Ph.D. Harvard University. Algebraic number theory
Marc A. Rieffel, Ph.D. Columbia University. Operator algebras
Donald E. Sarason, Ph.D. University of Michigan. Functional analysis
James A. Sethian, Ph.D. University of California at Berkeley. Applied mathematics, numerical methods
Jack V. Silver, Ph.D. University of California at Berkeley. Mathematical logic, set theory
Stephen Smale, Ph.D. University of Michigan, Dr. Sc. University of Warwick. Algorithmic, numerical analysis
Michael T. Anderson, Ph.D. University of Chicago. Metamathematics of set theory
John R. Stallings, Jr., Ph.D. Princeton University. Topology
William P. Thurston, Ph.D. University of California at Berkeley. Topology and geometry
Den-Virgil Voskoboinik, Ph.D. University of Bucharest. Algebra
John B. Wagoner, Ph.D. Harvard University. Differential topology, algebraic K-theory
Alan D. Weinstein, Ph.D. University of California at Berkeley. Symplectic geometry, mathematical physics
Robert M. Williamson, Ph.D. University of Chicago. Lie groups, harmonic analysis
Takao Yoshida, Ph.D. University of California at Berkeley. Harmonic analysis
W. Hugh Woodin, Ph.D. University of California at Berkeley. Set theory
Hung-Hsi Wu, Ph.D. Massachusetts Institute of Technology. Number theory
William G. Busey (Emeritus), Ph.D. University of California at Los Angeles. Functional analysis
David H. Blackwell (Emeritus), Ph.D. University of Illinois. Urbanas. Bayesian inference, game theory
Harald C. BRENNER (Emeritus), Ph.D. University of Minnesota. Mathematical biology
Paul J. Cohen (Emeritus), Ph.D. University of California at Berkeley. Applied mathematics
Shirshendu Chakravarthy (Emeritus), Ph.D. University of Hamburg. Dr. Sc. University of Chicago. LL.D. Chinese University of Hong Kong. Differential and integral geometry
Helga O. Cordeau (Emeritus), Ph.D. University of Gottingen. Classical analysis
Gerard Darmois (Emeritus), Dr. Sc. University of Paris. Harmonic analysis
Stephen P. Diliberto (Emeritus), Ph.D. Princeton University. Celestial mechanics, applied mathematics
Leslieパス Dubins (Emeritus), Ph.D. Stanford University. Probability, gambling theory, geometry
Jacob Feldman (Emeritus), Ph.D. University of Chicago. Ergodic theory, operator algebras
Alfred L. Foster (Emeritus), Ph.D. Princeton University. Functional analysis
D. Solomon (Emeritus), Ph.D. Princeton University. Algebraic geometry
David Gale (Emeritus), Ph.D. Princeton University. Mathematical economics
Henry Helson (Emeritus), Ph.D. Harvard University. Harmonic analysis, function theory
Leon A. Helms (Emeritus), Ph.D. University of Kentucky. Lie groups
Morris W. Hirsch (Emeritus), Ph.D. University of Chicago. Differential geometry
Gerhard P. Hochschild (Emeritus), Ph.D. Princeton University. Algebra
Ewing G Kutzbach (Emeritus), Ph.D. Princeton University. Applied mathematics
Zosia Kato (Emeritus), Ph.D. University of Tokyo. Mathematical physics
John L. Kelley (Emeritus), Ph.D. University of Virginia. Functional analysis
Lucien M. Le Cam (Emeritus), Ph.D. University of California at Berkeley. Mathematical statistics, research
Edmund J. Pinney (Emeritus), Ph.D. California Institute of Technology. Applied mathematics, differential equations
Murray R. Polterovitch (Emeritus), Ph.D. Brown University. Partial differential equations
Robert M. Robinson (Emeritus), Ph.D. University of California at Berkeley. One complex variable, foundations
Robert A. Rosenblatt (Emeritus), Ph.D. Harvard University. Algebraic geometry, differential algebra
Rainer H. von Sehn (Emeritus), Ph.D. University of Pennsylvania. Relativity, biophysics
John J. Schurman (Emeritus), Ph.D. University of Tokyo. Symmetric spaces, automorphic functions
Isadore M. Singer (Emeritus), Ph.D. California Institute of Technology. Applications of mathematics, differential equations
Murray G. Plotter (Emeritus), Ph.D. Harvard University. Partial differential equations
Michael R. Spivak (Emeritus), Ph.D. University of Michigan. Topology, topology of manifolds
Hans J. Bremermann (Emeritus), Ph.D. Humboldt University. Mathematical physics
Andrzej T. Talis (Emeritus), Ph.D. University of Michigan. Mathematical physics, relativity, computation
Angela C. Taylor (Emeritus), Ph.D. California Institute of Technology. Differential equations
P. E. Emery (Emeritus), Ph.D. University of Pennsylvania. Partial differential equations
Robert L. Vaught (Emeritus), Ph.D. University of California at Berkeley. Mathematical logic

Assistant Professor:
Nicolai Reshetikhin, Ph.D. Steklov Institute. Mathematical physics, low-dimensional topology
Paul Vojta, Ph.D. Harvard University. Number theory
Marian M. Wodzicki, Ph.D. Stanford University. Global analysis, geometry, K-theory
Honors Program. In addition to completing the requirements for the major in mathematics or major in applied mathematics, students in the honors program must (a) earn a grade-point average of at least 3.5 in upper division and graduate courses in the major and at least 3.5 in all courses taken at the University; (b) complete course 186 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.

The Minor Program

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 major program in mathematics gives students the opportunity to obtain a strong, well-rounded mathematical background suitable for postgraduate study as well as for professional careers in science, industry, or education. The courses required for the major emphasize theoretical material. Students with an interest in the applications of mathematics may find the major program in applied mathematics particularly responsive to their needs. The requirements for both majors are summarized below. More detailed information is given in the Undergraduate Announcement, available from the undergraduate assistant in 965 Evans Hall.

General Major Requirements. Both major programs require a lower division base of Mathematics 1A-1B and 50A-50B. Courses 15A-15B are not an acceptable alternative. Math 1A-1B must be completed with average grades of C or better; Math 50A and 50B must be completed with minimum grades of C in each. Transfer students should contact the undergraduate assistant in 965 Evans Hall about requirements for admission to the major. The minimum upper division major requirements are as follows:

Major In Mathematics. (a) Courses 104, 110, 113 and 185; (b) One course from each of the following three subject areas: I. Computing (100, 129A); II. Geometry (140, 141, 142); III. Logic and foundations (125A, 135); (c) At least eight upper division courses in all.

With the approval of the major adviser, students may count not more than two mathematically theoretical courses in computer science, statistics, physics, astronomy, mathematical economics, or other courses toward requirements for the major in mathematics.

Major In Applied Mathematics. (a) 104, 110, 113, 126A, and 185; (b) Three additional upper division courses, approved by a major adviser, which form a coherent cluster in some applied area such as actuarial science, biophysics, classical mechanics, computer science, decision theory, economics, fluid mechanics, geophysics, mathematical biology, numerical analysis, operations research, probability theory, quantum mechanics, systems theory. Many other clusters are also possible.

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.

Lower Division Courses

Math 1A-1B is the calculus sequence intended for students planning majors in mathematics, engineering, or the sciences. The sequence is also acceptable as a substitute for Math 18A-18B. 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.

Math 32 is intended for students who wish to take Math 1A or 18A but have not met the prerequisites.

1A. Calculus. (4) Students will receive no credit for 1A after 2 or 16B; 2 units after 16A. Two hours of lecture and two hours of discussion per week; optional third hour of lecture or workshop. Prerequisites: Three and a half years of high school math, including trigonometry and analytic geometry, plus a satisfactory score on the following: the AP test, the UC/CSU math diagnostic test, or 32. Consult the Mathematics Department for details. Students with AP credit should consider choosing a course more advanced than 1A. This sequence is intended for majors in engineering and the physical sciences. An introduction to differential and integral calculus of functions of one variable, with applications, transcendental functions, and techniques of integration. (F,SP)

1AL. Calculus Computer Laboratory. (1) Two hours of microcomputer laboratory per week. Must be taken on a passed/not passed basis. Prerequisites: Concurrent enrollment in 1A. Optional microcomputer supplement to accompany 1A. Graphing and analysis of mathematical and physical functions. Introduction to the use of the microcomputer for “self-study.” The sequence is intended for majors in the life or social sciences. The sequence is also acceptable as a substitute for Math 18A-18B. It is designed to prepare students for further courses in mathematics.

Math 1B. Calculus. (4) Students will receive no credit for 1B after 3; two units after taking 16B. Two hours of lecture and two hours of discussion per week. Prerequisites: Three and a half years of high school math, including trigonometry and analytic geometry, plus a satisfactory score on the following: the AP test, the UC/CSU math diagnostic test, or 32. Consult the Mathematics Department for details. Students with AP credit should consider choosing a course more advanced than 1B. This course is intended for majors in engineering and the physical sciences. An introduction to differential and integral calculus of functions of one variable, with applications, transcendental functions, and techniques of integration. (F,SP)

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 of the following introductory graduate courses: 202A-202B, 214, 225A-225B, 228A-228B, 250A-250B.

Graduate Programs

The department offers the M.A. degree in mathematics and Ph.D. degrees in both mathematics and applied mathematics. Detailed information concerning admission, graduate student instructorships and fellowships, and degree requirements is given in the Graduate Announcement of the Department of Mathematics, which is available upon request from the graduate assistant, Department of Mathematics.

1. On leave, spring, fall
2. On leave, fall
3. Recipient of Distinguished Teaching Award

1AS-1BS. Self-Paced Study in Calculus. (1-4) Open consulting. Prerequisites: Same as 1A-1B. A self-paced version of Mathematics 1A-1B. Reduced credit for students who have taken parts (a) or 1A-1B or 16A-16B. Simultaneous enrollment in both sections is possible. Unit credit and grades assigned at the end of each semester, depending on the number of study units completed. Units of credit can be adjusted upward.

H1A-H1B. Self-Paced Study in Calculus. (55) Two hours of lecture and three hours of discussion per week. Prerequisites: Same as 1A-1B, plus As or Be in high school math. Honors course corresponding to 1A-1B for able students with strong mathematical inclinations and motivation. Students may have difficulty with hard problems. Recommended as preparation for the major, particularly for honors candidates.

H1AS-H1BS. Honors Self-Paced Calculus. (4-4) Individual study guided by faculty. Graduate student instructors and tutors. Prerequisites: Same as 1A-1B.
This course covers the same material as 1A-1B but at a different pace. Problems of the same type used to prove theorems in the regular calculus course will be emphasized. Problems more challenging than those in 1A-1B will be assigned. Students will be able to achieve more than four units of credit for this semester if the appropriate material is completed.

3. Accelerated Freshman Calculus. (5) Students will receive no credit for 3 after taking 1B or 2A. Three hours of lecture and two hours of discussion per week. Prerequisites: One year of high school calculus, or consent of the instructor. Material of Math 1A-1B in one semester. The material of Math 1A is reviewed. Most of the time is spent on 1B material.

10. The Nature of Mathematics. (3) Three hours of lecture per week. Prerequisites: Satisfaction of quantitative reasoning requirement. Introduction to the nature of mathematics by examination of various problems and techniques.

15. Concepts of Mathematics for Elementary School Teachers. (3) Three hours of lecture per week. Prerequisites: Upper division standing and consent of instructor. Development and structure of the real number system and its subsystems. Elementary concepts of set theory, factorization and divisibility, nonmetric geometry, measurement. (SP)

16A. Analytic Geometry and Calculus. (3) Students will receive no credit for 16A after taking 1A. Two hours of lecture and one hour of discussion per week; optional third hour of lecture or workshop. Prerequisites: High school algebra, including trigonometry, plus a satisfactory grade in one of the following: CEEB MAT test, an AP test, the UC/CSU math diagnostic exam or 32. Consult the Mathematics department for details. This sequence is intended for majors in the life and social sciences, inequalities, absolute value, graphs of simple functions, the derivative, maxima and minima, rates of change and differentials, integrals and improper integrals, applications of logarithms and exponential functions. (SP)

16B. Analytic Geometry and Calculus. (3) Students will receive no credit for 16B after 3 or 1B, 2 units after 1A. Two hours of lecture and one hour of discussion per week; optional third hour of lecture or workshop. Prerequisites: 16A. Continuation of 16A. Introduction to integration, properties of sin and cos, fundamental theorem of calculus, properties of the integral, integration by substitution and by parts, volumes of solids of revolution and arc lengths. (SP)

24. Freshman Seminars. (1) Course may be repeated for credit. One hour of seminar per week. Sections 1-2 to be graded on a letter-grade basis. Sections 3-4 to be graded on a pass/No pass basis. The Berkeley Seminar Program has been designed to familiarize new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F, SP)

32. Precalculus. (4) Students will receive no credit for 32 after taking 1A-1B or 16A-16B, and 2 units after taking P. Prerequisites: Three years of high school mathematics, plus satisfactory score on one of the following: CEEB MAT test, UC/CSU math diagnostic exam or SAT. Consult the Mathematics department for details. This sequence is intended for majors in the life and social sciences, inequalities, absolute value, graphs of simple functions, the derivative, maxima and minima, rates of change and differentials, integrals and improper integrals, application to more than one branch of mathematics from among group theory, number theory, systems or ordinary differential equations, complex analysis, geometry. Prerequisites and specific topics will vary. (SP)

50A. Linear Algebra and Differential Equations. (4) Students will receive 2 units for 50A after completing 51. Three hours of lecture and two hours of discussion per week. Prerequisites: 18 or 3. Ordinary differential equations. Basic linear algebra. Introduction to partial differential equations. Fourier series. (F, SP)

50AL. Computer Lab for Linear Algebra and Differential Equations. (4) Students will receive 2 units for 50AL after completing 50A. Time for 50AL must be taken on a pass/credit basis. Prerequisites: Concurrent enrollment in 50A. Optional microcomputer supplement to Math 50A. (F, SP)

50B. Multivariable Calculus. (4) Students will receive 2 units for 50B after completing 51. Three hours of lecture and two hours of discussion per week. Prerequisites: 50A. Multivariable calculus: gradient, divergence, and curl, multiple integrals; Green's, Stokes's, and Gauss's Theorems. Application of linear algebra to multivariable calculus. Eigenvalue problems. (F, SP)

50BL. Computer Lab for Multivariable Calculus. (1) Two hours of microcomputer laboratory per week. Must be taken on a pass/credit basis. Prerequisites: Concurrent enrollment in 50B. Optional microcomputer supplement to Math 50B. (SP)

50HA-H50B. Honors Linear Algebra, Differential Equations, Multivariable Calculus. (4) Prerequisites: 18, 3, or 16A. This course is intended for upper division students in Mathematics, Statistics, the Physical Sciences, and for economics majors with adequate mathematical preparation. No economics background is required. Also listed as Economics 103 and IDS 103.

50H1. Introduction to Analysis. (4) Three hours of lecture per week. Prerequisites: 50B. The real number system; sequences, limits; the Fundamental functions in R and R^n. The concept of a metric space. Uniform convergence, interchange of limit operations. Infinite series. Mean value theorem and applications. The Riemann integral. (F, SP)

50H2. Introduction to Analysis. (4) Three hours of lecture per week. Prerequisites: 104. Differential calculus, the derivative, the mean value theorem, inverse and implicit function theorems, Lebesgue integration on the line; comparison of Lebesgue and Riemann integrals. Convergence theorems. Fourier series. L^2 theory. Fubini's theorem, change of variable. (SP)

50L1. Honors Linear Algebra. (4) No credit allowed after completion of Math 112 or 113B. Three hours of lecture per week. Prerequisites: 51 or 50B. Matrices, vector spaces, linear transformations, inner products, determinants, eigenvalues, eigenvectors. (SP)

50L2. Honors Linear Algebra. (4) No credit allowed after completion of Math 112 or 113B. Three hours of lecture per week. Prerequisites: 51 or 50B. Matrices, vector spaces, linear transformations, inner products, determinants, eigenvalues, eigenvectors. Elementary theory of quadratic forms and Rayleigh's principle. Jordan canonical form, applications. Linear functionals. (F, SP)

98. Supervised Group Study. (1-4) Must be taken on a pass/credit basis. Directed Group Study, topics vary with instructor. (F, SP)

Upper Division Courses

100. Computational Mathematics. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Vary according to instructor. Syntactic and semantic description of a high-level language. Exploration and application to more than one branch of mathematics from among group theory, number theory, systems or ordinary differential equations, complex analysis, geometry. Prerequisites and specific topics will vary. (SP)

103. Introduction to Mathematical Economics. (3) Three hours of lecture per week. Prerequisites: 104A-104B. Formerly Economics 104. 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 for economics majors with adequate mathematical preparation. No economics background is required. Also listed as Economics 103 and IDS 103.

104. Introduction to Analysis. (4) Three hours of lecture per week. Prerequisites: 104B. The real number system; sequences, limits; the Fundamental functions in R and R^n. The concept of a metric space. Uniform convergence, interchange of limit operations. Infinite series. Mean value theorem and applications. The Riemann integral. (F, SP)

110. Linear Algebra. (4) No credit allowed after completion of Math 112 or 113B. Three hours of lecture per week. Prerequisites: 51 or 50B. Matrices, vector spaces, linear transformations, inner products, determinants, eigenvalues, eigenvectors. (SP)

111. Linear Algebra. (4) No credit allowed after completion of Math 112 or 113B. Three hours of lecture per week. Prerequisites: 51 or 50B. Matrices, vector spaces, linear transformations, inner products, determinants, eigenvalues, eigenvectors. (SP)

111H. Honors Undergraduate Seminar in Mathematical Problem Solving. (3) Three hours of lecture per week. Prerequisites: 51 or 50B. Honors section corresponding to 111. Recommended for students who enjoy mathematics and are good at it. Greater emphasis on theory and challenging problems.


116. Field Theory. (3) Three hours of lecture per week. Prerequisites: Same as Math 113H. Honors section corresponding to 116. Recommended for students who enjoy mathematics and are good at it. Greater emphasis on theory and challenging problems.

117. Second Course In Abstract Algebra. (4) Three hours of lecture per week. Prerequisites: 116. Further topics on groups, rings and fields not covered in Math 115. Further topics in field theory and their applications to group theory; classical groups; abelian groups and modules over a principal ideal domain; algebraic field extensions; splitting fields and Galois theory; cohomology and classification of finite fields. (SP)
115. Introduction to Number Theory. (4) Three hours of lecture per week. Prerequisites: 50B or 51. Divisibility, congruences, prime numbers, congruence of primes. Topics selected: Diophantine analysis, continued fractions, partitions, quadratic fields, asymptotic distributions, additive problems. (SP)

H117. Honors Mathematical Problem Solving. (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 original thought and various mathematical approaches. May include advanced topics developed through problems and open research problems.

119. Introduction to Applied Mathematics. (4) Three hours of lecture per week. Prerequisites: 50A-50B. A sample of ideas important in the mathematical sciences. Emphasis on applications of the topics to real problems arising in mathematical physics. Intended for students in the physical sciences who are not planning to take more advanced mathematics courses. (F,SP)

121A-121B. Mathematical Tools for the Physical Sciences. (4,4) Three hours of lecture per week. Prerequisites: 50B. Functions of a complex variable, Fourier series, finite-dimensional linear systems. Infinite-dimensional linear systems, orthogonal expansions, and Hilbert spaces. Topics include differential equations arising in mathematical physics. (F,SP)

123. Ordinary Differential Equations. (4) Three hours of lecture per week. Prerequisites: 104. Existence and uniqueness of solutions, linear systems, regular singular points. Other topics selected from analytic systems, autonomous systems, Sturm-Liouville Theory. (F)

125A-125B. Mathematical Logic. (4,4) Three hours of lecture per week. Prerequisites: 113 or consent of instructor. Propositional and predicate logical, general grammar, semantic interpretation, formal deduction, and their interaction. Applications to formal mathematical theories. Selected topics from model theory or proof theory. (F,SP)

126. Introduction to Partial Differential Equations. (4) Three hours of lecture per week. Prerequisites: 104. Classification of second order equations, boundary value problems for elliptic and parabolic equations, initial value problems for hyperbolic equations, existence, uniqueness, regularity of solutions with applications. Topics selected from analytic systems, autonomous systems, Sturm-Liouville Theory. (SP)

128A. Numerical Analysis. (5) Three hours lecture, one hour discussion and three hours of computer laboratory per week. Prerequisites: 50B. Programming for numerical computations, approximation and interpolation, numerical quadrature, and solution of ordinary differential equations. Practice on the computer. (F,SP)

128B. Numerical Analysis. (5) Three hours of lecture, one hour of discussion and three hours of computer laboratory per week. Prerequisites: 110 and 128A. Iterative solution of systems of nonlinear equations, evaluation of eigenvalues and eigenvectors of matrices, and introduction to simple partial differential equations. Practice on the computer. (SP)

130. The Classical Geometries. (4) Three hours of lecture per week. Prerequisites: 113 and 110. Topics chosen from the following list: axioms for affine and projective planes, planes over a division ring; duality, the Desarguesian theorem; the Delaunay theorem; geometry over a field, collineations and correlations, classification of hyperquadrics, the projective group and its sub-groups, non-Euclidean geometry, Inversion and hyperbolic geometry. (SP)

132. Topics in Geometry. (4) Three hours of lecture per week. Prerequisites: 113 and 104 or consent of instructor. Topics selected from such areas as classical projective geometry, Inversion geometry, symplectic geometry, geometric algebra, integral geometry, convexity, and elementary topology. (SP)

135. Introduction to the Theory of Sets. (4) Three hours of lecture per week. Prerequisites: 113 and 104. Set-theoretic paradoxes and means of avoiding them. Sets, relations, functions, order and well-order. Proof by transfinite induction and definitions by transfinite recursion. Cardinal and ordinal numbers and their arithmetic. Continuum hypothesis and its consequences. (F,SP)

140. Metric Differential Geometry. (4) Three hours of lecture per week. Prerequisites: 104 or 121B. Frenet formulas, isoperimetric inequality, focal theory of surfaces in Euclidean space, first and second fundamental forms, Gaussian and mean curvature, isometries, geodesics, parallelism, the Gauss-Bonnet-Von Dyck Theorem. (SP)

141. Elementary Differential Topology. (4) Three hours of lecture per week. Prerequisites: 104 or equivalent and linear algebra. Manifolds in n-dimensional Euclidean space and smooth maps, Sard's Theorem, classification of compact one-manifolds, transversality and intersection modulo 2. (SP)

142. Elementary Algebraic Topology. (4) Three hours of lecture per week. Prerequisites: 104 and 113. The topology of one and two dimensional spaces: manifolds and the classification of surfaces; Euler characteristic, fundamental groups, plus further topics at the discretion of the instructor. (F)

145. Boolean Algebra. (4) Three hours of lecture per week. Prerequisites: 125A. Postulates; treatment as rings or lattices: relation to sentential calculus and calculus of classes; Boolean series; Boolean algebras, ideals, direct products; representation theorem. (SP)

160. History of Mathematics. (4) Three hours of lecture per week. Prerequisites: 50B and 113. History of algebra, geometry, analytic geometry, and calculus from ancient times through the seventeenth century and selected topics from more recent mathematical history. (SP)

170. Linear Programming, Games, Models of Exchange. (4) Three hours of lecture per week. Prerequisites: 50A-50B. Topics include linear programming, matrix games, models of production and exchange. Treats properties of the models and methods for calculating their behavior. (SP)

185. Introduction to Complex Analysis. (4) Three hours of lecture per week. Prerequisites: 104. Analytic functions of a complex variable. Cauchy's integral theorem, Cauchy's integral formula, power series, Laurent series, singularities of analytic functions and Riemann surfaces; Further topics chosen with applications to definite integrals. Some additional topics such as conformal mapping. (SP)

H185. Introduction to Complex Analysis. (4) Three hours of lecture per week. Prerequisites: 104. Honors section corresponding to Math 185 for exceptional students. Emphasis on rigorous treatment and proof motivation. Emphasis is on rigor, depth, and hard problems. (SP)

187. Senior Level Analysis. (4) Three hours of lecture per week. Prerequisites: 104, 113, and 185. Course gives a comprehensive view of analysis. Emphasis is on the interrelations among topics taken from differential equations, harmonic analysis and group representation, elementary functional analysis and special functions. (SP)

188. Mathematical Models in Physics and Engineering. (4) Three hours of lecture per week. Prerequisites: 110; 121B or 185. Designed primarily for mathematics majors with little or no background in physical sciences. Study of the relationship between mathematical models and the physical phenomena they represent. Mathematical concepts such as differential equations, Fourier series, boundary value problems. (SP)

198. Mathematical Methods in Classical and Quantum Mechanics. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 104, 110, 2 semesters lower division Physics. Topics in mechanics presented from a mathematical viewpoint: e.g., hamiltonian mechanics and symplectic geometry, differential equations for fluids, spectral theory in quantum mechanics, probability theory and statistical mechanics. See department bulletin for specific topics each semester course is offered. (SP)

191. Experimental Courses in Mathematics. (1-4) Course may be repeated for credit. Hours to be arranged. Prerequisites: Consent of Instructor. The topics to be covered and the method of instruction to be used will be announced at the beginning of each semester that such courses are offered. See departmental bulletin. (SP)

195. Special Topics in Mathematics. (4) Course may be repeated for credit. Hours to be arranged. Prerequisites: Consent of Instructor. Lectures on special topics, which will be announced at the beginning of each semester that such courses are offered. See departmental bulletin. (SP)

Graduate Courses


211. Mathematical Theory of Fluid Mechanics. (4) Three hours of lecture per week. Development of the fundamental equations describing the behavior of fluid continua. The treatment of some topics selected to exhibit different physical situations, analytical techniques, and approximate methods of solutions.

212. Several Complex Variables. (4) Three hours of lecture per week. Prerequisites: 185 and 202A-B or their equivalents. Power series development, domains of holomorphy, Hartogs’ phenomenon, pseudo convexity and plurisubharmonicity. The remainder of the course may treat either sheaf cohomology and Stein manifolds, or the theory of analytic subvarieties and spaces.

213A-213B. Mathematical Economics. (3-3) Two hours of lecture 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 twelve hours of outside work per week including outside reading, preparation. Also listed as Economics 207A-207B and IDS 213A-213B.

214. Differentiable Manifolds. (4) Three hours of lecture per week. Prerequisites: 207A. Smooth manifolds and maps, tangent and normal bundles. Sard’s theorem and transversality, Whitney embedding theorem. Morse functions, differential forms, Stokes’ theorem, Frobenius theorem, basic degree theory. Flows, Lie derivatives, Lie groups and algebras. Additional topics selected by instructor. (F, SP)

215A-215B. Algebraic Topology. (4-4) Three hours of lecture per week. Prerequisites: 130 and point-set topology (e.g. 202A). Fundamental group and definition of homotopy equivalence, adjoint maps, covering spaces, simple connectedness, relation between the fundamental group and homology, and homotopy and homology, obstruction theory, and topics from spectral sequences, cohomology operations, and characteristic classes. Sequence begins fall.

219. Ordinary Differential Equations and Flows. (4) Three hours of lecture per week. Prerequisites: 207A and 202A-B or equivalent. Introduction to differential equations. Diffeomorphisms and flows on manifolds. Stable manifolds, generic properties, structural stability. Special topics selected by the instructor. (F)

221. Advanced Matrix Computations. (4) Three hours of lecture per week. Prerequisites: 128A. Applications and problems of numerical linear algebra. A matrix or equivalent matrix with computation. Direct solution of linear systems, including large sparse systems: error bounds, factorization methods, least square approximation, eigenvalues and eigenvectors of matrices, nonlinear equations, and minimization of functions. (F)

222A-222B. Partial Differential Equations. (4-4) Three hours of lecture per week. Prerequisites: 207A and 202B; 185. The theory of initial and boundary value problems for hyperbolic, parabolic, and elliptic partial differential equations, with emphasis on non-linear equations. Linear and non-linear systems of equations. Sequence begins fall.


226A. Abstract Machines and Languages. (4) Three hours of lecture per week. Prerequisites: 226A or consent of instructor. Semigroups, wreath products, prime decomposition theorem, application to finite state machines, algebraic theory of complexity.

227A-227B. Theory of Recursive Functions. (4-4) Three hours of lecture per week. Prerequisites: 225B. Recursive and recursively enumerable sets of natural numbers; characterizations, significance, and classification. Effective operations, degrees of unsolvability. Recursion theory. Constructive ordinals, the hyperarithmetical and analytical hierarchies. Recursive objects of higher type. Sequence begins fall.


236. Metamathematics of Set Theory. (4) Three hours of lecture per week. Prerequisites: 228B and 235A-B. Axiomatic foundations of strength, transitive, and normal models, finite axiomatizability. Independence and consistency of axioms of choice, Continuum hypothesis, etc. The measure problem and axioms of strong infinity.

240. Riemannian Geometry. (4) Three hours of lecture per week. Prerequisites: 214. Riemannian metric and Levi-Civita connection, geodesics and completeness, curvature, first and second fundamental forms of arclength. 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. (SP)

241. Complex Manifolds. (4) Three hours of lecture per week. Prerequisites: 214 and 215A. Riemann surfaces, divisors and line bundles on Riemann surfaces, sheaves and the Dolbeault theorem on Riemann surfaces, the classical Riemann-Roch theorem and the theorem of Abel-Jacobi. Complex manifolds, Kahler metrics. Summary of Hodge theory, groups of line bundles, additional topics such as Kodaira’s vanishing theorem, Lefschetz hyperplane theorem. (SP)

245A-245B. General Theory of Algebraic Structures. (4-4) Three hours of lecture per week. Prerequisites: 113 and 135. Structures defined by operations and relations, and their homomorphisms. Classes of structures determined by identities. Constructions such as free objects, objects presented by generators and relations, ultraproducts, direct limits. Applications of general results to groups, rings, lattices, etc. Course may emphasize study of congruence- and subalgebra-lattices, or category-theory and adjoint functors, or other aspects.

250A. Groups, Rings, and Fields. (4) Three hours of lecture per week. Prerequisites: 110; 104 and 185, or Introductory analysis. Groups, rings, fields, including fundamental theorem of Galois theory, theory of finite fields, and transcendence degree. (F)

250B. Multilinear Algebra and Further Topics. (4) Three hours of lecture per week. Prerequisites: 250A. Tensor algebras and exterior algebras, with application to linear transformations. Commutative ideal theory, localization. Elementary specialization and valuation theory. Related topics in algebra. (SP)

251. Ring Theory. (4) Three hours of lecture per week. Prerequisites: 250A. Topics such as: Noetherian rings, rings with descending chain condition, theory of the radical, homological methods.

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. (F)

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.

254A-254B. Number Theory. (4-4) Three hours of lecture per week. Prerequisites: 250A. Valuations, units, and ideals in number fields, ramification theory, quadratic and cyclotomic fields, topics from class field theory, zeta-functions and L-series, distribution of primes, modular forms, quadratic forms, diophantine equations, p-adic analysis, and transcendental numbers. Sequences begins fall.


256A-256B. Algebraic Geometry. (4-4) Three hours of lecture per week. Prerequisites: 250A. Affine and projective algebraic varieties. Theory of schemes and morphisms of schemes. Smoothness and differentials in algebraic geometry, coherent sheaves and their cohomology, Riemann-Roch theorem and selected applications. Sequences begins fall.
276. Topics In Applied Mathematics. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of Instructor. Advanced topics chosen by the instructor. The content of this course changes, as in the case of seminars.

277. Topics In Differential Geometry. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of Instructor. Advanced topics chosen by the instructor. The content of this course changes, as in the case of seminars.

278. Topics In Partial Differential Equations. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of Instructor. Advanced topics chosen by the instructor. The content of this course changes, as in the case of seminars.

280A-280B. Mathematical Theory of Relativity. (4,4) Three hours of lecture per week. Prerequisites: 140 or consent of instructor. Special theory of relativity, reformation of the geometric. Approximation theory in relativistic form, principle of equivalence, Einstein’s theory of gravitation, astrophysical and cosmological problems. Additional topics chosen by the instructor.

290. Seminars. (1-6) Course may be repeated for credit. Hours to be arranged. Topics in foundations of mathematics, theory of numbers, numerical calcula- tion, analysis, geometry, topology, algebra, and their applications, by means of lectures and informal con- ferences; work based largely on original memoirs. (F,SP)

295. Individual Research. (1-12) Course may be repeated for credit. Hours to be arranged. Sections 1-30 to be graded on a satisfactory/unsatisfactory basis. Investigation of special problems under the direction of members of the department. (F,SP)

300. Reading Course for Graduate Students. (1-6) Course may be repeated for credit. Hours to be assigned. Sections 1-30 to be graded on a satisfactory/unsatisfactory basis. Readings under the direction of members of the department. (F,SP)

302. Undergraduate Mechanics Instruction. (1,2) Course may be repeated for credit. Three hours of seminar and four hours of tutorial per week. Must be taken on a pass/fail basis. Prerequisites: Permission of SLC instructor, as well as sophomore standing and at least a B average in two semesters of calculus. Apply at Student Learning Center. May be taken for one unit by special permission of instructor. Teaching at the Student Learning Center or the Professional Development Program. (F,SP)

Other Departments and Groups with Related Programs

Biostatistics
Electrical Engineering and Computer Sciences
Industrial Engineering and Operations Research
Logic and the Methodology of Science
Science and Mathematics Education

Mechanical Engineering (College of Engineering)

Department Office: 6189 Echols Hall, 642-1326

Professors:
Alice M. Agogino, Ph.D. Stanford University. Decision and expert systems

Lawrence Talbot, Ph.D. (Emeritus)

Tutoring at the Student Learning Center or for the Professional Development Program. (F,SP)

Other Departments and Groups with Related Programs

Biostatistics
Electrical Engineering and Computer Sciences
Industrial Engineering and Operations Research
Logic and the Methodology of Science
Science and Mathematics Education

Statistical

Mechanical Engineering

College of Engineering

Note: Elective units include (a) six courses (five for double major students), of at least 3 units each in humanities and social studies selected from an approved list of courses. Of these, at least one course must be an English elective, and at least one course in English 1A, one must be from a list of selected courses in History and Cultures, and two must be upper division courses. The English elective and either the course in History and Cultures or that in Literature and Values must be taken for a letter grade. A minimum of two courses, at least one of which is in the upper division, must be taken from a single department.


101. Introduction to Manufacturing Systems. (3) Three hours of lecture per week. Prerequisites: 102A, Engineering 45. Fundamentals of manufacturing systems including machine tool control, CAM, processing considerations in manufacturing automation, robotics, integrated systems for assembly and inspection; use of case study method for design and selection of modern manufacturing systems. (SP) Dowell

102A. Mechanical Behavior and Processing of Materials. (3) Three hours of lecture per week. Prerequisites: Engineering 45 and Engineering 26; Civil Engineering 130. Elastic and plastic deformation under static and dynamic load conditions. Prediction and prevention of failure, fatigue, creep and wear. Environmental influences, residual stress effects. Selection, forming, cutting, heat treatment of materials based on design requirements. (F,SP) Dhawan

102B. Mechanical Engineering Design. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: 102A and Engineering 28. Application of principles of mechanics, material science and manufacturing processes to the design of components and mechanisms in which the designer must prescribe functional requirements. Synthesis and analysis of a major machine design project. (F,SP) Staff

104. Engineering Mechanics II. (3) Three hours of lecture per week. Prerequisites: Engineering 36 (recommended); Mathematics 50B. Principles of Newtonian mechanics as applied to a particle or system of particles and of rigid bodies in one- and two-dimensional motions. (F,SP) Casey

105. Thermodynamics. (4) Four hours of lecture per week. Prerequisites: Chemistry 1A; Mathematics 50A; Physics 7A. First and second laws of thermodynamics, thermodynamic processes, irreversible processes, real active systems, cycles, statistical mechanics and microscopically based properties. (F,SP) Dibble

106. Fluid Mechanics. (3) Three hours of lecture per week. Prerequisites: 104 and 105. Fluid properties; hydrostatics, mass, momentum and energy balances on finite control volumes; free surface. Descriptive discussion of simple inviscid and viscous flows. Flow measurement. Empirical description of turbulent flow. Model laws. Applications to flow around bodies and through conduits, meters and machines. (F,SP) Morris

107A. Experimentation and Measurement. (3) Three hours of lecture per week in the first ten weeks, no lectures in the last five weeks; three hours of laboratory per week. Prerequisites: 104, 105, 106, 109 (may be taken concurrently); EECS 100. Methods and procedures for experimental investigation of mechanical engineering phenomena and systems. Experimental design, measurement systems, data processing and data reduction. Modeling of measurement and experimental systems. Technical communication skills. (F,SP) Staff

107B. Mechanical Engineering Laboratory. (4) Seven hours of laboratory per week. Prerequisites: 107A. Experimental investigation of engineering systems and phenomena of interest to mechanical engineers. Design and planning of experiments. Analysis of data and reporting of experimental results. (F,SP) Staff

108. Heat Transfer. (3) Three hours of lecture per week. Prerequisites: 105 and 106. Conductive, convective and radiative transport of thermal energy, boiling and condensation heat transfer, heat exchangers. (F,SP) Pagni

110. Mechanical Engineering—Project Engineering. (3) Three hours of lecture per week. Prerequisites: 107A (which 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) Lieu

122. Processing of Materials in Manufacturing. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 102A, Engineering 45. Fundamentals of manufacturing processes (metal forming, metal cutting, welding and joining and casting); selection of metals, plastics and other materials relative to choice and control of manufacturing processes. (F) Dhawan


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, computer graphics in a PLOT-10/1GL color graphics environment, and numerical methods for shape optimization of mechanical systems. (F,SP) Pisan


133. Mechanical Vibrations. (3) Three hours of lecture per week. Prerequisites: 104. An introduction to the theory of mechanical vibrations including topics of simple harmonic vibrations, random vibration, random excitation, applications of Fourier analysis and convolution methods. Multidegree of freedom discrete systems including principal mode, principal coordinates and Rayleigh's principle. (F) Tongue

134. Automatic Control Systems. (3) Three hours of lecture and three hours of laboratory per week. Prerequisites: Mathematics 50B; Physics SC; Engineering 7. Formulation of mathematical models of active and passive, linear and non-linear dynamic systems; State variables, transfer functions, control system design by the use of root loci; design of PID control; Controller design in the frequency and time domains; Discrete time and computer control of systems. (F,SP) Packard

135. Design of Microprocessor-Based Mechanical Systems. (3) Three hours of lecture per week. Prerequisites: Engineering 7. This course provides preparation for the conceptual design and prototyping of mechanical systems using 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 control systems, and computer-aided laboratory exercises lead through studies of different levels of software. (SP) Auslander

140. Combustion Processes. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 105 and 109. Fundamentals of combustion, flame structure, flame speed, flammability, ignition, stirred reaction, kinetics and nonequilibrium processes, pollutant formation. Application to energy production and fire safety. (F) Fernandez-Pello

142. Thermal Environmental Control. (3) Three hours of lecture per week. Prerequisites: 105, 106, and 109 (may be taken concurrently). Systems and processes for the production and control of thermal environments, including conventional and new concepts to meet requirements. Specific topics include refrigerant component and system analysis, cryogenic systems, absorption refrigeration, psychrometrics, human comfort criteria, air-conditioning, solar radiation effects, and heat transfer in buildings. The course emphasizes the use of computer simulation as a tool for analysis of thermal systems. (SP) Casey

151. Advanced Heat Transfer. (3) Three hours of lecture per week. Prerequisites: 105 and 106. 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) Pagni

161. Applied Fluid Mechanics. (3) Three hours of lecture per week. Prerequisites: 105 and 106. Operating principles and characteristics of flow in conduits, lubrication systems, pumps, turbines and compressors will be described, and application of basic concepts to potential flow, laminar viscous flow and turbulent flow. (SP) Savas

162. Elementary Hydrodynamics. (3) Three hours of lecture per week. Prerequisites: Mathematics 50A-50B. Engineering 117 recommended. This course provides an introduction to Classical Hydrodynamics aimed at senior undergraduate and first-year graduate students. The course is mainly theoretical and makes use of analytical techniques, especially complex variable methods, for solving a variety of symmetric flow problems. Applications are made to flow past airfoils, hydrofoils, to internal channel flows, free streamline flows, and surface waves. Viscous effects are discussed briefly. (SP) Savas

163. Engineering Aerodynamics. (3) Three hours of lecture per week. Prerequisites: 106. Introduction to the lift, drag, and moment of two-dimensional airfoil, three-dimensional wings, and the complete airplane. Calculations of the performance and stability of airplanes in subsonic flight. (SP) Savas

172. Engineering Mechanics III. (3) Three hours of lecture per week. Prerequisites: 104 between Fall 1983 and Spring 1985 will receive no credit for 170. Two hours of lecture and one hour of discussion per week. Prerequisites: 104, Thermodynamics. Dynamics of a particle or system of particles and of rigid bodies in three-dimensional motion. (F,SP) Casey


175. Intermediate Dynamics. (3) Three hours of lecture per week. Prerequisites: 104. Lagrange's Mechanics. Theory of constraints, virtual displacement and velocities, generalized coordinates; Lagrange's Hamilton's principle and Lagrange's equations of motion; first integrals; engineering applications to constrained motion of particles and rigid bodies, oscillations, gyrodynamic and electro-mechanical problems. (F) Ma

185. Introduction to Continuum Mechanics. (3) Three hours of lecture per week. Prerequisites: Physics 7A; Mathematics 50B. Kinematics of deformation, the concept of stress, conversion of mass and balance of linear momentum, angular momentum and energy. Mathematical concepts and theorems for ideal fluid, linear elastic solid. (SP) Naghdi

H194. Honors Undergraduate Research. (2-4) Course may be repeated for credit. Prerequisites: 3.3 or higher upper division technical GPA and consent of instructor. 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. A maximum of 3 units of 194 may be used to fulfill technical elective requirements in the Mechanical Engineering program (unlike 198 or 199, which do not satisfy technical elective requirements). (F,SP)

198. Directed Group Studies for Advanced Undergraduates. (1-4) Course may be repeated for credit. Must be taken on a pass/no pass basis.
Graduate Courses

207. Experimental Methods in Mechanical Engineering. (3) One and one-half hours of lecture and three 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 the instructor. Engineering analysis, especially application of modern control theory, of complex biological systems, especially engineering evaluation of anatomical-physiological elements. Experimental methods applied to biological control systems in the laboratory, with specialized bioengineering transducers and on-line computerized data acquisition to interpret experimental data and to elucidate design features of these living systems. (F) Staff


213. Fluid Mechanics of Biological Systems. (3) Three hours of lecture per week. Prerequisites: 106 or equivalent; 255A or consent of instructor. Investigation of fluid flow related to biological systems including circulatory, pulmonary, and renal systems. Motion in the large and small blood vessels, pulsated and peristaltic flow. Analysis of prosthesis design and flow related to biological systems. Applications of fluid flow measurements in biological systems. Berger

220. Case Studies in Mechanical Engineering. (2) Two hours of lecture/per week. Prerequisites: One graduate semester. Studies of selected problems that illustrate various methods of the design process in advanced mechanical engineering systems.

221. Advanced Manufacturing Systems. (3) Three hours of lecture per week. Prerequisites: 101, graduate standing or consent of instructor. Fundamental technologies of advanced manufacturing systems including computer-aided-design, computer-aided-manufacturing, machine tools, flexible manufacturing systems (FMS), precision manufacturing, sensors for untended manufacturing. (SP) Dornfeld

222. Applications of Theory of Plasticity. (2) Two hours of lecture per week. Application of the theory of plasticity to plastic forming problems. Solutions by the method of characteristics, the bounding method, and the general approximations method. Numerical analysis of plastic deformation.

222A. Metal Forming and the Finite-Element Method. (2) Two hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. Applications of finite-element method for the analysis of metal-forming processes. General description of metal forming processes, theory of plasticity and viscoplasticity, variational formulation of the problem and the finite element analysis, applications to plastic bending, extrusion and drawing, and sheet metal forming.

224. Mechanical Behavior of Engineering Materials. (3) Three hours of lecture per week. Prerequisites: Civil Engineering 130 or consent of Instructor. Treatment of elastic, plastic, and creep deformation under steady and variable loads, experimental stress analysis, and material flow solutions which enable the prediction of service performance from simple tests. Failure due to fatigue, creep-rupture, and plastic instability will also be covered. (F) Finnie

225. Fracture of Engineering Materials. (3) Three hours of lecture per week. Prerequisites: Civil Engineering 130 or consent of instructor. Treatment of fracture from engineering point of view. The topics covered will include: linear elastic fracture mechanics, crack propagation, fracture criteria, temperature approaches, statistical aspects of the strength of brittle solids, fracture of composites, and ductile fracture. (SP) Finnie

226. Tribology. (3) Three hours of lecture per week. Prerequisites: 102A, 102B, 104. Surface interactions. Friction: Three hours of lecture per week. Prerequisites: Consent of instructor and major adviser. Supervised independent study. (1-4) Course credit for 193 or 199.


228. Computer-Aided, Optimal Mechanical Design. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: Graduate standing and the equivalent of both 102B and 128. This course will cover the optimal mechanical design of mechanical systems and components. A variety of computer-aided design and optimization techniques will be developed, applied to mechanical design, and implemented on the computer. (SP) Pisano

229. Design of Basic Electro-Mechanical Devices. (3) Three hours of lecture per week. Prerequisites: EECS 100, graduate standing or consent of instructor. Fundamental principles of magnetics, electromagnetics, and magnetic materials as applied to design and operation of electro-mechanical devices. Type of device to be used in a particular application and dimensions of parts for the overall design will be discussed. Typical applications covered will be linear and rotary actuators, stepper motors, AC motors, and DC brush and brushless motors. A design project is required. Liu

230. Real-Time Applications of Mini and Micro Computers. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: Graduate standing in engineering or consent of instructor for advanced undergraduates. Mini and micro computers, operating systems, development tools and software, and microcomputer 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, program writing, and output/input operation, and through laboratory work with mini and micro computer systems. (F) Auslander

231. Advanced Kinematics and Mechanisms. (3) Three hours of lecture per week. Prerequisites: 104. Kinematic analysis and synthesis of plane and spatial mechanisms. Emphasis on computer-aided design using modern numerical and matrix methods. Synthesis, simulation, and computer-aided design of rigid body through multiple positions with finite and infinitesimal displacement constraints. (SP) Pisano


233. Advanced Control Systems II. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 225. Linear Quadratic Optimal Control, Stochastic State Estimation, Linear Quadratic Gaussian RIar Doman. Loop Transfer Recovery, Adaptive Control and Model Reference Adaptive Systems, Self Tuning Regulators, Repetitive Control, Application to engineering systems. (SP) Tomizuka

234. Multivariable Control System Design. (3) Students may not take 234 for credit if they have taken 225. Three hours of lecture per week. Prerequisites: 223 or EECS 221A, as well as firm foundation in classical control. Formerly 291C. Analysis and synthesis techniques for multi-input (MIMO) control systems. Emphasis is on the fact that model uncertainty has on the design process. (SP) Packard

235. Switching Control and Computer Interfacing. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: 230. Design and analysis of control systems utilizing switching elements, microprocessors, and microprocessor devices for sequential logic. Applications to control of mechanical systems and control computer interfacing. (SP) Auslander

237. Control of Nonlinear Dynamic Systems. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 234. Fundamental properties of nonlinear systems. Stability of nonlinear systems. Control of nonlinear systems. Control of nonlinear systems. Control Design via Linearization Methods including limit cycle prediction, (F) Hedrick

243. Evaluation of Petroleum Production Processes. (3) Three hours of lecture per week. Prerequisites: Basic knowledge of economics. Physical Fluids 201C. Three hours of lecture per week. Prerequisites: 242. Economics of oil and gas producing properties. Estimation and evaluation of oil and gas reserves. Profitability analysis, optimization of expenditures. Udell

247. Subsurface Reservoir Characterization. (3) Three hours of lecture per week. Prerequisites: Basic knowledge of fluid mechanics and a course in reservoir engineering. Fundamentals of rock behavior, strength, failure theories, fracture; rock behavior, under confining stress and pore pressure; thermal stresses, thermodynamic behavior, hydraulic fracturing; well stimulation and rock drilling. Udell


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. (SP) Chigirev

252. Heat Convection. (3) Three hours of lecture per week. Prerequisites: 151; Engineering 230A. Heat transfer in fluids in motion; free and forced convection in laminar and turbulent flow over surfaces and within ducts. (SP) Grief

253. Thermal Radiation. (3) Three hours of lecture per week. Prerequisites: 151. Thermal radiation properties of gases, liquids, and solids; the collection of radiant energy transfer. (SP) Chigirev
Medieval Studies

Course (College of Letters and Science)

Chair: (To be announced)

Graduate Adviser: Suzanne Fleischman, Ph.D.

Medieval studies are currently undertaken in a joint program designed to prepare students for the advanced study of the Middle Ages. The courses are offered by the departments of History (together with Middle Eastern Studies), English, Romance Philology, Art History, and Medieval Studies. Each student is expected to consult with the Medieval Studies Program, which administers the degree. The program is designed to familiarize students with the major intellectual movements and the major historical events of the Middle Ages, to acquaint them with the primary sources, to provide them an appreciation of the major religious, political, and social trends of the period, and to give them an understanding of the intellectual and artistic achievements of the period.

Upper Division Courses

110. Development of the Book: From the New Codex through the Carolingian Era. (4) Four hours of lecture per week. Prerequisites: Consent of instructor. The book is an essential of the culture that produced it. The evolution of the codex form occurred in the ninth century. This course covers the development and arrangement of texts, with an emphasis on the illustrations and the decoration of manuscripts.

150. Studies in Medieval Culture. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. Medieval culture and the development of the medieval world is covered. This course offers an opportunity to study a topic related to his or her specialty. (F) Herman

Graduate Courses

200. Introduction to Research Materials and Methods. (2) Two hours of lecture/discussion per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing. Basic materials and resources in fields represented in the History of Ideas. Emphasis on research skills and critical evaluation of their use.

Middle Eastern Studies

Course (College of Letters and Science)

Group Major Office: International and Area Studies, 207 Moses Hall, 642-4466

Undergraduate Advisers: Mr. Boyarin (Near Eastern Studies), Mr. Lapidus (History), Mr. Michaels (Center for Middle Eastern Studies), Mr. Sotiri (Near Eastern Studies)

The interdisciplinary major in Middle Eastern Studies offers an opportunity to study a region of historic and cultural importance whose current development is bound with the political, economic, and cultural development of our own society. The Middle East encompasses the Arab world, Turkey, Iran, and Israel. This program is designed to allow students to pursue a broad and balanced course of study which will familiarize them with the languages, culture, and history of the region, its basic geographic, demographic, and ethnic character, and with the course of recent political, eco-
nomic, social, and cultural change. The program draws on over 200 Middle East-related courses available in 15 different departments of the University.

The program is under the supervision of an interdepartmental committee of faculty members organized through the Center for Middle Eastern Studies under the auspices of International and Area Studies. It is designed for students planning their programs by a major adviser who will help to design courses of study which suit individual needs.

The Center for Middle Eastern Studies is located at 372 Stephens Hall, and is open 9 a.m.-noon Monday through Friday. The chair of the center is Ira Lapidus, and the vice chair is Laurence Mitchell. Students are encouraged to use the center's resources.

Major Program

At the time this catalog was published, revisions were under consideration. Please check with the Group Major Office regarding current eligibility requirements and application procedures.

Lower Division

A. Required Introductory Course: Near Eastern Studies 10, a survey course introducing students to the cultures, politics, and history of the Middle East. This course will count as one upper-division semester course; 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.

A. Anthropology 181; Geography 166; Geography 167.
C. Economics 172; Political Science 142A-142B.

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 interests of students and to create a coherent and influential 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, 372 Stephens Hall, or in the Group Major Office, 207 Moses Hall. The courses should be selected with a view toward developing an in-depth knowledge 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 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 Eastern Politics; History 109C, The Middle East from the 18th Century to the Present.

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 156A, 158; Geography 130; Economics 117, 118; Political Science 125A-125B, Sociology 112.

Senior Paper or Seminar. Each major in the program will participate in a tutorial or seminar with a faculty member of the program to do a research paper on a topic within the Middle Eastern area. Students must register for 1-4 units of Middle Eastern Studies 190 for a letter grade.

Senior Honors Program. Senior students with a grade-point average of 3.3 in courses for the major and in all work completed in the University are eligible to enroll in the honors program. The senior honors thesis in Middle Eastern Studies, MESH 191H or 191A-H191B, is for the thesis preliminary work, followed by MESH 191B for the thesis completion. The thesis, a paper of 50 pages or more, is supervised by a member of the faculty with the student's interest. A grade of "In Progress" (IP) is given for MESH 191A, which will ultimately receive the same grade as MESH 191B when the student completes the sequence.

Units. The program requires a minimum of 30 and a maximum of 36 upper division units.

Lower Division Courses

10. Social Issues in Middle Eastern Studies. (4) Three hours of lecture per week. This is a lower division interdisciplinary course about contemporary social issues relating to the Middle East. The intended audience is majors and prospective majors in Middle Eastern Studies, PEIS, Development Studies and Near Eastern Studies, as well as other interested students. It introduces students to topics such as: (1) the political economy of development; (2) identity issues, including ethnicity, nationality and religious revival; and (3) family and community affairs. (F,SP) Staff.

20. Perspectives on the Middle East. (3) Two hours of seminar per week. A weekly seminar of guest speakers. Speakers in the first part of the course give ethnical and national perspectives (Persians, Arabs, Turks, Israelis and others). Speakers in the second part of the course give perspectives on the Middle East from different disciplines (anthropology, religious studies, etc.). The seminar introduces students to the work of several major Berkeley Middle East-related scholars. (SP) Michalak

Upper Division Courses

130. Cross-Listed Topics. (1-4) Course may be repeated for credit. Prerequisites: Consent of instructor. This course is designed to allow the student to select courses offered through other departments, the content of which is applicable to Middle Eastern Studies majors. Content and unit values vary from course to course. (F,SP) Staff

140. Special Topics. (2) Course may be repeated for credit. Prerequisites: Consent of instructor. A short course designed to provide a vehicle to take advantage of short-term visitors coming to campus who have considerable expertise in areas of interest to Middle Eastern Studies. (F,SP) Staff

150. Advanced Study in the Middle East. (4) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Consent of instructor. Advanced research in current issues of Middle Eastern Studies. Seminars will focus on specific areas with appropriate interdisciplinary content included. A major research project is required as well as class presentations. Topics change each semester. (F,SP) Staff

195A-H195B. Honors In Middle Eastern Studies. (1-4) Weekly discussion with faculty thesis advisor. Credit and grade to be awarded on completion of sequence. Prerequisites: Senior standing, one year of language, and five units of Middle Eastern Studies. (SP) Staff

197. Field Studies. (1-4) Three hours of work per unit of credit, plus regular meetings with adviser. Must be taken on a pass/no pass basis. Prerequisites: Upper division standing and consent of instructor. Supervised experience relevant to specific aspects of Middle Eastern Studies in off-campus organizations. Regular individual meetings with faculty sponsor and written reports required. (F,SP) Staff

198. Directed Study for Upper Division Students. (1-4) Course may be repeated for credit. One to four hours of seminar per week. Must be taken on a pass/no pass basis. 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 Middle Eastern Studies faculty adviser. Final paper required. Units determined on consultation with instructor. (F,SP) Staff

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Independent or supervised research. Must be taken on a pass/no pass basis. For students wishing to pursue an interest not represented in the curriculum by developing an individual program of study and research supervised by a faculty member. A written proposal must be approved by a Middle Eastern Studies faculty adviser. Final paper required. Units determined on consultation with instructor. (F,SP) Staff

*On leave, spring
**Recalled to active service
†Recipient of Distinguished Teaching Award
Military Officers' Education Program (ROTC) (Special Studies)

Office: See following listings for Aerospace Studies, Military Science, and Naval Science.

Chair, Advisory Committee on ROTC: Thomas G. Barnes, D.Phil.

Adjoint Professors: Patrick H. Corbett, Ph.D., Colonel, U.S. Air Force
Ronald K. Hendricks, M.S., Colonel, U.S. Marine Corps
James F. Madison, Ph.D., Lieutenant Colonel, U.S. Army

Adjunct Associate Professor: Ronald A. Hellbusch, M.S., Colonel, U.S. Marine Corps

Adjunct Assistant Professors: Scott B. Armacost, B.A., Lieutenant, U.S. Navy
Karl V. D'Ambrosio, B.S., Lieutenant, U.S. Navy
Michael E. Finnin, LL.M., Major, U.S. Marine Corps
Mark R. Grandstaff, Ph.D., Captain, U.S. Air Force
Adrian R. Lewis, M.A., Major, U.S. Army
Michael L. Perry, B.S., Lieutenant, U.S. Naval Reserve

Lecturers: Kenneth R. Thrasher, M.S., Captain, U.S. Army
Mitchell D. Vawser, M.B.A., Captain, U.S. Air Force

The Military Affairs Program comprises the three distinct military officers' commissioning programs: Air Force ROTC, Army ROTC, and Naval ROTC. The purpose of the Program is to integrate the educational offerings of the separate military services into the regular University curricula. Although these core courses are expressly designed to serve ROTC candidates, they are open to all students. Students who want to complete the Military Officers' Education Program and earn commissions in any of the military services should consult the program advisors in the appropriate unit.

Military Affairs

Lower Division Courses

1. American Military Experience: Revolution to Vietnam (2) Two hours of lecture and one hour of discussion per week. Examines four general themes in the military history of the United States: the growth and development of the armed forces, the evolution of civil-military relations, the elaboration and refinement of military technology, and the changes in military strategy. (F) Grandstaff

2. The Military in American Society (3) Three hours of lecture and one hour of discussion per week. An introduction to the military profession, with emphasis on the relationships between the military institution and its relationship to the individual, the government, and the society. Investigates the need for national defense and studies the causes of war. (3) Defense Leadership and Management (2) Two hours of 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) Staff

20. Evolution of Warfare (3) Three hours of lecture per week. Progressive analysis of the evolution of warfare from the ancient world to the present. Emphasis placed on the impact of war in history and on modern society, as well as the influence of economic, moral, political, and technological factors on strategic thought. (SP) Finnie

24. Freshman Seminars. (1) Course may be repeated for credit as topic varies. One hour of seminar per week. Designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Berkeley Seminars are offered in all campus colleges and topics vary from department to department and semester to semester. (F,SP) Staff

Upper Division Courses

120. The Evolution of American Warfare: 1607-1980. (3) Three hours of lecture per week. Emphasis on the development of American theory of warfare from colonial period and Revolution through Spanish American War. Social, economic, and political influences are examined, tracing the evolution of the American military. Emphasis on international relations, technology, and the practice of warfare are emphasized. (F,SP) Staff

121. The Evolution of American Warfare: 1980-2000. (3) Three hours of lecture per week. Military history of World War I and II, survey of modern revolutionary warfare. Influence of modern technology on American military organizations. The development of a global military strategy, impact of the social fabric of the nation on the military as it became a world power. Examination of historical theorists on revolutionary warfare in its contemporary form. (SP) Staff

123. Korea, Vietnam and the American Military Experience. (3) Two hours of lecture and one hour of discussion per week. This course examines recent military experience of the United States in terms of the traditional American way of preparing for and waging war with emphasis on the strategy and tactics used in the Korean and Vietnam wars. (SP) Lewis

124. War in Literature. (3) Three hours of lecture per week. Interdisciplinary exploration of novels and narratives of war as artifacts of our popular culture reflecting American experience of both a military necessity 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 self-styled& defender nation. (F,SP) Staff

140. The North Atlantic Treaty Organization (NATO). (2) Two hours of lecture per week. Prerequisites: Upper division standing and consent of instructor. Theory and history of alliances; NATO's political, military, and ideological structures; NATO's role in the defense and security of Europe; and the ongoing evolution of the alliance. (F,SP) Grandstaff

144. Military Law, Ethics, and Professionalism. (2) Three hours of lecture per week. Topics to be analyzed and discussed include the court-martial system, the punitive articles of the Uniform Code of Military Justice, fundamental rights of accused persons, rules of evidence, punishment, administrative boards, and the Law of War. Survey of ethical and professional issues in the military. (SP) Madison

145A-145B. National Security Forces In Contempory United States. (S,S) Three hours of seminar 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 national and international environment in which U.S. defense policy is formulated and implemented. (F,SP) Grandstaff

154. The History of Littoral Warfare. (3) Three hours of lecture per week. An analysis of the theory, origins, historical evolution, and impact of man's attempts to project military power ashore. A case study approach is used to study major developments in amphibious warfare. (F) Finnie

170. Comparative Military Systems: The Third World. (3) Two hours of lecture and one hour of discussion per week. Concentrates on the paradigms for analyzing internal conflict, the role of the military in the state, and external influences of the advanced states on developing nations. 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'état.

171. Comparative Military Systems: USSR, PRC, and Mid-East. (3) Two hours of lecture and one hour of discussion per week. Comparative analysis of the current Sino-Soviet and selected Middle Eastern military systems as they relate to the socio-political organizations of their respective countries. Special emphasis placed on decision making and command structures and the relationships of the military with their domestic and international environment.

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Individual conference to be arranged. Must be taken on a passed/not passed basis. 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) Staff

Aerospace Studies (Air Force ROTC)

Department Office: 11 Callaghan Hall, 442-3875, 1-900-852-8747

The Department of Aerospace Studies offers students in virtually all academic areas the opportunity to qualify for a commission in the United States Air Force while simultaneously completing university undergraduate and graduate degree requirements. Two accredited AFROTC programs are available: 1) entering freshmen may elect the military course or, for students who have at least two full academic years remaining in their degree program, the department offers a two-year professional officer course.

Students interested in the general military course are eligible to compete for scholarships which cover the costs of tuition, books, and most fees; also a $100 per month living allowance is paid to each student on the college scholarship. Freshmen and sophomores competing for scholarships should contact the department.

Students not taking the general military course may still be eligible for the two-year professional officer course. This upper division program is open to students who have at least two full years of study remaining in their academic program. Selection for the professional officer course is based on such factors as aptitude, interest, college grades, and performance at a six-week field training camp. Students selected for the professional officer course are provided uniforms, textbooks, and a $1000 per-month allowance while they are active in the program. Normally, upper division standing is required for entering freshmen who desire to enter the two-year program, but exceptions can be made for lower division students who can complete degree requirements in two years. It is also possible to take all or part of the professional officer course as a graduate student.

Both the two-year and the four-year AFROTC programs emphasize student participation and involvement. Classes are conducted as seminars and calls for active-student discussion. In addition, laboratory visits require that is mandatory for all AFROTC cadets. In this laboratory, students become involved in the management of their own cadre organization. Students also participate in projects, conferences, and flight orientations.

Completion of the program to earn an Air Force commission requires enrollment during each semester in a specified course in Aerospace Studies or Military Affairs. The normal sequence for the four-year program is as follows: AB 2A, MA 2A, MA
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, advancement of the military profession, 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 commission in the Regular Army, Army Reserve, or National Guard.

Graduate or undergraduate students can complete the Military Science requirements through a four-year, three-year, or two-year program. The four-year and three-year programs involve the basic and advanced courses; the two-year program involves only the advanced course.

1. The basic course is designed for students who are unsure of their interest in the military, and it includes no service obligation. It is composed of a series of Military Science and Military Affairs courses taken over a period of four semesters. Each student is required to attend a noncredit laboratory which includes analysis 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. 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 course of the Army ROTC, and are academic juniors as a minimum when they enter the advanced course.

Financial Assistance and Scholarships. All advanced course students receive $100 per month (nontaxable) for up to ten months a year. Outstand is available 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 as an 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 642-3374.

Lower Division Courses

1. Leadership Laboratory. The laboratory may be taken for one hour of credit and practical application in leadership and associated military skills. Must be taken on a passed/not passed basis. The instruction includes organization and physical training to the real world environment of the military. Survival 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 five programs available:

1. NROTC Four-Year (and Three-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 or in the Army ROTC, a U.S. citizen, and 21 years. The scholarship is for up to four years and includes tuition, fees, books, and $100 per month during the school year. Three summer training cruises are required. Upon graduation, the student receives a commission as a regular army officer.

2. Recalled to active service

3. Recipient of Distinguished Teaching Award

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3. NROTC Four-Year (and Three-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 or in the Army ROTC, a U.S. citizen, and 21 years. The scholarship is for up to four years and includes tuition, fees, books, and $100 per month during the school year. Three summer training cruises are required. Upon graduation, the student receives a commission as a regular army officer.

4. Recalled to active service

5. Recipient of Distinguished Teaching Award
2. Tweddle Scholarship Program: This program provides NROTC Navy scholarships specifically for junior and senior year. Applicants cannot have been affiliated with NROTC or any other officer accession program. Students must be currently enrolled and must have completed one semester/term of college work with all course grades of "C" or better. These scholarships can be conditionalally granted by the Professor of Naval Science in College Hall following an interview and screening process. Accepted applicants must meet NROTC physical qualification standards and will be required to take an abbreviated selection of Naval Science courses. For additional details, contact the Office of the Dean of Students, College Hall.

3. 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 and, upon graduation, the student receives a commission in the Navy or Marine Corps Reserve with a three-year active duty obligation. (Obligated service is not included in the second year of the college program.) Scholarships may be offered to highly qualified college program students.

4. NROTC Two-Year Scholarship Program:Nationwide 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 is required before entrance into the program. Two-year scholarship students must not reach their 23rd birthday prior to the start of the second year. Competition and commissions are anticipated. Waivers to age 29, 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, before the start of their junior year. Graduates of the Naval Science Institute will receive full payment of tuition, fees, books, and $100 per month during their last two years in college. One summer training cruise is required. Upon graduation, the student receives a commission in the regular Navy or Marine Corps with a four-year active duty obligation. Graduation and commissioning deadline is normally March 1 of the sophomore year.

5. 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 27% 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 before their junior year. Graduates of Naval Science Institute enroll in the NROTC unit as juniors and receive uniforms, Naval Science books, and $100 per month stipend in their last two years in college. One summer training cruise and, upon graduation, the student receives a commission in the Navy or Marine Corps Reserve with a three-year active duty obligation. Application deadline is normally March 1 of the sophomore year.

For further information, direct inquiries to the chair of Naval Science, 25 Callaghan Hall.

Lower Division Courses
1. Introduction to Naval Science. Two hours of lecture/discussion per week. Must be taken on a passed/not passed basis. A general introduction to the national security concept of security emphasizes the mission, 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 patterns. The course also covers the role of the military in society, military justice, and nomenclature. The course acquaints the student with the professional standards expected of a naval officer. (F)

2. Sea Power and Maritime Affairs. (2) Two hours of lecture per week. Prerequisites: Consent of instructor. Traces the U.S. Navy's concepts, theories and applications. Emphasizes the impact of world situation, U.S. National interest, changing technology, and naval leadership on the evolving concept of sea power. Relates historical developments to current trends. Examinations briefly the U.S. Merchant Marine's and the former Soviet Navy's impact on sea power policy formulation. (SP) Williams

12A. Navigation and Naval Operations I. (3) Three hours of lecture and one hour of laboratory per week. Theory, principles, and procedures of terrestrial and celestial navigation and piloting techniques. A study of coordinating systems, including the celestial coordinate system, nautical charts and publications, position fixing, dead reckoning, nautical astronomy, the theory and methods of celestial navigation, and the theory and prediction of tides and current. (F) Perry

12B. Navigation and Naval Operations II. (3) Three hours of lecture and one hour of laboratory per week. Prerequisites: 12A or consent of instructor. Introduction to the various aspects of naval operations at sea. Emphasis on the principles of the operational aspects of the Navy and Marine Corps Reserve. (SP) Lippman

24. Topics in Seapower (Seafarer's Seminars). (1) Course may be repeated for credit as topic varies. One hour of seminar per week. This seminar focuses on the use of U.S. military seapower, with particular emphasis on U.S. Navy and Marine Corps. All seminars will include in U.S. Navy and Marine Corps. All seminars will include a study of the role of the Navy and Marine Corps in national security. The subject matter will be determined by the Chief of Naval Education and Training or the professor of naval science. (F,SP) Williams

Professional Courses
400A-400H. Naval Laboratory. Two hours of instruction and practical application in leadership and associated military skills. Must be taken on a passed/not passed basis. A practical application of the naval administration training of an academic nature. The laboratory is intended for topics such as drill and ceremonies, physical fitness and swimming testing, cruise preparation, crew evaluation, safety awareness, processing, preparation for commissioning, personal finances, insurance, and applied exercises in naval ship systems, navigation, naval operations, naval administration, and leadership. Naval Ship's Systems. (3) Three hours of lecture per week. Must be taken on a passed/not passed basis. A comprehensive, advanced-level study of organizational behavior and management in a naval context. The course covers counseling methods, military justice administration, naval human resources management, directives and correspondence, naval personnel administration, material management and storage, and personnel training. (SP) Bentle

411. Leadership and Management I. Two hours of lecture/discussion per week. Must be taken on a passed/not passed basis. The study of naval junior officer leadership, evaluation, management, and career path development. Course emphasizes counseling methods, military justice administration, naval human resources management, directives and correspondence, naval personnel administration, material management and storage, and personnel training. (SP) Heilbusch

Molecular and Cell Biology
(College of Letters and Science)

Department Office: 991 Life Sciences Addition Chair: Gunther S. Stent, Ph.D.
Division Office: Biochemistry and Molecular Biology: 121 Koshland Hall, 645-0077
Program Developmental Biology: 299 Life Sciences Addition, 645-2588
Immunology: 299 Life Sciences Addition, 645-0972
Graduate Affairs: 121 Koshland Hall, 645-6252

Professors:
John D. Allison, Ph.D. University of Texas. Molecular Immunology
Bruce N. Ames, Ph.D. California Institute of Technology. Biochemistry, molecular biology, membranes
David R. Bentley, Ph.D. University of Michigan. Developmental neurobiology
Phyllis B. Blair, Ph.D. University of California at Berkeley. Immunology, virology
Michael R. Bishop, Ph.D. University of California at Berkeley. Molecular virology, immunology
Saul B. Broh, Ph.D. University of California at Berkeley. Developmental biology
Herman Brotman, Ph.D. University of California at Berkeley. Neurobiology, neurology, psychology
Michael D. Brown, Ph.D. University of California at Berkeley. Biochemistry, molecular biology, membranes
David L. Chapman, Ph.D. Stanford University. Nucleic acids, gene expression
Thomas W. Cline, Ph.D. Harvard University. Sex determination and recombination
Nicholas R. Cozzarelli, Ph.D. Harvard Medical School. DNA replication and recombination
Peter H. Duesberg, Ph.D. University of Frankfurt. Genetic mechanisms of recombination
Harrison Eichls, Ph.D. University of Wisconsin. Molecular genetics of viruses
John E. diGregorio, Ph.D. University of Pennsylvania. Membrane proteins, transport and energetics
Walter J. Freeman, M.D. Yale University. Neurophysiology, neurochemistry, brain dynamics
Joseph E. Golstein, Ph.D. Stanford University. Developmental genetics
John Garhart, Ph.D. University of California at Berkeley. Developmental biology
Robert M. Glaser, Ph.D. University of California at Berkeley. Membrane proteins, transport and energetics
Donald A. Glaser, Ph.D. California Institute of Technology. Neurovirology, virology, molecular genetics of viruses
Alexander N. Glazer, Ph.D. University of Utah. Macromolecular complexes, photosynthetic systems
Richard K. Gold, Ph.D. University of California at Berkeley. Neurobiology, molecular genetics
Raymond Keller, Ph.D. University of Illinois at Urbana-Champaign. Developmental biology
Jack F. Kirsch, Ph.D. Rockefeller University. Enzymology, site-directed mutagenesis
Marian E. Kochland, Ph.D. University of Chicago. Molecular genetics of viruses
Sydney G. Kutz, Ph.D. University of California at Davis. Pharmacology, biochemical genetics
Harold Lecar, Ph.D. Columbia University. Neurophysiology, excitable membranes
Terrance Leaheit, Ph.D. University of British Columbia. Microbiology, molecular and developmental genetics
Bruce Levine, Ph.D. Stanford University. Enzymology of DNA metabolism
Terry L. Michen, Ph.D. University of California at Los Angeles. Epithelial transport, cellular and membrane biology
G. Steven Martin, Ph.D. University of California at Berkeley. Cell biology, tumor virology
Barbara J. Meyer, Ph.D. Harvard University. Sex determination in C. elegans
Shelley S Miller, Ph.D. University of Michigan. Membrane biophysics, epithelial physiology
Sugiyohata S. Hirokawa, Ph.D. University of California at Berkeley. Biochemistry and microbiology
Alexander V. Nicolaus, Ph.D. University of California at Berkeley. Membrane biology and endocrinology
Hiroshi Niki, M.D., M.D. Osaka University. Membrane biology and endocrinology
George F. Oster, Ph.D. Columbia University. Mathematical models in cell and developmental biology
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Donald Rio, Ph.D. University of California at Berkeley. Neuroimmunology.
Hishigakaki, Ph.D. Kyoto University, Molecular immunology.
David A. Widelquist, Ph.D. California Institute of Technology, Developmental biology.
Jeffrey A. Wexler, Ph.D. University of Tennessee, Neuroanatomy, comparative neurobiology, neonatology.
Patricia S. Lawrence, Ph.D. (Emeritus) Columbia University. Gene regulation.

Assistant Professors:
David G. Drubin, Ph.D. University of California at San Francisco. Cytoskeleton and regulation of cell cycle.
Brendan W. S. St. Louis University. Nervous system development.
Estud Liscouet, Ph.D. McGill University. Potassium channels, synaptic plasticity.
Susan Marqusee, Ph.D., M.D. Stanford University. Protein folding and translation.

Hans J. Bremermann, Ph.D. University of Freiburg. Theoretical biology, mathematics.

W. Geoffrey Owen, Ph.D. Imperial College, London. Developmental biology, differentiation and function of T lymphocytes.

Gary L. Firestone, Ph.D. University of Iowa. Molecular virology.

R. David Covell, Ph.D. University of California at San Diego. Molecular virology.

John W. Gofman, M.D., Ph.D. Emphasis in Cell and Developmental Biology, Immunology, and Neurobiology; 299 Life Sciences Addition (LSA), 642-3313.

Graduate Affairs Unit: Mr. S. Rosen. MCB 160L (4), MCB 140L (4), MCB 119 (1 recommended; or emphasis in Genetics), MCB 140L (4) and one additional upper division MCB course; or (emphasis in Immunology) MCB 150 (4) and MCB 150L (4). Students in the Biology and Molecular Biology emphasis can substitute MCB 112 (4) for the MCB 140 requirement. Undergraduate units: 21-24.

Plan II. (Emphasis in Cell and Developmental Biology; Emphasis in Neurobiology)

Lower Division. Chemistry 1A and 3A-3B (13) or Chemistry 1A-1B and Chemistry 112A-112B (18); Biology 1A and 1B (8); Mathematics 1A-1B, 3A, and Physics 8A-8B (8). The emphasis in Biological Chemistry and Molecular Biology, Chemistry 5 is required of students who do not take Chemistry 112A-112B. Lower division units: 40-42 (emphasis in Biochemistry and Molecular Biology) or 37-42 (emphasis in Genetics or Immunology).

Upper Division. Core requirements: Chemistry 130A (3); MCB 100 (4), MCB 110 (4), MCB 149 (4). Additional requirements: (emphasis in Biochemistry and Molecular Biology) MCB 110L (8) and one additional upper division MCB course, MCB 119 (1 recommended; or emphasis in Genetics) MCB 140L (4) and one additional upper division MCB course; or (emphasis in Immunology) MCB 150 (4) and MCB 150L (4). Students in the Biology and Molecular Biology emphasis can substitute MCB 112 (4) for the MCB 140 requirement. Upper division units: 21-24.

The undergraduate major in molecular and cell biology replaces the previously offered major, Biochemistry and molecular biology, with an undergraduate major in molecular and cell biology. The undergraduate major is administered by the Interdivisional Graduate Affairs Committee which is chaired by Professor Stuart Linn.

The Major

Students in both plans of the MCB major can use lower division courses to satisfy some of their lower division major requirements. (Contact the MCB Undergraduate Affairs Office for a list of AP equivalencies.) However, students should be advised that some medical schools do not accept AP credit for their admissions requirements; pre-med students should contact the campus Office of Pre-Graduate and Professional School Advising about medical school requirements.
Honors Program. At the beginning of their senior year, students who have been selected for the program, for which consent of their research mentor and a grade-point average of 3.3 or higher in courses satisfying their emphasis of the major and in all courses taken in the University are required. Certain research laboratories 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 departmental honors, students must complete at least 4 units of the course MCB H196, write a superior thesis based on research, and attain a final cumulative grade-point average of 3.3 or higher in courses taken at UC to satisfy major requirements and in all courses taken at UC.

Graduate Program

The department offers a program of graduate study leading to the Ph.D. in molecular and cell biology. This program provides advanced training in the research methods and concepts of the study of the molecular structures and processes of cellular life. The training is intellectually well-focused, but at the same time offers unusually wide opportunities for varied disciplinary specialization. Undergraduate preparation for admission to the program should correspond to one of the three plans of the department. Students taking the graduate course in cell biology will be required to serve as a graduate student intern during some part of their career in the program. Students seeking employment in the program should regard such matters as admission, curriculum, and sources of financial support, should contact the Departmental Graduate Affair Office.

Research Facilities

The Robert D. Ogg Electron Microscope Laboratory is an instructional and research unit of the College of Letters and Science. It houses equipment for transmission electron microscopy (TEM) and scanning electron microscopy (SEM). The staff is skilled not only in the operation and maintenance of instruments, but in standard, and most specialized, techniques of sample preparation. Qualified undergraduates and graduate students, postdoctoral associates, faculty, and research staff in biology and physical sciences, once trained, may make arrangements for use of the laboratory for research and directed study, as approved in the form of both classes and individual training. Training is provided as MCB 481B and/or 481C. Register students and faculty are not charged for training. Nominal charges are made for use of the laboratory for individual research work. With permission from the director, non-UC personnel can be accepted for training or laboratory use. Equipment can be used outside normal hours. The laboratory provides demonstrations of the electron microscope and preparative techniques for on-campus classes and can make special arrangements for tour groups.

Division of Biochemistry and Molecular Biology

Head: Randy Schechman

Lower Division Courses

11. Of Molecules and Man: A View for the Layman. (3) Three lectures and one hour of discussion per week. Examination of molecular mechanisms that underlie normal functions of living organisms and those functions that are altered in medical disorders and environmental agents. Designed to provide non-biologists with an understanding of modern biochemistry and the ways we can use and alter the biology of our life and health. (SP) Advisement. (SP) Affirmative. (SP) Advanced Placement.

12. The Microscopic World. (3) Students who have received credit for 51 or 52 will receive only two units for 12. Four hours of lecture per week. Must be taken on a pass/not pass basis. Prerequisites: High school chemistry or Chemistry 1A. High school biology or Biology 1A. Formerly Microbiology and immunology 10. This course is an introduction to the biology of microorganisms and the immune system; the fundamental principles of and major advances in microbiology and immunology; intended for students not majoring in a biological science. (F) Leighton, Blair

14. Enology---The Microbiology and Biochemistry of Wine. (5) Two hours of lecture and discussion per week. Prerequisites: High school biology and high school chemistry. Formerly Microbiology and Immunology 2. The microbial history, ecology, biochemistry, and physiology of organisms affecting the production and stability of various wine types produced throughout the world. Microbiological and biochemical factors affecting wine quality will also be discussed. (SP) Leighton

15. Current Topics in the Biological Sciences. (2) Course may be repeated for credit as topic varies. Two hours of lecture and one hour of discussion per week. Prerequisites: Suitable for freshmen who plan to major in a biological science. Students in this course will critically examine modern methods of biological investigations and their social implications. Relevant literature will be used to present basic biological concepts that address the cultural, technological and health aspects of current topics in the biological sciences. Designing and evaluating scientific questions will be stressed. (SP) Kane, Linn

90. Freshman Seminars. Course may be repeated for credit as topic varies. Two hours of seminar per week. Prerequisites: Open to freshmen only. Formerly Biochemistry 90A, Biochemistry 90B, Biochemistry 90C, Biochemistry 90D. These seminars are designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small setting. Berkeley seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP) Gerhart

90A. Biochemistry and Molecular Biology. (1)
90B. Cell and Developmental Biology. (1)
90C. Genetics. (1)
90D. Immunology. (1)
90E. Neurobiology. (1)

91, Freshman/Sophomore Seminar. Course may be repeated for credit as topic varies. Two hours of seminar per week. Prerequisites: Open to freshmen only. Formerly Biochemistry 91A, Biochemistry 91B, Biochemistry 91C, Biochemistry 91D. These seminars are designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small setting. Berkeley seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP) Gerhart

91A. Biochemistry and Molecular Biology. (2-4)
91B. Cell and Developmental Biology. (2-4)
91C. Genetics. (2-4)
91D. Immunology. (2-4)
91E. Neurobiology. (2-4)

Upper Division Courses

100. General Biochemistry. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1A, Chemistry 3B or equivalent and a course in physical chemistry. Formerly Biochemistry 100A. Chemical and physical factors concerned in life processes, including the chemistry, function, degradative, and biosynthesis of major cellular constituents; enzymatic catalysts, energy, and metabolism, and control of metabolic reactions. For students majoring in the biological sciences. (SP) Staff

102. Survey of the Principles of Biochemistry and Molecular Biology. (4) Partial credit (2 units) will be given to students who have completed Biochemistry 100A or 100. No credit after taking both 100 and 110. Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1A, Chemistry 3B. Recommended: a course in physical-chemistry. Formerly Biochemistry 102. A comprehensive survey of the principles of biological chemistry, including the properties of intermediary metabolites, 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) Two hours of lecture and six hours of laboratory per week. Prerequisites: Chemistry 5; 102 (preferably completed but may be taken concurrently). Formerly Biochemistry 102L. Experimental work to acquaint students with 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) Ballou, Duesberg

110. General Biochemistry and Molecular Biology. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 100 (may not be taken concurrently). Formerly Biochemistry 100B, Molecular Biology 100A-100B. Molecular Biology of prokaryotic and eukaryotic cells and their viruses. Mechanisms of DNA replication, transcription, translation. Structure of genes and chromosomes. Regulation of gene expression. (F,SP) Staff

110L. General Biochemistry and Molecular Biology Laboratory. (5) Three hours of lecture and nine hours of laboratory per week. Prerequisites: 110 (may not be taken concurrently). Chemistry 5. Formerly Biochemistry 110L, Molecular Biology 100A-100B. Experimental techniques of biochemistry and molecular biology, designed to accompany the lecture course. (F,SP) Staff

112. General Microbiology. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1A, 102 or 100 (may be taken concurrently). This course will explore the molecular bases for physiological and biochemical diversity among members of the two major prokaryotic kingdoms, the eu- bacteria and archaeabacteria. The ecological significance and evolutionary origins of this diversity will be discussed. Molecular genetic analysis of microbial metabolism, replication, transcription, translation, cell division and differentiation will be emphasized. (F) Zusman, Leighton

112L. Microbiology Laboratory. (4) One hour of lecture and eight hours of laboratory per week. Prerequisites: 112 or consent of instructor. Formerly Microbiology and Immunology 100L, 101L. Experimental work, designed to accompany course 112, which acquaints the student with the isolation of bacteria from natural habitats, methods of culture, microscopic observation, determination of biological features of microbial cells, and their molecular genetics. Zusman

113. Applied Microbiology and Molecular Biology. (2) Two hours of lecture per week. Prerequisites: 112 or consent of instructor. Formerly Microbiology and Immunology 102. 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 energy production. (SP) Glazer, Nikaido

114. Introduction to Comparative Virology. (3) Three hours of lecture per week. Prerequisites: Introductory Chemistry (1A and 3A-3B or equivalent) and Introductory Biology (1A-1B or equivalent). Formerly Biology 120. Viruses will be considered as infectious agents of bacteria, plants, and animals (vertebrates and invertebrates). Viruses will also be compared with respect to biochemical, structural and morphological properties, and strategies of infection and replication. (SP) Volkman

117. Topics in Biochemistry and Molecular Biology. (1-3) Course may be repeated for credit. One, two, or three hours of lecture per week. Must be taken on a pass/not pass basis. Prerequisites: Consent of instructor. Formerly Biochemistry 195, Molecular Biology 196. Topics of current and general interest in some specialized domain of molecular and cell biology.
119. Proseminar. (1) Course may be repeated for credit. One hour of seminar per week. Must be taken on a pass/fail basis. Prerequisites: 110 (may be taken concurrently). Formerly Biochemistry 190. Seminar for senior majors in Molecular and Cell Biology, based on the biochemical molecular biological literature. (SP) Staff

Graduate Courses

200. Advanced Biochemistry and Molecular Biology. (5) Three hours of lecture per week. Prerequisites: 110 or equivalent. Formerly Molecular Biology 200A-200B. Graduate course for advanced graduate students. Recent advances in the study of structural, functional, and genetic characteristics of prokaryotic and eukaryotic cells and their viruses, macromolecular biopolymers, nucleic acid chemistry, structure and cleavage. Protein-protein interactions. (F) Forster, Hariand, Tjian

201A-201C. Advanced Biochemistry and Molecular Biology Laboratory Strategies. (11/11) Three hours of lecture per week. Prerequisites: Graduate standing and consent of instructor. Formerly Biochemistry 201A-201B-201C. A. Protein purification; B. Bacterial genetics; C. Molecular Biology. The lectures will cover the strategies and the practices involved in modern molecular biological research approaches to molecular biology. The goal is to present and discuss what theoretical and practical considerations are used in deciding upon a particular course of action and to demonstrate the evaluation of the results of that course of action. (SP) Staff

203. Structure and Function of Eukaryotic Cell Membranes. (2) Two hours of lecture per week. Prerequisites: 130, Formerly Biochemistry 203. The arrangement and biogenesis of eukaryotic membrane proteins and lipids, the movement and assembly of cell organelles, and the function of the cell surface in various cell cycle events. Staff

205. Biochemistry of Nucleic Acids. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 110 or equivalent. Formerly Biochemistry 205. The chemistry, biochemistry, and biologic roles of nucleic acids and their constituents. (SP) Chamberlin

206. Physical Biochemistry. (3) Three hours of lecture per week. Prerequisites: Year courses in organic chemistry and physical chemistry. 100 recommended. Formerly Biochemistry 206. Application of modern physical principles to the analysis of the structure and function of large molecules of biological interest. (F) Schachman

207. Comparative Biochemistry. (1) One hour of lecture per week. Prerequisites: 100. Formerly Biochemistry 207. Contributions of comparative biochemistry to the knowledge of the molecular basis for functional diversity, the mechanism of evolution, and the phylogenetic relationships of species.

208. Regulation of Gene Expression. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 110 or equivalent; 140. Formerly Biochemistry 208. Regulation of genes at the biochemical and molecular levels, chromosome structure and replication; transcription and RNA processing; recombination, transformation, transposition; gene regulation in prokaryotes, eukaryotes. (F) Thormer, Harland, Tjian

214. Protein/Nucleic Acid Chemistry and Enzymology. (3) Three hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. Protein structure, denaturation and folding. Nucleic acid chemistry, structure and cleavage. Proteins to nucleic-acid interactions. Enzyme kinetics and mechanism, catalytic antibodies. Intended for graduate students in Chemistry, Biochemistry, and Molecular and Cell Biology. Also listed as Chemistry 230 and Interdepartmental Studies 229. (SP) Kirsch, Klinman

215. Molecular Biology of Animal Viruses. (2) Two hours of lecture per week. Prerequisites: 100 or 112, or equivalent. Formerly Molecular Biology 220. Structure, reproduction, mutations and host cell interactions (including pathogenesis) of animal viruses. (SP) Martin, Botchan

216. Membrane and Lipoprotein Structure and Dynamics. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Characterization of cell membranes and lipoproteins by physical methods. Examples to be studied include vesicles, and plasma membranes. Current analytical methods include electron microscopy, diffraction and magnetic resonance, fluorescence and photobleaching recovery, electrical noise measurements, and single channel recording. Statistical mechanics and molecular dynamics. (F) Glasser

217A-217C. Selected Topics in Biochemistry and Molecular Biology. (1/11) Course may be repeated for credit with change in contents. Three hours of lecture per week for five weeks. Prerequisites: Consent of instructor. Formerly Biochemistry 217A-B-C. Topics changed each year. 217A, 217B, 217C are three sections of five weeks each. The sections are taught in tandem and may be taken individually. (F,SP) Staff

218. Research Review in Biochemistry and Molecular Biology. Course may be repeated for credit. Two hours of seminar per week. May be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Review of current literature and discussion of original research. (F,SP)

218A. Bacterial Viruses. (2) Prerequisites: Consent of instructor. Formerly Molecular Biology 282L. Initiation of DNA replication, interference between viruses, molecular cloning, and the heat shock response. (F,SP) Echols, Calendar

218B. Molecular and Developmental Genetics of Bacillus subtilis. (2) Prerequisites: Consent of instructor. Molecular genetic regulation of transcription, translation, and developmental gene expression in Bacillus subtilis. (F,SP) Leighton

218C. Malignant Transformation. (2) Prerequisites: Consent of instructor. Malignant transformation by retroviruses, the regulation of protein phosphorylation in growth regulation. (F,SP) Martin

218D. DNA Structure and Function. (2) Prerequisites: Consent of instructor. Formerly Molecular Biology 202L. DNA structure and function. (F,SP) Cozzarelli, Harland

218E. Viruses as Models for Eukaryote Gene Expression and Replication. (2) Prerequisites: Consent of instructor. Formerly Molecular Biology 285. Recent developments in molecular virology. New concepts in transcription and RNA replication, with particular emphasis upon virus-cell interactions. (F,SP) Botchan

218G. Mycobacterial Development. (2) Prerequisites: Consent of instructor. Review of current literature and discussion of control systems. (F,SP) Chamberlin

218H. Bacterial Nitrogen Metabolism. (2) Prerequisites: Consent of instructor. Regulation of nitrogen metabolism by feedback control, including the control of transcriptional control of transcription. (F,SP) Martin

218J. Advanced 20th Century Perspectives on Cancer Cell Genetics. (2) Prerequisites: Consent of instructor. Transduction of cellular sequences and genetic regulation of transformation by oncopogenic retroviruses as models for naturally occurring carcinogenesis, including a critical review of the current research. (F,SP) Duesberg

218K. Channel-Forming Membrane Proteins. (2) Prerequisites: Consent of instructor. Structure, functional properties, and assembly of proteins that form nonspecific and specific passive diffusion channels, as well as active transport apparatus, in bacterial membranes. (F,SP) Nikaido

218M. Structure, Function and Design of Nucleic Acid Binding Proteins. (2) Prerequisites: Consent of instructor. Includes the study of nucleic acid structure, protein structure, nucleic acid binding motifs, and protein-nucleic-protein interactions. (F,SP) Nelson

218N. Eukaryotic Transcriptional Control. (2) Prerequisites: Consent of instructor. Nucleic acid and protein interactions involved in the regulation of gene expression from eukaryotic chromosomes. (F,SP) Kaner

218P. Physical Optics and Crystallography. (2) Prerequisites: Consent of instructor. Formerly 220C. A combination of didactic presentations and informal discussions of methods and theory in physical optics and crystallography in the context of biological macromolecules. Emphasis on new developments, with the development of suitable background. (F,SP) Glaser

219C. Structural Biophysics. (2) Prerequisites: Consent of instructor. Formerly 220D. Structural biology of proteins and nucleic acids, cell membranes, cytoskeletal and motor systems, and the protein folding problem. (F,SP) Glaser

219R. The Protein Folding Problem. (2) Prerequisites: Consent of instructor. Protein structure, stability, design, and the pathway of protein folding. (F,SP) Marqusee

219T. Post-transcriptional Control in Saccharomyces Cerevisiae. (2) Prerequisites: Consent of instructor. Poly (A) tail recognition by translation and degradation enzymes in the yeast cell. (F,SP) Sachs

219V. Mechanisms of Gene Control in Vertebrate Animals. (2) Prerequisites: Consent of instructor. The course will focus on mechanisms of gene control in vertebrates, primarily in the area of vertebrate development. Amplificiation, mesoderm induction, neural induction and patterning of the nervous system will be explored at the molecular level. Control of transcription, pre-transcriptional control of gene expression (including control of RNA turnover and RNA localization). (F,SP) Harland

219W. Research Review in Biochemistry and Molecular Biology. Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Review of current literature and discussion of original research. (F,SP)

219B. Enzyme Mechanisms. (2) Prerequisites: Consent of instructor. Formerly Biochemistry 233. Enzyme mechanisms. (F,SP) Kirsch

219C. Regulatory Enzymes. (2) Prerequisites: Consent of instructor. Formerly Biochemistry 234. Biochemical and molecular regulation of reactions of allosteric proteins. (F,SP) Schachman

219D. DNA Enzymology. (2) Prerequisites: Consent of instructor. Formerly Biochemistry 240. Enzymology of DNA repair, replication, restriction, recombination, and methylation. (F,SP) Linn

219E. Regulation of Gene Transcription. (2) Prerequisites: Consent of instructor. Formerly Biochemistry 242. The mechanism of regulation of gene function, primarily at the level of genetic transcription. (F,SP) Chamberlin

219F. Eukaryotic Gene Expression. (2) Prerequisites: Consent of instructor. Formerly Biochemistry 245. Protein-DNA interactions and the control of gene expression in eukaryotes. (F,SP) Tjian

219G. Mutagen Detection. (2) Prerequisites: Consent of instructor. Formerly Biochemistry 246. Mutagenesis, and carcinogenesis. (F,SP) B. Ames

219H. Chromosomal-Structure. (2) Prerequisites: Consent of instructor. Formerly Biochemistry 248. Protamine DNA interactions and the control of gene expression in eukaryotes. (F,SP) Tjian

219I. Regulatory Substances in Bacteria. (2) Prerequisites: Consent of instructor. Formerly Biochemistry 249. Proteins involved in the structure and dynamics of chromosomal DNA. (F,SP) Cole

219M. Regulatory Substances in Bacteria. (2) Prerequisites: Consent of instructor. Formerly Biochemistry 254. Bacterial regulation. (F,SP) B. Ames

219N. Chemotax. (2) Prerequisites: Consent of instructor. Formerly Biochemistry 255. Bacterial chemotaxis as a model sensory system. (F,SP) D. Koshland

219P. Secretion and Cell Membrane Assembly. (2) Prerequisites: Consent of instructor. Formerly Biochemistry 256. Cell surface growth with emphasis on
Division of Cell and Developmental Biology

Head: Terry E. Machen

Lower Division Courses

Biology 1A. General Biology. (4) Three hours of lecture, three hours of laboratory, and one hour of discussion per week. Prerequisites: Chemistry 1A-1B. Concurrent enrollment in Chemistry 3A may be used in lieu of Chemistry 1B. General introduction to cell structure and function, and molecular and organismal genetics, animal development, form and function. In tended 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. Neither is a prerequisite to the other. Sponsored by Molecular and Cell Biology. (F,SP) Staff

Note: Biology 1A and 1B are each taught both semesters, and students may enroll in either (but not both) during either the fall or spring semester. Neither is a prerequisite for the other.

31. The Biology of Human Potential. (3) Three hours of lecture and one hour of discussion per week. Formerly Zoology 13. Biological basis for outstanding human performance; evolutionary, physiological, and genetic determinants of selected human functions. (SP)

32. Introduction to Human Physiology. (3) Three hours of lecture per week. Prerequisites: One year of high school or college chemistry. Formerly Physiology 1. A comprehensive introduction to human cell biology. This course includes basic mechanisms of human body functions, including cells and membranes; nerve and muscle function; cardiovascular, respiratory, renal, and gastrointestinal physiology; metabolism, endocrinology, and reproduction. (F)

32L. Introduction to Human Physiology Laboratory. (1) Three hours of laboratory and one hour of discussion per week. Prerequisites: Concurrent with 32L. Formerly Physiology 1. Experiments and demonstrations are designed to amplify and reinforce information presented in MCB 32. Exercises include investigations into the structure and function of muscle, nerve, cardiovascular, renal, respiratory, endocrine and blood systems. (F)

Upper Division Courses

130L. Cell and Developmental Biology Laboratory. (4) Six hours of laboratory and two hours of lecture per week. Prerequisites: May be taken concurrently with 130L. Formerly Physiology Laboratory 101L, 101L, Zoology 115, 155. Experimental analyses of the classical problems of cell and developmental biology. The assembly of supramolecular structures; membrane structure and function; the cell surface; cytoskeletal membranes; the cytoskeleton and cell motility; the eukaryote genome, chromosome, and gene expression; the cell cycle; organelle biogenesis, differentiation and morphogenesis. (F,SP)

130L. Cell and Developmental Biology Laboratory. (4) Six hours of laboratory and two hours of lecture per week. Prerequisites: May be taken concurrently with 130L. Formerly Physiology Laboratory 101L, 101L, Zoology 115, 155. Experimental analyses of the classical problems of cell and developmental biology. The assembly of supramolecular structures; membrane structure and function; the cell surface; cytoskeletal membranes; the cytoskeleton and cell motility; the eukaryote genome, chromosome, and gene expression; the cell cycle; organelle biogenesis, differentiation and morphogenesis. (F,SP)
tution; the relationships and conflicts within and between these fields; the path to molecular biology and the diseases of the developing organism. (F,SP) Staff

230. Advanced Cell Biology, (3) Three hours of lecture per week. Prerequisites: 130. Formerly 200A. Advanced treatment of topics in cell biology. (F,SP) Staff

231. Advanced Developmental Biology, (3) Three hours of lecture per week. Prerequisites: 130, 131, 140-142, 230, or consent of instructor. Formerly 230B. An advanced treatment of topics in morphogenesis, determination, and differentiation in developing systems. (F,SP) Staff

232. Advanced Topics In Endocrinology, (2) Course may be repeated for credit. Three hours of lecture and one hour of discussion per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. During the first half of the semester selected faculty and guest lecturers will present lectures on topics of their interest and will discuss the material afterwards. During the second half students will present lectures on related topics or other approved subjects. (SP) Nisoli, Firestone

233. Mathematical Modeling of Biological Systems, (5) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Calculus and differential equations, Biology 1A-1B, or consent of instructor. Formerly Biophysics 224. The art of rendering the essential features of biological systems in mathematical language. Topics include: morphogenesis at the cell and tissue level, circadian rhythms, biomechanics, and evolution. Emphasis is on biologically realistic models. (F) Oster

234. Development Review, (1) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Formerly Interdepartmental Studies 205. A seminar devoted to the analysis of the essential features of animal and embryology-cell type determination, pattern formation, cell and tissue interactions and mechanisms of morphogenesis with emphasis on regulations and integration of development from the cellular, molecular, and tissue levels of organization. (F,SP)

235. Advanced Topics In Cell Biology, (1) Course may be repeated for credit. One hour of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Formerly Biology 236. Reviews and reports of current literature in cell biology. (F,SP) Burnside

236. Wednesday Evening Development Seminar, (1) One and one-half hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Formerly 290. This class consists of relatively informal weekly research presentations in the areas of developmental biology, developmental neurobiology, or relevant areas of cell biology. Speakers are usually recruited from graduate students, postdocs and faculty with occasional outside visitors. The instructors strive to foster extensive questions and discussions in the course of each presentation. (F)

239. Research Review In Cell and Developmental Biology, Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Review of current literature and discussion of original research. (F,SP)

239A. Animal Cells and Viruses, (2) H. Rubin

239AA. Atherosclerosis. (2) Formerly 229K. Nichols

239B. Differentiation and Transformation of Cultured Animal Cells, (2) H. Rubin

239C. Vertebrate Development, (2) Herbst

239D. Epithelial Function, Structure, and Regulations, (2) Machen

239E. Tumor Biology, (2) Nandi

239G. Photoreceptor Motility and Morphogenesis, (2) Bumsride

239H. Cell Division, (2) Cande

239J. Steroid Hormone and Growth Factor Action, (2) Firestone

239K. Morphogenesis, (2) Keller

239M. Protein Secretion in Animal Cells, (2) Moore

239N. Biophysics of Cell Motility and Morphogenesis, (2) Oster

239P. Development and Aging, (2) Timiras

239Q. Membrane Transport in Red Blood Cells, (2) Macey

239R. Cell Regulation in Growth and Differentiation, (2) Steinhardt

239S. Cellular Transport Processes, (2) Forte

239T. Muscle Regulation, (2) Strichman

239V. Biological oxidation, free radicals, and oxygen toxicity, (2) Packer

239W. Lactose Embryogenesis and Development, (2) Wells-

239Y. Determination and Differentiation in Development, (2) Wilt

Division of Genetics

Head: Gerald M. Rubin

Lower Division Courses

41. Genetics and Society, (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Primarily for students not specializing in biology. Formerly Genetics 10. Basic mechanisms of inheritance; gene mapping; gene expression and genetic disease in animals and humans; social implications of genetics. (F) and (SP) Oster

41X. Heredity and Society, (4) Two hours of lecture and one hour of discussion per week. Prerequisites: Primarily for students not majoring in the biological sciences. Basic genetic principles and mechanisms, evolution, philosophical implications and relation of genetics to global problems of human and environmental health. Also listed as IDS 41X and Plant Biology 41X. (SP) Freeberg

Upper Division Courses

140. General Genetics, (4) Students will receive one unit of credit after taking 142. Three hours of lecture and one hour of laboratory per week. Prerequisites: 100 and consent of instructor. Formerly Genetics 100A-100B. In-depth introduction to genetics, including mechanisms of inheritance; gene transmission and recombination; transposable DNA elements; gene structure, function, and regulation; and developmental genetics. (F,SP) Beckendorf

140L. Genetics Laboratory, (4) Six hours of laboratory and two hours of lecture per week. Prerequisites: 140. May be taken concurrently. Formerly Genetics 100L. Experimental techniques in classical and molecular genetics. (F,SP) G. Rubin

142. Survey of General Genetics, (4) Not open to students with credit in 140. Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1A-1B or consent of instructor. Recommended: Chemistry 3A-3B or equivalent. Formerly Genetics 102. A survey of genetics with primary emphasis upon mechanisms of heredity and molecular genetics. Includes some treatment of evolutionary genetics. (SP) Freeberg

Graduate Courses

240. Advanced Genetic Analysis, (3) Three hours of lecture per week. Prerequisites: Graduate standing with 110 and 140 or consent of instructor. (SP) Rubin

241. Principles and Practice of classical and modern genetic analysis as applied to eukaryotic organisms, including yeast, nematodes, Drosophila, mice and humans; isolation and analysis of mutations; gene mapping; suppressor analysis; chromosome structure; control of gene expression; and developmental genetics. (F) Rine, Anderson

242A-242B. Advanced Topics In Genetics, (2-2) Course may be repeated for credit. Three hours of lecture and one hour of discussion per week. Prerequisites: Graduate standing with 110 and 140 or equivalents; or consent of instructor. Advanced level of coverage of current research problems in genetics. The topics covered vary from year to year.

243. Neurogenetics, (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Graduate standing with 110; 140; or consent of instructor. Transmission and molecular genetic approaches to understanding the development and function of the nervous system. Goodman. G. Rubin

244. Developmental Genetics, (2) Three hours of lecture and one hour of discussion per week. Prerequisites: Graduate standing of consent of instructor. Fundamental and molecular genetic approaches to understanding the development of multicellular organisms. (F) Staff

245. Chromosome Structure, (2) Three hours of lecture and one hour of discussion per week. Prerequisites: 110; 140; and consent of instructor. The molecular architecture of chromosomes and their function in replication, gene expression, cell division and cell differentiation.

246. Molecular Genetics, (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 110; 140; 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.

249. Research Review In Genetics. Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Review of current literature and discussion of original research. (F,SP)

249A. Developmental Genetics of Insect Metamorphosis. (2) Prerequisites: Consent of Instructor. Gene expression and function during metamorphosis in Drosophila. (F,SP) Frisstrom

249B. Metazoan Sex Determination. (2) Prerequisites: Consent of instructor. Molecular and cellular mechanisms of Metazoan sex determination, with emphasis on Drosophila melanogaster, will be covered in research reports and reviews of the current literature. (SP) Rubin

249C. Nucleic Acid-Protein Interactions and Control of Gene Expression. (2) Prerequisites: Consent of Instructor. Gene regulation and developmental genetics of eukaryotic messenger RNA splicing and transposition, with an emphasis on Drosophila melanogaster as an experimental system, will be covered in research reports and discussion of current experiments in the field. (F,SP) Rio

249D. Mechanisms of Genetic Regulation In Yeast. (2) Prerequisites: Consent of Instructor. Formerly Biochemistry 257. Genes, gene products and molecular mechanisms that control cell types in the unicellular yeast Saccharomyces cerevisiae. (F,SP) Rine

249E. Molecular Genetics of Drosophila. (2) Prerequisites: Consent of Instructor. Formerly Biochemistry 244. Gene regulation and developmental neurobiology. (F,SP) G. Rubin

249F. Neurological Development. (2) Prerequisites: Consent of instructor. Molecular and genetic approaches to the problem of how molecular genetics, with emphasis on Drosophila melanogaster and Caenorhabditis elegans, will be covered in research reports. (F,SP) Garriga

249G. Developmental Genetics of Drosophila. (2) Prerequisites: Consent of instructor. Formerly Molecular Biology 218. An introduction to Drosophila embryogenesis, ranging from classical embryology and
Division of Immunology

Head: James P. Allison

Lower Division Courses

51. Immunity and Defense. (2) Students will receive no credit for 51 after taking 12. Four hours of lecture/discussion per week. Must be taken on a passed/not passed basis. Prerequisites: High school biology. Lectures and discussion centering on the organ systems involved in the immune system and the microbes that the immune system must defend. Intended for students who are not majoring in biology. (SP) Blair

52. Cancer and Immunology, (1) Two hours of lecture/discussion per week. Must be taken on a passed/not passed basis. Prerequisites: Biology 1A. For senior-year students majoring in molecular biology and molecular genetics. Lectures and discussion centering on the factors involved in the development of cancer and the role that the immune system can play in its detection and its prevention. Topics will be limited to the number of students in the course. (F) Good

53. Immunology and Disease, (1) Two hours of lecture per week. Must be taken on a passed/not passed basis. Prerequisites: Biology 1A. Lectures and discussion centering on the role the immune system plays in health and disease. (F) Blair

Upper Division Courses

150. Molecular Immunology. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 100 or 102. Fundamentals of immunology with emphasis on molecular and cell biology and molecular techniques used to study the immune system and its application in medicine and biotechnology. Topics covered include description of the immune system, antibody and T-cell receptor structure and function, genes of the immunoglobulin superfamily, cells and molecular mediators that regulate the immune response, allergy, autointolerance, immunodeficiency, tissue and organ transplantation, and tumor immunology. (F,SP) Good, Shastrl, Winoto

150L. Immunology Laboratory. (4) Eight hours of laboratory and one hour of lecture per week. Prerequisites: 150 (may be taken concurrently). Consent of instructor. Formerly Microbiology 10S. Experimental techniques of protein and DNA analysis, molecular biology and cell biology. Molecular techniques covered include recombinant DNA procedures such as gene cloning, gene transfer, DNA sequencing, Southern blot, and restriction mapping. Immunological techniques covered include cell culture and monoclonal antibody production, detection of fluorescent antibodies, ELISA, radioimmunoassay, and western blot. (F,SP) Good, Shastrl, Winoto

154. Medicine in the 21st Century. (4) Course may be repeated for credit. Two hours of lecture and six hours of discussion per week. Changing patterns of mortality and morbidity indicate increases in the occurrence of disorders whose etiologies are multifactorial behaviors. If successful methods of prophylaxis and treatment of these disorders are to be employed by physicians of the 21st Century, better understanding of medical, biologic, and behavioral aspects of disease is essential. Problems in the intervention of novel methods of intervention will have to be devised. The principal focus of the course will be research of the literature relevant to individually selected topics. (SP) Mishell

Graduate Courses

250. Advanced Immunology, (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 100, 110, 140, 150 or consent of instructor. For former Microbiology 254. The immune response: antigen-antibody reactions: structure and function of antibody molecules; Immunoglobulin genes, both structural and regulatory; lymphocyte differentiation; cellular and molecular interactions of immunity and tolerance. (F) Koshland, Raulet

250L. Advanced Immunology Laboratory. (3-6) Course may be repeated for credit. Two hours of lecture and 12 to 18 hours of laboratory per week. Prerequisites: 100, 110, 140, 150 or the equivalent or consent of instructor. Formerly Microbiology and Immunology 202L. Students will specialize on problems that may take portion of the course on a modular basis. In the first module, students will learn a variety of molecular and cellular immunological techniques including production of monoclonal antibodies. In the second module, students will work on individual projects that require the application of immunological techniques. (F) Good

252. Immunobiology of the T-Lymphocyte, (3) Two hours of lecture/discussion per week. Prerequisites: 250 or consent of instructor. Thymus-derived lymphocytes play a central role in the immune system, recognizing foreign antigens in the context of self-antigens, and carry out both effector and regulatory functions. This course will cover developmental, cellular, and molecular aspects of the T-lymphocyte system, with emphasis on the differentiation of T-cells, acquisition of antigen repertoire, and molecular biology of antigen recognition. Course designed for graduate students in immunology, molecular biology, and genetics. Offered odd-numbered years. (SP) Allison

253. Regulation of the Immune Response, (2) Course may be repeated for credit. Two hours of lecture 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 involve direct cell-to-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. (F) Allison

254. Molecular Biology of Cancer, (2) Course may be repeated for credit with consent of instructor. Two hours of lecture per week. Prerequisites: 250 or consent of instructor. For former Microbiology 254. The molecular and biological basis for development of cancer includes pathways of cell-cell communication, resistance to growth inhibition, requirement for genetic alterations, and dependence on a normal microenvironment. Intended for students who are not majoring in biology. (SP) Voss

255. Regulation of T-Cell Receptor Genes Expression, (2) Molecular biology of T cell receptor genes and their transcriptional control. Genes involved in development of antigen-specific T cells. (F) Voss

256. Molecular Biology of the Lymphocyte, (3) Two hours of lecture/discussion per week. Prerequisites: 250 or consent of instructor. Thymus-derived lymphocytes play a central role in the immune system, recognizing foreign antigens in the context of self-antigens, and carry out both effector and regulatory functions. This course will cover developmental, cellular, and molecular aspects of the T-lymphocyte system, with emphasis on the differentiation of T-cells, acquisition of antigen repertoire, and molecular biology of antigen recognition. Course designed for graduate students in immunology, molecular biology, and genetics. Offered odd-numbered years. (SP) Allison

259A. Differentiation of T lymphocytes. (2) Molecular and biological analysis of T cell differentiation, with particular emphasis on the role of antigen receptor and related structures. Allison

259B. Specificity of T lymphocytes. (2) Molecular basis of antigen recognition function of T lymphocytes. Shastri

259C. Regulation of Genes Involved in the Immune Response. (2) Molecular biology of immunoglobulin gene family, T antigen, and other gene families coding for lymphokines and their receptors. Sakano

259D. Lymphokine Signaling of B Cell Immune Responses. (2) Molecular analyses of lymphokine receptors, signaling pathways, and mechanisms of gene regulation. Koehland

259E. Regulation of T Cell Receptor Genes Expression. (2) Molecular biology of T cell receptor genes and their transcriptional control. Genes involved in development of antigen-specific T cells. (SP) Voss

259F. Antigen Receptor Repertoire of T-lymphocytes. (2) Molecular and biological basis for development of antigen-specific T cells. (SP) Voss

259G. T-Cell Development. (2) Molecular and cellular aspects of thymocyte differentiation. Robey

Division of Neurobiology

Head: Corey Goldman

Lower Division Courses

61. Brain, Mind and Behavior. (3) Two hours of lecture and one hour of discussion per week. Must be taken on a passed/not passed basis. Introduction to brain mechanisms in humans of sensation, movement, perception, thinking, learning, memory, and emotion; in terms of anatomy, physiology and chemistry of the nervous system in health and disease. Intended for students in the humanities and social sciences and others not majoring in the biological sciences. (SP) Freeman

Upper Division Courses

160. Introduction to Neurobiology, (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 102 or 100, Biology 1A, Physics 8A-8B. An introductory course designed to provide a general understanding of nervous system function including how it works, how it develops, how it changes with learning and memory. Analysis from the level of molecules to cells to simple circuits to complex neural systems and higher brain functions. (F) Miller, Werbin, Shatz, Goodman

160L. Neurobiology Laboratory. (2) One hour of discussion and four hours of laboratory per week. Prerequisites: 100 or 102, 160. Biology 1A, Physics 8A-8B. Electrophysiological, psychophysical, and neuroelectromagnetic experiments and demonstrations designed to illustrate the properties of nerve cells and their ensembles. (SP) Zucker

162. Developmental Neurobiology, (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 130, 160 or equivalent. Analysis of the strategies and processes of nervous system development, including generation of diverse nerve cell types, guidance of growing nerve fibers, competition and cell death in the maturation of synaptic connections, plasticity, and genetic and molecular mechanisms. (SP) Wall, Weibel

163. Mammalian Neuroanatomy, (2) Two hours of lecture and three hours of laboratory per week. Prerequisites: Biology 1A, Development, structure (gross, microscopic) and functioning of nervous systems. (F) Weibel

164. Sensory and Integrative Neurobiology, (3) Three hours of lecture per week. Prerequisites: 160. Transduction, coding and information processing in a variety of sensory systems including vision, audition, olfaction and others. Neural circuitry: modulation of...
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synaptic transmission, integrative mechanisms at dif-
ferent levels of sensory processing. Correlation of find-
ings, topdown, and bottomup models of sensory and psy-
chophysiology. (SP) Werblin, Miller, Jacobs.

165. Molecular Neurobiology. (3) Three hours of
lecture per week. Prerequisites: 102 or 110, 160. The
molecular and biochemical aspects of the structure
and function of the nervous system, including ion
channels, neurotransmission and their receptors,
and messenger systems, and molecular mechanisms
of development and plasticity. (SP) Ngai, Isacoff, Ignat

166. Biophysical Neurobiology. (3) Three hours of
lecture per week. Prerequisites: Biology 1A, Physics
8A-8B, Chemistry 13A-13B, and consent of instruc-
tor. Formerly 115:Biophysical properties of ion chan-
nels and excitability, ion selectivity, membrane trans-
port phenomena. Sensory transduction, optical
measurements and microscopy. Cellular networks as
developmental, integrative and bio- as
computation^ devices, information processing and
(SP) Ngai, Isacoff, Ignat.

Graduate Courses

260. Principles of Neuroscience. (4) Four hours of
lecture per week. Prerequisites: 160 and 160L, or
equivalent or consent of instructor. Comprehensive
survey of current state of knowledge in molecular,
cellular, developmental, integrative and behavioral
aspects of neuroscience. (F) Owen and Staff.

260L. Survey of Experimental Neurobiology. (3)
Four hours of lecture and at least one hour of discus-
sion per week. Prerequisites: 260 or equivalent. Intended
to acquaint the beginning graduate student with a
broad range of experimental methods used in the
study of the nervous system. Students will become fa-
miliar with laboratory procedures and gain insight into
quantitative evaluation of experimental results. (SP)
Westphal.

261. Advanced Cellular Neurobiology. (3) Three
hours of lecture per week. Prerequisites: 160. Physio-
al and chemical basis of membrane potentials, electrical
potential, action potential generation and propagation,
synaptic transmission, sensory receptor function, and
volume conductor potentials. (F) Lecar, Lewis, Owen,
Zucker, Isacoff.

261L. Advanced Neurophysiology Laboratory. (4)
Eight hours of laboratory and three hours of demon-
stration per week. Prerequisites: 260 or 261 (may be
taken concurrently). Provides a working knowledge of
current electrophysiological techniques in integrative
and behavioral neuroscience through demonstrations,
and individual research problems. Synaptic transmis-
sion, excitatble membranes, sensory perception and
circuits of neurons generating behavior will be
studied using intra- and extracellular recording, dye in-
jection, and ionophoresis techniques. Laboratory
(F) Zucker, Miller.

262. Integrative Neurobiology. (3) Three hours of
lecture and one hour of discussion per week. Pre-
rerequisites: 260 or 261 (may be taken concurrently).
Formerly IDS 200B. In-depth consideration of current
research questions central to the understand-
ing of the organization of nervous systems, and of the
behavior mediated by these systems. When appro-
priate these questions are illustrated with exam-
ple drawn from both the vertebrate and inverte-
brate literature. Course, networks, or system analogs
and analysis will be emphasized where these ap-
proaches lend clarity. Sensory-motor integration is dis-
cussed in small systems or neurons. (SP) Miller,
Keller, Werblin, Jacobs.

263. Advanced Developmental Neurobiology. (3)
Three hours of lecture per week. Prerequisites: 162 or
 equivalent. Advanced level coverage of current
research problems in the embryonic and post-embryonic
development of vertebrate and invertebrate nervous
systems. Offered odd-numbered years. (SP) Goodman.

264. Neural Networks and Biological Computation.
(3) Three hours of lecture per week. Prerequisites:
Consent of instructor, 160, Math 504-508. Survey of
work on neural nets including that of Pitts and Mo-
noccio (binary nets), Rosenblat (perceptrons), Min-
sky and Papert (perceptrons), the Parallel Distributed
Processing (PDP) theories and applications to nervous
and other. The biology and psychophysics of the human
visual system will also be described. Many examples
of applications of neural nets to vision and to other
problems of biology and physics will be given. (F)
Glaser.

265. Advanced Topics in Neurobiology. (1) Course
may be repeated for credit. Hours to be arranged.
Must be taken on a satisfactory/unsatisfactory basis.
Prerequisites: 160 or consent of instructor. Review of
recent literature and discussion of original research.
(F,SP) Miller.

266. Development of the Leech Nervous System. (2)
(F,SP) Stent.

268. Synaptic Transmission and Neuromodulation.
(2) (F,SP) Zucker.

269. Neurodynamics. (2) (F,SP) Freeman.

269D. Invertebrate Neurobiology. (2) (F,SP) Miller,
Jacobs.

269E. Auditory Neurosciences. (2) (F,SP) Winer.

269F. Retinal Signal Processing. (2) (F,SP) Owen.

269G. Neural Systems. (2) (F,SP) Westphal.

269H. Recent Advances in Retinal Neurobiology. (2)
(F,SP) Werblin.

269I. Psychophysical and Computational Studies of Vi-
sion. (2) (F,SP) Glaser.

269J. Auditory Transduction. (2) (F,SP) Bearden.

269K. Ionic Channels and Membrane Excitability. (2)
(F,SP) Lecar.

269M. Receptors Controlling Neuronal Process Out-
growth. (2) (F,SP) Lecar.

269N. Development of the Mammalian Central Ner-
vous System. (2) (F,SP) Shatz.

269P. Molecular Genetic Analysis of Pathway and Tar-
get Recognition. (2) (F,SP) Goodman.

269Q. Neuron Process Outgrowth. (2) (F,SP) Bentley.

269R. Potassium Channels and Synaptic Plasticity. (2)
(F,SP) Isacoff.

269S. Molecular Mechanisms of Olfaction. (2) (F,SP) Ngai.

All Divisions

199. Supervised Independent Study and Research. (1-4)
Course may be repeated for a maximum of 8 units. Laboratory research
conferences. Prerequisites: Enrollment in departmental honors program and consent of instructor. Formerly
Biochemistry H195, Biology H195, Biophysics 195A-
195B, Genetics H195, Microbiology and Immunology
H195A, Molecular Biology H195B, Physiology 195H,
Zoology 196A-B. Individual research followed by a written report, under the supervision of a staff member.
At least 4 units of 199A are needed for honors in 199.

199A. Supervised Independent Study and Research. (1-4)
Course may be repeated for credit. Laboratory
research. Must be taken on a pass/no pass basis.
Prerequisites: Consent of instructor. Formerly
Biochemistry 199A, Biology 199A, Biophysics 199A,
Genetics 199, Microbiology and Immunology 199, Molecular
Biology 199B, Physiology 199B, Zoology 199B. Enrollment
restrictions apply; see the Introduction to Courses and Curricula section of this catalog. (F,SP) Staff.

290. Graduate Seminar. (1) Course may be repeated
for credit. One hour of seminar per week. Prerequisites:
Consent of instructor, 160, Math 504-508. Survey of
work on neural nets including that of Pitts and Mo-

*On leave, spring, fall.
*On leave, fall.


### Professional Courses

380. Teaching of Molecular and Cell Biology, (2) Course May be repeated for a maximum of 4 units. Weekly seminar with instructor and teaching hours as assigned. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing; consent of instructor. Formerly BEHS 302, Biochemistry 300, Physiology 300, Zoology 301, 302. Teaching laboratories and/or discussions for Molecular and Cell Biology courses; analysis of specific format and problems. (F,SP) Staff

481. Instrumentation in Molecular and Cell Biology. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing; consent of instructor and sponsorship of a faculty member. Formerly BEHS 185 and Biology 499. Individualized laboratory instrumentation projects. (SP) Staff

481A. Microchemical Instrumentation. (1-4) Prerequisites: Graduate standing; consent of instructor and sponsorship of a faculty member. Formerly IDS 292. Good grades are essential.

481B. Transmission Electron Microscopy. (1-4) Prerequisites: Graduate standing; consent of instructor and sponsorship of a faculty member. Formerly Biology 499. (FSP) Scllwa

481C. Scanning Electron Microscopy. (1-4) Prerequisites: Graduate standing; consent of instructor and sponsorship of a faculty member. Formerly Biology 499. (FSP) Scllwa

481D. Physiological Instrumentation. (1-4) Prerequisites: Graduate standing; consent of instructor and sponsorship of a faculty member. Formerly Physiology 492. Instruction in the design and construction of mechanical instruments, application of individual mechanical instrumentation projects to monitoring of physiological parameters. (F,SP) Zuckier

481E: Principles and Operation of the Light Microscope. (1-4) Prerequisites: Graduate standing; consent of instructor and sponsorship of a faculty member. Formerly BEHS 185. Thornton

481F. Basic Scientific Photography. (1-4) Prerequisites: Graduate standing; consent of instructor and sponsorship of a faculty member. Formerly Biology 499. Black and white photographic skills; developing, printing, and exposure. Students must have access to a 35mm camera.

### Interdepartmental Studies Courses

#### Lower Division Course

IDS 41X: Heredity and Society, (4) Two hours of lecture and two hours of discussion per week. Prerequisites: Primarily for students not majoring in the biological sciences. Basic genetic principles and mapping. Emphasis on the relation of genetics to global problems of human and environmental health. Also listed as Molecular and Cell Biology 41X and Plant Biology 41X. (SP) Feeuing

#### Upper Division Courses

IDS 114A-114B. Advances in Aging: Alzheimer’s Disease; Biological and Social Dimensions. (2) Two hours of 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, socio-economic, legal and ethical). Invited speakers with special expertise in these areas will participate. Sponsoring departments: Optometry, Social Welfare, Public Health, and Molecular and Cell Biology.

IDS 115. Multidisciplinary Studies and Field Experience in Aging. (2) Two hours of seminar per week for seven weeks and six hours of fieldwork. Prerequisites: Upper division or graduate student and consent of instructor. Students must be 70 years and over. Students will visit older patients from local geriatric clinic and confer with clinic staff. One-hour weekly seminar consists of lecture on aging by faculty from specific discipline. Other hours are devoted to case presentation by student on a patient’s condition. Course grade is based on student participation and final paper demonstrating this knowledge. Two hours of nature of aging and caring for older people. Sponsoring departments: Optometry, Social Welfare, Public Health, and Molecular and Cell Biology. (F)

#### Graduate Courses

IDS 229. Protein/Nucleic Acid Chemistry and Enzymology. (3) Three hours of lecture per week. Prerequisites: Graduate standing or consent of instructor. Protein structure, denaturation and folding, protein-nucleic acid chemistry, structure and cleavage. Protein-protein and protein-nucleic acid interactions. Enzymes: kinetics and mechanism, catalytic ability, and inhibitors. Interd for graduate students in Biochemistry and Molecular and Cell Biology. Also listed as Chemistry 230 and Molecular and Cell Biology 214. (SP) Kinnison

IDS 282. Tumor Biology Seminar. (1) Course may be repeated for credit. One hour of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of Instructor, Reviews and reports of current research in tumor biology. Sponsoring departments: Integrative Biology and Molecular and Cell Biology.

IDS 295. Systems and Integrative Biology. (1) Course may be repeated for credit. Two hours in a seminar/lecture every other week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing or consent of instructor. Development and current research in integrative, developmental, and regulatory biology. Emphasizes on interdisciplinary communication and approaches. Sponsoring departments: Nutritional Sciences and Molecular and Cell Biology. (SP) Staff

### Music (College of Letters and Science)

- **Department Office:** 104 Morrison Hall, 642-2678
- **Chair:** Joseph Kermann, Ph.D.

#### Professors:

- Richard L. Crook, Ph.D. Yale University. Medieval music, 14th century
- Alan Curtis, Ph.D. University of Illinois. Early music

#### Staff:

- Edwin Dugger, M.F.A. Princeton University. Composition, electroacoustic music
- Richard Feldman, Ph.D. University of Iowa. Composition, contemporary music, acoustics
- Daniel Haas, Ph.D. University of Maryland. Contemporary music

#### Instructor:

- Lawrence H. Moe, Ph.D. (Emeritus)
- Joseph Kermann, Ph.D. Princeton University. Criticism, 16th- and 17th-century music
- Anthony Newcomb, Ph.D. Princeton University. Italian renaissance, 19th-century music
- John Roberts, Ph.D. University of California at Berkeley. Early music, 16th-century music
- Richard Terstal, Ph.D. Columbia University. Renaissance period, Russian music, Stravinsky
- John Thorp, Ph.D. Harvard University. Composition, 20th-century music
- Bonnie C. Wada, Ph.D. University of California. Conducting, South and East Asia
- David Wessel, Ph.D. Stanford University. Computer music, music perception
- Oly Wilson, Ph.D. University of Iowa. Composition, 20th-century music, contemporary music

#### Lecturers:

- Andrew W. Imbrie, M.A. (Emeritus)
- Lawrence H. Moe, Ph.D. (Emeritus)
- Joseph Kermann, Ph.D. (Emeritus)
- Michael Senturia, A.B. (Emeritus)
- Edgar H. Sparks, Ph.D. (Emeritus)

#### Assistant Professor:

- John But, Ph.D. Cambridge University. Organ, J.S. Bach

#### Assistant Professors:

- Benjamin Briner, Ph.D. University of California at Berkeley. Ethnomusicology, Indonesian music
- Cindy Cox, Indiana University. Composition
- Media Kuiper, Ph.D. University of California. Conducting
- Judith Lerman, Ph.D. University of Chicago. Composition
- Jung-Joo Ro, M.M. University of Southern California. Orchestral conducting
- Elizabeth Davidson, M.A. (Emerita)
- John M. Swachhammer, A.B. (Emeritus)

#### University Garitellists:

- Ronald M. Barnes, M.A.
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 50A-50B; Harmony 60A-60B.

Second Year. Musicianship 51A-51B; Harmony 61A-61B; History of Western Music 70-71.

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 (normally fall-spring) of either Music 141, University Symphony, or Music 144, University Chorus; and two additional courses from the performance series 140-149. (b) One course from the series 150-159 and one course from the series 170-179. (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 the major.

Honors Program: The Department of Music offers an individualized program leading to the A.B. degree with honors. Students with a grade-point average of 3.3 overall and 3.5 in the major may apply to enroll in the honors program in the last two semesters of their undergraduate study. The program is intended to recognize significant creativity and effort exceeding the scope of regular course work. This is demonstrated by means of a special project undertaken under course H118 for one or two semesters. Application for admission to the program consists of a detailed outline of the project signed by a supervising faculty member. Forms for this application, with more detailed criteria for approval, can be obtained from the department office. The application is submitted for approval to the Honors Committee, consisting of the department chairman and five other recommended faculty advisors, no later than the end of the first week of the semester in which the project is started.

Teaching Training. Consult major advisers.

The Minor

Lower Division

Two courses in musicianship and two courses in harmony from the major series 50A-50B or the nonmajor series 20A-20B and 25A-25B; Introduction to Music 27, History of Western Music 70, or equivalent.

Upper Division

A minimum of five courses. At least two must be taken from courses numbered in the 120s and 130s (including IDS 135) and at least two must be taken from courses numbered in the 140s. A course numbered between 151 and 179 may be substituted for a course in the 120s and 130s on completion of the prerequisites and with the instructor's approval.

All courses taken in the minor must be taken for a letter grade. The Department of Music office for confirmation that they have completed the minor program. They should bring a copy of their Dean's Card.

Students who wish to take the harmony and musicianship classes for majors must first take the placement examination, which is given at the beginning of each semester.

Adviser for the minor: Ms. Dana.

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 require the guidance of at least one student instructor 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 exams are made by December 15.

Medieval Studies. Please see Index for information on Medieval Studies.

Group I

Courses open to all students in the University.

Lower Division Courses

20A-20B. Basic Musicianship. 2 (2) Three hours of lecture 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 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 music. Perceptual and psychological aspects of musical categories. Perceptual grouping mechanisms; perceptual principles for orchestration. (SP) Wessel

116. Jazz Theory and Musicianship. 4 Three hours of lecture per week. Prerequisites: Audition. A systematic study of jazz theory including chord and scale construction, chord progression, and chord application, applied to playing, singing, transcribing, and aural identification of scales, patterns, chords, melodic forms, key changes, voicings and improvisation. Materials will be drawn from jazz music, 1940 to the present. (SP) Dana

History and Literature

Lower Division Courses

26. Music in American Culture. 4 Three hours of lecture per week. Two perspectives are developed: 1) diverse music of groups in America and 2) American music as a unique phenomenon. Groups considered are African, Asian, European, Hispanic, Afro, and Native American. Lectures and musical examples are organized by topics such as music of socio-economic subgroups within large groups, survival of culture, patrinity, religious and concert music, and the folk-popular music continuum. This course satisfies the American cultures requirement. (SP)

27. Introduction to Music. 4 Two hours of lecture, one hour of discussion, and one hour of discussion per week. Devoted to the development of listening skills, and a survey of major forms and types of Western art music. This fall semester will also include musical examples drawn from various other cultures, (F,SP) Butt

39. Freshman/Sophomore Seminar. 2 (4) Course may be repeated for credit as topic varies. Seminar format. Sections 1-2 to be graded on a letter-grade basis. Sections 3-4 to be graded on a pass/fail basis. Prerequisites: None. Offered to freshmen and sophomores. Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester.

40. Classical Music: Performance and Context. 1 One hour of seminar per week. This seminar will examine selected classical music from J.S. Bach to Philip Glass. Topics to be considered are the role of performance and technology in classical music, its changing audiences, and its function in today's world. Students will attend three concerts which will form subjects for discussion. Readings and listening assignments.

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 hours of lecture, one hour of discussion, and one hour of listening 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-end dramatic aspects of opera. Lectures on selected operas will be supplemented by assigned recordings and films or videotapes of notable performances. (F) Dugger

128B. Beethoven. 4 Three hours of lecture and one hour of listening per week. Prerequisites: 27 or consent of instructor. Emphasis on the symphonies. (SP) Crocker

128C. Contemporary Music. 4 Three hours of lecture and one hour of listening 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 hour of listening per week. Prerequisites: 27 or consent of instructor.

128E. Mozart and Haydn. 4 Three hours of lecture and one hour of listening per week. Prerequisites: 27 or consent of instructor.
132F. Music of Johannes Brahms. (3) Three hours of lecture and one hour of listening per week. Prerequisites: 27 or consent of instructor.

132G. 19th- and 20th-Century Symphonic Literature. (4) Three hours of lecture and one hour of listening per week. Prerequisites: 27 or consent of instructor. Survey of principal literature of the period, from Beethoven to Stravinsky. (F, P) Pak

132H. The Piano Concerto. (4) Three hours of lecture and one hour of listening per week. Prerequisites: 27 or consent of instructor. A study of the development of the 19th-century piano concerto.

132I. Russian Music. (4) Three hours of lecture and one hour of listening per week. Prerequisites: 27 or consent of instructor. Survey of Russian music including liturgical chant, 18th-century folk music sources, and art music from the 18th century into the 20th century.

132J. Music from the Middle Ages to the High Renaissance. (4) Three hours of lecture and one hour of listening per week. Prerequisites: 27 or consent of instructor. A study of selected repertories from the 14th to the 17th centuries.

132K. Choral Literature. (4) Three hours of lecture per week. Prerequisites: 27 or consent of instructor. A survey 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.

132M. Wagner. (4) Three hours of lecture per week. Prerequisites: 27 or 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.

132N. From Troubadours to T.V. (4) Three hours of lecture per week. A study of vocal idioms of different cultures and different historical periods. Topics will include popular song and "art" song, speaking vs. singing, the diva and the pop idol, and the threat of rock. Readings from Medieval moralists, Renaissance theorists, fin-de-siecle decadents, and 20th-century critics.

132P. The Music of Women Composers. (4) Three hours of lecture and one hour of listening per week. Prerequisites: 27 or consent of instructor. Survey of representative works by women from antiquity to the present. The 20th century: women composers, Hildegard von Bingen, Maddalena Casulana, Clara Schumann, Amy Beach, Alma Mahler, Ruth Steeger, Vivian Fine, Ellen Zwilich, Joan Tower, and Libby Larsen. (SP) Cox

132S. Studies in the Carillon. (4) Three hours of lecture per week. Prerequisites: 25A and 27 or knowledge of basic music history and theory or consent of instructor. A survey of the history and development of the carillon and its music. A discussion and analysis of the carillon as a historical instrument writing and performing with emphasis on the North American carillon movement in the twentieth century.

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) Three hours of lecture plus field work laboratory per week. Focus on issues of ethnicity raised in the field of ethnomusicology, 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 focusing on public celebrations of ethnicity, in order to relate theory to the lives of California ethnic groups.

Upper Division Courses

130A. African American Music. (4) Three hours of lecture and one hour of discussion per week. Study of the African-American music from its West African origins to the various forms at the end of the 18th century.


132. Music of the Middle East. (4) Three hours of lecture per week. Music of the Middle East, including folk, art, popular and religious music of the Pan-Islamic and Israeli traditions.

133A. Music of the Southeast Asia Tradition. (4) Three hours of lecture and one hour of laboratory per week. Surveys the musics of Indonesia (Java and Bali), Thailand, Cambodia, Laos, Malaysia, and the Philippines—cultures which share instrument types but have developed distinctive musical styles. (SP) Brinner

133B. Music of India. (4) Three hours of lecture and one hour of laboratory per week. Includes traditional music traditions of both North and South India (Hindustani and Karnatak musics). Emphasis on class listening. (F) Waddle

134A. Music of the East Asia Tradition. (4) Three hours of lecture and one hour of laboratory per week. Surveys the musics of China, Tibet, Korea, Vietnam, and Japan—cultures which share instrument types but have developed distinctive musical styles.

134B. Music of Japan. (4) Three hours of lecture and one hour of laboratory per week. Traditional classical musics of Japan: Shinto ritual music, the imperial court orchestral music and dance, biwa and shakuhachi forms, chamber music for shamisen and koto, the artificial genre of kabuki and noh. Reading in music and pertinent Japanese literature in translation.

Performance
Admission to all performance courses is determined by audition, as listed 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.

Upper Division Courses

140. Javanese Gamelan. (3) Course may be repeated for credit. Four hours of rehearsal per week. A performing course for the study and practice of Indonesian music and Instruments. (F,SP)

141. University Symphony Orchestra. (2) Course may be repeated for credit. Four hours of rehearsal per week. Prerequisites: Audition. May be taken for credit or audited. (F,SP) Pak

142. University Concert Band. (2) Course may be repeated for credit. Four hours of rehearsal per week. Prerequisites: Audition. Performance of wind and percussion repertory by groups of varying sizes will be covered by this course. May be taken for credit or audited.

144. University Chorus (2) Course may be repeated for credit. Three hours of rehearsal and one hour of sectional rehearsal per week. Prerequisites: Audition. The University Chorus primarily performs major works for chorus and orchestra. (F,SP) Kuzma

145. University Chamber Chorus. (2) Course may be repeated for credit. Four hours of rehearsal per week. Prerequisites: Audition. A smaller mixed choir that aims at a professional standard of ensemble singing as it covers the lesser-known choral repertoire. (F,SP) Butt

146. Chamber Music Ensemble. (2) Course may be repeated for credit. Four hours of rehearsal per week. Chamber music for strings, winds, piano, percussion, and voice. (F,SP) Crowlen, Guggenheim, Pollock

147. Contemporary Chamber Music Ensemble. (2) Course may be repeated for credit. Four hours of rehearsal per week. A group organized to perform and study compositions representing recent developments in music.

148. African Music Ensemble. (2) Course may be repeated for credit. Four hours of rehearsal per week. Performance of West African music with particular emphasis on the music of Ghana. Practical instruction in traditional instrumental and vocal techniques. (F,SP) Ladzekpo

149. Collegium Musicum. (2) Course may be repeated for credit. Four hours of rehearsal per week. Performance of Renaissance and Baroque music for voices and instruments. (F,SP)

Group II

Courses primarily for students whose major subject is music.

Note: Musicianship 50A-50B and 51A-51B (formerly 1A-1B and 2A-2B). Harmony 1A and 1B may be taken for credit or audited. Four hours of rehearsal per week. Performance of West African music with particular emphasis on the music of Senegal. Practical instruction in traditional instrumental and vocal techniques. (F,SP) Ladzekpo.

50A-50B. Musicianship. (3) Three class hours per week. Prerequisites: Majors only; 50A is prerequisite to 50B. Formerly A-B. Ear training, eight sight-singing, and dictation. (F,SP) Dana, Rosenak

51A-51B. Musicianship. (3) Three class hours per week. Prerequisites: 50A is prerequisite to 51A; 51A is prerequisite to 51B. Formerly A-C. A continuation of 50A-50B. (F,SP) Dana, Rosenak

60A-60B. Harmony. (4) Three class hours per week. Prerequisites: 60A is prerequisite to 60B. Formerly 1A-1B. Diatonic harmony, modal analysis, and analytical studies. Emphasis on written exercises. (F,SP) Staff (Duggan in charge)

61A-61B. Harmony. (4) Three class hours per week. Prerequisites: 60B is prerequisite to 61A; 61A is prerequisite to 61B. Formerly 2A-2B. Advanced diatonic, chromatic, and early 20th-century harmony. Emphasis on written exercises. (F,SP) Staff (Lideman in charge)

Theory

Upper Division Courses

150. Instrumental and Vocal Instruction. (1) Course may be repeated for credit if B average is maintained. One half-hour laboratory per week. Prerequisites: Must be a music major. Advanced private instruction in keyboard, stringed, woodwind, brass, and percussion instruments and in voice. (F,SP) Butt in charge

151. Introduction to Composition. (4) Three hours of class 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 eighteenth- and nineteenth-century models. (SP) Lideman

152. Advanced Musicianship. (2) May be repeated once for credit. Three hours of class per week. Prerequisites: D, 2B, 450D, 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) Dana

153. Fugue. (3) Three hours of class per week. Prerequisites: 154A. A study of subjects, answers, counter-subjects, expositions, episodes and stretti, leading
Upper Division Courses

171A. Studies in Medieval and Renaissance Music. (4) Three hours of lecture per week. Prerequisites: 2B and 70 or consent of instructor. (F) Curtis

171B. The Performance of Medieval and Renaissance Music. (4) Three hours of lecture per week. Prerequisites: 2B and 70 or consent of instructor; experience in playing an instrument or singing. Formerly 171A. A study of the music of the Middle Ages and the Renaissance, with emphasis on performance practices and styles.

171C. Monteverdi. (4) Three hours of lecture per week. Prerequisites: 2B and 70, or consent of instructor. Formerly 171B.

171D. The Performance of Baroque Music. (4) Three hours of lecture per week. Prerequisites: 2B and 70, or consent of instructor; experience in playing an instrument or singing. Formerly 171C. A study of music from 1600-1750 with emphasis on performance practices and style.

171E. J. S. Bach. (4) Three hours of lecture per week. Prerequisites: 2B and 70, or consent of instructor. Formerly 171D.

172A. Mozart. (4) Three hours of lecture per week. Prerequisites: 2B and 70, or consent of instructor.

172B. Beethoven. (4) Three hours of lecture per week. Prerequisites: 2B and 70, or consent of instructor.

172C. Art Song of the Nineteenth Century. (4) Three hours of lecture per week. Prerequisites: 2B and 70, or consent of instructor. A study of the Art Song with emphasis on the music of Schubert and Schumann. (SP) Kuzma

172D. Schubert to Brahms. (4) Three hours of lecture per week. Prerequisites: 2B and 70, or consent of instructor. A study of the operas of Wagner's Ring cycle.

172E. American Song. (4) Three hours of lecture per week. Prerequisites: 2B and 70, or consent of instructor. A study of the American Song with emphasis on the music of Debussy and Mahler. (SP) Crocker

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.

Lower Division Courses

70. History of Western Music I. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 15B or consent of instructor. Formerly 70A-70B. An introduction to music history and criticism, and practice in analytical methods for music of all periods, with emphasis on listening, exercises and papers. Music of the eighteenth and nineteenth centuries. For a continuation, see 71. (F)

71. History of Western Music II. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 70 and consent of instructor. Formerly 170. Music of the 20th century. (SP)

Honors and Special Studies Courses

Upper Division Courses

H195. Special Study for Honors Candidates in Music. (4) Course may be repeated once for credit. Independent study. Prerequisites: Restricted to Seniors with a grade-point average of 3.3 in major and 3.5 in the major. Consent of instructor and Department Honors Committee. Individual tutorials leading to the completion of a special honors project. (F,SP)

196. Group Special Study for Advanced Undergraduates. (2-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. Not to serve in lieu of regular courses of instruction. (F,SP)

197. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a pass/no pass basis. Not to serve in lieu of regular courses of instruction. Enrollment restrictions; apply; see the Introduction to Courses and Curricula section of this catalog. (F,SP)

Graduate Courses

Students must obtain consent of instructor before enrolling in any graduate courses.

200A. Introduction to Music Scholarship I. (2) One and one-half hours of seminar per week. Principles of music bibliography, techniques of library research, sources of information on music, problems in bibliographic citation and description. Presentation of results in written and oral forms. (F) Roberts

200B. Introduction to Music Scholarship II. (4) Three hours of seminar per week. Principles and methods of scholarly research in Western art music, especially history and criticism of music; use of documentation and design of projects. Presentation of results in written and oral forms. (F) Kerman

200C. Introduction to Music Scholarship III. (4) Three hours of seminar per week. Introduction to issues and methods in ethnomusicology, from the perspectives of both the social sciences and music. Presentation of results in written and oral forms. (SP) Wade

201. Workshop in Electronic Music. (4) Course may be repeated for credit. Three hours of workshop and nine hours of laboratory per week. A consideration of compositional and technical issues necessary to create work with electronic instruments. (F,SP)

202. Seminar in Contemporary Music. (4) Course may be repeated for credit. Three hours of seminar per week. Studies in 20th-century music. Emphasis on the analysis of the works of contemporary composers. (SP) Fielding

203. Seminar in Composition. (4) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: 156, or consent of instructor. Advanced problems in orchestration. (SP) Wilson

204. Studies in Musical Analysis. (4) Course may be repeated for credit. Three hours of seminar per week. A study of the principles of contemporary music, with emphasis on the analysis of music in terms of structure, form, and style. (SP) Wilson

205. Organology. (4) Three hours of seminar per week. A study of the construction and function of instruments from various perspectives including psychological characteristics, classification systems, symbolism, iconography, and performance techniques. (F,SP) Wilson

206. Seminar in 12-Tone Practice. (4) Three hours of seminar per week. A study of the techniques and practices of the 12-tone works from the Viennese school to the present. (SP) Kuzma

208. Advanced Problems in Orchestration. (4) Three hours of seminar per week. A study of advanced problems in orchestration and techniques of contemporary music. Composition required. Enrollment restricted to students with consent of instructor. (SP) Fielding

210. Proseminar in Music History. Three hours of seminar per week. Studies in the history and literature of Western art music, dealing with representative composers, music, and topics. The courses listed below will be given in rotation.

210A. Gregorian and Medieval Chant. (4)

210B. Medieval Polyphony. (4)
235. Ethnomusicology Methods: Field Research. (4) Course may be repeated for credit. Three hours of lecture per week. Formerly Music 238A. Techniques, equipment, research and data collection, analysis, documentation, notation, transcription. (F) Brinner

290. Colloquium. (1) Course may be repeated for credit. About five meetings per semester. Must be taken on a satisfactory/unsatisfactory basis. Meetings for the presentation of original work by faculty, visiting lecturers, and advanced graduate students. Assigned readings. In rotation members of the class will be appointed as respondents for the papers. (F,SP) Kerman

291A. Oral Performance: Neoetics and Poetics. (4) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Consent of Instructor required. This seminar will explore how oral performance traditions organize and manage knowledge. Emphasis will be placed upon the totality of the performance, with a focus upon music as a codeterminant of the meaning and a catalyst for composing the text. Also listed as Interdepartmental Studies 291A, Rhetoric 291A and Southeast Asian 291A.

298. Group Special Studies. (2-8) Course may be repeated for credit. Meetings are arranged according to units taken. Open to normally qualified graduate students for research or creative work, including work on the doctoral dissertation. Such work shall not serve in lieu of regular courses of instruction. (F,SP)

299. Special Study. (2-12) Course may be repeated for credit. Meetings are arranged according to units taken. Open to normally qualified graduate students for research or creative work, including work on the doctoral dissertation. Such work shall not serve in lieu of regular courses of instruction. (F,SP)

681. Individual Study for Master's Students. (1-6) Course may be repeated for credit. Course does not satisfy unit or residence requirements for master's degree. Meetings are arranged according to units taken. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: For candidates for master's degree. Preparation for the comprehensive or language requirements in consultation with the field adviser. (F,SP)

682. Individual Study for Doctoral Students. (1-6) Course may be repeated for credit. Course does not satisfy unit or residence requirements for doctoral degree. Meetings are arranged according to units taken. Must be taken on a satisfactory/unsatisfactory basis. Special study under the direction of a staff member with emphasis on the teaching of undergraduate courses in music. (F,SP)

405A-405B. Elementary Piano. (1) One hour of class per week. Must be taken on a passed/not passed basis. Prerequisites: Open only to majors in music. Required of music majors who do not pass the entrance examination in piano. (F,SP) Bidwell, Chow

405C-405D. Elementary Piano. (1) One hour of class per week. Must be taken on a passed/not passed basis. Prerequisites: 405B is prerequisite to 405C. C is prerequisite to D; open only to majors in music. Required of music majors who do not pass the entrance examination in piano. (F,SP) Bidwell, Chow.

410A-410B. Vocal Technique. (1) One hour of class per week. Must be taken on a passed/not passed basis. Prerequisites: Major or minor in Music or enrollment in the University Choruses and consent of instructor. A course in basic vocal techniques, primarily for students in the University Choruses, covering techniques of breathing, pronunciation, and articulation. (F,SP) BenBickel

Interdepartmental Studies Courses

Upper Division Course

IDS 135. Mozart and Beaumarchais: The Figaro Cycle. (4) Three hours of lecture plus extensive listening assignments. Prerequisites: Music 130 or French or music major, or consent of instructor. Beaumarchais's plays as a portrait of European society on the eve of the French Revolution, and its 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 Molinari Don Juan. Sponsoring departments: Music and French.

Graduate Course

IDS 291A. Oral Performance: Neoetics and Poetics. (4) Course may be repeated for credit. Three hours of seminar per week. Formerly Music 238A. Techniques, equipment, research and data collection, analysis, documentation, notation, transcription. (F) Brinner

Native American Studies

(Special Studies or College of Letters and Science)

Program and Major Office: 3410 DeWitt Hall, 546-2717
Coordinator: Clara Sue Kidwell, Ph.D.
Assistants: Sara Kidwell, Ph.D., Clara Kldweli, Ph.D., Terry Wilson, Ph.D., Ruth Hopper.

Undergraduate Major Advisers: Ms. Kidwell, Ms. Hopper.

The Native American Studies Program exists to broaden the understanding of students interested in the history, culture, and contemporary situations of Native Americans. The curriculum has been structured to provide courses that deal with both historical and cultural analysis of Native American cultures and contemporary legal and social institutions that affect Native American life. The program, not only stresses sound academic preparation in the classroom but also allows students the flexibility to take part in community-oriented education through field work or studies directed toward community situations and problems.

Choice of Program

A student can complete the major in Native American Studies in the College of Letters and Science (A.B. degree) or in the Department of Ethnic Studies (A.B. degree). Students in each program are subject to the requirements of the respective college or department.

The Major

The major program in Native American Studies leads to an A.B. degree. Admission to the program requires written approval from a program academic adviser who will assist in working out an appropriate course of study. Consultation with the adviser for admission into the major should be held no later than the first semester of the junior year. Students will be required to outline their academic and professional goals.
Requirements

1. University Requirements. (a) Completion of 120 units, at least 36 of which must be in upper division, with a cumulative grade-point average of 2.0 or better: (b) Completion of senior residence, Subject A, and American History and Institutions requirements.

2. Major Requirements. (a) 71: Native Americans in North America to 1900. (b) 72: Native Americans in the 20th Century. (c) Ethnic Studies 50 or 51. (d) NAS 100: Native American Law. (e) 110: Theories and Methods in Native American Studies or ES 194: Quantitative Methods for Community Research or ES 195: Selected Issues in Third World Research. (f) Four upper division NAS courses, taken from three of the disciplinary areas in the program. Students will choose an area of emphasis, from which they will take two of the four required courses. The course number system reflects the areas; i.e., 140s are social science courses, 150s are humanities courses, 170s are history courses, and 100s are law/policy courses. (g) One upper division course from the ethnic studies group major.

3. Breadth Requirements—Special Studies (for College of Letters and Science breadth requirements, see the college announcement), (a) 1A and 1B: Native American Studies Reading and Composition (or an equivalent); (b) natural science: one course; (c) three upper division courses outside major disciplines. Students: Social science: one course; humanities: one course; one additional course in the area of emphasis, i.e., social sciences, humanities.

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 GTA in the major. To complete the degree with honors the student will be required to undertake a 4-unit research 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 these faculty members will establish criteria and grade the project.

The Minor

Students in the College of Letters and Science may complete more than one minor, normally in a field both academically and administratively distinct from their major.

Lower Division. One course: NAS 71 or 72.

Upper Division. Five courses: Law: NAS 100; NAS 110 or ES 194 or ES 195; one course from each of the disciplinary areas in the major (social sciences: courses numbered in the 140s; humanities: courses numbered in the 150s; history: courses numbered in the 170s).

Lower Division Courses

1A. Native American Studies Reading and Composition. (4) Three hours of lecture and one hour of writing workshop per week. Prerequisites: Satisfaction of Subject A requirement. This course introduces students to the genres of Native American literature (written and oral traditions), provides historical and cultural frameworks for understanding, appreciating, and interpreting Native American writings, and develops basic skills in expository and creative writing. Molesky

1B. Native American Studies Reading and Composition. (4) Three hours of lecture and one hour of workshop per week. Prerequisites: 1A. Course examines Native American written and oral traditions in historical and cultural contexts. Emphasis on literary interpretation and creative and analytical writing, so that students increasingly write from positions of strength. Molesky

71. Native Americans in North America to 1900. (4) Three hours of lecture and one hour of discussion per week. Formerly 71A and 71B. An ethnobiological analysis of America's original inhabitants and their interactions with Europeans and Euro-Americans emphasizing an Indian perspective. (F) Wilson

72. Native Americans in the 20th Century. (4) Three hours of lecture and one hour of discussion per week. Formerly 50 and 71B. A survey and analysis of issues affecting Native Americans in the 20th century. Course will explore political, economic, and social/cultural developments in the United States during that period and the role of Indian tribes. (F) Wilson

80. Freshman Seminar—Myth, Memory and History. (4) Three hours of seminar per week. Prerequisites: Limited to Freshmen. The course will introduce students to different ways of understanding the history of American Indians and to basic resources and research methods for studying the history of Indian tribes. Kidwell

98. Supervised Group Study and Research. (1-3) Course may be repeated for credit. Hours to be arranged. Must be taken on a pass/fail basis. Prerequisites: Consent of Instructor. Limited to freshmen and sophomores. Supervised research by lower division students. (F,SP) Kidwell

Upper Division Courses

100. Native American Law. (4) Three hours of lecture per week. Prerequisites: 71, 72, or consent of Instructor. Historical background of the unique relationship between the United States government and Native American tribes, and examination of contemporary legislation, court cases, and federal, state, and local policies affecting Native American social, political, legal, and economic situations. (F) Staff

101. Native American Tribal Governments. (4) Three hours of lecture per week. Prerequisites: 71, 72, or consent of instructor. Overview of formal and informal aspects of tribal governments and policies affecting the lives of Native American people, the basis for their political power historically and in contemporary society, and their structure and functions. (SP) Staff

104. Native American Economic Development. (4) Three hours of lecture per week. Prerequisites: 72 or consent of instructor. Analysis of impact of U.S. economic policies on tribal lands and resources. Examination of the effect of federal legislation, Bureau of Indian Affairs regulations, and corporate interests on tribal economic life. Consideration of alternative strategies of development. (SP) Staff

110. Theories and Methods in Native American Studies. (4) Three hours of lecture per week. Prerequisites: 71 or consent of instructor. Overview of literary theory and criticism, historiography, and social sciences theories and methods useful in the study of Native American literature, history and contemporary tribal groups. Course will develop skills of information gathering and development of theories that structure information. (SP) Staff

149. Native American Women. (4) Three hours of lecture per week. Prerequisites: 71 or 72, or consent of instructor. Formerly 159. An overview of the role of women in traditional Indian societies and in the modern United States, the socialization of Indian women, the role of women in women's movements, and women's roles in contemporary society. (SP) Staff

150. Native American Narratives. (4) Three hours of seminar per week. Prerequisites: Junior or senior standing. Course provides intensive study of the crafts of writing in relation to various Native American genres as well as writing and discussion of student work. (F) Molecy

151. Native American Philosophy. (4) Three hours of lecture per week. Prerequisites: Consent of Instructor. An introduction to the philosophic and metaphysical aspects of Native American world views, with emphasis on systems of knowledge, explanations of natural phenomena, and relationships of human beings to nature through ritual and ceremonial observances. (F) Kidwell

152. Native American Literature. (4) Three hours of lecture per week. Prerequisites: 151 is recommended but not required. An analysis of the written and oral traditions developed by North American Indian peoples. Course will be placed on a multifaceted approach (aesthetic, linguistic, psychological, historical, and cultural) in examining American Indian literature. (F) Viteznor

155. Native American Medicine. (4) Three hours of seminar per week. Prerequisites: 71, Anthropology 3, or consent of instructor. Course examines methods of Native American healing and curing practices, including herbal medicines, ceremonies, and physical techniques, among Native American groups in North and South America. Kidwell

156. Native American Autobiographies. (4) Three hours of lecture per week. Prerequisites: 152 or consent of instructor. Native American Indian autobiographies as literature and comparative cultural histories: representational and postmodern themes, with critical and theoretical attention to tribal hermeneutics. (SP) Viteznor

157. Native American Simulations. (4) Three hours of seminar per week. Prerequisites: 71 and consent of instructor. Course will analyze the sociological, psychological, and literary aspects of Hollywood movies' stereotypes of the American Indian through the history of the film. The format will include representative Indian films, lectures, and guest speakers from the movie industry. (SP) Wilson

175. History of Native Americans in California. (4) Three hours of lecture per week. Prerequisites: 71, 72, or consent of instructor. History of the Native Americans of California with emphasis on the lifeways, mores, warfare, and relations with the United States government. Attention will be given to the Background and evolution of acculturation up to the present. (SP) Black

178. History of Native Americans in the Southwest. (4) Three hours of lecture per week. Prerequisites: 71, 72, or consent of instructor. An historical analysis of the Native American Nations of the southwestern United States. (SP) Wilson

177. Plains Indian History. (4) Three hours of lecture per week. Prerequisites: 71, 72, or consent of instructor. Course will cover the entire range of Plains Indian history from archaeological sites to the social movements of the 1970s. It will stress the changes the tribes underwent as they met the challenges of ecological, economic, and historical forces. (SP) Ross

182. Native American Music. (4) Three hours of lecture per week. Focuses on the range and variety of musical forms and styles and the relationship of these to other aspects of human activity, belief, and world view. Special attention will be given to the ceremonial activities which will include discussion, recordings, and direct contact with musical performances and musicians. Offered alternate years. (F) Blum

190. Seminar on Advanced Topics in Native American Studies. (1-4) Course can be credited as a seminar topic. Requires prior consent of instructor. The course will cover one of the following topics: (F,SP) Staff

H105. Native American Studies Honors Course. (4) Course may be repeated for credit. Hours to be arranged.

*On leave, spring
*Recalled to active service
*Recipient of Distinguished Teaching Award
Naval Architecture and Offshore Engineering
(College of Engineering)

Department Office: 202 Naval Architecture Building, 642-344
Chair: Ronald W. Yeung, Ph.D.
Professors: Robert G. Bes, M.S. Offshore and coastal structures, ocean and coastal engineering;
Alaa E. Merwade, Ph.D. Ship and ocean structures
William C. Webster, Ph.D. Ship hydrodynamics, system analysis
Ronald W. Yeung, Ph.D. Ship and offshore hydrodynamics, numerical fluid mechanics
J. Randolph Peto, Ph.D. (Emeritus)
John V. Wehausen, Ph.D. (Emeritus)

Professors:
Ben C. Gensick, Jr., B.S. (Emeritus)
Robert L. Wiegel, M.S. (Emeritus)

The Department of Naval Architecture and Offshore Engineering offers courses in the design methodologies of marine vehicles and offshore structures, and the fundamentals of structural mechanics and fluid mechanics related to ships and marine structures.

Undergraduate Program
A total of 120 units is required. Six courses of at least 3 units each in humanities and social studies selected from an approved list of courses will be required. Of these, at least one course must be an English composition course equivalent in content to English 1A, one must be from a list of selected courses in History and Cultures, one must be from a list of selected courses in Literature and Values, and two must be upper division courses. The English composition course and either the course in History and Cultures or that in Literature and Values must be taken for a letter grade. A minimum of two courses, at least one of which is in the upper division, must be taken from a single department.

Required Lower Division Courses. Mathematics 1A-1B, 5A-5B; Chemistry 1A; Physics 7A-7B-7C; Engineering 77, 28, 35, 45; Naval Architecture 10, (recommended); Statistics 25; and 13 units of electives including humanities and social studies.

Required Upper Division Courses. Mechanical Engineering 104, 105, 106, 107A, 133; Civil Engineering 130, 157; Naval Architecture 151, 152A-152B, 153, 154, 155A-155B; Electrical Engineering and Computer Sciences 100; plus electives which must include humanities and social studies.

Graduate Program
Graduate study is offered in the areas of marine structures, marine hydrodynamics, and offshore engineering. Degrees include the master's and doctoral degrees. The graduate student normally must take Naval Architecture and Offshore Engineering 240A-240B, 241A-241B, and 290C. 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 interdisciplinary program in ocean engineering) are available from the department upon request.

Lower Division Courses
16. Ship Systems. (3) Three hours of lecture per week. Prerequisites: Mathematics 1A or Mathematics 16A. Principles of design and operation of ships. Emphasis on description and analysis of ship geometry, strength, and stability in intact and damaged conditions. Principles of thermodynamic cycles, resistance, marine propulsion plants, both conventional and nuclear, and auxiliary machinery systems. Current developments in offshore engineering. A field trip. (SP) Staff

Upper Division Courses
151. Statics of Naval Architecture. (4) Three hours of lecture and two hours of laboratory 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, flood, and drainage of bilge and float; stability and up-end of offshore platforms. Laboratory exercises in ship hydrostatics. An overview of numerical analysis used in naval architecture. Execution of large programs for specific systems. (SP) Staff

152A. Ship Dynamics I. (3) Three hours of lecture per week. Prerequisites: 151 (may be taken concurrently); Mechanical Engineering 106. Dimensional analysis and fundamentals of ship propulsion. 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 from series charts. Laboratory experiment for determination of well-known forces and moments acting on a propeller. (SP) Staff

152B. Ship Dynamics II. (3) Three hours of lecture and four hours of laboratory per week. Prerequisites: 152A. Elementary water-wave theory. Rigid-body dynamics of ships and offshore platforms. Motions and loads in a seaway. Statistical description of seaway and resulting loads. Laboratory experiment for determination of ship’s motion behavior in the ship model tank. Prediction of steering and maneuvering characteristics. (SP) Staff

154. Ship Structures. (3) Three hours of lecture per week. Prerequisites: 151 and Civil Engineering 106. Introduction to the specialized features of ship structures and their design. Structural loads, hull girder and hull components analysis, laterally loaded girders and plates, cross-stiffened plates, plate buckling, modes of distortion and their design. Probable failure to be designed against, use of theory and classification society rules in combination in the design process. (F) Mansour

155A-155B. Ship Design I, II. (4, 4) Three hours of lecture and one hour of discussion per week. Prerequisites: 151, 152. (F, SP) Staff

156. Design, Construction, and Maintenance of Marine Structures. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 151 recommended; Mechanical Engineering 106 or Civil Engineering 102; Civil Engineering 132; Senior Standing. Equipment, procedures, and considerations associated with the design, construction, maintenance, and de-commissioning of coastal and offshore structures including pipelines, fixed and mobile platforms, corrosion prevention. Underwater inspections and repairs. Design, constraints, and criteria for steel and concrete, structures, pile and mat foundations. Also listed as Civil Engineering 180. (SP) Staff

185. Directed Group Studies for Advanced Undergraduates. (1-4) Units awarded upon discretion of adviser. Course may be repeated for credit. Hours to be arranged. Must be taken on a passed/not passed basis. Prerequisites: Consent of Instructor. Group study of selected topics which will vary from year to year. (F, SP) Staff

190. Supervised Independent Study. (1-4) Course may be repeated for a maximum of four units per semester. Individual conferences. Must be taken on a passed/not passed basis. Prerequisities: Consent of instructor and major adviser. Supervised independent study. Enrollment restrictions apply; see the Introduction to Courses and Curricula section of this catalog. (F, SP) Staff
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Graduate Courses

250B. Wind and Wave Forces on Marine Structures. (3) Three hours of lecture per week. Prerequisites: 152B, 241A, or 241B, or Civil Engineering 205A or Mechanical Engineering 265A. Determination of wind and wave forces on coastal structures, pipelines, fixed and mobile offshore platforms. Evaluation of nominal and extreme loads, local and global forces, and dynamic effects. Time- and frequency-domain characteristics of wave and wind loadings. Evaluation of accuracy of analytical models based on field and laboratory data. Also listed as Civil Engineering 205B and Interdepartmental Studies 205 (SP) Bena

240A-240B. Theory of Ship Structures. (3,3) Three hours of lecture per week. Prerequisites: 152B and 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 high-strength modes of failure, reliability concepts and design considerations. (F,SP) Mansour


241B. Hydrodynamics II: Floating Bodies and Hydrodynamics. (2,3) Three hours of lecture per week. Prerequisites: 152B, or 241A, or Civil Engineering 205A or Mechanical Engineering 265A. Analytical and numerical methods in free-surface problems. Inviscid external lifting and non-lifting flows, boundary-layer equations, potential flowcode development and application to ship and offshore problems. Two-dimensional thin-wing theory. Three-dimensional lifting surfaces. Last two topics omitted for 2-unit option. (SP) Yeung

243. Advanced Methods in Free-Surface Flows. (3) Three hours of lecture per week. Prerequisites: 241B or Civil Engineering 205A or Mechanical Engineering 265A. Analytical and numerical methods for free-surface problems. Inviscid external lifting and non-lifting flows, boundary-layer equations, potential flowcode development and application to ship and offshore problems. Two-dimensional thin-wing theory. Three-dimensional lifting surfaces. Last two topics omitted for 2-unit option. (SP) Yeung

290C. Design Criteria for Marine Structures. (3) Three hours of lecture per week. Development of criteria for design and requalification of marine structures (platforms, coastal facilities). Reliability and decision analyses. Evaluations of uncertainties. Loadings and structural design criteria for full-scale, life cycle design of ship structures. Human and organizational error. Determination and communication of acceptable reliability characteristics. Also listed as Civil Engineering 290A and IDS 293. (SP) Bena

290D. Vehicles for Ocean Engineering. (3) Three hours of lecture per week. Prerequisites: Graduate standing in Civil Engineering. The construction and design of vehicles for performing engineering functions in the ocean. Topics include environment, deep ocean tasks, vehicle types, design requirements, motion stabilization, structural systems. (F,SP) Webster

290E. Design, Construction, and Maintenance of Marine Structures. (3) Three hours of lecture per week. Equipment, procedures, and considerations associated with the construction, maintenance, and de-commissioning of coastal and offshore structures, including breakwaters, piers, fixed and mobile platforms.

Corrosion prevention. Underwater inspections and repairs. Design of steel for steel and concrete structures, piles and mat foundations. Also offered as Civil Engineering 290E and IDS 292.

296. Group Studies, Seminars, and Group Research. (1-8) Course may be repeated for credit. Section 1 to be graded on a satisfactory/unsatisfactory basis. All other sections to be graded on a letter-grade basis. Advanced study in various subjects through special seminars on topics to be selected each year, informal group studies of special problems, group participation in conferences or research on complete problems for analysis and experimentation. (F,SP) Yeung

299. Individual Research. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Investigation of selected advanced research problems in marine science or technology. May not be used for unit or residence requirements for the doctoral degree. (F,SP) Staff

Near Eastern Studies (College of Letters and Science)

Department Office: 250 Barrows Hall, 642-3757
Chair: Cathleen A. Keller, Ph.D.

Professors:
- Hamid Agar, Ph.D. Cambridge University, Islamic and Persian studies
- Robert B. Allen, Ph.D. (Class of 1937) Professor; Harvard University, Hebrew literature, modern and biblical
- Gutey Acrarp, Ph.D. University of California at Berkeley, Near East.
- Aries B. Bloch, Ph.D. Münster University, Arabic and Semitic studies, Arabic literature
- Daniel Boyern, Ph.D. (Warren P. and Sophie Taubman Professor of Jewish Culture) and SP Staff, Near Eastern Studies
- Ariel A. Bioch, Ph.D. Montana University, Arabic and Hebrew literature
- Robert Alter, Ph.D. (Class of 1937 Professor) Harvard University, Hebrew literature
- Jean Monn, Ph.D. Harvard University, Hebrew literature
- Wolfgang J. Heimpel, Ph.D. University of Heidelberg, Mesopotamian cultures, Semitic
- Anna D. Klimer, Ph.D. University of Pennsylvania, Assyriology, Akkad, Mesopotamian culture, literature, music
- James T. Monroe, Ph.D. Harvard University, Classical, Arabic, Hispanic-Arabic literature, comparative literature
- Martin Lewis, Ph.D. Hebrew University, Near East
- Kelly A. Maguire, Ph.D. University of Chicago, Near Eastern archaeology
- David B. Storrs, Cambridge University, Near Eastern archaeology
- Carol A. Redmount, Ph.D. University of Chicago, Near Eastern archaeology
- Mehdi Marashi, Ph.D.; (Mellon Lecturer) University of Texas at Austin, Persian
- Ariele A. Bioch, Ph.D. Montana University, Arabic and Hebrew literature
- James T. Monroe, Ph.D. Harvard University, Classical, Arabic, Hispanic-Arabic literature
- Walter W. Kaiser, Ph.D. University of Chicago, Near Eastern archaeology
- Area Director:

Associate Professors:
- Cathleen A. Keller, Ph.D. University of California at Berkeley, Ancient Egyptian language, history
- Chana Kronfeld, Ph.D. University of California at Berkeley, Hebrew, Yiddish
- MMBulbek, Ph.D. University of California at Berkeley, Comparative literature, Arabic and Hebrew literature

Assistant Professor:
- Carol A. Redmount, Ph.D. University of Chicago, Egyptian archaeology, Syro-Palestinian archaeology

Adjunct Professor:
- David J. Biale, Ph.D. University of California at Los Angeles, Medieval and modern Jewish thought

Lecturers:
- Ruth Adler, M.A. University of California at Berkeley, Linguistics, Hebrew linguistics, English as a second language
- Avi Alper, M.A. (Melton Lecturer) University of California at Berkeley, Turkish language and literature, language pedagogy
- David A. Fowcog, Ph.D. University of California at Berkeley, Semitic language, literature, religion

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

A. The Major in Near Eastern Studies

The Majors

A. The Major in Near Eastern Studies

Major guidelines for each discipline are available in the departmental office. With the consent of the department, portions of the requirements may be fulfilled by related courses in other departments.

1. In Arabic, Hebrew, Persian, and Turkish: Prerequisite: the elementary courses in the language, or their equivalents. It is recommended that these be taken beginning in the freshman year.

The major requires from 21 to 25 upper division language units, depending upon the language undertaken, plus 6 upper division lecture units.

2. In Assyriology and Hittitology, Old Iranian Studies, and Egyptology: A basic reading knowledge of German is recommended. The major requires from 22 to 26 upper division language units, depending upon the language undertaken, plus 8 upper division lecture units or 6 in Egyptology.

B. The Major in Ancient Near Eastern Archaeology and Art History

1. Mesopotamian Archaeology. Three lower division courses are required: NES 15; NES 20 or 25; and NES 10 or 16 or 18. The student must complete three upper division courses including NES 121A-121B or 120A-120B and 20 units from the following list: NES 121A-121B, NES 122A-122B, NES 123A-123B, NES 124A-124B. If, and only if, the courses listed above are not available during the student’s junior and senior years of study, the student may complete the remaining credits from any ancient language or lecture course in the ancient field of Near Eastern Studies.

2. Egyptian Archaeology. This option requires that students take NES 18, 102A-102B, and Egyptian 103A-103B, 101A-101B. Students also must have 8 units from NES 15, 20, and Anthropology 2. In addition, students must take 8 upper division units from the following list: NES 107A-107B, 108, 109, 103A, 103B, 101A-101B, 102A-102B, 122A-122B, 123A-123B, 124A-124B, Anthropology 134, 135.
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 graduate students to take advantage of courses in other departments which are relevant to their disciplines and fields of study. Upon approval by the graduate adviser, such courses may be recognized as fulfilling portions of the departmental course work requirements for graduate degrees.

The M.A. Degree. The M.A. is obtained according to Plan I or 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 either French or German (another language may be substituted on approval of the major adviser).

Plan I: This plan is an option for the departmental programs in archaeology and art history. The plan requires an M.A. thesis, 20 units of course work, and an oral defense of the thesis.

Plan II: This plan is required for all other programs and is an option for programs in archaeology and art history. The 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 are required. Written comprehensive examinations are required of all students to test (a) working knowledge of pertinent languages; (b) general knowledge of the history and civilization of area of emphasis; (c) knowledge of other subjects suggested by the student's degree committee.

The Ph.D. Degree. Students must have completed an appropriate M.A. program to be eligible for the Ph.D. program. Admission to candidacy for the Ph.D. degree depends on completion of the following requirements: (1) Ph.D. course work; (2) reading examinations in French and German (proficiency in a European or other modern language germane to the student's field of emphasis may be substituted on approval of the graduate adviser); (3) proficiency in one or two Near Eastern languages, as required for the student's field of study, (4) written preliminary examinations in French and German, which will cover at least two Near Eastern languages. For Egyptian archaeology and art history majors, proficiency will be tested through written preliminary examinations, which will include an examination in Egyptian and/or Coptic. 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 pass a proficiency examination 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 and the oral qualifying examination; (6) a prospectus of the dissertation approved by the student's proposed Ph.D. dissertation committee. After admission to candidacy, the student is to fulfill the requirements for dissertation as outlined in the Graduate Education section of this catalog. For further information on these graduate programs, contact the graduate assistant in 250 Barrows 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 archaeological, historical, religious, and moral thought patterns of the ancient Near East and Egypt, with emphasis on the various forms of religious expression indigenous to their cultures. Applicants must have the Ph.D. degree as their goal. They should possess an M.A. or the equivalent in Near Eastern Studies or a related field and should have proficiency in two appropriate ancient languages equivalent to that obtainable through an undergraduate degree in those languages. Applicants must be admitted into both the Graduate Theological Union and the University of California at Berkeley; the degree is conferred jointly by both institutions.

The Graduate Program in Ancient History and Mediterranean Archaeology (see index for the location of a full description of this program) is available for students interested in Near Eastern studies and in the history and archaeology of the Mediterranean area. The ancient studies faculty of this department are members of the faculty group for this program.

Near Eastern Studies

Courses listed under Near Eastern Studies are taught in English. Courses listed under ancient Near Eastern headings are language courses and assume an appropriate level of knowledge of that language.

The Schedule of Classes issued before 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 hours of lecture and one hour of discussion per week. The ancient and modern history, languages, and religious groups in the Arab states, Turkey, Israel, and Iran.

12. Middle Eastern Religions. (3) Three hours of seminar per week. Prequisites: 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 hours of lecture and one hour of discussion per week. The art, architecture of Islamic lands from the seventh to the nineteenth century.

17. Introduction to Languages and Scripts of the Near East. (4) Three hours of lecture and one hour of discussion per week. A survey-history of the chief languages and writing systems of the Near East, with emphasis on their role in developing of society, literature, and art.

18. Introduction to Egyptology. (4) Three hours of lecture and one hour of museum study per week. A survey of the art and architecture of ancient Egypt and their relations to the social and political institutions of the times.

20. Mesopotamian History. (3) Students who have completed any part of 20A-20B will receive no credit for 20. Three hours of lecture per week. An survey of the political and cultural history of Babylon and Assyria from the time of the first written documents to the Persian conquest.

23. Topics in Near Eastern Archaeology. (3) Course may be repeated for credit. Three hours of lecture per week. Limited to ten 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.
24. Freshman Seminars. (1) Course may be repeated for credit as topic varies. One hour of seminar per week. Sections 1-2 to be graded on a letter-grade basis. Sections 3-4 to be graded on a passed/not passed basis. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester.

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 hours of lecture 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 the Hebrew Bible in English translation. Prerequisites: 18 or equivalent or consent of instructor. Special attention will be paid to the social relevance and stylistic characteristics of the documents discussed.

106A-106B. Art and Architecture of Ancient Egypt. (4-4) Three hours of lecture and one hour of discussion per week. Prerequisites: A. 18 or equivalent, or consent of instructor. B. 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 Hearst Museum collection.

106. Topics in the Ancient Mediterranean World. (4) Three hours of lecture per week. Topics in the cultural connections of the ancient Mediterranean world, from the second millennium B.C.E. to late antiquity. Typical themes might be: (1) ideologies of gender and sexuality; (2) religion in the ancient Mediterranean; (3) the literatures of the ancient Mediterranean.

111. Special Topic Seminars. (4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. This seminar is designed to afford students an opportunity to work closely with Near Eastern Studies faculty on a topic of mutual interest in great depth. Emphasis on student participation; course writing required. See department office for current topic.

120A-120B. Near Eastern Art. (4-4) Three hours of lecture and one hour of discussion per week.

A. The Neo-Assyrian through the Kassite period.

B. The Iron Age through Sasanian times.

121A-121B. Islamic Art. (4-4) Three hours of lecture 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 hours of lecture and one hour of discussion per week. A survey of the archaeology of Iran from Prehistoric times down to the Umayyad, and Abbasid periods.

123A-123B. Mesopotamian Archaeology. (4-4) Three hours of lecture and one hour of discussion per week. A survey of the archaeology of Mesopotamia.

124A-124B. Archaeology of the Eastern Mediterranean. (3-3) Three hours of lecture per week. The aim of this course is to investigate specific archaeological problems by means of a general survey of archaeological sites in Cyprus, Jordan, Israel, and Syria. The time period covered will be Ceramic/Late Neolithic-Middle Bronze (about 5000-1600 BC).

130A-130B. History of Ancient Israel. (3-3) Three hours of lecture per week. The patriarchal age through the Hellenistic period.

131. Aspects of Biblical Religion. (3) Three hours of lecture per week. The time periods that the text of the ancient Jewish and Christian religious traditions has been transmitted to us.

132. Judaism and Hellenism. (3) Three hours of lecture per week. A survey of the impact of Hellenism on Judaism through a detailed study of various apocryphal and pseudepigraphical writings. Special attention will be given to Wisdom Tradition and the philosophic works of Philo Judaeus and their relationship to Greek philosophy and early Christianity.

133. Judaism in Late Antiquity. (3) Three hours of lecture per week. The emergence and development of classical Judaism, its impact, institutions, thought, and literature.

134. Talmud and Midrash in Translation. (3) Three hours of lecture per week. Reading in translation and discussion of selection of Talmudic Midrashic literature, their use for a history of Jewish thought and their historical development and place within the broader Jewish religion and general context (1st - 6th centuries Common Era).

137. Modern and Contemporary Jewish Thought. (3) Three hours of lecture per week. An analysis of modern Jewish movements and ideas. Topics include Spinoza, Hasidism, The Enlightenment, Jewish religiosity, movements in America, Zionism, Buber, Rosenweig, Kaplan, Heschel.

139. Modern Jewish Literatures. (3) Three hours of lecture per week. Prerequisites: Upper division standing or consent of instructor. Trends and genres in modern Jewish literatures—translated from Hebrew and Yiddish, with selected translation from other Jewish languages like Ladino and Judeo-Arabic. Focus will be on developments in Jewish literary traditions since the enlightenment in the context of tensions between occidental and oriental formations of Jewish culture.

140. Topics in Islamic Thought and Institutions. (3) Course may be repeated for credit. Three hours of lecture per week. Selected topics from Islamic intellectual history.

141. Modern and Contemporary Islamic Thought. (3) Three hours of lecture per week. A survey of leading Muslim thinkers and movements of the past two centuries.

142. Shi'i Islam. (3) Three hours of lecture per week. The beliefs, traditions, and practices of the Shi'ite school of Islam.

143A-143B. Islam in Iran. (3-3) Three hours of lecture per week. A general survey of the religious history of Islam in the Iranian period, covering the rise and development of religious movements and the literature of the religious sciences, Sufism, and sectarian movements.

144. Introduction to Islamic Law. (3) Three hours of lecture per week. The origins and evolution of the legal precepts of Islam.

145. Islamic Bibliography. (3) Course may be repeated for credit. Three hours of lecture per week. A survey of primary sources in the Islamic religious sciences.

150A-150B. Arabic Literature in Translation. (3-3) Three hours of lecture per week. No knowledge of Arabic is required.

A. Survey of Arabic literature from its origins in pre-Islamic poetry through its historical development during the Umayyad, and Abbasid periods.

B. Survey of Arabic literature in its development from the post-Abbasid period to the present.

160. Religions of Ancient Iran. (3) Three hours of lecture per week. Principally devoted to Zoroastrianism and Manichaeism but with some attention to Indo-Iranian origins, and relevance of Iranian religion for the history of Hellenistic Gnosticism, Judaism, and Islam.

161. Introduction to Comparative Study of Iranian Languages. (3) Three hours of lecture 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 hours of lecture 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 hours of lecture per week. A survey of the development 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, folklore, etc.

171. Ottoman City and Society. (3) Three hours of lecture per week. Surveys aspects of the civilization and culture of the Ottoman Empire (14th - 15th cent.). 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 centered upon preparation of an honors thesis.

188. Directed Group Study for Upper Division Students. (1-4) Course may be repeated for credit. Variable meetings. Must be taken on a passed/not passed basis. Instruction in areas not covered by regularly scheduled courses: Phoenician, Cypriote, Syrian Archaeology.

189. 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 shown in the General Catalog.

Graduate Courses

220A-220B. Seminar in Near Eastern Art. (4) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Graduate standing as consistent of instructor. Graduate seminar on specific aspects of the arts of Western and Central Asia. Topic to be announced at first seminar meeting. Students who take this course may be assigned credit and grade at the end of the sequence.

221A-221B. Seminar in Islamic Art. (4) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Consent of instructor. Topics will vary according to student interest.

222A-222B. Topics in Near Eastern Art and Archaeology. (4) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Graduate standing or consent of instructor. Course to be taught jointly by two members of the staff. Seminar on the comparative study of the art and archaeology of the countries of the Near East in the first millennium BC. Students who take two semesters in succession may be assigned credit and grade at the end of the sequence.

223A-223B. Seminar in Near Eastern Archaeology. (4) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Graduate standing or consent of instructor. Study of selected sites whose issues, problems, or methods or themes in archaeological research. Emphasis on results of archaeological research for understanding the history and culture of people living in these lands during:

A. Early, Middle, and Late Bronze Ages (ca. 3000-1200 BC).
B. Iron Age, the Persian, Hellenistic and Roman periods (ca. 1200 BC - AD 135).

230. Special Studies. Course may be repeated for credit. Prerequisites: Consent of instructor. Students may enroll in more than one section of 290, but the total number of units of Special Study in any one semester may not exceed 12.

290A. Near Eastern Studies. (1-5)
290B. Arabic. (1-5)
290C. Cuneiform. (1-5)
290D. Egyptian. (1-5)
290E. Hebrew. (1-5)
290F. Iranian. (1-5)
290G. Semitic. (1-5)
290H. Turkish. (1-5)

292. Museum Internship. (4) Course may be repeated for credit. Ten to fifteen hours per week of curatorial work. Must be taken on a satisfactory/unsatisfactory basis. Jointly supervised by a professional staff of a museum and a faculty member in the Art and Archaeology division of the Department of Near Eastern Studies.

295. Supervised Field Research in Archaeology. (2-12) Course may be repeated for credit. Two to twelve hours of fieldwork per week. Full time participation in an archaeological excavation or exploratory survey, preceded by three hours of seminar per week for one half of one semester, at the discretion of the instructor. Students will participate in all aspects of the operation and will be responsible for preparing a written report on some specific part of the work. Geographical areas and sites to be determined each year. Students taking the seminar will only receive 2 units only.

296. Problems in Egyptian Archaeology. (4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Prerequisites: Two semesters of 102 or the equivalent, or consent of instructor. Topics will vary and may deal with a particular chronological or regional aspect of archaeological material. Work with museum specimens or with field data may be involved.

298. Seminar. (1-4) Course may be repeated for credit. Prerequisites: Consent of instructor. Special topics in Near Eastern Studies. Topics vary and are announced at the beginning of each semester.

299. Individual Research. (4-12) Course may be repeated for credit. Individual conferences. Successful completion of Ph.D. qualifying exams, limited to students engaged in research for the doctoral dissertation.

601. Individual Studies for Master's Students. (1-4) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual study in consultation with the graduate advisor. Units may not be used to meet either unit or residence requirements for master's degree.

602. Individual Study for Doctoral Students. (1-8) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Individual study in consultation with the major field advisor. Individual conferences. Successful completion of Ph.D. qualifying exams, limited to students engaged in research for the doctoral dissertation.

Arabic

Lower Division Courses

1A-1B. Elementary Standard Arabic. (5) Five hours of recitation per week. A presentation of literary Arabic, leading to the reading of a variety of classical and modern texts.

17A-17B. Readings in Current Arabic Newspapers. (2-22) Course may be repeated for credit. Two hours of lecture/recitation per week. Must be taken on a passed/not passed basis. Prerequisites: 1A-1B. Reading of current Arabic newspapers from various countries. Emphasis on current affairs, this genre and in vocabulary acquisition. Selections will be chosen so that both second and third year Arabic students can benefit.

20A-20B. Intermediate Arabic. (5) Five hours of recitation per week. Prerequisites: 1A-1B.

Upper Division Courses

100A. Arabic Grammar and Syntax. (3) Three hours of lecture per week. Prerequisites: 20A-20B. Discussion of the grammar, syntax, semantics and styles of Arabic, as reflected in literary texts.

100B. Arabic Grammar and Syntax. (3) Three hours of lecture per week. Prerequisites: 100A, or consent of instructor. Discussion of the grammar, syntax, semantics and styles of Arabic, as reflected in literary texts. Literary texts, organized throughout the semester in an 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 if different dialect is offered. Three hours of recitation per week. Prerequisites: 1A-1B. 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: 204-20B. Reading and literary analysis of classical Arabic poetry.

106. Classical Arabic Prose. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 204-20B. Reading and literary analysis of classical prose.

107. Arabic Historical Texts. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 204-20B. Readings of selected texts from various periods.

108. Arabic Religious and Philosophical Texts. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 204-20B. Selected texts of various periods.

109. Modern Arabic Literature: Poetry. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 204-20B. Selected readings from modern Arabic verse.

110. Modern Arabic Literature: Prose Writings. (3) Course may be repeated for credit. Three hours of reading/recitation per week. Prerequisites: 204-20B. Fiction, essays, and drama.

111A-111B. Survey of Arabic Literature (in Arabic). (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 101A. 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. 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. Inclusion requirements apply; see the Introduction to Courses and Curricula section of this catalog.

Graduate Courses

200. Advanced Syntax. (3) Course may be repeated for credit as topic varies. Three hours of lecture per week. Prerequisites: 100A. Major syntactic phenomena of classical and modern literary Arabic will be analyzed
201. Arabic Dialectology. (3) Three hours of lecture per week. Prerequisites: At least two years of Arabic and one year of another Semitic language or equivalent. A comparative approach to the Arabic dialects; their relationship to literary Arabic and other Semitic languages.

206. Classical Arabic Poetry. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 106. Intensive study of classical poetry.

207. Classical Arabic Prose. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 106. Intensive study of classical prose.

208. Arabic Legal Texts. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Two years of Arabic. Selected readings in Islamic law.

209-209B. Readings In The Qur'an. (3-3) Course may be repeated for credit as texts vary. Three hours of reading per week. Prerequisites: Three years of Arabic. Selected readings in Arabic from the Qur'an, traditional Islamic exegesis, and other secondary material.

210. Judeo-Arabic Texts. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Two years of Arabic. A survey of literary, historical, and religious material in Judeo-Arabic. Introduction to paleography, grammar, and varieties of Judeo-Arabic style from 9th-13th centuries. Readings will vary.

211A-211B. Hispano-Arabic Literature. (3-3) Course may be repeated for credit. Three hours of lecture 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. Three hours of lecture per week. Prerequisites: 106A. An 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. Three hours of lecture per week. Prerequisites: 110. Intensive study of modern prose in relation to the cultural tradition.

298. Seminar. (1-4) Course may be repeated for credit. Prerequisites: Consent of Instructor. Special topics in Arabic. Topics vary and are announced at the beginning of each semester.

Cuneiform

Upper Division Courses

100A-100B. Elementary Akkadian. (5-5) Four hours of lecture per week. Prerequisites: Background in German and French recommended. Introduction to Cuneiform script and grammar, reading of selected Cuneiform texts. Sequence begins in fall. Offered alternate years.

101A-101B. Intermediate Akkadian. (3-3) Three hours of lecture per week. Prerequisites: 100A-100B; background in German and French recommended. Reading of selected texts, including law codes, letters, medical, and epic texts. Sequence begins in fall. This course will be offered in 1990-91 and in alternate years thereafter.

102A-102B. Elementary Sumerian. (4-4) Three hours of lecture per week. Prerequisites: Background in German and French recommended. Introduction to Sumerian grammar and writing.

103A-103B. Intermediate Sumerian. (3-3) Three hours of lecture 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.

106A-106B. Elementary Hittite. (4-4) Three hours of lecture per week. Prerequisites: Background in German and French recommended. Introduction to Cuneiform Hittite language and grammar with reading of selected historical and religious texts.

185. Senior Honors. (2-4) Must be taken on a passed/not passed basis. 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. Instruction 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. Enrollment is restricted by regulations shown in the General Catalog.

Graduate Courses

200A-200B. Readings In Coptic. (3-3) Course may be repeated for credit. Three hours of reading per week. Prerequisites: 102A-102B. Reading of selected texts. Prereq: 102A or 102B. Introduction to Coptic language and literature. Texts selected are based on the chronological needs of participating students.

206A-206B. Advanced Hittite. (3-3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 106A-106B. Reconstruction and reading of Hittite texts belonging to different literary genres (epics, mythology, annals, law codes, political treatises, rituals, etc.) or introduction to Hieroglyphic Law.

210A-210B. Advanced Sumerian. (3-3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 103A-103B. Reading of selected texts with the purpose of initiating students into the diverse genres of Sumerian literature.

298. Seminar. (1-4) Course may be repeated for credit. Prerequisites: Consent of Instructor. Special topics in Cuneiform. Topics vary and are announced at the beginning of each semester.

Egyptian

Upper Division Courses

100A-100B. Elementary Egyptian. (5,5) Three hours of lecture and one hour of discussion per week. Introduction to Middle Egyptian grammar and texts.

101A-101B. Intermediate Egyptian. (3,3) Three hours of lecture per week. Prerequisites: 100A-100B. Readings in Middle Egyptian hieroglyphic and hieratic texts.

102A-102B. Elementary Coptic. (4,4) Three hours of lecture per week. Prerequisites: 100A-100B; background in German and French recommended. A. Introduction to Sahidic dialect. B. Readings in Sahidic, other dialects.

195. Senior Honors. (2-4) Must be taken on a passed/not passed basis. 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. Instruction 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. Enrollment is restricted by regulations shown in the General Catalog.

Graduate Courses

200A-200B. Readings In Coptic. (3,3) Course may be repeated for credit. Three hours of reading per week. Prerequisites: 102A-102B. Reading of selected texts. Prereq: 102A or 102B. Introduction to Coptic language and literature. Texts selected are based on the chronological needs of participating students.


202A-202B. Egyptian Texts. (3,3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of Instructor. Special topics in Egyptian. Topics vary and are announced at the beginning of each semester.

Hebrew

Lower Division Courses

1A-1B. Elementary Hebrew. (5,5) Five hours of recitation and one hour of laboratory per week.


15A-15B. Hebrew Conversation. (2,2) Two hours of discussion 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 hours of lecture per week. Prerequisites: 1A-1B.

Upper Division Courses

100A-100B. Advanced Hebrew. (3,3) Three hours of lecture per week. Prerequisites: 20A-20B or equivalent. Advanced Hebrew, especially designed for those going on to the study of modern Hebrew literature. Vocabulary building, grammar review, and literary analysis of a sampling of modern texts.

101A-101B. Biblical Hebrew Texts. (3,3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 100A-100B 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 hours of lecture per week. Prerequisites: 20A-20B or equivalent. Texts from the rabbinic period (Mishnah, Tossefta, Talmud, and Midrash) and an introduction to the languages of rabbinic texts.

103A-103B. Later Rabbinic And Medieval Hebrew Texts. (3,3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 20A-20B or equivalent. Study of midrashic, exegetical, halakhic (legal), poetic, apocalyptic, messianic, or historical texts.

104A-104B. Modern Hebrew Texts. (3,3) Course may be repeated for credit with different topic and consent of instructor. Three hours of lecture per week. Prerequisites: 20A-20B or equivalent. An introductory study of selected topics in Hebrew literature from the European Enlightenment to contemporary Israeli poetry and fiction.

105A-105B. The Structure Of Modern Hebrew. (3,3) Course may be repeated for credit, two 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.

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

Near Eastern Studies / 345
Upper Division Courses

100A-100B. Intermediate Modern Persian. (3;3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 101A-101B or equivalent. Syntactic and stylistic development, including English and Hebrew, classroom strategies, and the development of instructional materials. Required of all new Graduate Student Instructors in Hebrew.

Persian and Iranian

Lower Division Courses

1A-1B. Elementary Modern Persian. (5;5) Five hours of lecture per week.

15A-15B. Conversational Persian. (2;2) Two hours of lecture per week. Prerequisites: Concurrent enrollment in elementary Persian or consent of instructor. Practice of speaking Persian as a supplement to elementary Persian.

Upper Division Courses

100A-100B. Intermediate Modern Persian. (3;3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 101A-101B or equivalent. A systematic study of the Prophets beginning with Isaiah.

101A-101B. Selected Readings in Persian Literature. (3;3) Course may be repeated for credit with consent of instructor. Three hours of lecture per week. Prerequisites: 100A-100B or equivalent. Readings in both prose and poetry from the beginning of modern Persian literature, designed to increase reading skills and vocabulary and to provide a transition to the study of more difficult texts.

102A-102B. Readings in Classical Persian Prose. (3;3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 101A-101B or equivalent. Systematic study of poetic forms to classical Persian poetry, with consideration of questions of prosody, rhetoric, and style.

104A-104B. Contemporary Persian Literature. (3;3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 101A-101B or consent of instructor. This course will deal with significant works of Persian prose and poetry from the beginning of the nineteenth century to the present. Complete dependence on either Persian or English will be read in the original as a preliminary to their analysis in terms of literary and stylistic development, as well as the changing role of language in society.

A. The works of the nineteenth century and the period of the Constitutional Revolution (1905-1911).

B. The literature of the rest of the twentieth century.

105A-105B. Advanced Persian Grammar. (4;4) Four hours of lecture per week. Prerequisites: 104A-104B or consent of instructor. Focus on biblical texts and contemporary Persian in both prose and poetry, chiefly from modern Persian literature, with attention to the historical and intellectual context.

103A-103B. Classical Persian Poetry. (3;3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 100A-100B or equivalent. Systematic study of poetic forms to classical Persian poetry, with consideration of questions of prosody, rhetoric, and style.

Graduate Courses

201A-201B. Advanced Biblical Hebrew Texts. (3;3) Course may be repeated for credit. Three hours of lecture per week. Credit and grade to be awarded on completion of sequence, Prerequisites: 101A-101B. The exegesis of a biblical book in the light of its ancient Near Eastern background.

202A-202B. Advanced Late Antique Hebrew Texts. (3;3) Course may be repeated for credit as texts vary. Three hours of lecture per week. Prerequisites: 102A-102B, 103A-103B, or equivalent. A study of the Hebrew of Jewish and Christian traditions.

203A-203B. Advanced Medieval Hebrew Texts. (3;3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 103A-103B and 105A-105B. Literacy of the Middle Ages: culture, language, and literature, chiefly from the Middle Persian period.

204A-204B. Advanced Modern Hebrew Texts. (3;3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 103A-103B and one of 101A-101B, 102A-102B, or 103A-103B. Selected topics in the development of Hebrew literature from the European Enlightenment to contemporary Israeli poetry and fiction.

206. Ancient and Modern Hebrew Literary Texts. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 104A-104B or consent of instructor. Readings in the development of Hebrew literature from the ancient to modern periods, emphasizing connections between the ancient and modern periods.

207. Seminar. (1-4) Course may be repeated for credit. Prerequisites: Consent of Instructor. Special topics in Hebrew. Topics vary and are announced at the beginning of each semester.

Professional Courses

301A-301B. Teaching Hebrew in College. (3;3) One hour of lecture per week plus participation in demonstration classes. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate Standing. The methodology of teaching Hebrew as a second language. Lectures on constructivist analysis of English and Hebrew, classroom strategies, and the development of instructional materials. Required of all new Graduate Student Instructors in Hebrew.

Persian and Iranian

Graduate Courses

200A-200B. Advanced Persian. (3;3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Twelve units of upper division work. Different sections offering a variety of texts from all periods of the literature.

202A-202B. Persian Sufi Writings. (3;3) Course may be repeated for credit. Three hours of lecture per week. Readings in all genres of Sufi expression, prose and poetry, with concentration on major figures.

203A-203B. Persian Historical Texts. (3;3) Course may be repeated for credit. Three hours of lecture per week. Systematic readings in the classics of Persian historiography, from the tenth to the eighteenth centuries.

298. Seminar. (1-4) Course may be repeated for credit. Prerequisites: Consent of Instructor. Special topics in Persian. Topics vary and are announced at the beginning of each semester.

Iranian

Upper Division Courses

110A-110B. Middle Persian. (3;3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Persian 100A-100B or equivalent; background in German or French recommended, but not required. Material covered in Middle Persian texts, with an introduction to Pahlavi.

111A-111B. Old Persian. (3;3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of Instructor; background in German and French recommended, but not required. Texts from the Veritable and the Yashts; Achaemenid inscriptions.

Semitics

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 beginning Fall.

101A-101B. Syriac. (3;3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Biblical Aramaic or consent of instructor; 12 units of upper division work. Morphology and syntax of the Syriac language. Readings in the Syriac translation of the Bible and Syriac literature.

H195. Senior Honors. (2-4) Must be taken on a pass/no pass basis. 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 pass/no pass basis. Enrollment is restricted by regulations shown in the General Catalog.
Graduate Courses

200A-200B. Studies in Comparative Semitics. (3-3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Twelve upper division units in Semitics or consent of instructor; 200A is prerequisite to 200B. Comparative Semitic phonetics, morphology, and lexicography within 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 lecture per week. Prerequisites: 101A-101B or 100A-100B or equivalent. Ugaritic language and literature with stress on comparative methodology and lexicography. Sequence begins Fall.

210A-210B. The Cansanite Dialects. (3-3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Advanced status in Hebrew; 210A is prerequisite to 210B. The Phoenician, Punic, Moabite, and early Aramaic inscriptions, with reference to paleography, dialectology, and literary style. Sequence begins Fall.

296. Seminar. (1-4) Course may be repeated for credit. Prerequisites: Consent of instructor. Special topics in Semitics. 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. Three hours of 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 ancient 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. Staff

Neurobiology

(College of Letters and Science)

The biological sciences at Berkeley were reorganized in July 1989. Consult staff in the Department of Molecular and Cell Biology for information about the current undergraduate program in neurobiology. Undergraduate students who declared the neurobiology major before fall 1989 may continue in the program provided they complete all degree requirements and graduate before the fall semester 1992.

Graduate Program in Neurobiology

Office: 121 Genetics and Plant Biology Building, 642-2525

Professors:

- David R. Kesel, Ph.D.
- S. Marcel Breslow, Ph.D.
- Beth Burns, Ph.D.
- Karen Davids, Ph.D.
- Rachel E. Venable, Ph.D.
- Walter J. Freeman, M.D.
- Donald A. Glaser, Ph.D.
- Corey S. Goodman, Ph.D.
- Edward L. Keller, Ph.D.
- Harold Lucar, Ph.D.
- Mervin Lewis, Ph.D.
- Joseph L. Martinic, Ph.D.
- George F. Petter, Ph.D.
- W. G. Wilson, Ph.D.
- Gerald M. Rubin, Ph.D.
- Carla Shatz, Ph.D.
- Richard A. Saffran, Ph.D.
- Gunther S. Stent, Ph.D.
- Ralph D. Freeman, Ph.D.
- Mark T. Bernfield, Ph.D.
- Michael J. Dam, Ph.D.
- Richard C. Vail, Ph.D., O.D., Ph.D.
- Frank S. Werth, Ph.D.
- Gerald E. Wissler, Ph.D.
- Robert S. Zucker, Ph.D.
- Alan J. Bearden, Ph.D.

Head Advisers: Frank S. Werblin, Ph.D.; Carla Shatz, Ph.D.

Graduate Program Officers: Paul L. Chambers, Ph.D. (Emeritus)
Lawrence M. Grossman, Ph.D. (Emeritus)
Ehud Isacoff, Ph.D. (Emeritus)
Richard A. Stelhorn, Ph.D. (Emeritus)
Karen DeValois, Ph.D.
Betti Bumslie, Ph.D.

Lecturers:

- Thomas F. Pidgeon, Ph.D.
- Virgil E. Schrock, M.S., M.E. (Emeritus)

Assistant Professors:

- Per F. Peterson, Ph.D.
- Thomas F. Pidgeon, Ph.D.

Graduate Program in Neurobiology

Office: 121 Genetics and Plant Biology Building, 642-2525

Professors:

- Edward C. Monte, Ph.D.
- Raymond C. Stevens, Ph.D.
- John P. Miller, Ph.D.
- Robert S. Zucker, Ph.D.
- John Ngal, Ph.D.
- Gerald Westheimer, Ph.D.
- Hsiao-Ping H. Moore, Ph.D.
- David E. Kochand, Jr., Ph.D. (Emeritus)
- Karen DeValois, Ph.D.
- Betti Bumslie, Ph.D.
- Paul L. Chambers, Ph.D. (Emeritus)
- Walter J. Freeman, M.D.
- Harold Lucar, Ph.D.
- Paul L. Chambers, Ph.D. (Emeritus)
- Richard A. Stelhorn, Ph.D. (Emeritus)

Graduate Program Officers:

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- John Ngal, Ph.D.
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- Walter J. Freeman, M.D.
- Harold Lucar, Ph.D.
- Paul L. Chambers, Ph.D. (Emeritus)
- Richard A. Stelhorn, Ph.D. (Emeritus)

Lecturers:

- Jennifer D. McFarland, M.D.

Assistant Professors:

- Hsiao-Ping H. Moore, Ph.D.
- David E. Kochand, Jr., Ph.D.
- Karen DeValois, Ph.D.
- Betti Bumslie, Ph.D.
- Paul L. Chambers, Ph.D. (Emeritus)

Nuclear Engineering

(With Co-registration in Nuclear Engineering and Chemical Engineering)

Department Office: 4153 Etchells Hall, 642-5010

Chair: T. Kenneth Fowler, Ph.D.

Professors:

- T. Kenneth Fowler, Ph.D. University of Wisconsin at Madison. Applied plasma physics and fusion
- Edward C. Monte, Ph.D. University of Illinois. Applied plasma physics
- Stanley G. Pissin, Ph.D. University of Michigan. Nuclear radiodochemistry and its applications
- Paul L. Chambers, Ph.D. (Emeritus)
- Lawrence M. Grossman, Ph.D. (Emeritus)
- Mark T. Bernfield, Ph.D. (Emeritus)
- Thomas F. Pidgeon, Ph.D. (Emeritus)
- Richard A. Stelhorn, Ph.D. (Emeritus)
- Virgil E. Schrock, M.S., M.E. (Emeritus)

Assistant Professors:

- Per F. Peterson, Ph.D.
- Thomas F. Pidgeon, Ph.D.
- Jennifer D. McFarland, M.D.

Graduate Program Officers:

- Edward C. Monte, Ph.D.
- Raymond C. Stevens, Ph.D.
- John P. Miller, Ph.D.
- Robert S. Zucker, Ph.D.
- John Ngal, Ph.D.
- Gerald Westheimer, Ph.D.
- Hsiao-Ping H. Moore, Ph.D.
- David E. Kochand, Jr., Ph.D. (Emeritus)
- Karen DeValois, Ph.D.
- Betti Bumslie, Ph.D.
- Paul L. Chambers, Ph.D. (Emeritus)
- Walter J. Freeman, M.D.
- Harold Lucar, Ph.D.
- Paul L. Chambers, Ph.D. (Emeritus)
- Richard A. Stelhorn, Ph.D. (Emeritus)

Lecturers:

- Jennifer D. McFarland, M.D.

Assistant Professors:

- Hsiao-Ping H. Moore, Ph.D.
- David E. Kochand, Jr., Ph.D.
- Karen DeValois, Ph.D.
- Betti Bumslie, Ph.D.
- Paul L. Chambers, Ph.D. (Emeritus)

Nuclear engineering is concerned with the applications of nuclear reactors, including the design, analysis, and operation of nuclear reactors and their nuclear fuel cycles. The principles taught in the nuclear engineering courses are applicable both to 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 materials, 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 can major in nuclear engineering or in the nuclear engineering double major programs. Students can major in the double major programs beginning in their junior year. The double major programs are offered through nuclear engineering and other fields of engineering. Graduate programs leading to the master’s and doctoral degrees involve advanced course work in nuclear engineering and in allied fields and direct participation in research under supervision of the nuclear engineering faculty.

Curriculum for the Bachelor’s Degree

A total of 120 units is required, including:

Lower Division. Required: Mathematics 1A-1B, 50A-50B; Chemistry 1A-1B; Physics 7A-7B-7C; Engineering 77, 45; Electrical Engineering and Computer Science 100, Introduction to Electronics (may also be satisfied by EEC 40 plus EEC 43). Electives.


Note: Electives must include (a) units to meet the humanities and social studies requirement, and (b) at least 11 units of upper division NE courses.

Humanities and Social Studies Requirement. Six courses of at least 3 units each in humanities and social studies selected from an approved list of courses will satisfy the requirement. Electives and all such courses will be required of double major students. Of these, at least one course must be an English composition course equivalent to English 1A, one course must be from a list of selected courses in History and Cultures, one must be from a list of selected courses in Literature and Values, and two must be upper division courses. The English composition course and either the course in History and Cultures or that in Literature and Values must be taken for a letter grade. A minimum of two courses, at least one of which is in the upper division, must be taken from a single department.

For details on double major degree requirements, please consult the Announcement of the College of Engineering.

Note: In addition to the courses listed below, the Department of Nuclear Engineering offers the following courses found in the Engineering section of this catalog: 115, Engineering Thermodynamics; 160, Energy and Power.

Lower Division Courses

24. Freshman Seminars. (1) Course may be repeated for credit as topic varies. One hour of seminar per week. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP)

38. Introduction to Nuclear Engineering. (2) Two hours of lecture per week. Introduction to topics and issues in nuclear engineering: nuclear reactions and radiation, radiation protection and control, energy production and utilization, nuclear fuel cycle, reactor theory, nuclear power engineering, reactor operation, controlled fusion, nuclear waste, and medical and other applications. Primer, advanced topics. (F) Fowler, Peterson

Upper Division Courses

101. Nuclear Reactions and Radiation. (4) Four hours of lecture per week. Prerequisites: Physics 7C. Energies and 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) Prussian

104A. Nuclear Engineering Laboratory. (2) One hour of lecture and four hours of laboratory per week. Prerequisites: 101. (F) Prussian

104B. Nuclear Engineering Laboratory. (2) One hour of lecture and four hours of laboratory per week. Prerequisites: 101, 150, 180. 104A not required. Nuclear materials experiments at high temperature; thermal-hydraulics and two-phase flow; diagnosis of fusion plasmas and fusion neutrons. (SP) Prussian

106. Chemical Methods in Nuclear Technology. (3) One and one-half hours of lecture and four and one-half hours of laboratory per week. Prerequisites: 101 or Chemistry 142. 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 radioactivity to study of chemical problems; nuclear activation analysis. Also listed as Chemistry 144 and IDS 145. (SP) Prussian

120. Nuclear Materials. (4) Four hours of lecture per week. Prerequisites: Engineering 45 and an upper division course in thermodynamics. The effects of neutron and fission fragment irradiation on the properties and behavior of fission reactor materials; microscopic and macroscopic aspects of radiation damage; macroscopic consequences in ceramic fuels and structural alloys. (F) Prussian

124. Nuclear Chemical Engineering. (3) Three hours of lecture per week. Prerequisites: Engineering 115 or equivalent course. Sources of actinides and fission products; nitrides, actinides and fission products; production of radionuclides in nuclear reactors. (SP) Prussian

150. Introduction to Nuclear Reactor Theory. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 101 or Mathematics 50B. Neutron interactions, nuclear fission, and chain reaction systems in thermal and fast nuclear reactors. Diffusion and slowing down of neutrons. Criticality calculations. Nuclear reactor dynamics and reactivity feedback. Fuel cycles and fuel burnup. Production of radionuclides in nuclear reactors. (SP) Vujic

160. Thermo-Fluid Processes in Nuclear Power. (4) Four hours of lecture per week. Prerequisites: Upper division course in thermodynamics. Fundamentals of heat and momentum transfer with application to nuclear power systems. (F) Peterson

161. Nuclear Power Engineering. (4) Four hours of lecture per week. Prerequisites: 150; course in fluid mechanics and heat transfer; junior-level course in thermodynamics. Energy conversion in nuclear power systems; design of reactor components; thermal and structural analysis of reactor core and plant components; thermal-hydraulic analysis of accidents in nuclear power plants; safety evaluation and engineered safety systems. (F) Peterson

162. Radiation Protection and Control. (3) Three hours of lecture per week. Prerequisites: 101. Passage of radiation through material, dosimetry units and measurement, effects of radiation on man, radiation-exposure, radiation protection and control, radiation exposure and dose, sources of radiation and radioactivity, environmental dispersion, biological pathways, radiation transport in shielding, shielding design concept. (SP) Prussian

170. Design of Nuclear Power Systems. (3) Three hours of lecture per week. Prerequisites: 161. Design analysis of nuclear fusion power plants; nuclear reactor design; design and construction of nuclear power plants; construction, performance, fuel cycles and decommissioning; elements of probabilistic risk assessment applied to nuclear reactors. (F) Fowler

180. Introduction to Controlled Fusion. (3) Three hours of lecture per week. Prerequisites: Physics 7C. Introduction to energy production by controlled thermonuclear reactions. Nuclear fusion reactions, energy balances for fusion systems, survey of plasma physics; design and control of breeder reactors; vacuum systems; tritium handling. (F,SP) Fowler

198. Group Study for Advanced Undergraduates. (1-4) Course may be repeated for credit. Various. Must be taken on a passed/not passed basis. Prerequisites: Upper division standing. Group studies of selected topics. (F,SP)

199. Supervised Independent Study. (1-4) Course may be repeated for credit for a maximum of 4 units per semester. Individual conferences. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor. Supervised independent study. Enrollment restrictions apply; see the Introduction to Courses and Curricula section of this catalog. (F,SP)

Graduate Courses

201. Nuclear Reactions and Interactions of Radiation with Matter. (4) Four hours of lecture per week. Prerequisites: 101. Interaction of gamma rays, neutrons, and charged particles with matter; nuclear structure and radioactive decay; cross sections and energetics of nuclear reactions and the fission products; fission and fusion reactions as energy sources. (F) Prussian

220. Irradiation Effects in Nuclear Materials. (3) Three hours of lecture per week. Prerequisites: 120 or consent of instructor. Physical aspects and computer simulation of radiation damage; nuclear and irradiation creep. Mechanical analysis of structures under irradiation. Sputtering, blistering, and hydrogen behavior in fusion reactor materials. (SP) Olander

221. Corrosion in Nuclear Power Systems. (3) Three hours of lecture per week. Prerequisites: 121. Materials Science and Mineral Engineering 112 recommended. Structural metals in nuclear power plants; properties and fabrication of Zircaloy; aqueous corrosion; reactor components; stress, fracture, and mechanical properties of reactor components under combined mechanical loading, neutron irradiation, and chemical environment. (SP) Olander

250. Nuclear Reactor Theory. (4) Four hours of lecture per week. Prerequisites: 101, 150; Engineering 171 recommended. Fission characteristics; neutron chain reactions, neutron transport and diffusion theory; reactor kinetics; multigroup methods, fast and thermal spectrum calculations, nonequilibrium reactor design, computer simulation of reactor dynamics. (SP) Vujic


266. Thermal Aspects of Nuclear Reactors. (4) Four hours of lecture per week. Prerequisites: 160. Fluid dynamics and heat transfer; thermal and hydraulic aspects of reactor design; flow boiling; radiative and convective heat transfer; compressible flow; stress analysis; energy conversion methods. (F) Peterson

265. Design Analysis of Nuclear Reactors. (3) Three hours of lecture per week. Prerequisites: 150 and 161. Principles and techniques of economic analysis to determine capital and operating costs; fuel management and fuel cycle optimization; thermal limits on reactor performance, thermal converters, and fast breeder. Prerequisites: Reactor safety and licensing; release of radioactivity from reactors and fuel processing plants. (F) Melrose

266. Two Phase Flow and Heat Transfer. (3) Three hours of lecture per week. Prerequisites: 160; Mechanical Engineering 105. Study of the hydrodynamics and heat transfer characteristics of two-phase flows and their applications in nuclear power and propulsion systems. Emphasis is on analysis of the single and two-component gas-liquid systems. Aspects of gas-solid and liquid-solid systems are also treated. (SP Peterson
257. Engineering Aspects of Nuclear Reactor Safety. (3) Three hours of lecture per week. Prerequisite: 160 and 161. Methods used in safety evaluation of large nuclear power plants. Safety philosophies and design criteria. Reliability analysis and probabilistic estimates of risks. Nuclear and thermal-hydraulic transients and design basis accidents at Berkeley/Lena. Role of containment, Siting. History of accidents. (F, S) Staff

258. Fusion Reactor Engineering. (3) Three hours of lecture per week. Prerequisites: 120 and 180. Engineering and design of fusion systems. Introduction to controlled thermonuclear fusion as an energy economy, from the standpoint of the physics and technology involved. Case studies of fusion reactor design. Engineering principles of support technology for fusion systems. (SP) Morse

259. Fully Ionized Plasmas. (3) Three hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Presentations on current topics of interest in nuclear technology by experts from government, industry, and universities. Open to the campus community. (F,SP) Fowlser, Morse

259. Nuclear Engineering Colloquium. One and one-half hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Seminars in current research topics in nuclear engineering: Section 1: Fusion; Section 2: Nuclear Waste Management; Section 3: Nuclear Thermal Hydraulics; Section 4: Nuclear Chemistry; Section 5: Nuclear Materials; Section 7: Fusion reaction design; Section 8: Nuclear Instrumentation. (F,SP) Staff

260. Individual Research. (1-12) Course may be repeated for credit. Course does not satisfy unit or residence requirements for doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Qualifications: Graduate standing. Investigation of advanced nuclear engineering problems. (F,SP) Staff

602. Individual Study for Doctoral Students. (1-4) Course may be repeated for credit. Course does not satisfy unit or residence requirements for doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Qualifications: For candidates for doctoral degree. 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,SP)

Department Office: 119 Morgan Hall, 642-6490
Chair: Janet C. King, Ph.D.

264. Nuclear Science. (College of Natural Resources)

Nutrition

Office: 146 Morgan Hall, 642-2879
Chair: Janet C. King, Ph.D.

Professors: Brian A. Ames, Ph.D. (Molecular and Cellular Biology)
Leonard F. Bjeldanes, Ph.D. (Nutritional Sciences)
John D. Forte, Ph.D. (Molecular and Cellular Biology)
John G. King, Ph.D. (Molecular and Cellular Biology)
Norman Kreitzman, M.D., Ph.D. (Nutritional Sciences)
Alexandra V. Nichols, Ph.D. (Molecular and Cellular Biology)
Lester Packer, Ph.D. (Molecular and Cellular Biology)
Z. Hai, Ph.D. (Molecular and Cellular Biology)
George Snellensh, Dr. D. (Public Health, BEHS)
Barry Shane, Ph.D. (Nutritional Sciences)
Fernando E. Vivi, M.D., Ph.D. (Nutritional Sciences)
Fernando E. Vivi, M.D., Ph.D. (Nutritional Sciences)
Doris Howse Calloway, Ph.D. (Nutritional Sciences)
Kathleen L. Carpenter, Ph.D. (Nutritional Sciences)
Theresa M. Ewies, Ph.D. (Nutritional Sciences)
Sylvia Lam, Ph.D. (Nutritional Sciences)
Angela C. Little, Ph.D. (Nutritional Sciences)
Sharon M. Austin, Ph.D. (Molecular and Cellular Biology)
John S. Neals, Ph.D. (Molecular and Cellular Biology)

Herbert H. Sacko, Ph.D. (Emeritus) (Molecular and Cellular Biology)
E.L. Robert (Stated, Ph.D. (Emeritus) (Nutritional Sciences)
Mary Ann Williams, Ph.D. (Emeritus) (Nutritional Sciences)
Associate Professors:
Nancy K. Amy, Ph.D. (Nutritional Sciences)
Gregory W. H Мос, Ph.D. (Nutritional Sciences)
George W. Chang, Ph.D. (Nutritional Sciences)
Bentie O. deluman, Ph.D. (Nutritional Sciences)
Sharon E. Fanning, Ph.D. (Nutritional Sciences)
Susan M. Ocoe, Ph.D. (Nutritional Sciences)
Assistant Professors:
Barbara A. Koo (Public Health, SAHS)
Marc Hellerstein, M.D., Ph.D. (Nutritional Sciences)
Lecturers:
Reginald H. Dadd, Ph.D. (Emeritus) (Entomological Sciences)
Jonas Richards, Ph.D. (Emeritus) (Nutritional Sciences)
Graduate Advisors: Ms. Bjeldanes, Ms. deluman, Mr. Hellerstein.

The Graduate Group in Nutrition offers a degree program that focuses on the interaction of nutrition and metabolism. Graduate research may be focused at any level of integration from molecules and cells to laboratory animals and humans. The program has special strengths in cellular and molecular nutrition and in human nutrition and metabolism. Graduate research may be conducted in collaboration with biological scientists from other departments at Berkeley including the Departments of Molecular and Cellular Biology, Integrative Biology, and Plant Biology, as well as with the Lawrence Berkeley Laboratory. For admission to the M.S. or Ph.D. programs, students must have a bachelor's degree in the biological sciences or related fields, including biochemistry and molecular biology, chemistry, or any of the biological sciences. Candidates for the Ph.D. degree are required to complete a sequence of core graduate nutrition courses and the Ph.D. oral examination. In addition, all students in the group gain experience in teaching as a graduate student instructor. Students seeking further information concerning major courses such as curricula, admission, and financial support should contact the student affairs officer in the Department of Nutrition.

Nutritional Sciences

Department of Nutrition

Nutritional Sciences (College of Natural Resources)

Field Station Offic~: 119 Morgan Hall, 642-6490
Chair: Janet C. King, Ph.D.

Professors:
Norman Kreitzman, M.D., Ph.D. University of Minnesota. Diets and nutritional status of populations.
Barry Shane, Ph.D. University of London. Regulation of vitamin metabolism.
Doris Howse Calloway, Ph.D. University of California at Berkeley. Nutrition and resistance to Infection.
Angela C. Little, Ph.D. University of California at Berkeley. Nutrition and resistance to Infection.
E.L. Robert (Stated, Ph.D. (Emeritus) (Nutritional Sciences)
Mary Ann Williams, Ph.D. (Emeritus) (Nutritional Sciences)

Associate Professors:
Gregory W. H Мос, Ph.D. (Nutritional Sciences)
George W. Chang, Ph.D. (Nutritional Sciences)
Bentie O. deluman, Ph.D. (Nutritional Sciences)
Sharon E. Fanning, Ph.D. (Nutritional Sciences)
Susan M. Ocoe, Ph.D. (Nutritional Sciences)

Assistant Professors:
Marc Hellerstein, M.D., Ph.D. Massachusetts Institute of Technology. Hepatic metabolism regulation, nutrition and inflammation.

Adjunct Professors:
Judith Turner, Ph.D. (Emeritus) (Molecular and Cellular Biology)

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 the biological sciences with advanced coursework in the biochemical and physiological study of nutrient utilization, and food science, and the processes and properties of food materials. Graduates often pursue further study in the biological sciences, enter professional programs in health sciences, or seek employment in research laboratories, government agencies, or in the food industry. Courses that fulfill the lower division prerequisites for junior standing include: Biology 1A; Chemistry 1A, 3A-B, 5A; English 1A-B or equivalent; Mathematics 16A; Molecular and Cell Biology 32; 32L; Nutritional Science 10; Physical Sciences 8A; and Statistics 2 or 20.

The nutrition and clinical dietetic majors are approved by the American Dietetic Association as a Didactic Program in Dietetics (DPD). At the junior and senior levels, students take courses emphasizing nutrition and the application of this knowledge through didactic practice. Graduates of a Didactic Program in Dietetics are eligible to apply to dietetic internships or preprofessional practice programs during which students will receive practical training. Undergraduate students complete the academic course work and a preprofessional program of practical training, students are eligible to take the nationally administered registration examination for credentialing as a registered dietitian. Registered dietitians find employment in health care, government, industry, community agencies, educational institutions, and research laboratories. Many graduates pursue further professional or graduate study in nutrition, health sciences, or related fields. Additional courses which fulfill the lower division prerequisites for junior standing include: Business Administration 1; Computer Science 3; Economics 1; and Psychology 1 or Sociology 3.

The graduate courses offered by the department are designed primarily for support of the Ph.D. and M.S. degree programs in nutrition. Courses include advanced study of the nutritional requirements of humans and other species in the context of health care, including nutrition and the Spillpatsh of this application. Many graduates pursue further professional or graduate study in nutrition, health sciences, or related fields. Additional courses which fulfill the lower division prerequisites for junior standing include: Business Administration 1; Computer Science 3; Economics 1; and Psychology 1 or Sociology 3.

Major degree requirements appear in the Announcement of the College of Natural Resources. For further information, please contact the student affairs officer, 146 Morgan Hall, 642-2879.

Honors Program. Students who are interested in the Honors Program in Nutrition should apply no later than the beginning of their senior year. A grade-point average of 3.5 or higher is required both overall and in the major course work. Students admitted to the Honors Program for a minimum of two semesters in NS H196, Honors Research in Nutritional Sciences, for a minimum of 3 semester units. Attendance in a graduate seminar is highly recommended. Undergraduate students must pass the examination for the degree of Bachelor of Science in accordance with the requirements of the college. Further information, please contact the student affairs officer, 146 Morgan Hall, 642-2879.
10. Introduction to Human Nutrition. (3) Students who have taken 100 will not receive credit for 101. 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. Students are required to record their own diet, calculate its composition and evaluate it. (F,SP) Amy, Vitiel
Optometry / 351

Optometry (School of Optometry)
Office of the Dean (642-3414) and Admissions (642-9937): 351 Minor Hall
Dean: Anthony J. Adams, O.D., Ph.D.

Professors
- Arlene C. Adams, O.D., Ph.D. Color vision; assessment of retinal function
- Ian L. Bailey, O.D., M.S. Low vision; clinical optics; clinical and instructional performance
- Martin S. Banker, Ph.D. Infant vision; developmental and sensorimotor function
- Theodore E. Cohn, Ph.D. Psychophysics of vision; visual neurophysiology; color vision; visual acuity
- Karen DeVriate, Ph.D. Psychophysics and electrophysiology of color vision and spatial vision
- Jerald A. Host, Ph.D. Visual neurophysiology; color vision; visual acuity
- Jay M. Brode, O.D., Ph.D. Retinal receptor optics and function; quantitative layer-by-layer perimetry; visual performance
- Ralph D. Freeman, O.D., Ph.D. Neurophysiology and psychophysics of visual development and plasticity

Stanley A. Klein, Ph.D. Spatial vision; psychophysical methods and vision test design; nonlinear analysis of visual processes
Robert B. Manchel, O.D., Ph.D. Structure, growth, and development of the ocular surface; contact lenses
Shelley S. Miller, Ph.D. Membranes: transport and physiology
Keith R. Polarek, O.D., M.S. Corneal physiology: concept, contact lenses
Clifton M. Sochor, 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. Neurobiology of visual development; neurophysiology: visuomotor interaction
Ivan F. Ellis, Ph.D. Material and energy transport in the eye; contact lens technology related to physiology of the eye
Elwin M. Mcllvain, O.D., Ph.D. Visual neurophysiology; development and plasticity, visual-evoked potentials
Meredith W. Morgen, O.D., Ph.D. Optic chiasms and binocularity

Associate Professor:
- Guazza Hagaardson-Portny, O.D., Ph.D. Clinical psychology: basic aspects of human color vision; binocular vision

Assistant Professors:
- Joseph A. Bonanno, O.D., Ph.D. Corneal physiology and neurophysiology
- Jack H. Hobenston, (B.S.

Senior Lecturers:
- Darrel J. Carter, O.D., Ph.D. Ocular pharmacology: clinical optometry: optometry education
- Michael G. Harris, O.D., J.D., M.S. Contact lenses and corneal physiology

Lecturers:
- John D. Grisham, O.D., M.S.

Affiliated Professors:
- Richard J. Brand, Ph.D. (Biomedical and Environmental Health Sciences) Biostatistical methods for clinical research
- Sumner F. Davis, Ph.D. (Physiology) Airway reflexes
- Marlin C. Diamond, Ph.D. (Integrated Biology) Neurophysiology of the endocrine and autonomic nervous systems
- Stephen F.L. Dilliberton, Ph.D. (Mathematics) Mathematical/destistical mechanics, applied mathematics
- Richard A. Mathies, Ph.D. (Chemistry) Biophysical and physical chemistry
- Herbert O. Krones, O.D., Ph.D. Education (Reading acquisition, reading problems
- Eugene Selleith, Ph.D. University of California at Santa Cruz. Chemistry and Psychology
- Gerald W. Wynn, O.D., Ph.D. (Molecular and Cell Biology) Neurophysiology, psychophysics

Associate Dean of Clinical Academic Affairs: Kenneth A. Polase, O.D., Ph.D.

Upper Division Course

IDS 191A. Introduction to Laboratory Animal Science and Resources. (2) Two and one-half hours of laboratory and one and one-half hours of lecture per week. Must be on a passed/not passed basis. Prerequisites: Psychology 1A-1B or equivalent, upper division course in biology. Students working with laboratory animals. Lectures on basic animal science, including animal research models; principles of anaesthesia, surgery, and sanitation; animal welfare regulations and practices of humane care and breeding; animal genetics and diseases. Laboratory applications of lecture material. Sponsoring departments: Entomology and Nutritional Sciences. Staff

Graduate Course

IDS 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: Nutritional Sciences, Agricultural and Resource Economics and Social and Administrative Health Sciences. (SP) Staff

IDS 295. Systems and Integrative Biology. (1) Course may be repeated for credit. Two hours of seminar and laboratory per week. Must be taken on a pass/no pass basis. 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: Nutritional Sciences, Agricultural and Resource Economics and Social and Administrative Health Sciences. (SP) Staff

Programs
For a description of optometry programs, see page 105.

Upper Division Courses

100. Introduction to Optometry. (2) Two hours of lecture and two hours of clinic per week. Formerly 100A. Optometric Introduction: Definiton, history, current trends, contribution of scientific methods, relation to clinical practice. Clinical observation and clerkship. (Harvey) 120A. Clinical Examination of the Visual System. (3) Three hours of lecture, two hours of laboratory, and two hours of clinic per week. Prerequisites: 100 and 200. Formerly 102B. Diagnostic elements of the optometric examination. Case history, visual acuity and confrontation tests. Refractive error and its correction. (SP) Harris

#On leave, spring
#On leave, fall
#Recipient of Distinguished Teaching Award
120B. Clinical Examination of the Visual System. (4) Two hours of lecture, four hours of laboratory, and two hours of clinical per week. Prerequisites: 120A; formerly 127A. Diagnostic elements of the ophthalmic examination, theory and techniques of examination procedure. Procedures to determine the refractive status for distance and near vision. (F) Harris

120C. Clinical Examination of the Visual System. (6) Three hours of lecture and two hours of laboratory per week. Prerequisites: 120A; formerly 127A. Diagnostic elements of the ophthalmic examination, theory and techniques of examination procedure. Procedures to determine the refractive status for distance and near vision. (F) Harris

122A. Optics of Ophthalmic Lenses. (3) Two hours of lecture and two hours of laboratory per week. Prerequisites: Vision Science 101 and 102. Formerly 114A. Optical and physical characteristics of ophthalmic lenses including spheres, cylinders, spherical-cylinders, prisms, thickness relationships and lens materials. Measurement methods including lens clock, calipers, and lensometers, controlling placement of lenses in frames, effects upon vision. Characteristics of contact lenses. (SP) Grisham

122B. Ophthalmic Optics and Environmental Vision. (3) Two hours of lecture and two hours of laboratory per week. Prerequisites: 122A. Formerly 114B. Multifocal lens designs including complex optical surfaces. Aberrations of lenses and their minimization. Abnormalities of the ocular media including corneal, anterior and posterior capsular opacities. Interactions between optical, physiological, and psychological aspects of contact lenses. Pharmaceutical preparations used in the treatment of external ocular conditions. Fundamentals of the aging patient. Special problems associated with refractive surgery. (SP) Lee

130A. Medical Physiology and Biochemistry. (3) Three hours of lecture per week. Prerequisites: 120A. Formerly 140A. Basic principles of cellular function, biochemistry, and immunology. Chemical and physical properties of the eye. Structure and function of the ocular system. Trends and health care implications. (F,SP) 60-

130B. Physiology and Biochemistry. (4) Four hours of lecture per week. Prerequisites: Vision Science 105. Formerly 140B. Basic principles of cellular function, biochemistry, and immunology. Chemical and physical properties of the eye. Structure and function of the ocular system. Trends and health care implications. (F,SP) 60-

132A. Pharmacology. (3) Three hours of lecture per week. Prerequisites: 130A. Formerly 130A. Basic processes underlying human disease. Epidemiology, signs, symptoms, and treatment of systemic diseases. Basic approaches of pharmaceutical evaluation and interpretation of common symptoms and signs related to systemic disease processes. (F) Walker-Brandreth

136A. Ocular Manifestations of Systemic Disease. (3) Three hours of lecture per week. Prerequisites: 130A. Formerly 131A. Basic processes underlying the ocular system. Mechanisms of systemic disease. Relationship between basic disease processes and dysfunctions of the visual system. (SP) Walker-Brandreth

137A-137B. Fundamentals of Ocular Disease Diagnosis. (2,5) Two hours of lecture and two hours of laboratory per week. Prerequisites: 130 and Vision Science 101 and 102, formerly 114A and 114B. Basic approaches to the visual system. Methods and principles relating to the detection and diagnosis of ocular disease. Includes examination of the ocular fundus, the anterior segment of the eye and the ocular adnexa, anatomy, histology, and psychophysical tests of visual function. (F,SP) DiMartino

138A-138B. Basis, Recognition, and Management of Ocular Disease. (5,5) Four hours of lecture and two hours of laboratory per week. Prerequisites: 135. Formerly 138A-138B. Endocrinology, histopathology, microbiology, symptoms, pathology, recognition and differential diagnosis, and management of ocular disease. (F,SP) Wiley

140A. Anomalies of Binocular Vision. (3) Two hours of lecture and two hours of laboratory per week. Prerequisites: Vision Science 118. Formerly 133. Heterophoria, strabismus, and amblyopia. Detection, measurement, classification, etiology, symptomatology, signs, and procedures for the evaluation of both convergent and divergent fixation anomalies. Orthoptics and vision training. (SP) Haegerstrom-Portney

141. Treatment of Binocular Anomalies. (3) Two hours of lecture and two hours of laboratory per week. Prerequisites: 140. Formerly 134. Analysis of problems of binocular vision and assessment of the prognosis for their treatment. Examination and treatment of binocular vision problems with lenses, prisms, occlusion, orthoptics, prisms, drugs, and surgery. Design and implementation of treatment programs. (F) Grisham

142. Pediatric Optometry. (2) One hour of lecture and two hours of laboratory per week. Prerequisites: 120C. Formerly 150B. Optometric examination, management and treatment of pediatric patients. Psychology of infants and children. Methods of assessing visual and perceptual functions that are related to educational development. Procedures used by other professionals in the management of children's health and education. (SP) Grisham

150A. Geriatric Optometry. (2) Two hours of lecture per week. Prerequisites: 120C. Formerly 150B. Geriatric physiology and low vision. Optometric examination and treatment of the low vision patient. Interdisciplinary rehabilitation resources, counseling, and referral. (SP) Bailey

160A. Contact Lenses: Examination of the Contact Lens Patient. (3) Two hours of lecture and two hours of laboratory per week. Prerequisites: 120B. Formerly 151A. The physiological basis for fitting contact lenses. Effects of contact lenses on tears, lids, and corneas. Examination procedures and instrumentation used in monitoring the ocular response to contact lenses. Contact lens inspection, care and handling. (SP) Harris

160B. Contact Lenses: Principles and Practice. (3) Two hours of lecture and two hours of laboratory per week. Prerequisites: 160A. Formerly 161B. Continuation of 160A. Physical and optical properties of contact lenses. Fitting contact lenses to the human eye, clinical applications. (F) Mandell

160C. Contact Lenses: Advanced Techniques. (2) Two hours of lecture and two hours of clinic per week. Must be taken on a passed/not passed basis. Prerequisites: 160B, Formerly 161C and 161D. Continuation of 160B. Advanced techniques in fitting contact lenses and recent developments in the field of contact lenses. (SP) Mandell

170A-170B. Practice of Optometry. (3,5) Three hours of lecture per week. Prerequisites: 120C. Formerly 185A-185B. Laws governing the practice of optometry. Establishment, management, and economics of an optometric practice. Professional organizations and responsibilities. Methods for the delivery of optometric services. Epidemiological trends and health care implications. (F,SP) Thal, Hitaka

190A-190B. Optometry Research Project. (1,1) One hour of lecture and one hour of discussion per week. Prerequisites: consent of instructor. Must be taken on a passed/not passed basis. Prerequisites: 120C. Elements of a research proposal. Fundamentals of scientific inquiry, Experimental design and data analysis. (F,SP) Bonanno, Cohn

191A-191B. Optometry Research Project. (1,2) One hour of discussion per week. Must be taken on a passed/not passed basis. Credit and grade to be awarded on completion of sequence. Prerequisites: 190A and 190B. Thesis research for optometry students. Presentation of research results. (F,SP) Bonanno, Cohn

198. Group Studies. (2) Two hours of lecture per week. Must be taken on a passed/not passed basis. Prerequisites: 430A. Advanced topics in specialty areas. (F,SP) Staff
Optometry / 253

Graduate Courses
201A-201B. Seminar in Vision Science. (2.2) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. Formerly Physics/Physiological Optics 104. 201A. Graduate seminar in vision science. (F) Staff


206. The Oculomotor System. (3) Two hours of lecture and four hours of laboratory per week. Prerequisites: Consent of instructor. Formerly Psychological Optics 204. Functions of the eye, pupil activity, accommodation and pupil activity. Anomalies of eye movements, associated lenticular accommodation, interference, defocusing, accommodation and pupil function. Anomalous binocular vision development and plasticity of the same visual pathways. Normal and Abnormal Vision Development. (1) One hour of lecture per week. Formerly Psychological Optics 195. Normal development of the visual pathways including optics, anatomy and physiology. Visual deprivation and abnormal development. Genetic and experiential factors and psychophysical functions. (F) Freeman

115. Infant Vision. (1) One hour of lecture per week. Prerequisites: 103 and 105 or consent of instructor. Formerly Optometry 166B. Development of the eye and visual system. Assessment of visual function in the developing eye. Development of color vision, binocular vision, visual functions, visual sensitivity to light and dark and perception. Refraction and retinal error in infants. (F) Banks

116. Oculomotor Functions and Neurology. (2.5) Two hours of lecture and ten hours of laboratory per week. Prerequisites: 105 and 110 or consent of instructor. Formerly Physiological Optics 125. Kinematics of eye movements, binocular nystagmus, sensory motor responses, arc and repetitive responses, motor suppression and discrimination of eye movements, accommodation and pupil function. Anomalous binocular vision development and plasticity of the same visual pathways. Normal and Abnormal Vision Development. (1) One hour of lecture per week. Formerly Psychological Optics 112. Development of the eye and visual system. Assessment of visual function in the developing eye. Development of color vision, binocular vision, visual functions, visual sensitivity to light and dark and perception. Refraction and retinal error in infants. (F) Banks

117. Oculomotor Functions and Neurology. (2.5) Two hours of lecture and ten hours of laboratory per week. Prerequisites: 105 and 110 or consent of instructor. Formerly Physiological Optics 125. Kinematics of eye movements, binocular nystagmus, sensory motor responses, arc and repetitive responses, motor suppression and discrimination of eye movements, accommodation and pupil function. Anomalous binocular vision development and plasticity of the same visual pathways. Normal and Abnormal Vision Development. (1) One hour of lecture per week. Formerly Psychological Optics 112. Development of the eye and visual system. Assessment of visual function in the developing eye. Development of color vision, binocular vision, visual functions, visual sensitivity to light and dark and perception. Refraction and retinal error in infants. (F) Banks

118. Binocular Vision and Space Perception. (3) Two hours of lecture and twenty-four hours of laboratory per week. Prerequisites: 101 and 105 or consent of instructor. Formerly Physiological Optics 160. Perception of space, direction, and distance. Binocular retinal correspondence, herring, differential magnification effects and anomalies of binocular vision development. Sensory vision, local stereopsis, static and dynamic stereopsis, binocular depth cues. (SP) Schor

196. Group Studies for Advanced Undergraduates. (1-4) Supervised group study. Must be taken on a pass/fail basis. Prerequisites: Upper division status and consent of instructor. Formerly Psychological Optics 196. (F) Staff

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Must be taken on a pass/fail basis. Prerequisites: Upper division status and consent of instructor. Formerly Psychological Optics 199. Supervised independent study and research. Enrollment restrictions apply; see the introduction to Courses and Curriculum section of this catalog. (F) Staff
detection, cataract, corneal disease, glaucoma, strabismus, 218. Spatial Aspects of Vision. (2) Course may be repeated for credit with consent of instructor. Two hours of lecture per week. Prerequisites: 111 or consent of instructor. Selected topics from spatial perception and anomalies of binocular vision. (SP) K. DeVellis, R. DeVellis.

220. Binocular Vision. (2) Course may be repeated for credit with consent of instructor. Two hours of lecture per week. Prerequisites: 118 or consent of instructor. Selected topics from stereopsis and binocular depth perception. Development of binocular vision, binocular interactions, binocular disparity, binocular space perception and anomalies of binocular vision. (F) Schor

222. Application of Vision Psychophysics to Clinical Disorders. (3) Course may be repeated for credit with consent of instructor. Two hours of lecture and two hours of laboratory or discussion per week. Prerequisites: Consent of instructor. Formerly Physiological Optics 222. Selected topics from: Non-invasive techniques in the study of retinal and optic nerve function, contrast sensitivity, color vision, accommodation, strabismus, amblyopia, and various degrees of visual impairment; study of basic laboratory procedures which may be applied to allow identification of site(s) of anomaly in the visual pathway, increase sensitivity in disease detection, and contribute to an understanding of the prognosis for eye disease. (SP) Enoch Adams.

252. Neurobiology of Visual Development. (2) Course may be repeated for credit. Two hours of seminars per week. Prerequisites: Consent of instructor. Formerly Physiological Optics 252. Reading and critical discussion of neurobiological studies of developing mammalian visual systems. Evaluation of the role of innate and environmental factors in specifying the development of central visual pathways. (VP) Van Stavler, Banks.

280. Vegetative Physiology of the Eye. (3) Four hours of lecture per week. Prerequisites: Graduate standing and a course in calculus. Formerly Physiological Optics 280. Detailed analysis of the vegetative functions of the eyeball and heat transference to ocular tissue, corneal, solera, lens, and vitreous body. The formation of aqueous humor and the relation of intraocular pressure to the rates of formation and drainage. (F) Miller

288. Group Studies, Seminars, or Group Research. (1-6) One to four hours of lecture per week. Formerly Physiological Optics 292. Group studies of selected topics. Advanced studies in various subjects through special seminars on topics to be selected each year, informal groups studying special problems, group participation in experimental problems and analysis. (F,SP) Staff

298. Research in Vision Science. (1-12) Varies. Prerequisites: Consent of instructor. Formerly Physiological Optics 298. Research. (F,SP) Staff

601. Individual Study for Master's Students. (1-6) Course does not satisfy unit or residence requirements for master's degree. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Formerly Physiological Optics 601. Individual study for the comprehensive requirements in consultation with the advisor in vision science. (F,SP) Staff

602. Individual Study for Doctoral Students. (1-6) Course does not satisfy unit or residence requirements for master's degree. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Formerly Physiological Optics 602. Individual study in consultation with the advisor in vision science, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required for the Ph. D. (F,SP) Staff

Professional Courses
401. Applications of Electronics and Computers. (2) Two hours of lecture and two hours of laboratory per week. Prerequisites: Graduate standing in vision science, consent of instructor and consent of instructor. Formerly Physiological Optics 401. The study of vision requires the application of electronic and computer techniques. Topics will cover the recording of bioelectric phenomena, image analysis, data reduction, averaging and computer processing and displays, and computer interactive systems used in vision science and optometry. (F,SP) Staff

Interdepartmental Studies Courses
Upper Division Courses
IDS 114A-114B. Advances in Aging: Alzheimer's Disease; Biological and Social Dimensions. (2,2) Two hours of 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, socio-economic, legal and ethical). Students and speakers with special expertise in this field will participate. Sponsoring departments: Optometry, Social Welfare, Public Health, and Molecular and Cell Biology. (F)

IDS 119. Multidisciplinary Studies and Field Experience in Aging. (2) Two hours of seminar per week for seven weeks and six hours of fieldwork. Prerequisites: Upper division or graduate student and consent of instructor. Course does not satisfy unit or residence requirements. Prerequisites: Consent of instructor. Formerly Physiological Optics 601. Individual study in consultation with the advisor in vision science. Intended to cover a broad range of Interdisciplinary nature of aging and caring for older people. Sponsoring departments: Optometry, Social Welfare, Public Health, and Molecular and Cell Biology. (F)

Related Courses in Other Departments
Psychology 210A. Proseminar: Sensory Processing. (3)
Psychology 210D. Proseminar: Perception. (3)

Oriental Languages
(See College of Letters and Science)
(See East Asian Languages)

Parasitology
(School of Public Health, Interdepartmental Graduate Groups)
Office: 19 Warren Hall, 642-6351
Chair: James L. Hardy, Ph.D.
Professors: Anna H. Good, M.D., Ph.D. (Molecular and Cell Biology); George O. Polen, Ph.D. (Entomology and Parasitology)
Graduate Advisers: Ms. Agabian, Mr. Hardy, Mr. Lane.

This program is administered by an interdepartmental group composed of staff members drawn from various departments interested in parasitology. Graduate study leading to the M.S. and Ph.D. degrees is offered. Students with a bachelor's degree in a biological science may be admitted to the program.

The varied background and interests of the supervising group offer the prospective student a broad scope of educational opportunities. A common interest of the group is host-parasite interactions. Hosts of primary interest are those in the animal kingdom. The parasites under consideration cover a broad range of invertebrate and microbial forms, and special attention is directed to parasites of humans 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 available in the following units of the faculty members of the group. These include the Department of Entomological Sciences, the Department of Integrative Biology, the Department of Molecular and Cell Biology, and the School of Public Health on the Berkeley campus and the P hiji 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
(College of Letters and Science)
Program Office: 361 Campbell Hall, 643-6465.
Chair: Sheldon Margen, Ph.D.
Academic Coordinator: Jerry Sanders, Ph.D.

Affiliated Faculty: Christopher Alexander (Architecture); James Anderson (Anthropology); Gudrun Berreman (Anthropology); Claudia Carr (Conservation and Resource Studies); Barbara Christian (American Studies); West Churchman (Business Administration); Diane Clemens (History); B. J. das Gupta (Political Science); Troy Duster (Sociology); SnowArrow Faussett (Native American Studies); John Harris (Energy and Resources Group); Charles Henry (African American Studies); Percy Hintzen (African American Studies); John Hurst (Education); Michael Johns (Geography); Elaine Kim (Asian American Studies); Leslie Krueg (Classical and Comparative Literature); A. Kent MacDougall (Journalism); Beatriz Manz (Geography and Ethnic Studies); Joe McBride (Forestry and Resource Management); Margaret Mahaffa (Chicano Studies); Carolyn Merchant (Conservation and Resource Studies); Jean Molesky (Ethnic Studies); Carlos Muñoz (Chicano Studies); Laura Nagler (Anthropology); Michael Nagler (Classics); A. D. Pasaden (Education); Arnold Schultz (CRS/Forestry); Charles Schwartz (Physics); Susan Schwekl (English); Peter Dale Scott (English); Ronald Takaki (Ethnic Studies); Stalin Varany (Electrical Engineering and Computer Sciences); William Vega (Social and Administrative Health Sciences); Richard Walker (Geography); Michael Watts (Geography); David Wood (Entomological Science).

Affiliated faculty serve as course instructors, student advisers and committee members.
The Program
Peace and Conflict Studies is an interdisciplinary undergraduate program which offers an integrative approach to the study of peace theory and practice in historical perspective; global problems of war, injustice, poverty, and ecological deterioration; social, economic, and political dimensions of conflict and nonviolent conflict resolution in domestic, regional, and international contexts; culture and religion, worldviews and ideology as factors in conflict and cooperation; the intersection of violence and models of world order, as well as past and present efforts to achieve them; and education and other change processes for realizing a more peaceful and just world.

The Major
Core Courses—Lower Division. 10, 15, 25, 186, 187, 190.
Lower division students fulfill their College of Letters and Science breadth requirements and begin upper division work by using PACS core courses and preparatory course work. The lower division courses serve as a structured approach to peace studies. Students are encouraged to select survey courses that provide a base for their intended area of concentration. The area of concentration is composed of a minimum of four additional upper division courses. Following the survey and area concentration courses, PACS 186 and 187 provide fieldwork experience, and PACS 190, Senior Seminar, provides students with an opportunity to synthesize their academic experience. The program requires the written approval of the major advisor. Interested students should speak with the student affairs officer in the PACS office.

The Minor
Students in the College of Letters and Science may complete one or more minors of their choice. Minimum requirements for a minor in peace and conflict studies are completion of five PACS courses taken for a grade, with an average of C overall. PACS 15 and 190 may be counted toward the minor only and do not count toward the major.

Honors
Majors in peace and conflict studies who have maintained a 3.2 GPA in the major and a 3.0 GPA overall in course work undertaken at Berkeley are eligible to apply for the honors program. Admission to the program requires the written approval of a faculty sponsor and the program chair. Candidates for honors are then required to conduct independent research and write a thesis under a PACS faculty advisor. Departmental honors are awarded upon completion of the honors course with a grade of B or better, and a GPA of 3.0 in both the major and overall in the student's last semester at Berkeley.

The Minor
Students in the College of Letters and Science may complete one or more minors of their choice. Minimum requirements for a minor in peace and conflict studies are completion of five PACS courses taken for a grade, with an average of C overall. PACS 15 and 190 may be counted toward the minor only and do not count toward the major.

Lower Division Courses
10. Introduction to Peace and Conflict Studies. (4) Three hours of lecture and one-half hour of discussion per week. Prerequisites: None. This course will explore the political and social causes of violence and war and the processes that lead to ecological social integration, justice and peace. The course will be based on guest lectures and readings with continuity provided by faculty lectures. This course is required for majors but non-majors are welcome. (F,SP)
15. Integrative Seminar. (1) One hour of seminar per week. Must be taken on a passed/not passed basis. Prerequisites: 10 or consent of instructor. For majors or intended majors only. Formally 105. A weekly seminar designed to help PACS majors identify and emphasize concepts that unify their diverse course work. Students will write a term paper (or academic statement of purpose) which serves as a planning guide in selecting their specialized course work and faculty advisor(s). (F,SP) Sanders
24. Freshman Seminars. (1) Course may be repeated for credit as topic varies. One hour of seminar per week for one semester with grade of Pass/No Pass on a pass/fail basis. Sections 5-8 to be graded on a passed/not passed basis. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP)

25. Critical Thinking and Research Methodology. (3) Three lecture hours plus discussion required. Prerequisites: 10 or consent of instructor; for majors or intended majors only. This is a course in how to think critically about policy research, in which scientific and value structures inevitably become merged. It prepares students to make independent, reasoned decisions regarding the explicit integration of scientific considerations and ethical concerns in their approach to the research. (SP) Staff

98. Directed Group Study. (1-3) Course may be repeated for credit. 1-4 hours of lecture/group per week. More than one hour of credit must be taken on a passed/not passed basis. Group discussion, research and reporting on selected topics. (F,SP)

99. Supervised Independent Study and Research. (1-9) Course may be repeated for credit. Tutorial. Must be taken on a passed/not passed basis. Prerequisites: Lower division standing; GPA 3.4 or better; consent of instructor, adviser and departmental chair; usually restricted to PACS majors. Supervised independent study and research provided to PACS not covered in depth by other courses. A proposal must be formulated in consultation with the faculy sponsor with clearly stated objectives and means of implementation. (F,SP)

Upper Division Courses
100. Peace Theory: Approaches and Analyses. (3) Two hours of lecture and two hours of discussion per week. Prerequisites: 10. For majors only. This course will explore the fundamental 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 major paradigms and major debates in peace studies and research. (F,SP)

119. Special Topics In Peace and Conflict Issues. (3) Course may be repeated for credit as topic varies. Two hours of lecture and two hours of discussion per week. Topics vary from semester to semester. Check with the PACS office for precise schedule of offerings. (F,SP)

120. The Child at Risk: Public Health and Social Justice 1840-1990. (3) Course may be repeated for credit. Three hours of lecture/seminar per week. Prerequisites: Consent of instructor. An interdisciplinary, cross-cultural approach to examine the unfolding hazards that children have faced locally and around the world since the industrial revolution, and responses to these hazards by state, philanthropic and community organizations; the history of specific children's rights or economic-social-cultural rights. (F,SP)

149. International Conflict and World Order. (3) Three lecture hours per week. An introduction to the consideration of values and ethics in the study of international relations. This course will explore the historical development of the field of international relations, and the ways in which these values are encountered in the study of global interdisciplinary issues. (SP) Nagler

150. Conflict Resolution: Theory and Practice. (3) Three hours of lecture per week. This course will introduce theories of individual and group conflict as a conceptual framework for practical application. Students will engage in practical exercises as parties to conflicts and as third-party interventionists. The course will look at sources of conflict, considering multicultural aspects, and will emphasize the opportunities for growth and development for all parties. (SP) Nagler

161. War and Peace Movements In Twentieth Century America. (3) Three lecture hours per week. An examination of the history of anti-war movements which have been an integral component to contemporary U.S. history. The historic roots of these movements will be studied in conjunction with their impact in shaping U.S. society. (SP)

164. Theories of Nonviolence. (3) Three hours of lecture per week. Special topics in theories of nonviolence as articulated or inferred in the work of major practitioners. (SP) Nagler

165. Introduction to the Ethics and Value Asumptions In Planning and Systems. (3) Two hours of lecture and two hours of discussion per week. Introduction to the consideration of values and ethics in social planning and policy-making, e.g., in operations research, systems planning, benefit analysis, urban and national planning, and world modeling. (SP) Churchman

174. Politics of Chemical and Biological Warfare. (3) Three hours of lecture and one hour of discussion per week. More deadly than nuclear weapons? Re- view of biology of chemical and biological warfare, and current issues of current CWB weaponry and policy in the United States. Ethics questions surrounding CWB development, stockpiling and use will be discussed. (F)

186. Peace and Conflict Studies Internship. (2-4) Three lecture hours per week. May be taken on a passed/not passed basis. Prerequisites: 10 or consent of instructor. For majors or intended majors only. Formerly 105. A weekly seminar open to students interested in gaining practical experience in the field of peace and conflict studies. Opportunities are offered for intensive analysis of the historical background and implementation problems involved in one or another set of civil-political rights or economic-social-cultural rights. (F,SP)

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124. Issues in Global and Domestic Hunger. (3) Three hours of lecture per week. An introduction to the root causes of hunger, global and domestic, and potential solutions. Topics to be examined include: Overview of the global food system; the politics of hunger; relationships of political and economic structures with hunger; and critical evaluation of current efforts to alleviate hunger. (F)

127. Human Rights. (3) Course may be repeated for credit. Three hours of seminar per week. A seminar providing a panoramic overview of both the practical and reality underlying domestic and global conflicts on human rights. Special attention to the connection between human rights and peace, differences between the U.S. and the rest of the world on human rights approaches. Opportunities are offered for intensive analysis of the historical background and Implementation problems involved in one or another set of civil-political rights or economic-social-cultural rights. (F,SP)

135. Special Topics In Regional Conflict. (3) Course may be repeated for credit. 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 geo-political problems and the sources of their conflicts. (F,SP)

149. International Conflict and World Order. (3) Two hours of lecture and two hours of discussion per week. Provides an understanding of the present world system, an appreciation of emerging trends and problems in international relations, and an opportunity to explore alternatives to meet these challenges. Particular attention will be given to the role of hegemony and power, the ways in which they are changing today and their effects on international security. The opportunities provided by a global interdisciplinary framework will be analyzed. (SP)

150. Conflict Resolution: Theory and Practice. (3) Three hours of lecture per week. This course will introduce theories of individual and group conflict as a conceptual framework for practical application. Students will engage in practical exercises as parties to conflicts and as third-party intervenors. The course will look at sources of conflict, considering multicultural aspects, and will emphasize the opportunities for growth and development for all parties. (SP) Nagler

161. War and Peace Movements In Twentieth Century America. (3) Three lecture hours per week. An examination of the history of anti-war movements which have been an integral component to contemporary U.S. history. The historic roots of these movements will be studied in conjunction with their impact in shaping U.S. society. (SP)

164. Theories of Nonviolence. (3) Three hours of lecture per week. Special topics in theories of nonviolence as articulated or inferred in the work of major practitioners. (SP) Nagler

165. Introduction to the Ethics and Value Asumptions In Planning and Systems. (3) Two hours of lecture and two hours of discussion per week. Introduction to the consideration of values and ethics in social planning and policy-making, e.g., in operations research, systems planning, benefit analysis, urban and national planning, and world modeling. (SP) Churchman

174. Politics of Chemical and Biological Warfare. (3) Three hours of lecture and one hour of discussion per week. More deadly than nuclear weapons? Re- view of biology of chemical and biological warfare, and current issues of current CWB weaponry and policy in the United States. Ethics questions surrounding CWB development, stockpiling and use will be discussed. (F)

186. Peace and Conflict Studies Internship. (2-4) Three lecture hours per week. May be taken on a passed/not passed basis. Prerequisites: 10 or consent of instructor. For majors or intended majors only. Formerly 105. A weekly seminar open to students interested in gaining practical experience in the field of peace and conflict studies. Opportunities are offered for intensive analysis of the historical background and implementation problems involved in one or another set of civil-political rights or economic-social-cultural rights. (F,SP)
Petroleum Engineering
(College of Engineering)

Office: 210 Hearst Mining Building, 642-3801
Beginning the 1983-94 academic year, students may elect Petroleum engineering as an option within the earth resources major administered by the Department of Materials Science and Mineral Engineering or in the dual major program administered by the Department of Chemical Engineering. See the Materials Science and Mineral Engineering and the Engineering—Double Major Programs sections of this catalog, as well as the Announcement of the College of Engineering and the Announcement of the College of Chemistry.

The graduate program in petroleum engineering is offered as a field of study in mechanical engineering, materials science and mineral engineering, and chemical engineering.

Philosophy
(College of Letters and Science)

Department Office: 514 Moses Hall, 642-2722
Chair: Janet Browntugh, Ph.D.

Professors:
Charles S. Chihara, Ph.D.
Thompson Clarke, Ph.D.
Hubert L. Dreyfus, Ph.D.
Barzel Schiffer, Ph.D.
John R. Searle, Ph.D.
Hans Sluga, B.Phil.
Barry G. Stroud, Ph.D.
Bruce J. Vermazen, Ph.D.
Bernard Williams, M.A. (Deutsch Professor)
Ernest W. Adams, Ph.D. (Emeritus)
William Craig, Ph.D. (Emeritus)
Donald H. Davidson, Ph.D. (Emeritus) (Sluasser Professor)
Paul K. Feyerabend, Ph.D. (Emeritus)
Benison Mates, Ph.D. (Emeritus)
Wallace I. Matson, Ph.D. (Emeritus)
David Rynin, Ph.D. (Emeritus)
Frits Staal, Ph.D. (Emeritus)
Joseph Tusman, Ph.D. (Emeritus)

Associate Professors:
David Gill, Ph.D.
Hannah Ginsborg, Ph.D.
Elisabeth Lloyd, Ph.D.
Hwan-me Lee, Ph.D.

Assistant Professors:
David Gill, Ph.D.
Martin Jones, Ph.D.
Stephan Neale, Ph.D.
Daniel Warren, Ph.D.

Affiliated Faculty:
Jeremy Waldron, LL.B. Boalt School of Law
Mills Professor:
Richard Wolin, M.A.

The Major
Lower Division. 12A or 14A, 25A and 25B.
Upper Division. 100, 104, and two courses from the following four groups (no more than one course from any one group):
Group A: 122
Group B: 125
Group C: 131, 132
Group D: 133, 135
A total of 48 units is required in the major program.

Students should pass Philosophy 12A or 14A before the end of the junior year and should take Philosophy 100 as soon as possible after passing the major. One of the three additional upper division courses may be taken in another department, provided that the course selected is deemed by the minor advisor to be beneficial to the major. One course in the major may be taken on a passed/not passed basis.

Honors Program. With the consent of the major advisor, a student with an overall 3.3 grade-point average 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 H198, Senior Colloquium, or (2) a graduate course in the Department of Philosophy 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 Philosophy H198.

The Minor
Required: Philosophy 25A or 25B; Philosophy 104; one of the following six courses: 122, 125, 131, 132, 133, 135; three additional upper division courses in philosophy (excluding Philosophy 101). A minimum of three of the upper division courses must be taken at Berkeley. Each course must be completed on a letter-grading 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. (3) Three hours of lecture and one hour of discussion per week. Introduction to ethical and political philosophy. (F) Gill
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 unit, Gocslaw. (SP) Searle
4. Knowledge and Its Limits. (3) Three hours of lecture and one hour of discussion per week. Introduction to the theory of knowledge. (F) Jones
5. Science and Human Understanding. (4) Three hours of lecture and one hour of discussion per week. Introduction to the Philosophy of Science. 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 realization that the changing answers to these questions are themselves self-inter- pretations. Dreyfus
7. Existentialism in Literature and Film. (3) Three hours of lecture and one hour of discussion per week. Christian, agnostic, and atheistic existentialism as expressed in the works of Dostoyevsky, Melville, Kafka, Auden, and Godard, etc.
8. Introduction to Philosophy of Art. (4) Three hours of lecture and one hour of discussion per week. This course will identify the central features of art, and it will consider alternative accounts. Topics will include: The definition of art, the institutional theory of art, the ontological nature of art, the role of art in society, the relation of art and artefact, representation, expression, metaphor, and value. (F) Wolfheim
9. Chinese Philosophy. (4) Three hours of lecture per week. An introduction to Chinese philosophical thought. The main ideas of different schools of thought, including Confucianism, Taoism and Buddhism, will be

110. Aesthetics. (4) Three hours of lecture per week. Prerequisites: Upper division courses in philosophy or consent of instructor. Major topics in aesthetics: Aesthetic arts/literature and music. Form, expression, representation style; interpretation and evaluation. (F) Vermazen

111. Aesthetic Theories. (4) Three hours of lecture per week. A study of aesthetic theories based on his/her historical matrix. (F) Scheffler

115. Political Philosophy. (4) Three hours of lecture per week. Analysis of political problems and related problems. (F) Scheffler


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. Prerequisites: 12A, 12B or equivalent. Fundamental problems in metaphysics and the theory of knowledge.

123. Philosophy of Science. (4) Three hours of lecture per week. A survey of main topics in the logic of science and other issues coming under the general heading of philosophy of science. (F) Lloyd

129. Special Topics in the Philosophy of Science. (4) Three hours of lecture per week. A discussion of some depth of one or a few special issues in, or approaches to, the philosophy of science. Details of current topics are available in the departmental guide each semester in which the course is given.

130. Philosophy of Social Science. (4) Three hours of lecture per week. Philosophical issues 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 role of practical arguments? What is the structure of explanations of action? (F) Vermazen

132. Philosophy of Mind. (4) Three hours of lecture per week. Mind and matter; other minds; the concept "person." (F) Searle

133. Philosophy of Language. (4) Three hours of lecture per week. (F,SP) Neale, Searle

135. Theory of Meaning. (4) Three hours of lecture per week. Prerequisites: One course in logic or consent of instructor. Language 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 actions, actions. Relations between thought and language.


142. Philosophical Logic. (4) Three hours of lecture per week. Main subject of study will be logical aspects of natural language, and their relations to formal logic. Special attention will be given to unsettled questions in logical theory, including the nature of generalizations, time and tense, etc.

143. Modal Reasoning. (4) Three hours of lecture per week. Prerequisites: 12A, 12A or consent of instructor. Analysis of modal logical reasoning. The uses of modal concepts and modal logic in philosophical reasoning. (F) Chinara


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) Course may be repeated for credit. Meetings to be arranged. Prerequisites: Consent of instructor. Special course designed to facilitate repetition of upper division course undertaken on the quarter system in which student received a deficient grade. (F,SP)

151. Early Chinese Thought. (4) Three hours of lecture per week. An examination of early Chinese thought via a study of representative thinkers and texts. Topics will include: pre-Ch'in Confucianism and Taoism, development of Confucian thought in Han dynasty and of Taoist thought in the Wei-Ch'in dynasties, development of Buddhist thought. (Shun)

152. Later Chinese Thought. (4) Three hours of lecture per week. This course begins with an introduction to early Chinese thought, including the development of Confucian, Taoist and Buddhist thought up to the ninth century. It then continues with an in-depth examination of the development of Confucian thought in response to the influence of Taoism and Buddhism via a study of representative thinkers from the Sung, Ming, and Ch'ing dynasties. (Shun)

153. Chinese Philosophy. (4) Three hours of lecture per week. The course focuses on certain central topics in Chinese philosophy, though a survey of the history of Chinese thought is an important component. 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. (Shun)

154. 19th-Century Philosophy. (4) Three hours of lecture per week.

156. Foundations of Analytic Philosophy. (4) Three hours of lecture per week. For Early 156-156. (SP) Ginsborg

160. Plato. (4) Three hours of lecture per week. (F) Gill

161. Aristotle. (4) Three hours of lecture per week.

163. Special Topics in Greek Philosophy. (4) Three hours of lecture per week. Prerequisites: 12A, 12B or equivalent. The course is designed to deal with a variety of topics in Greek philosophy, its contents will vary from occasion to occasion. Possible topics: the character study of one or more of Plato's dialogues, the reading of one of Aristotle's texts, stoicism, scepticism, and neo-pleatonism.

167. Introduction to Chinese Philosophy. (4) Three hours of lecture and one hour of discussion 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, Hsun Tzu, Mo Tzu, Chuang Tzu, Tung Chung-shu, Chu Hsi, Wang Yang-ming, Tai Che-li. One of the major courses presented in the course is the development of Chinese ethical theory and the role of language in moral education. Also listed as IDS 167 and Chinese 165. (Shun)

170. Descartes. (4) Three hours of lecture per week.

171. Hobbes. (4) Three hours of lecture per week. (SP) Vermazen

172. Spinoza. (4) Three hours of lecture per week.

173. Leibniz. (4) Three hours of lecture per week.

175. Berkeley. (4) Three hours of lecture per week. (F) Ginsborg

176. Hume. (4) Three hours of lecture per week. (F) Broughton

178. Kant. (4) Three hours of lecture per week. (F) Warren
181. Hegel. (4) Three hours of lecture per week.
182. Kierkegaard. (4) Three hours of lecture per week. Prerequisites: One philosophy course. A study of Kierkegaard as theologian, psychologist, and existen-tialist. It emphasizes on three aspects of his thought which have provided the basis of existential phenomenology.
183. Schopenhauer and Nietzsche. (4) Three hours of lecture per week. An examination of the philosophy of Schopenhauer and Nietzsche. (SP) Sluga
184. Nietzsche. (4) Three hours of lecture per week.
185. Special Topics in Modern Philosophy. (4) Three hours of lecture per week. The course is designed to deal with a variety of topics in modern philosophy. Its contents will vary from occasion to occasion. Possible topics include the detailed study of an important text by a modern philosopher, or the study of a particular period or movement of modern philosophy.
187. Heidegger. (4) Three hours of lecture and one hour of discussion per week. A study of Heidegger's Being and Time. (F) Dreyfus
188. Wittgenstein. (4) Three hours of lecture per week. Sluga
189. Special Topics in Recent European Philosophy. (4) Three hours of lecture per week. The course is designed to deal with a variety of topics in contemporary European philosophy. Its contents will vary from occasion to occasion. Possible topics include: further work in phenomenology and existentialism, the study of a particular text by an important figure in contemporary European philosophy, current French and German philosophy. (SP) Sluga
H185. 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)
H186. Senior Colloquium. (4) Three hours of seminar per week. A seminar course for honor students in philosophy on a topic to be announced. Emphasis on the writing of papers and discussion of them.
188. Group Study. (1-4) Course may be repeated for credit. Tutorial. One unit per weekly hour of instruction. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor. Directed study on special topics. (F,SP)
190. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Tutorial. One unit per weekly hour of instruction. Must be taken on a passed/not passed basis. Enrolment restrictions apply; see the Introduction to Courses and Curricula section in this catalog. (F,SP)

Graduate Courses
200. First Year Graduate Seminar. (3) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. A combination seminar and tutorial, required of and limited to first year graduate students in philosophy. (F)
204. Foundations of Ethics/Recent work in Ethics. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor: An advanced investigation of fundamental questions about the nature of morality. (SP) Scheffler
233. Recent Work in Philosophy of Language. (3) Course may be repeated for credit. Two hours of seminar per week.
234. Recent Work in Theory of Knowledge. (3) Course may be repeated for credit. Two hours of seminar per week.
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.
290. Special Studies. (1-9) Course may be repeated for credit. Tutorial. Prerequisites: Admission to candidacy for the doctoral degree. (F,SP)
291. Directed Studies. (1-9) Course may be repeated for credit. Tutorial. Prerequisites: Consent of instructor. Open to qualified students wishing to pursue special study or research under the direction of a member of the staff. (F,SP)
290. Seminar. (3) Course may be repeated for credit. Two hours of seminar per week. Advanced study in various fields of philosophy. Topics will vary from semester to semester. (F,SP)
299. Independent Study. (2-12) Independent study. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing. (F,SP)
602. Individual Study for Doctoral Students. (1-8) Course may be repeated for a maximum of 16 units. Course does not satisfy unit or residence requirements for doctoral degree. Independent study. 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 of the Ph.D. (F,SP)
603. Independent Philosophical Studies. (1-4) Course may be repeated for credit. Course does not satisfy unit or residence requirements for doctoral degree. Independent study. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing. Reading or other advanced study by arrangement with a staff member, for preparation in advance of an examination for a higher degree. (F,SP)

Professional Courses
301. Professional Preparation: The Teaching of Philosophy. (2-6) Course may be repeated for credit. Course does not satisfy unit or residence requirements for doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Appointment as a graduate student instructor. Students 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)

Interdepartmental Studies Courses
Graduate Courses
IDS 236. Cognitive Science Research Discussion. (1) Course may be repeated for credit. One and one-half hours of research per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Student must be the Cognitive Science research assistant for one of the professors associated with the Cognitive Science Program. The student will be in charge of the Cognitive Science-related research that they are carrying on as R.A.'s with the aim of broadening 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. Sponsoring departments: Linguistics, Philosophy, and Psychology.

Physical Education (College of Letters and Science)
Department Office: 200 Hearst Gymnasium, 642-3388
Chair: Timothy P. White, Ph.D.

Professors:
Anna S. Espenschade, Ph.D. (Emeritus)
G. Lawrence Rarick, P.H.D. (Emeritus)
Mary Lou Norrie-Brown, Ph.D. (Emeritus)
Chester W. Murphy, S.M.S. (Emeritus)
Harold J. Frey, Ph.D. (Emeritus)
Frederick Bernhard, M.S. (Emeritus)
G. Lawrence Rarick, P.H.D. (Emeritus)
Peter J. Cullen, M.B. (Emeritus)
James H. Fergerson, Ph.D. (Emeritus)
Charles J. Keeney, A.B. (Emeritus)
Aaron C. Melnick, M.S. (Emeritus)
Ralph D. Miller, M.A. (Emeritus)
Debra Weir, M.A.

Assistant Adjunct Professor: C. Edward McLaughlin, M.D.

Lecturers:
S. Johannessen, M.A.
Susanna Li-Jue, M.F.A.

Graduate Advisers: Ms. Park, Mr. White.

Pre-Major Advisers: Ms. Scott.

The Department of Physical Education at Berkeley offers an undergraduate major and graduate majors leading to the M.A. and Ph.D. degrees. In addition, the department makes available to all students a large variety of sports, dance, fitness, and gymnastics activities. The department operates an Exercise Stress Testing Laboratory for students and members 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 on the development of 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 sports, and similar activities in human culture—both contemporary and historical. At Berkeley the physical education major is academic in its orientation and is 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 scientific and scholarly basis for entrance into advanced degree programs which emphasize biomedical and sociocultural research, as well as for entrance into such professional programs as physical therapy, sports medicine, cardiovascular 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 56 to 70 semester units: Chemistry 1A and at least three of the following: Integrative Biology 131-131L (formerly Anatomy 105-105L) or equivalent, Elementary Statistics, Physics 8A, Mathematics 16A, Molecular and Cell Biology 32 (formerly Physiology 1-1L) or Integrative Biology 132-132L (formerly Physiology 139A-139AL) (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 131-131L (formerly Anatomy 105-105L) or equivalent, Physiology 132-132L (formerly Physiology 139A-139AL) (human physiology with laboratory), and at least two of the following: Elementary
Statistics, Physics 8A, Mathematics 16A, Psychology 1, History 5, 7B, 17A-17B or 30B, Anthropology 1 or Sociology 1.

Courses accepted for the above requirements must be the equivalent of Berkeley major courses.

The Major

Lower Division. Chemistry 1A; a course in elementary statistics; Molecular and Cell Biology 32 (formerly Physiology 1-1L) (or Integrative Biology 132-132L formerly Physiology 109-109L); Integrative Biology 131-131L (formerly Anatomy 108-108L); Physics 8A; Mathematics 16A; Psychology 1; English 5; 7A, 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 completion of 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 graduate major in physical education.

Graduate Degrees

Graduate work leading to the M.A. and Ph.D. degrees is offered by the Department of Physical Education. Each is a research-oriented degree. The department does 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 leading to the Ph.D. in Physical Education for Teachers is available. Each 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, and fitness. Instruction is planned to develop and improve physical fitness, to impart knowledge, and to improve general education. The department offers a wide variety of physical education courses provided in many activities. 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 student to participate in all regular departmental sports, intramural programs, tennis courts, and athletic fields. Lockers and shower facilities are provided. Some activity classes such as 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) clear locker by specified date; (b) return equipment or clothing on or before the date posted for such return at the end of each semester or at the end of each special session of the University; (c) oversight 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 University Health Service) offers a program of exercise stress testing and prescription. Participants are offered evaluations of pulmonary and cardiovascular function. A measure of body composition (percent fat, percent lean). Additionally, electrocardiographic (ECG) and oxygen consumption response during graded and maximum exercise on treadmills or bicycle ergometer are monitored. The determination of maximum oxygen uptake (VO2 max) is the best measure of physical fitness available. Participants are presented a computer generated evaluation of fitness status, as well as a prescription for a program to improve physical fitness. This program is available to the university community on a fee basis. Inquiries should be directed to 103 Harman Gymnasium.

Lower Division Courses

1. Physical Education Activities. (S) Course may be repeated for credit. Two hours of laboratory per week. Instruction in a 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) White, Staff

2. Physical Education Activities. (S) Course may be repeated for credit. Two hours of laboratory per week. Instruction in a 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) White, Staff

3. Physical Education Activities. (S) Course may be repeated for credit. Two hours of laboratory per week. Instruction in a 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) White, Staff

4. Physical Education Activities. (S) Course may be repeated for credit. Two hours of laboratory per week. Instruction in a 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) White, Staff

5. Physical Education Activities. (S) Course may be repeated for credit. Two hours of laboratory per week. Instruction in a variety of sports, exercise, and conditioning activities is offered at the advanced level. Students select section by activity and time preferences. Students should consult the Schedule of Classes each semester to determine the particular activities available. (F,SP) White, Staff

6. Physical Education Activities. (S) Course may be repeated for credit. Two hours of laboratory per week. Instruction in a variety of sports, exercise, and conditioning activities is offered at the advanced level. Students select section by activity and time preferences. Students should consult the Schedule of Classes each semester to determine the particular activities available. (F,SP) White, Staff

7. Physical Education Activities. (S) Course may be repeated for credit. Two hours of laboratory per week. Instruction in a variety of sports, exercise, and conditioning activities is offered at the advanced level. Students select section by activity and time preferences. Students should consult the Schedule of Classes each semester to determine the particular activities available. (F,SP) White, Staff

8. Physical Education Activities for Majors. (S) Course may be repeated for credit. Four hours of laboratory per week. Sections in sport, exercise, and dance for physical education majors. (F,SP) Scott

9. Physical Education Activities for Majors. (S) Course may be repeated for credit. Four hours of laboratory per week. Sections in sport, exercise, and dance for physical education majors. (F,SP) Scott

On leave, spring, fall
On leave, fall

10. Exploring Our Collective Past: Leisure and Culture in California 1790-1930. (S) Three hours of seminar per week. Prerequisites: Limited to freshmen. An historical analysis of leisure and culture in California from 1790 to 1930. Particular attention will be given to the multicultural populations of the State and their activities. Emphasis is on organized leisure pursuits (e.g. sports, organization, musical and literary societies, fraternities), with some attention to more general and informal activities. This course satisfies the American cultures requirement. (SP) Park

32. Fitness for Life: Physiological Adaptations to Exercise. (S) One hour of lecture and three hours of laboratory per week. Requirements: M.A. and Sophomores. Introduction to the body's major systems (i.e., cardio-respiratory, musculo-skeletal, neuro-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, strength will be examined. The lab will provide students with actual opportunities to participate in the assessment of fitness. (F,SP) Jochannessen

40. Healthy, Moral and Strong: Athleticism in the 19th Century. (S) Three hours of seminar per week. Prerequisites: Sophomore standing. Nineteenth century American and European views of bodily fitness, exercise, and athletics. The rise of "modern" sport. Medicine, biology and Victorian notions of health and exercise. Physical fitness as perceived means to moral and physical regeneration, and the establishment of a well-ordered society. (SP) Park

50. Emergency First Aid and Sports-Related Injuries. (S) One and one-half hours of lecture and two hours of laboratory per week. Must be taken on a pass/fail basis. Intensive course in first aid. Upon successful completion of the course and the additional requirements of the American Red Cross, an appropriate certificate may be issued. Scott

66. Descriptive Introduction to Physical Education. (S) Two hours of lecture per week. Prerequisites: High school biology or physiology. Overview of physical education with reference to the immediate and more lasting effects of physical activity on the human body including: growth and development, factors affecting motor learning, socio-psychological aspects of sports participation, and philosophical and historical considerations of sports. Scott

99. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Three to twelve hour tutorials (or field research) per week. Must be taken on a pass/fail basis. Consent of Instructor. (SP) Park

Upper Division Courses

101. Muscle Biology and Plasticity. (S) Two hours of lecture and three hours of laboratory per week. Prerequisites: Integrative Biology 131 and 131L, or equivalent; Molecular and Cell Biology 32 and 32L, and Physical Education 200-4 units. The course will cover the fundamentals of skeletal muscle structure and function. The changes of muscle during the processes of development and aging are discussed, as are the adaptations to physical activity. Emphasis is on the role of skeletal muscle function and the effects of exercise on muscle size, strength, and the estabishment of a well-ordered society. (SP) Park

105A. Exercise Physiology. (S) Three hours of lecture and three hours of laboratory per week. Prerequisites: A college level course in human physiology with laboratory and Chemistry 1A. Discussions of how
107. Physical Education. (1) Three hours of lecture and one hour of discussion per week. Prerequisites: Psychology 1 and equivalents; Physical Education 32 and 32L; Integrative Biology 131 and 131L. Basic biomechanical and anatomical concepts of human movement and their application to fundamental movement patterns, exercise, and sport skills. (F,SP) White

108. Neuromuscular Fatigue. (2) Three hours of lecture, three hours of laboratory per week. Prerequisites: History 5, 7B, 17A-17B or 30. History of physical education and sport. Social, cultural, and philosophical development of sport and physical education in modern society. Emphasis on 17th through early 20th centuries. (F) Park

131. Curriculum Development and Administration. (2) Two hours of lecture per week. Prerequisites: 111 and 130. Curriculum development and evaluation in school and college programs of physical education including integrated physical education, intramural sports and interscholastic athletics. Administrative policies and procedures pertaining to staff, facilities, equipment, budget and program. Kyle

135A. Measurement and Evaluation in Physical Education. (2) Two hours of lecture and two hours of laboratory per week. Prerequisites: Sociology 1 or Anthropology 3. Nature, scope and significance of recreation in the social and economic life of the American people.

160. Theory of Dance. (2) Two hours of lecture and three hours of laboratory per week. Prerequisites: Art of Movement. Activity class sections in dance and either Sociology 1 or Anthropology 3. Ethic, social, and contemporary dance forms; development of folk forms in Europe and the Americas; post modernism in the United States; nature and function of rhythm in dance; theories and principles of technique and composition. Li-Jue

165. Introduction to the Biomechanical Analysis of Human Movement. (2) Three hours of lecture and three hours of laboratory per week. Prerequisites: 9 and Integrative Biology 131 and 131L. Basic biomechanical and anatomical concepts of human movement and their application to fundamental movement patterns, exercise, and sport skills. (F) Scott

171. Conditioning for Exercise and Sports, and Care of Sports Injuries. (2) One hour of lecture and two hours of laboratory per week. Prerequisites: Molecular and Cell Biology 32 and 32L; Integrative Biology 131 and 131L (or equivalents), current American Red Cross first aid certificate. Conditioning for exercise, sports, and athletics; sleep, diet, health, and physical activity habits. Regimens of preventing sports injuries. Care of injuries with special emphasis on taping, therapy, protective equipment.

195. 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) White, Staff

196. Honors Thesis. (2) Course may be repeated for credit. Individual conferences to be arranged. (F,SP) White, Staff

197. Field Study in Physical Education. (1-3) Course may be repeated for credit. Individual conferences to be arranged. Must be taken on a passed/not passed basis. Supervised experience relevant to specific aspects of physical education, sport and fitness. Regular individual conferences with faculty sponsor and written reports required. (F,SP) White, Scott

198. Supervised Group Study. (2) One hour of lecture and two hours of discussion per week. Must be taken on a passed/not passed basis. Supervised experience relevant to specific aspects of physical education, sport and fitness. Regular individual conferences with faculty sponsor and written reports required. (F,SP) White, Scott

390. Research. (2-12) Course may be repeated for credit. Hours to be arranged. (F,SP) White, Staff
Course may be repeated for credit. Hours to be arranged. Advanced study of special topics under the direction of a faculty member. (F,SP) White, Staff

600A. History of Physical Education and Sport. (1-6) Park

600B. Kinesiology. (1-6) White

600C. Motor Development. (1-6)

600D. Exercise Physiology. (1-6) Brooks

600E. Psychological Bases of Physical Activity. (1-6) Bredemeier

600F. Socio-Cultural Bases of Physical Activity. (1-6) Park

600G. Motor Control. (1-6) Lehman

601. Individual Study for Master's Students. (3-12) Course may be repeated for credit. Hours to be arranged. Must be taken on a satisfactory/unsatisfactory basis. Individual study to prepare for master's comprehensive examination. Units may not be used to meet either unit or residency requirements for the master's degree. (F,SP) White, Staff

602. Individual Study for Doctoral Students. (3-12) Course may be repeated for credit. Hours to be arranged. Must be taken on a satisfactory/unsatisfactory basis. Individual study in consultation with major field adviser to prepare for doctoral examinations. May not be used for unit or residency requirements for the doctoral degree. (F,SP) White, Staff

605. Training in Research Methods in Physical Education. (14) Course may be repeated for credit. Hours to be arranged. Must be taken on a satisfactory/unsatisfactory basis. Experiences in methods appropriate to the conduct of research in various areas of the field of physical education. Students may enroll in an area which corresponds to his/her area of emphasis in graduate study, and when such experiences clearly contribute to the attainment of the student's objectives, a satisfactory grade may not be used for unit or residency requirements for a master's degree. (F,SP) White, Staff

Professional Courses

300. Problems and Methods in Teaching Physical Education. (2) One hour of lecture and three hours of laboratory per week. Prerequisites: 9. 165; 101 or 105A; 110 or 135A. Current practices and theoretical problems involved with physical activities in schools, community agencies, and private organizations. Scott

305. Methods of Teaching Physical Education Activity. (14) One hour and one-half hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: A graduate student teaching at the college level. Various dimensions of teaching physical activity and its relationship to the physical education field. Courses include philosophies and competencies as well as methods of transmitting content and evaluation. Required for all new graduate students holding associate appointment in the physical education activity program. (F) Scott

320. Sport Management and Administration. (2) One hour of lecture and three hours of laboratory per week. Prerequisites: 114, 120 or 121, or 140. The management of interscholastic and intercollegiate athletics, professional sports, corporate fitness and related exercise and recreation programs: psychosocial, health, personnel, technical, and business considerations.

405. Principles of Exercise Testing and Prescription. (2) Course may be repeated for credit. Three hours of laboratory and one hour of lecture per week. Prerequisites: 165A or consent of instructor. Theory, clinical application and practice of exercise testing, electrocardiography, and exercise prescription. Laboratory techniques include recording of ECG, determination of blood pressure, direct measurement of oxygen uptake, administration of fitness assessments (body composition, muscular strength and endurance, flexibility), interpretation of test results, and exercise prescription. (F,SP) Johannaes

Single Subject Teaching Credential. All credential candidates must be certified under the provisions of the California Teacher Preparation and Licensing Act of 1970. Prospective single subject teachers in physical science are encouraged to complete the field major in physical sciences. Students may be required to pass a state examination prior to completing a program of professional preparation.

For further information on requirements for the Single Subject or Multiple Subject Credential, see the Announcement of the School of Education.

Physical Science

(Major of Letters and Science)

Major Adviser: Gilbert Shapiro, Ph.D., 368 LeConte Hall, 842-0481.

Field Major in Physical Sciences

This program has been developed for students who wish to concentrate on the physical sciences on a broader basis than is possible in a departmental major. Two plans are offered within the major. Plan A is based on the major division units B, which is required of life sciences students, and Mathematics 16, which is required in part by life sciences departments. Through this plan a student preparing for a career in research in the physical sciences may major in physical science and at the same time acquire the necessary preprofessional preparation. For example, Plan A, together with organic chemistry and a year of biology, will meet the entrance requirements of most medical schools. Plan B is based on Physics 7 and Mathematics 1, which are required by physical science and engineering departments. Within this plan it is possible to complete much of the departmental major in, for example, physics or chemistry, while also studying astronomy and geology as well as computer science.

Plan A

(Broad Introduction to Physical Science)

Lower Division Courses. Mathematics 16A-16B, 51 or 55; Chemistry 5A-5B; Chemistry 1A-1B; Computer Science 9

Upper Division Courses. Chemistry 132; Chemistry 130A-130B; Vision Science 101; Statistics 131A. Electives in physical sciences, mathematics and statistics, with the approval of the adviser to complete a total of 30 units in the major. Up to 8 upper division units in engineering and/or computer science will be accepted with the approval of the adviser.

Plan B

(Option of departmental concentration)

Lower Division Courses. Mathematics 1A-1B, 50A-50B; Physics 7A-7B-7C; Chemistry 1A-1B or 4A-4B.

Additional Required Courses. Geology 50/50L or Geology 100A or Astronomy 7 or 127A.

Upper Division Courses. Two of the courses 105, 110A, or 137A, Chemistry 120A or for (students well-enough prepared) 104A. Electives in physical sciences, mathematics, and statistics with approval of the adviser to complete a total of 24 upper division units. Up to 8 upper division units in engineering and/or computer science will be accepted with approval of the adviser.

Honors Program

Students with a grade-point average both overall and in the major of at least 3.3 may wish to participate in an honors program leading to graduation with honors. The honors program will include two semesters of work in a departmental honors program with a senior thesis.

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

Physics

(Major of Letters and Science)

Department Office: 366 LeConte Hall, 842-7168
Chair: Herbert M. Stainer, Ph.D.

University Professors:

Professors:
Orlando Alvarez, Ph.D. Harvard University. Theory of elementary particles
Jonathan A. Bloom, Ph.D. Harvard University. Astrophysics and plasma physics (Astronomy)
Kok-Kang Lim, Ph.D. University of Rochester. Theory of elementary particles
Harry H. Bingham, Ph.D. California Institute of Technology. Quantum optics
Daniel S. Chernia, Ph.D. University of Paris. Experimental elementary particles
Raymond Y. Chiao, Ph.D. Massachusetts Institute of Technology. Optical physics

John Clarke, Ph.D. University of Cambridge. Experimental condensed matter physics
Mary R. Cohen, Ph.D. University of Chicago. Theoretical condensed matter physics

R. C. Corwin, Ph.D. Columbia University. Atomic and nuclear physics

Michael D. Dagenais, Ph.D. University of Wisconsin. Quantum mechanics

Roger W. Felson, Ph.D. Stanford University. Quantum electronics and atomic physics

L. N. Hall, Ph.D. University of California. Theoretical condensed matter physics

William R. Frazer, Ph.D. University of California at Berkeley. Theory of elementary particles

Stuart J. Freedman, Ph.D. University of California at Berkeley. Nuclear physics

Mary K. Gaillard, Ph.D. University of Paris. Theory of elementary particles

Donald A. Glesier, Ph.D. California Institute of Technology. Astrophysics and theoretical cosmology

Lawrence J. Hall, Ph.D. Harvard University. High energy astrophysics

Martin B. Halpern, Ph.D. Harvard University. Theory of elementary particles

Steven M. Kahn, Ph.D. University of California at Berkeley. High energy astrophysics

Allen H. Krinman, Ph.D. University of Chicago. Theoretical plasma physics

Edgar Knobloch, Ph.D. Harvard University. Theoretical plasma physics

Robert P. Lin, Ph.D. University of California at Berkeley. Elementary particles

Christopher McKee, Ph.D. University of California at Berkeley. Theoretical astrophysics

Stanley Mandelstam, Ph.D. Harvard University. Theoretical plasma physics

Richard Marcus, Ph.D. University of California at Berkeley. Atomic physics

Herbert Monton, Ph.D. Catholic University of America. Statistical physics

Frank S. Meyer, Ph.D. California Institute of Technology. Space physics

Richard A. Muller, Ph.D. University of California at Berkeley. Experimental physics

Joseph W. Weisenstein, Ph.D. Massachusetts Institute of Technology. Condensed matter physics

Richard E. Packard, Ph.D. University of Michigan. Low temperature physics

Alan M. Portis, Ph.D. University of California at Berkeley. Experimental physics

Paul L. Richards, Ph.D. University of California at Berkeley. Infrared astrophysics

Arthur H. Rosenfeld, Ph.D. University of California at Berkeley. Energy and conservation

Robert S. Ross, Ph.D. University of California at Berkeley. Elementary particle physics, particle astrophysics

Bernard Sadoulet, Ph.D. University of Paris. Cosmic ray astrophysics

Charles V. Shank, Ph.D. University of California at Berkeley. Elementary particle physics
The physics major is designed to give the student a broad and thorough understanding of the fundamentals of physics. The emphasis is, therefore, on general understanding rather than on specialization. Some specialized courses are among the options open to the student. Those considering a physics major are urged to consult a departmental adviser early, in order to discuss the contents of the major and also the opportunities after graduation. Recent graduates have entered graduate work in many scientific fields such as biophysics and geophysics as well as in physics, and others have gone to jobs in academic, industrial and government laboratories. Students who are considering high school teaching as a career are especially urged to consult with their adviser early.

Lower Division Courses. Physics 7A-7C (regular or honors, although honors is recommended for upper division preparatory courses), Mathematics 1A-1B or 1A-1B or 1A-1B or 1A-1B, and SOA-50B. Those who have not taken a substantial chemistry course in high school are urged to take a one-year sequence. Those not familiar with a computer programming language are urged to include an introductory course in Computer Science.

Upper Division Courses. Courses 7A-7C or 7D (regular or honors). Lower division courses in differential calculus and integral calculus are prerequisite to all upper division courses except Physics 132 and 133. Upper division courses may have scheduled one additional hour to the three hours of lecture. See Schedule of Classes. Physics 101, 110A-110B, 112, 117A-117B, five units of 118A. These courses are the following list chosen with the approval of the major adviser: 124, 129A-129B, 139, 141A-141B, 142, 150, 180. These options will give the student an extended introduction to some areas of current research.

Special programs may be worked out in consultation with the adviser. Completion of a physics major program is usually required for admission to graduate school. Additional mathematics from among Mathematics 104, 120A-120B, 121A-121B, 185 is recommended. Competence in the use of computers is desirable.

Honors Program. Students with an overall grade-point average of 3.3 or higher in courses in the major may be admitted to the honors program. A major adviser should be consulted before the student's last year of residence. This program requires completion of the major, at least one semester of Physics H190 and a senior thesis, H195A-H195B.

Biophysics. Students who wish to obtain a broad introduction to the physical sciences and their application to biology are referred to the major in biophysics, which appears under the Department of Molecular and Cell Biology.

Engineering Physics. The College of Engineering, with the cooperation of the Department of Physics, offers a curriculum in engineering physics leading to the B.S. degree. The Engineering Physics major is open only to students registered in the College of Engineering.

Field Major In Physical Science. Students interested in this major should see Physical Science for description of the major program.

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 transcripts of undergraduate work, applicants must submit scores on the Graduate Record Examination in physics. Detailed information concerning admission, graduate student instructor appointments, fellowships, and degree 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 spectroscopy, nonlinear optics, solid state physics, high-temperature superconductivity and 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 other problems are pursued both in the Physics Department and in the Space Sciences Laboratory. Students with special research interests should make inquiry in the department.

Requirements for the Ph.D. Include the following courses: Physics 210A-210B and 221A-221B plus 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 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, the M.A. degree requires 36 semester units of upper division and graduate courses followed by a comprehensive final examination administered by the Department of Physics. At least 18 units must be in graduate courses in the major subject.

Lower Division Courses

Courses 7A-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 are interested in one of the options offered by the College of Engineering. Students proceeding with a second-year mathematics sequence should take courses 50A-50B concurrently with Physics 7B-7C, respectively. Physics 110A and 110B are designed for engineering majors, students in architecture, and students in the biological sciences. Physics 10 is recommended for the nonscience major who wishes to gain some understanding of basic physical concepts. These courses fulfill, in part, the natural science requirement of the College of Letters and Science.

All students planning to take lower division courses, except Physics 10, should have completed trigonometry.

7A. Physics for Scientists and Engineers: (3) Four hours of lecture and three hours of laboratory per week. Prerequisites: High school physics; Math 1A or 1AS; Math 1B or 1BS (which may be taken concurrently). Mechanics and wave motion. (F,SP) Staff

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, Math 50A (may be taken concurrently). Heat, electricity, and magnetism. (F,SP) Staff

7C. Physics for Scientists and Engineers: (4) Three hours of lecture, one hour of discussion, and three hours of laboratory per week. Prerequisites: 7A-7B,
and one hour of discussion per week. Prerequisites: High school physics, Math 1A or 1AS, Math 1B or 1BS (may be taken concurrently). Electromagnetic waves, physical optics, relativity, and quantum physics. (F,SP) Staff.

H7A-H7C. Physics for Scientists and Engineers. (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). Electromagnetic waves, quantum mechanics, and modern physics. (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 thirty hours of laboratory per semester. Prerequisites: Mathematics 16A or equivalent or consent of instructor. Mechanics, wave motion, electricity and heat. Some topics of biological interest are usually included in sections 8A-8B. (F,SP) 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 thirty hours of laboratory 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 in previous courses in Physics are assumed, although Physics 10 is recommended. Physical principles encountered in the study of music. The applicable laws of mechanics, fundamentals of sound, harmonic content, principles of sound production in musical instruments, musical scales. Numerous illustrative lecture demonstrations will be given. Only the basics of high school algebra and geometry will be used.

24. Freshman Seminars. (1) Course may be repeated for credit. Seminar format. Must be taken on a pass/no pass basis. Sections 1-2 to be graded on a letter-grade basis. Sections 3-4 to be graded on a pass/no pass basis. The Berkeley Seminar Program has been designed to provide students with the opportunity to explore an intellectual topic with a faculty member in a small seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP)

39. Lower Division Physics Seminar. (1) Course may be repeated for credit. Seminar format. Must be taken on a pass/no pass basis. Prerequisites: Consent by instructor or completion of Physics 10. Course details will vary from semester to semester. (F,SP) Staff.

48. 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. Newtonian mechanics, motion of a particle in one, two, and three dimensions, central force motion; moving coordinate systems, mechanics of continuous media, oscillations, normal modes, special relativity, wave mechanics, quantum theory, and quantum mechanics. (F,SP) Staff.

110A-110B. Electromagnetism and Optics. (4;4) Three hours of lecture and one hour of discussion per week. Prerequisites: 137A or consent of instructor. The course will begin with a semester (8 hours/week) laboratory and lecture on Basic Semiconductor Circuits (BSC(Sup) for 2 units, followed by individual experiments which are approximately 0.5 units each. This advanced laboratory for junior and senior physics students includes some of the significant experiments of atomic, nuclear, classical, and solid-state physics. Independent work is encouraged. (F,SP) Staff.

111. Modern Physics and Advanced Electrical Laboratory. (1-1) One credit unit for physics major; eight units may be taken for credit. No more than two units may be completed in one semester. Eight hours of laboratory per week. Prerequisites: 137A or consent of instructor. The course will begin with a semester (8 hours/week) laboratory and lecture on Basic Semiconductor Circuits (BSC(Sup)) for 2 units, followed by individual experiments which are approximately 0.5 units each. This advanced laboratory for junior and senior physics students includes some of the significant experiments of atomic, nuclear, classical, and solid-state physics. Independent work is encouraged. (F,SP) Staff.

123. Computational Physics. (2) Three hours of seminar and three hours of laboratory per week. Must be taken on a pass/no pass basis. Prerequisites: Working knowledge of at least one of the following computer languages: Basic, Fortran, Pascal, or C. Some prior knowledge in the physics major or related discipline and permission of the instructor. This course will be presented in the seminar on the solutions of physical problems by modern computational methods. Students will choose a physics problem or simulation and develop, design, and implement a solution using modern computer equipment. Seminars 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.

124. Introductory Nuclear Physics. (3) Three hours of lecture and three hours of laboratory per week. Prerequisites: 137A or equivalent. The course will cover the field of nuclear physics. Applications of nuclear physics to problems of nuclear energy and applications in fields such as electron microscopy, magnetic resonance, and nuclear reactions. (F,SP) Staff.

137A-137B. Quantum Mechanics. (4;4) Three hours of lecture and one hour of discussion per week. Prerequisites: 137A or equivalent. The course will cover the field of quantum mechanics. Applications of quantum mechanics to problems of quantum energy and applications in fields such as electron microscopy, magnetic resonance, and nuclear reactions. (F,SP) Staff.

138. Modern Atomic Physics. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 129A, 137A-137B. This course has two major goals: 1) The description and calculation of the properties of atomic energy levels based on the central field approximation. The ideas developed in this description are widely applicable to solid state, particle and nuclear physics. 2) The description of modern experimental methods in atomic physics and some of the important physics obtained from them. Examples are magnetic resonance, lasers and masers, ion and neutral atom traps, optical pumping and beam foil spectroscopy. (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. Historical and experimental foundations of Einstein's special theory of relativity; spatial and temporal measurements, particle dynamics, electromagnetic theory, Lorentz invariants. Introduction to general relativity; Selected applications. Designed for advanced undergraduate in physics and astronomy. (F) Staff.

141A-141B. Solid State Physics. (4;3) Three hours of lecture and one hour of discussion per week. Prerequisites: 137A-137B; may be taken concurrently. Motion of charge through electric and magnetic fields, dynamics of fully ionized plasma from both microscopic and macroscopic point of view, magnetohydrodynamics; small amplitude waves; x-rays from astrophysics, space telescopes and controlled-fusion research. (SP) Staff.

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 gravity waves in the solar system, galaxy, and universe resulting from the interactions of particles, fields, radiation and matter. (F) Staff.

153. Physics in the American System. (1) One and one-half hours of lecture per week plus optional section for mechanical applications. Course begins with a pass/no pass basis. Prerequisites: Introductory concepts of theoretical science or consent of instructor. A critical study of the political, economic, and social forces that influence the work of physicists and scientists generally.

160. Physics of Energy Conversion and Use. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 129A or equivalent. An introductory course emphasizing the role of the physicist as a consultant to the thermal and electrical conversion of solar, chemical, and nuclear energy. Thermal, optical, and electrical properties of energy conversion materials. Applications of thermodynamics to the efficient use of energy. (SP) Staff.

H190. Physics Honors Course. (2) Course may be repeated for credit. Must be taken on a pass/no pass basis. A seminar which includes study and reports on current theoretical and experimental problems. Open to all students. (F,SP) Staff.

H195A-H195B. Senior Honors Thesis Research. (1-3) Credit and grade to be awarded on completion of sequence. Prerequisites: Open only to students in the honors program. Thesis work under the supervision of a faculty member. To obtain credit the student must complete the end of two semesters. (SP) Staff.

*On leave, spring, fall
†On leave, fall
‡Recipient of Distinguished Teaching Award
*Staff
198. Directed Group Study. (1-4) Must be taken on a pass/no pass basis. Enrollment restrictions apply; see the Introduction to Courses and Curriculum section in this catalog. (F,SP) Staff

199. Supervised Independent Study. (1-3) Must be taken on a pass/no pass basis. Enrollment restrictions apply; see the Introduction to Courses and Curriculum section in this catalog. (F,SP) Staff

Graduate Courses

205A. Advanced Dynamics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 110A-110B and 137A-137B. 210A, 221A, or their equivalents are recommended. Special emphasis is placed on the mathematical methods that form the basis of modern mechanics. Applications of research in mechanics and statistical physics. Topics will be announced by the department. (SP) Staff

205B. Advanced Dynamics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 205A. Continuous systems, dissipative systems. Attractors, bifurcations, basin boundary, etc. Applications to recent developments, including turbulence. (SP) Staff

208A. Introduction to Quantum Electronics and Nonlinear Optics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 110A-110B and 137A-137B. 210A, 221A, or their equivalents are recommended. Special emphasis is placed on the mathematical methods that form the basis of modern mechanics. Applications of research in mechanics and statistical physics. Topics will be announced by the department. (SP) Staff

208B. Introduction to Quantum Electronics and Nonlinear Optics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 208A or consent of instructor. Various topics in nonlinear optics and coherent optical phenomena, such as stimulated Brillouin scattering, self-focusing, photon echoes, self-induced transparency, two-photon absorption and high resolution spectroscopies, multiphoton processes. (SP) Staff

210A. Theory of Elasticity and Magnetism. (5) Three hours of lecture and one hour of discussion per week. Prerequisites: 110A-110B or equivalent. Methods of mathematical physics, with emphasis on elasticity and magnetism. General study of partial differential equations, special functions, Green's function, complex variable methods, approximation methods. (F) Staff

210B. Theory of Elasticity and Magnetism. (5) Three hours of lecture and one hour of discussion per week. Prerequisites: 210A. Maxwell's equations, relativity, radiation, diffusion, interactions of radiation with matter. (SP) Staff

211. Equilibrium Statistical Physics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 112 or equivalent. Foundations of statistical physics. Ensemble theory. Degenerate systems. Systems of interacting particles. (F) Staff


218. Special Topics in Many-Body Physics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 221A-221B or equivalent recommended. Quantum theory of many-particle systems. Applications of theory and technique to physical systems. Pairing phenomena, superfluidity, equations of state, superconductors, phase transitions, nuclear matter. (SP) Staff

221A. Quantum Mechanics. (5) Three hours of lecture and one hour of discussion per week. Prerequisites: 137A-137B or equivalent. Basic assumptions of quantum mechanics; quantum theory of measurement; mathematical formulation; superposition theorem; symmetry and invariance principles; theory of angular momentum; stationary state problems; variational principles; time independent perturbation theory; time dependent perturbation theory; theory of scattering. (F) Staff

221B. Quantum Mechanics. (5) Three hours of lecture and one hour of discussion per week. Prerequisites: 221A. Many-body methods, radiation field quantization, relativistic quantum mechanics, applications. (SP) Staff

222. Special Topics in Mathematical Physics. (2-4) Course may be repeated for credit. Three hours of lecture and one hour of discussion per week. Prerequisites: 112, 137A, or consent of instructor. Staff

223. Group Theory and Quantum Mechanics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 221A-221B or consent of instructor. Introduction to group theory and group representations; brief survey of quantum mechanics of atoms, molecules, and solids, emphasizing applications of group theoretical methods. (SP) Staff

225A-225B. Relativistic Particle Physics. (5) Three hours of lecture and one hour of discussion per week. Prerequisites: 221A or equivalent; 226A is a prerequisite to 225B. Feynman diagram calculation methods, such as Compton, Möller, and Bethe scattering. Higher order diagrams and renormalization. Renormalization group. Consequences of charge conjugation, parity reflection, and time reversibility. Spin and statistics, and the standard model SU(6). Gauge symmetries of colors and flavors. Spontaneous breaking of symmetries. Parton model and perturbative quantum chromodynamics. (F) Staff

226. Experimental High Energy Physics. (3) Three hours of lecture per week. Prerequisites: 225A; 225B concurrently or equivalent. Course provides an overview of experimental high energy physics. Topics in both strong and weak interaction physics are discussed. (SP) Staff

228. Theory of Weak Interactions. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 225A or consent of instructor. Phenomenological theory of weak interactions based on four-fermi interaction. Decays of leptons and hadrons. Neutrino scattering at high energies. Unified gauge models of weak and electromagnetic interactions, in particular the Standard Model and its experimental verification. Grand unified models of electroweak and strong interactions. (SP) Staff

230A-230B. Quantum Theory of Fields and Particles. (4-4) Three hours of lecture and one hour of discussion per week. Prerequisites: 221A-221B and 225A, or equivalents. 225A may be taken concurrently; 230A is prerequisite to 230B. Relativistic quantum mechanics of fields and particles. Lorentz invariance, S matrix, perturbation expansion, renormalizations, and quantum electrodynamics. Topics selected from recent developments in field theory. Correspondence to nonrelativistic integral formalism, nonabelian gauge fields, renormalization group, and axiomatic and constructive field theories. (F) Staff

231. General Relativity. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 205B or equivalent, or consent of instructor. An introduction to Einstein's theory of gravitation. Tensor analysis, general relativistic models for matter and electromagnetism, Einstein's field equations. Applications, for example, to the solar system, dense stars, black holes, and cosmology. (SP) Staff

240A-240B. Quantum Theory of Solids. (4-4) Three hours of lecture and one hour of discussion per week. Prerequisites: 141A-141B and 221A-221B or equivalents, or consent of instructor; 240A is prerequisite to 240B. Phonons, magnons, plasmons, and excitons; electron field and electron-ion interactions; superconductivity; many-body techniques; Green's functions; Brillouin zones and symmetry; excitons; impurity states; transport processes; Fermi surfaces; neutron scattering; recoilless emission; theoretical methods in magnetic resonance. (F) Staff

242A-242B. Theoretical Plasma Physics. (4-4) Three hours of lecture and one hour of discussion per week. Prerequisites: 142. Analysis of plasma behavior according to the Vlasov, Fokker-Planck equations, guiding center and hydromagnetic approximations. Study of stability, time dependence, and nonlinear electromagnetic waves, transport, and interaction with radiation. Rigorous kinetic theory. (F) Staff

243. Physics of Ionized Gases. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 112, 137A, or consent of instructor. Staff

246A-246B. Statistical Thermodynamics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 210A-210B, 221A, or equivalents. Basic concepts of partially ionized plasmas, including electronic reactions, radiation and transport phenomena, plasma oscillations and decay. Application to astrophysical and astrophysical sciences, high speed gas dynamics, and electric discharges. (F,SP) Staff

250. Special Topics in Physics. (2-4) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. Staff

251. Introduction to Graduate Research in Physics. (1) One hour of lecture and one hour of discussion per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing in Department of Physics or consent of instructor. Formerly 251A. Staff

252. Issues in the Teaching of Physics. (2) Two hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Staff

255. Seminar. (2) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. (F,SP) Staff

256. Seminar. (2) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. (F) Staff

257. Seminar. (2) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. (F) Staff

258. Seminar. (2) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. (F) Staff

290C. Seminar in Non-Neutral Plasmas. (2) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. (F) Staff

290J. Seminar. (2) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. (F) Staff

290L. Seminar. (2) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. (F) Staff

290N. Seminar in Non-Neutral Plasmas. (2) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. (F) Staff

290P. Seminar. (2) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. (F) Staff

290Q. Seminar in Quantum Optics. (2) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. (F) Staff

295. Special Study for Graduate Students. (1-4) Must be taken on a satisfactory/unsatisfactory basis. Staff

299. Staff
Plant Biology (College of Natural Resources)

Department Office: 111 Koshland Hall, 642-6099
Student Affairs Office: 111E Koshland Hall, 642-5167
Chair: Wilhelm Grissom, Ph.D.

Professors:
Bob B. Buhman, Ph.D. Duke University. Plant biochemistry
Lewis J. Feldman, Ph.D. Harvard University. Plant physiology/development
Michael Freeling, Ph.D. University of Indiana. Plant development and gene regulation
William Grissom, Ph.D. University of Bonn. Plant molecular biology
Russell L. Jones, Ph.D. University of Wales. Plant physiology
Ronald G. Kaplen, Ph.D. University of California at Berkeley. Development of vascular plants
Kang-Mo Kim, Ph.D. University of California at Berkeley. Development of vascular plants
Anastasia Miel, Ph.D. Florida State University. Plant molecular responses to the environment
Robert B. Park, Ph.D. California Institute of Technology. Plant molecular biology
Peter H. Quail, Ph.D. University of Sydney. Plant molecular biology
Zinmay Renee Sung, Ph.D. University of California at Berkeley. Plant atomic cell genetics

Associate Professor:
Sheila M. McCormick, Ph.D. University of Missouri. Plant molecular biology

Adjunct Associate Professors:
Daniel J. Arnon (Emeritus), Ph.D. University of California at Berkeley. Developmental morphology
Seymour Fogel (Emeritus), Ph.D. University of Missouri. Plant development and gene expression
Watson M. Laetsch (Emeritus), Ph.D. Stanford University. Experimental morphology

Undergraduate Advisers: Mr. Melis, Ms. Sung
Graduate Advisers: Mr. Fischer (Head Adviser), Mr. Feldman, Mr. Freeling.

Department of Plant Biology

The Department of Plant Biology considers developmental and functional aspects of the biology of plants studied from molecular to organismal levels, using a range of organisms, including photosynthetic bacteria, algae, fungi, and higher plants, as objects of investigation. The recently reorganized department represents a unique amalgamation of traditional botanical sciences, such as plant phytochemistry, morphology and anatomy, and the newer biological disciplines of genetics, molecular biology, and biochemistry, to produce new syntheses and educational perspectives in the study of plants. Programs at both the undergraduate and graduate levels have been designed to offer students maximum flexibility in defining their own areas of interest. In addition to departmental resources that are available in Koshland Hall, the facilities of the National Science Foundation Center of Plant Developmental Biology and the United States Department of Agriculture Plant Gene Expression Center are available for the programs of the department.

Undergraduate Program

The department's undergraduate program in genetics and plant biology has been developed as a broadly based introduction in biology, emphasizing the study of plants from the molecular genetic to organismal levels. Lower division courses are intended to produce a foundation in both biological and physical sciences as preparation for advanced study at the upper division level. Two distinct tracks focus on molecular aspects of genetics, Track I and on the cellular and organismal aspects (Plant Biology, Track II) of plants.


For further details and requirements, please consult the Announcement of the College of Natural Resources.

Graduate Program

The graduate program in plant biology is designed to train students in modern research areas of plant biology and includes research mentorship in the following areas: molecular, cellular, genetic, biochemical, developmental, and structural plant biology. The graduate program includes an introductory one-semester core course which emphasizes in an integrated manner the following areas: plant structure, plant physiology, plant biochemistry, plant development, plant cell biology, and plant molecular biology. Additional special topics courses and seminars in areas of individual faculty expertise will also be available.

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 basic background in the sciences, mathematics, and biology, equivalent to the undergraduate program. An admissions committee composed of five members of the department will review applications and make recommendations to the full department on admission matters. Recommendations for admission will be based on a demonstration of academic excellence and potential for independent scientific research demonstrated by grades in university-level undergraduate courses, letters of recommendation, written statements of academic and professional goals, and other evidence of academic accomplishment. Sufficient scores on standardized tests, such as the Graduate Record Examination, will be required of all applicants. Students seeking detailed information about matters such as admission, curriculum, and sources of financial support should contact the student affairs assistant or the graduate adviser.

Lower Division Courses

Biology 11. Introduction to the Science of Living Organisms. (4) Students will receive no credit for 11 after taking both Integrative Biology 15 and 30. Three hours of lecture and one 3-hour laboratory per week. Prerequisites: For students not majoring in biological science and for non-senior majors. Principles of biological organization and function using examples from plant and animal kingdoms. Similar to Integrative Biology 1 except that knowledge of physical sciences is neither required nor assumed. Sponsoring Plant Biology. (SP) Jones, Rowell

20. Topics in Plant Biology. (1) Two hours of discussion per week. Must be taken of a pass/no pass basis. Prerequisites: For students not majoring in biological science. Reading and discussion with Plant Biology faculty on current research and topics in plant biology. Genes and plant development, plant pathology, plant ecology, plant molecular biology, and the newest developments in genetic engineering will be discussed. Ideal for students who are considering a major in the Department of Plant Biology. (F) Staff

*On leave, spring
†Recipient of Distinguished Teaching Award
99. Supervised Independent Study and Research. (1-3) Course may be repeated for credit. Individual meetings. Must be taken on a pass/no pass basis. Prerequisites: GPA of 3.4 or higher; lower division status. Lower division independent study and research intended for the academically superior student. Enrollment only with prior approval of faculty advisor directing the research. (F,SP Staff)

Upper Division Courses

100. Principles of Plant Morphology. (2) Two hours of lecture per week. Prerequisites: Biology 1A-1B; must be taken concurrently with 100L. Formerly lecture portion of Plant Biology 130. An analysis of the structural diversity of multicellular plants, especially the higher forms, with emphasis on the developmental mechanisms responsible for this variation in form and the significance of this diversity in relation to the environments in which plants grow. Also listed as Interdepartmental Studies 107 and Integrative Biology 100. (F,SP) Kaplan

100L. Laboratory for Principles of Plant Morphology. (2) Six hours as Interdepartmental Studies 41L. Prerequisites: Biology 1A-1B; must be taken concurrently with 100. Formerly laboratory portion of 130. Laboratory designed to accompany 100, Principles of Plant Morphology. Also listed as Interdepartmental Studies 107L and Interdepartmental Studies 102L. (F,SP) Kaplan

102. Diversity of Plants and Fungi. (2) Two hours of lecture per week. Prerequisites: Biology 1A-1B. Must be taken concurrently with 102L. An integrated treatment of the biology and evolution of the major groups in the plant, algae, and fungal kingdoms. Also listed as Interdepartmental Biology 101 and Interdepartmental Studies 102. (F,SP) Kaplan

102L. Laboratory in the Diversity of Plants and Fungi. (2) Four hours of laboratory per week and two 1-day field trips. Prerequisites: Biology 1A-1B. Must be taken concurrently with 102. Laboratory for 102L. Also listed as Interdepartmental Studies 105 and Plant Pathology 105. (F,SP) Jackson, Staskawicz

105. Modern Applications of Plant Biotechnology. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Suggested: 150. Molecular and Cell Biology 112. (F) Fry, Sheehy

110. Biology of Fungi. (2) Two hours of lecture per week. Prerequisites: Biology 1A-1B; Integrative Biology 101 recommended. Must be taken concurrently with 110L. Formerly lecture portion of 110. Selected aspects of fungi: their structure, reproduction, physiology, ecology, and relationship to plant disease, human welfare, and industry. (F) Taylor

110L. Laboratory for Biology of Fungi. (2) Six hours of laboratory per week. Prerequisites: Biology 1A-1B; Integrative Biology 101 recommended. Must be taken concurrently with 110. Formerly laboratory portion of 110. Formerly laboratory portion of 110. Laboratory designed to accompany 110, Biology of Fungi. Several field trips are offered including day trips to a mushroom farm, a winery and a cheese factory, and a weekend mushroom foray. (F) Taylor

111. Anatomy of Vascular Plants. (2) Two hours of lecture per week. Prerequisites: Biology 1A-1B; Integrative Biology 101, 101L; Biology 1A-1B. Must be taken concurrently with 111L. A consideration of the functional and developmental aspect of cell, tissue, and organ structure of plants, including their adaptations to ecological factors such as pollination, dispersal, and water availability. Also listed as Interdepartmental Biology 111 and Interdepartmental Studies 112. (SP)

111L. Laboratory in the Anatomy of Vascular Plants. (2) Four hours of laboratory per week. Prerequisites: Interative Biology 101, 101L; Biology 1A-1B. Must be taken concurrently with 111L. Laboratory for 111L. Also listed as Integrative Biology 111L and Interdepartmental Studies 112L. (SP)

120. Biology of Algae. (2) Two hours of lecture per week. Prerequisites: Biology 1A-1B; Integrative Biology 101 recommended. Must be taken concurrently with 120L. Formerly lecture portion of 120. General biology of fresh-water and marine algae including both phyla: Phaeophyta and Chlorophyta. In phylogeny, morphology and systematics. (SP) West

120L. Laboratory for Biology of Algae. (2) Four hours of laboratory per week plus field trips. Prerequisites: Biology 1A-1B; Integrative Biology 101 recommended. Must be taken concurrently with 120L. Formerly laboratory portion of 120. Laboratory designed to accompany 120, Biology of Algae. Laboratories include study of representative types, identification of field-collected specimens, techniques for culture, simple experiments on development and reproduction, and economic uses of algae. (SP)

135. Physiology and Biochemistry of Plants. (3) Three hours of lecture per week. Prerequisites: Biology 1A-1B. Must be taken concurrently with 135L. Formerly 100B. A study of physiological and biochemical processes in higher plants, including water relations, ion transport, and hormone physiology: photosynthesis (light utilization and carbon assimilation), nitrogen and sulfur metabolism, and plant-specific biosynthetic pathways. (SP) Melis, Terry

135L. Laboratory for Physiology and Biochemistry of Plants. (1) Three hours of laboratory with discussion per week. Prerequisites: Biology 1A-1B; must be taken concurrently with 135L. Formerly 100B. Laboratory designed to accompany 135L, Physiology and Biochemistry of Plants. (F) Melis, Terry

140. Introductory Plant Physiology. (3) Three hours of lecture per week. Prerequisites: Biology 1A-1B. An introduction to physiological aspects of plant biology. The course provides a balanced approach between the biophysics and biochemistry of plant function with emphasis on transport processes, water relations, mineral nutrition, photosynthesis, nitrogen metabolism and phytohormones.

150. Cellular and Developmental Plant Biology. (3) Three hours of lecture per week. Prerequisite: Biology 1A-1B. Formerly 100A. An introduction to the structural, molecular and cellular aspects of plant development. The use of genetic mutants in studying rules and principles of growth and differentiation; control of plant shape, division and development; shoot, root, leaf and floral morphogenesis from plant meristems. (SP) Sung, Sussex

150L. Laboratory for Cellular and Developmental Plant Biology. (1) Three hours of laboratory/discussion per week. Prerequisites: Biology 1A-1B. Must be taken concurrently with 150L. Formerly laboratory portion of 150. Laboratory designed to accompany 150L, Cellular and Developmental Plant Biology. (SP) Sung, Sussex

160. Plant Molecular Genetics. (3) Three hours of lecture per week. Prerequisites: Biology 1A-1B. A consideration of plant genetics and molecular biology. Principles of nuclear and organelle genome structure and function, including methods to analyze and manipulate genes, in response to environmental and developmental stimuli; clonal analysis; investigation of the molecular and genetic bases for the exceptional cellular and developmental strategies adopted by plants. (F) Fischer, Hake

170. Modern Applications of Plant Biotechnology. (3) Four hours of lecture per week. Prerequisites: Biology 1A-1B; 150 and Molecular and Cell Biology 112 are recommended. Formerly 105. This course is designed to introduce students to the principles and applications of modern plant biotechnology. Basic concepts of modern agriculture will be reviewed in light of emerging biotechnology applications. Emphasis will be placed on understanding the tools and strategies involved in optimizing plant productivity. (SP) Melis, Terry

182. Environmental Plant Biology. (3) Three hours of lecture per week. Prerequisites: Biology 1A-1B. An integrated and multidisciplinary approach to the study of plants in their interaction with the environment. The course introduces: physical parameters in the global and micro-environment that affect plant function; and molecular, cellular and developmental aspects of plant response to used to understand, consider. Undergraduate biochemistry, physiology and molecular biology of plant adaptation and acclimation mechanisms. Examines consequences of industrial activity on plant growth and productivity. (SP) Melis, Terry

Graduate Courses

200A. Plant Structure and Function. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Consent of instructor. A consideration of physiological and biochemical processes in plants, integrating structure and function. The course analyzes aspects of the use to understand, considering. Undergraduate biochemistry, physiology and photosynthesis. Class format involves lectures, readings of historical and contemporary papers, and discussion. (SP) Staff

200B. Plant Genetics and Molecular Biology. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Consent of instructor. The course provides a consideration of modern plant genetics, the second on molecular biology. Topics include mutation induction and characterization, characterization, DNA mechanics, transposons, and gene regulation of development. Current molecular approaches and the regulation of gene expression involved in plant growth and development. Mechanisms by which various regulatory factors such as light and hormones control gene expression will be examined. (SP) Staff

211. Advanced Topics In Plant Molecular Biology. (3) Course may be repeated for credit. Four hours of lecture per week. Prerequisites: Consent of Instructor. Topics will be covered in a research-oriented fashion, emphasizing both lecture, laboratory and field components as well as laboratory techniques. Topics: A. Current experimental techniques in plant molecular biology; B. Regulation of plant gene expression in response to light, hormones and stress; C. Mobile DNA elements, infection of non-plant cells by viruses; E. Characterization of functional genes (combinatorial tools); and D. Molecular analysis of plant development (embryogenesis, flower development, tissue-specific gene expression).

222. Photosynthesis. (3) Three hours of lecture per week. Prerequisites: Prerequisite: Consent of instructor. Carbon assimilation, structure of photosynthetic apparatus, light and dark reactions with special emphasis on energy conversion, photosynthetic phosphorylation, and photosynthesis in subcellular systems.
Plant Pathology (College of Natural Resources)

Department Office: 147 Hilgard Hall, 642-5121
Chair: David W. Schlegel, Ph.D.

Professors:
- Fields W. Cobb, Jr., Ph.D. Pennsylvania State University
- Forest pathology
- Andrew C. Hines, Jr., Ph.D. Cornell University
- Fungal ecology, disease and pathogen physiology
- Joseph A. Jacobson, M.S., Ph.D. Manitoba, Canada
- Plant virology
- Sydney Kamburowski, Ph.D. University of California, Davis
- Regulation of bacterial metabolism
- Steven E. Undvow, Ph.D. University of Wisconsin
- Bacterial ecology, and physiology
- Nicholas C. Panopoulos, Ph.D. University of California at Berkeley
- Molecular biology of pathogenesis
- Robert D. Rabaie, Ph.D. University of Wisconsin
- Fungal ecology, and mycology
- Milton N. Schroot, Ph.D. University of California at Berkeley
- Ecology, pathogen physiology, biocontrol
- Brian Schueler, California at Berkeley
- Molecular genetics
- Alan J. Siegel, University of California at Davis
- Fungal ecology, pathologist
- Peter A. Arditti, Ph.D. Emory University
- Albert J. J. Barak, Ph.D. Emory University
- Lee J. Ashworth (Emeritus), Ph.D.
- Kenneth F. Baker (Emeritus), Ph.D.
- Joel P. Mauchline, Ph.D.
- John G. Perretta (Emeritus), Ph.D.
- David E. Schlegel (Emeritus), Ph.D.
- Stephen Wilhelm (Emeritus), Ph.D.

Associate Professors:
- Thomas R. Gordon, Ph.D. University of California at Davis
- Fungal ecology, and mycology
- Orson E. Holm, Ph.D. University of California at Davis
- Fungal ecology, disease and pathogen physiology
- Philip S. Satter, University of Chicago
- Evolutionary biology and population genetics of fungi

Assistant Professors:
- Thomas A. Schubert, Ph.D. Michigan University
- Fungal molecular evolution
- Lynn Epstein, Ph.D. Michigan State University
- Development and biochemistry of plant fungal

Adjunct Assistant Professors:
- Barbara Baker, Ph.D. Genetic disease resistance
- David W. O. Ph.D. Plant viral gene expression

Note: The College of Natural Resources is presently reorganizing its course offerings. Please contact the college office or the Colleges and Schools section in the front of this catalog for a brief description of programs proposed for the college in the future. For current information about program requirements and course offerings, please consult the departmental office listed above or the Dean's Office, Office of Student Affairs, 106 Glannelli Hall, 642-0542.

Undergraduate Program

The Department of Plant Pathology has no undergraduate major. Undergraduates interested in plant pathology are encouraged to apply to Bioresources Sciences or Plant Biology for training at the undergraduate level. To function as a professional plant pathologist, graduate training to the M.S. level is required, and the Ph.D. is highly desirable. Because of the broad requirements, students are advised to obtain a strong undergraduate background in plant biology or general microbiology, 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.

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. Plant Pathology involves the study of interactions among plants, pathogens, and their environment, with the objective of developing effective procedures for the protection of plants from disease. The subject area is exceptionally broad, embracing the response of the plant to its disease agents such as bacteria, fungi, weed plants, and viruses. Plant pathologists are involved in the study of such diverse problems as host-parasite physiology, molecular genetics of pathogenicity, microbial ecology, and Integrated pest management, utilizing cultural, chemical, molecular, genetic, and biological control approaches. Because of the fundamental importance of plants as food, fiber, and recreational resources, the subject area is of great importance to human welfare.

Areas of emphasis include epidemiology and diagnosis of plant diseases; forest pathology; physiology of pathogenic fungi and bacteria; host-pathogen interactions; 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.

Requirements for Admission. Prospective students will be expected to show academic excellence and potential for independent scientific research. Students are expected to have a background in the plant sciences, such as plant pathology, plant biology, bioresources sciences, or botany, and a broad background in physical and biological sciences, including biochemistry, plant cell biology, and plant physiology. The department Student Affairs Committee reviews applications and makes recommendations to the University Graduate Division. Recommendations are based on upper division and graduate-level GPAs, letters of recommendation, written statements of academic and professional goals, and other evidence of academic capabilities. Graduation requires the Graduate Record Examination of all domestic applicants. The TOEFL is required for international applicants and the TSE is strongly recommended.

Graduate Studies. New students in the program meet initially with the graduate adviser, who discusses the background and interests of the student and advises on courses of study and research areas. Students are admitted to a particular laboratory, or they may arrange rotations through several laboratories advised by the graduate adviser and the major research adviser.

All students will be required to take the core curriculum offered by the Department of Plant Pathology. This course work provides basic emphasis in fungal, bacterial, and viral pathogens as well as a strong foundation in the basic science. Additional courses will be dictated by the student's background and interests, and programs will be individually designed to allow diversity in training for each student.

The Department of Plant Pathology follows the Graduate Division's Plan II for master's degrees. This plan requires a minimum of 24 hours of course work and a two-hour oral examination by three faculty who are chosen in consultation with the student. The oral examination is normally taken early in the fourth semester of study.

Normative time for the Ph.D. program is usually five years for students entering with a bachelor's degree and four years for students entering with a master's degree. The oral qualifying examination is normally taken during the fourth semester. The five-member faculty committee for the examination is chosen in consultation with the student.

In addition, Ph.D. students are required to serve as graduate student instructors (GSIs) for one semester as part of the training for the degree. The department teaches several undergraduate courses which use GSIs, and several faculty teach undergraduate courses in other departments which are also acceptable for fulfilling the teaching requirement. Further details about the program can be obtained by contacting the department.

Lower Division Courses

23. Introduction to Microbiology of Natural Resources. (4) Two hours of lecture and six hours of laboratory per week. Prerequisites: Biology 1A or 1B, Molecular and Cell Biology 11 or 32. A survey of the groups of microorganisms: bacteria, fungi, protozoa, algae and viruses. Emphasis of the course is on microbial control and specific applications as microcarote and entocercic microbes in the environment, particularly in agriculture. Laboratories are designed to acquaint students with contemporary techniques in microbiology, (SP) Epstein

Upper Division Courses

100. Introduction to Plant-Microbe Interactions. (3) Two hours of lecture and three hours of laboratory discussion per week. Prerequisites: Biology 1A-1B. An introduction to the study of symbiotic and parasitic relationships between plants and microorganisms, with emphasis on those causing plant disease. The molecular, cellular, physiological and ecological basis for these interactions will be considered. The laboratory will include experiments, demonstrations and discussions to supplement information provided in lectures. (F) Gordon

105. Modern Applications of Plant Biotechnology. (3) Two hours of lecture and one hour of discussion each week. Prerequisites: Biology 1A-1B; Plant Biology 150 and Molecular and Cell Biology 112 are recommended. This course is designed to introduce students to the principles and applications of modern plant biotechnology. Current problems in modern agriculture will be reviewed in light of emerging biotechnology applications. Emphasis will be placed on understanding the tools and strategies involved in optimizing crop production. Also listed as Integrated Experimental Studies 105 and Plant Biology 170. (F) Staskiweczek, Jackson

150. Microbial Ecology. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: Biology 1A or equivalent. Formerly Biology 151. Intro-
dudens to the ecology of microorganisms. Topics include the interactions of microorganisms and their environment; the role of bacteria, actinomycetes, algae, protozoa and fungi in cycling of the elements, in macroecology and in global ecology; physical, chemical and biological properties of terrestrial, aquatic and organismal habitats; population dynamics. (SP) Hulman

155. Population Genetics and Fungal Biology. (3) Students will receive no credit for 155 after Integrative Biology 161. Three hours of lecture per week. Prerequisites: Biology 1A-1B. Introduction to empirical and theoretical population genetics with particular, but not exclusive, reference to fungal population: Genetic variation, geno pool structure, mechanisms of genetic evolution, neutrality theory, gene flow, populations, mating systems, vegetative incompatibility, meiotic drive, host-parasite relations, speciation, molecular evolution. (SP) Spithler

197. Field Study in Plant Pathology. (1-3) Course may be repeated for credit. Three hours of laboratory/discussion per week. To be arranged. Must be taken on a passed/not passed basis. Supervised experience in off-campus organizations relevant to specific aspects of plant pathology. Regular Individual meetings. Instructor must review and sponsor reports required. (F,SP) Staff

198. Directed Group Study. (1-3) Course may be repeated for credit. Three hours of laboratory/discussion per week per unit. To be arranged. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor. Special topics will be offered from time to time. (F,SP) Staff

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Three hours of laboratory/discussion per week per unit. To be arranged. Must be taken on a passed/not passed basis. Prerequisites: Consent of instructor. Supervised independent study (upper division). (F,SP) Staff

Graduate Courses

201. Seminar in Plant Pathology. (1) Course may be repeated for credit. One hour of seminar per week. Must be taken on a satisfactory/un satisfactory basis. An advanced seminar on topics in plant pathology. (F,SP) Jackson

202. Advanced Plant Pathology. (1) One hour of lecture per week. Must be taken on a satisfactory/un satisfactory basis: Introduction to graduate study in Plant Pathology. The course will introduce important primary literature and discuss the role of Pathology in agricultural research. Offered odd-numbered years. (F)

204. Plant Bacteriology. (3) Two hours of lecture and three hours of laboratory/discussion per week. Prerequisites: Biology 1A-1B. The systematics, ecology, and genetics of bacterial diseases of plants are emphasized. Course content includes discussions on factors affecting the survival and pathogenicity of bacteria, the various mechanisms associated with the infection and invasion of the host. Chemical and contemporary methods for controlling diseases are also covered. Laboratory exercises emphasize methods necessary to isolate, identify, and classify bacterial pathogens. (SP)

206. Fungi in Relation to Plant Disease. (3) Two hours of lecture and three hours of laboratory/discussion per week. Prerequisites: Biology 1A-1B or equivalent. Formerly 200A - 200B. Overview of fungal plant pathogens. Lectures focus on taxonomy, ecology, and genetic structure of plant pathogens and symbiotic fungi. Laboratory exercises stress methods of collection, isolation, culturing, identification, genetic manipulation and characterization. Offered even-numbered years. (SP) Bruns

207. Epidemiology and Control of Plant Disease. (3) Three hours of lecture per week. Prerequisites: 100. Theory and practice of plant disease control and management. Chemical, cultural, biological, and genetic methods. Epidemiology of plant disease, inoculum-disease relationships, and factors involved in the development of epidemics. Offered odd-numbered years. (F) Lindow

210. Plant Pathology: Principles and Practice. (3) Two hours of lecture and one hour of discussion. Consent of instructor. An integrated approach to the study of disease mechanisms at the molecular, biochemical and cellular level. Emphasis will be placed on using genetic approaches to study pathogenesis and mechanisms of disease resistance in higher plants. Opportunities for and limitations of agricultural cropping for plant disease control will be covered. Offered odd-numbered years. (SP) Panopoulos

Political Economy of Industrial Societies

The Program in Political Economy of Industrial Societies introduces undergraduates to issues relevant to the political and economic institutions of modern societies, focusing on problems of both domestic and international policy. It is designed to give students a broadly based liberal arts background while providing them with intellectual skills applicable to careers in either the public or private sector. Additionally, the program provides excellent background for students planning postgraduate careers in social science disciplines and professional schools.

Political economy covers the interaction between political and economic factors affecting modern industrial societies. It is assumed that society, culture, geography, and demographics affect that interaction and are therefore critical contributors to an understanding of the subject. Therefore, any study of political economy must be both multi- and interdisciplinary in scope.

Although the major has a strong historical component, contemporary problems form the central focus. Students in the major emphasize planning and problem solving; environmental issues; resources use and distribution; and the challenges of institutional adaptation, value innovation, and changing political equilibriums.

Some of the questions which the major addresses include:

1. The tension between the need to increase production in order to satisfy rising consumer demand on the one hand, and the need to minimize resource depletion and pollution on the other;
The Group Major

Declaring a major in PEIS follows guidelines established by the College of Letters and Science. Students wishing to declare PEIS:

(1) must have completed at least 30 semester units of university work before applying to the program;
(2) must have completed at least two of the required lower-division courses or their equivalents and be enrolled in a third;
(3) must have a minimum GPA of 3.2 in courses relevant to the major, including the required lower-division courses;
(4) must have completed at least two semesters of college-level foreign language or the equivalent;
(5) should declare the major no later than the semester in which they complete the 61st unit (Junior transfer students should contact the Group Major Office concerning their eligibility).

Students who meet the above criteria are eligible for admission to the major. Students who do not meet the above criteria but wish to declare PEIS may submit a letter of appeal along with a completed application. Appeal cases are reviewed at the end of the fifth, tenth, and fifteenth weeks of each semester. Applications and instructions regarding the appeal and application process may be obtained from the Group Major Office, 207 Moses Hall.

Students are reminded that: (1) no course work for the major may be taken on a passed/not passed basis; (2) no course work may be used to satisfy more than one major requirement; (3) non-PEIS majors may be eligible for some programs. However, other minor programs taken in conjunction with PEIS are encouraged.

Double Majors. Double Majors must be approved by the Dean of the College of Letters and Science and cannot be used in more than one major. Applications and instructions regarding the application and appeal process may be obtained from the Group Major Office, 207 Moses Hall.

Study Abroad. The use of course work taken at institutions outside the United States to fulfill major requirements is restricted to the equivalent of three semesters of lower-division courses. Any courses taken to fulfill the foreign language requirement for the major group are not included in this restriction.

Honors Program. To graduate with honors from the group major in PEIS, students must enroll in the two-semester honors seminar, PEIS H185A-H185B, and must obtain grade-point averages of 3.5 in the major and in overall university course work. The honors seminar is taken in addition to a student's regular course work for fulfilling requirements for the major and culminates in the writing of a senior thesis. The thesis is read by the thesis instructor and at least one other faculty member who is selected by the student in consultation with the thesis instructor. Eligibility for participating in the Honors Program may be checked in the Group Major Office.

Course Plan

There is considerable flexibility within the PEIS major. It permits and encourages students to construct programs appropriate to their intellectual interests and the global areas they wish to stress in their studies. There are, however, minimal core course requirements that each student must meet. These core requirements are designed to provide all PEIS students with a common background of knowledge and common intellectual reference points.

The program consists of three tiers of course work and a foreign language requirement: (1) four lower-division courses provide necessary historical, political, quantitative, linguistic, and economic skills essential for upper-division course work and for future career and educational options; (2) six upper-division courses are required as background for studying modern political economies; and (3) four courses provide in-depth study in the student's chosen issue or problem emphasis.

In addition to the requirements outlined above, all PEIS majors must demonstrate proficiency in a single modern foreign language, other than English, equivalent to four college-level semesters.

Lower Division

There are four required courses at the lower division level. Lower division requirements may be satisfied by (1) successfully completing the appropriate course or its equivalent, (2) providing evidence of AP credit, or (3) with prior consent from a faculty advisor, satisfactorily completing an upper division equivalent.

Please consult with the Group Major Office for current information.

Required Courses

Economics 1, History 5, Political Science 2, Statistics 2 or Statistics 20 or Statistics 21 or Anthropology 190A.

Foreign Language Requirement

Demonstrated proficiency in any single modern foreign language equivalent to four college-level semesters is required of all PEIS majors. Two semesters must be completed for admission to the major. The remaining two semesters may be completed any time before graduation. Course work may consist of any combination of high school, college, summer program, or college-level study abroad program. This requirement may be satisfied by a proficiency examination or by the completion of appropriate course work with a grade of C- or better. Completion of a one-semester course abroad in a non-English language may be regarded as the equivalent of three semesters of the foreign language requirement.

Please consult with a faculty advisor or with the program office for current acceptable equivalency exams or course work.

Upper Division

There are 10 required upper division courses spread among four major divisions. These include three courses in conceptual tools; two courses in introductory sequence: historical context; one course in introductory sequence: political economy; and four courses focusing on a student's emphasis in the major.

Note: (1) In fulfilling the upper division major requirements, students should keep in mind that no more than three courses outside the College of Letters and Science may be used in their major program. Students are reminded that no course work used to complete major requirements may be taken P/NP.

I. Conceptual Tools. Section A: two courses in intermediate economics. Choose one of the following sequences:

Economics 100A-100B or Economics 101A-101B.

Section B: one course in modern theory and methodology: PEIS 101.

Recommended Courses

Students wishing to declare PEIS:

Listed below are a few of the many course options which PEIS majors have found particularly relevant in providing an eclectic introduction for methodology and other upper division courses:

Anthropology 193, Library and Information Studies

Students must take two courses in one of the four groups. The other two courses may be chosen from any of the remaining groups. Although a student may choose any course listed in one major group to fulfill requirements, students are reminded that courses must relate to their chosen issue or problem-based emphasis and are to be selected in strict consultation with a faculty advisor. A list of courses currently recommended for fulfilling major requirements for each group and a description of each group's focus are published annually and are available at the program office. Although every attempt is made to publish an acceptable list of acceptable course work, the list may not be entirely comprehensive. Please consult with a faculty advisor regarding the use of courses which are not listed.

Note: No more than two of the four courses needed to fulfill the emphasis course work requirement may be from the same department.

Lower Division Courses

98. Directed Group Study. (1-4) Course may be repeated for credit. Group meetings to be arranged. Must be taken prior to their units being considered for fulfillment. Prerequisites: Consent of instructor. Student-directed course under the supervision of a faculty member. Subject matter to change from semester to semester. (F,SP) Staff

Upper Division Courses

100. Classical Theories of Political Economy. (4) Three hours of lecture and one hour of discussion per week. One-semester lecture course offered each semester. One-hour class (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 literature that has emanated from the various social science disciplines which forms the basis of modern political economy. (F,SP) Staff, Fishlow

On leave, spring

On leave, fall

Recalled to active service

Recipient of Distinguished Teaching Award
101. Contemporary Theories of Political Economy. (4) Three hours of lecture and one hour of discussion per week. Recommended prerequisite for all honors students. Introduction to the fundamental theories of political economy with an emphasis on the relationship between economic theory and economic policy. This course is designed to accommodate cross-listed courses offered through other departments, the content and unit values vary from course to course. (F,SP) Staff

102. Scope and Methods of Research in Political Economy. (4) Three hours of lecture and one hour of discussion per week. Recommended prerequisite for all honors students. An introduction to the fundamental theories of political economy with an emphasis on the relationship between economic theory and economic policy. This course is designed to accommodate cross-listed courses offered through other departments, the content and unit values vary from course to course. (F,SP) Staff

130. Cross Listed Topics. (1-4) Course may be repeated for credit. Prerequisites: Consent of instructor. This course is designed to accommodate cross-listed courses offered through other departments, the content and unit values vary from course to course. (F,SP) Staff

135. Game Theory in the Social Sciences. (4) Students will be registered 155 after Econometrics 104. Three hours of lecture and one hour of discussion per week. A non-technical introduction to game theory. Basic principles, and models of interaction. Topics vary from course to course. (F,SP) Staff

150. Advanced Study in Political Economy of Industrial Societies. (4) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Consent of instructor. This course is designed to accommodate cross-listed courses offered through other departments, the content and unit values vary from course to course. (F,SP) Staff

152. Senior Thesis. (3) Individual weekly meetings. Prerequisites: Consent of instructor. This course is designed to accommodate cross-listed courses offered through other departments, the content and unit values vary from course to course. (F,SP) Staff

192. Senior Thesis. (3) Individual weekly meetings. Prerequisites: Consent of instructor. This course is designed to accommodate cross-listed courses offered through other departments, the content and unit values vary from course to course. (F,SP) Staff

H195A-H195B, Senior Honors Thesis. (4,4) Two hours of seminar and one hour of consultation per week. Credit and grade to be awarded on completion of an independent thesis. Prerequisites: Senior Standing. Check with the department office for current requirements. The honors student is required to write a thesis on research performed in the H195A-H195B course. The thesis will be evaluated by both the student and faculty advisor; and may be taken for a letter grade. (F,SP) Staff

185. Special Field Research. (1-4) Course may be repeated for a maximum of 12 units. 240-300 hours work per semester plus regular meetings with the faculty supervisor. Prerequisites: Consent of instructor. Students to work in selected internship programs approved in advance by the faculty coordinator for which written contracts have been established between the sponsoring organization and the student. Students will be expected to produce two progress reports for their faculty coordinator during the course of the internship, as well as produce a final paper for the course consisting of no fewer than thirty-five pages. Other restrictions apply; see faculty advisor. (F,SP) Staff

197. Field Studies. (1-4) Course may be repeated for credit. Regular individual meetings. Must be taken on a pass/no pass basis. Prerequisites: Upper division standing and consent of instructor. Supervised experience relevant to specific aspects of Political Economy of Industrial Societies in off-campus organizations. Regular individual meetings with faculty supervisor and written reports required. (F,SP) Staff

198. Directed Group Study. (1-4) Course may be repeated for credit. Group meetings to be announced. Must be taken on a pass/no pass basis. Prerequisites: Upper division standing and consent of instructor. (F,SP) Staff

199. Supervised Independent Study and Research for Undergraduates. (1-4) Course may be repeated for credit. Individual meetings to be announced. Must be taken on a pass/no pass basis. Prerequisites: Written proposal must be approved by a faculty advisor. Enrollment restricted by regulations of the college. (F,SP) Staff

Graduate Courses

299. Independent Study. (1-4) Course may be repeated for credit. Individual study. Prerequisites: Consent of instructor. This course is designed to accommodate cross-listed courses offered through other departments, the content and unit values vary from course to course. (F,SP) Staff

Political Science

(College of Letters and Science)

Department Office: 210 Barrows Hall, 642-2823
Chair: David Collier, Ph.D.

Professors:


Bruce E. Cain, Ph.D. Harvard University. International relations, comparative politics.

Martin S. Green, Ph.D. University of California at Berkeley. Political behavior, comparative government.

David Collier, Ph.D. University of Chicago. Comparative politics, Latin American politics, international law.

Giuseppi Di Palma, Ph.D. University of California at Berkeley. Comparative politics, international relations, comparative politics, comparative political economy.

Alessandro Di Tella, Ph.D. University of Chicago. Political economy, public choice.

Peter W. Spiroson, Ph.D. University of Michigan. Political economy, political behavior, political theory.

Kenneth W. Waltz, Ph.D. Columbia University. International relations, international politics.

Vinod K. Aggarwal, Ph.D. Stanford University. International relations, comparative politics.

Associate Professors:

Vinod K. Aggarwal, Ph.D. Stanford University. International relations, political economy.

Kevin P. Matheny, Ph.D. University of Chicago. Comparative politics, political economy of development, Middle East, comparative politics, public policy, public administration.

Robert R. G. Poisson, Ph.D. University of Wisconsin. International relations, international politics.


Assistant Professors:


Students may be required to complete Political Science 1 and 2 plus two other prerequisites before declaring the major. (Advanced placement credit does not satisfy any major prerequisites.)

Honors Program. Students who have maintained a 3.5 grade-point average in the major and are...
Graduate Program

Information about admission to the graduate program may be obtained from the departmental graduate office, 2108 Barrows Hall.

Lower Division Courses

1. Introduction to American Politics. (4) Students who have taken Political Science 100 will receive no credit for this course. Three or two hours of lecture per week. An introduction to the study of the relationship between distinctive peoples in the meetings be

2. Introduction to Comparative Politics. (4) Three hours of lecture and one or two hours of discussion per week. This course deals with the basic problems and processes that all political systems face and examines

3. Introduction to Empirical Analysis and Quantitative Methods. (4) Three hours of lecture and one or two hours of discussion per week. Analytical and methodological problems of political inquiry, with an emphasis on quantification and measurement. (F,SP)

4. Introduction to Political Theory. (4) Three hours of lecture and one or two hours of discussion per week. An approach to the understanding of politics through the perspectives and language of the political theorist. (F,SP)

20. National Security Policy. (4) Three hours of lecture and one or two hours of discussion/conference per week. Analysis of the evolution, development, and formulation and execution of current U.S. National Security Policy. The methods of national decision making; the translation of these concepts into specific policy objectives and supporting programs, the relationship to foreign policy, and current national security problems. (F,SP)

24. Freshman Seminars. (1) Course may be repeated for credit as topic varies. One hour of seminar per week. Sections 1-8 to be graded on a passed/not passed basis. Sections 7-8 to be graded on a letter basis. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member. In a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP)

33. Race, Ethnicity, and the Formation of American Identities. (4) Three hours of seminar per week plus additional weekly conferences. Examines the formation of racial and ethnic identities in the meetings between distinctive peoples in (what would become) the United States. Particular groups and historical periods may vary from year to year, but will always include two people of color in their major per semester. (F,SP)

40. Introduction to the Pacific Rim. (4) Three hours of lecture and one hour of discussion per week. This course will provide lower division students with a general survey of basic trends of political, economic, and cultural development in the Asian Pacific Region. (F,SP) Ditter

41. Freshman Seminar. (4) Three hours of seminar and one hour of discussion per week. Topic, experimental in nature, will vary from year to year. (F,SP)

98. Group Study of Selected Topics. (1) One hour of lecture per week. Must be taken on a passed/not passed basis. A course in which the instructor will work with an experienced writing JD/Ph.D. student, working with small groups of not more than fifteen students. Each Political Science 98 section will have as its goal the development of writing competencies through group discussion of structured weekly readings. (F,SP)

99. Supervised Independent Study. (1-4) By arrangement with faculty. Must be taken on a passed/not passed basis. Prerequisites: Completion of two Political Science courses and a 3.3 GPA. Supervised Independent Study and Research for lower division students. Pursuant to the Regulations of the Berkeley Division. (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 powers, structure, and operations of government, primarily at the national level. (For nonmajors.) (SP)

American Politics.

101. Labor, Professions, and Bureaucracy. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: One division course in political science or sociology. The organization of work and the nature of work experience 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, businesses, enterprises, and professions; work reform movements and economic democracy. (F,SP)

101B. Prosperity and Misery in America. (4) Three hours of lecture and one hour of discussion per week. The nature and extent of human misery in the United States; the role of government and the private sector as agents of amelioration; the causes of prosperity in a free society. (F,SP) Muir

102. The American Executive. (4) Three hours of lecture and one hour of discussion per week. Analysis of the presidential system, with special emphasis on the relationship between the President and the federal executive branch. Special attention will be given to topics of presidential leadership, staffing, executive-legislative relations, and policy formation. (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 relations, the formal and informal structures of both houses, relations with the executive branch, policy formulation, and lobbying. (F,SP)

104. Political Parties. (4) Three hours of lecture and one hour of discussion per week. The institutional environment within which American politics takes place. Concept and history of parties in the American context: their nature and function, origin and development. Party organization and structure. State, national, and local party systems and their variations. Nominations and elections. The directed research paper will be required. (F,SP)

105. The Politician. (4) Three hours of lecture and one hour of discussion 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. (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 American institutional setting. Business, labor, the media, the black protest and other significant lobbies of power. Implications for a democratic society. (F,SP)

107A. The Policy Process. (4) Three hours of lecture and one or two hours of discussion per week. How policy is "made" in the United States. How issues gel on the policy agenda, the role of legislators, executives, courts, bureaucracies, interest groups, and parties in formulating public policies; policy implementation and policy evaluation. (F,SP)

107B. Public Policy Doctrines. (4) Three hours of lecture and one or two hours of discussion per week. Analysis of the conceptual and methodological tools of public policy analysis. (F,SP)

108. Selected Topics in American Politics. (4) Three hours of lecture and one hour of discussion per week. See departmental announcements. (F,SP)

109. Women and Politics. (4) Three hours of lecture and one hour of discussion per week. Analysis of women in politics from a historical as well as a theoretical perspective. This course will examine the strategies 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-Capitol. (2) Two hours of seminar per week. Must be taken on a passed/not passed basis. Prerequisites: Limited to summer Cal-in-the-Capitol intern. This 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)

111. Political Cultures. (4) Three hours of lecture and one hour of discussion per week. The formation of preference which wants what, when, and why. How and why people organized into various ways of life (or cultures) perceive the world in different ways. (F,SP)

Political Theory

112A. History of Political Theory. (4) Three hours of lecture, one hour of discussion, and one hour of conference per week. Major theories from the ancient Greeks to the modern period. Ancient and medieval political thought, including Plato, Aristotle, and St. Augustine. (F,SP)

112B. History of Political Theory. (4) 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, and Rousseau. (F,SP)

112C. History of Political Theory. (4) Three hours of lecture, one hour of discussion, and one hour of conference per week. Nineteenth and twentieth century political thought, including Burke, Utilitarianism, Marx, and contemporary theory. (F,SP)

113A-113B. American Political Theory. (4-4) Three hours of lecture and one hour of discussion/conference 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) 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,SP)

115A-115B. Marxist Political Theory. (4-4) Three hours of lecture and one hour of discussion per week. A. The development of Marxist theory during Marx's lifetime. (F,SP)
120A. International Relations. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 120A or equivalent. Theory of international relations. (F,SP)

120B. International Relations. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 120A. Formerly 121, United Nations, Realism, and Global Order. (F,SP)

121A. International Organizations. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 120B. Formerly 121, United Nations, Realism, and Global Order. (F,SP)

121B. Politics of Regional Integration. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 121A. Is there a substitute for nationalism in the European Union? (F,SP)

122. International Law. (4) Three hours of lecture per week. This course deals with basic legal rules governing international transactions. It meets the criteria of law as well as the law of treaties. Special attention is given to the study of the laws of war, the relationship of the United States to the laws of war. (F,SP)

123. Selected Topics in International Relations. (4) Course may be repeated for credit with consent of instructor. Three hours of lecture and one hour of discussion per week. Prerequisites: 120A or 120B or consent of instructor. See departmental announcements. Topic will vary with instructor. (F,SP)

124A. War and Politics in History. (4) Three hours of lecture and one hour of discussion per week. The nature of war: the relationship of politics to war in history; historical varieties of strategic doctrine; the implementation of strategy; the ending of war. (F,SP)

124B. Politics and Military Strategy. (4) Three hours of lecture and one hour of discussion per week. The interests and institutions among players, with a strong emphasis on applications to international relations and domestic politi- cal science. Also listed as Economics 110, Political Economy of International Trade 135, and International Economics 136. (F,SP)

125. Science, Technology and International Politics. (4) Three hours of lecture and one hour of discussion per week. The intellectual history of the definition and solution of such International conflict issues as environmental degradation, implantation of advanced technologies, resource scarcity, and the types of institutions proposed to cope with these. (F,SP)

126A-126B. International Political Economy. (4/4) 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) Three hours of lecture and one hour of discussion per week. Analysis of the role of the American government in the national interest in international affairs. (F,SP)

128A-128B. Chinese Foreign Policy. (4/4) Three hours of lecture and one hour of discussion per week. Chinese foreign policy in the context of the Chinese Communist Revolution. This course aims at providing the student with a sufficient factual base, alternative theoretical approaches and some of the methodological tools useful in studying Chinese foreign policy. (F,SP)

129A-129B. Soviet Foreign Policy. (4/4) Three hours of lecture and one hour of discussion per week. The evolution of Soviet foreign policy from the formation of the Soviet Republics in 1917 to the present. Continuity and change in Soviet foreign policy and foreign policy makers. Current developments in Soviet foreign policy. (F,SP)

130. Soviet Foreign Policy. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 129A or equivalent. Focus on the Soviet Union's foreign policy. (F,SP)

131. Political Inquiry. (4) Three hours of lecture and one hour of discussion per week. Introduction to the epistemological and methodological issues that characterize the study of politics. Emphasis is placed on the development of a critical approach to the study of politics. (F,SP)

132A-132B. Quantitative Methods for Political Science. (4/4) Three hours of lecture and one hour of discussion per week. Credit and grade to be awarded on completion of sequence. Comprehensive introduction to research methods, statistical analysis, and computer usage in the social sciences. Emphasis on critical thinking and analysis 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 with consent of instructor. Three hours of lecture and one hour of discussion per week. Prerequisites: 132A or 132B. See departmental announcements. Topic will vary with instructor. (F,SP)

134. Formal Models of Politics. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 3 or consent of instructor. This course introduces some of the basic analytic tools that political scientists use to understand social phenomena in various areas of political science. (F,SP)

135. Game Theory in the Social Sciences. (4) Students will receive no credit for 135 after taking Economics 104. Three hours of lecture and one hour of discussion per week. A non-technical introduction to game theory. Basic principles, and models of interaction among players, with a strong emphasis on applications to international relations and domestic politics. Also listed as Economics 110, Political Economy of International Trade 135, and International Economics 136. (F,SP)

136. Development Politics. (4) Three hours of lecture and one hour of discussion per week. Modernization, development and political change. Relating general theoretical formulations to processes of politi- Comparative Politics

138A. Theory in Comparative Analysis. (4) Three hours of lecture and one hour of discussion per week. Major themes in comparative analysis. Political systems, culture, authority and other themes in the study of comparative politics. Subject matter will vary with instructor. (F,SP)

138B. Method in Comparative Analysis. (4) Three hours of lecture and one hour of discussion per week. The comparative method. Application of the comparative method to the study of political events. (F,SP)

137A. Revolutionary Change. (4) Three hours of lecture and one hour of discussion per week. Ideologies and their impact on political events. (F,SP)

137B. Revolutionary Movements. (4) Three hours of lecture and one hour of discussion per week. The historical development of political movements from the Middle Ages to the present day. (F,SP)

137C. Intellectuals in Politics. (4) Three hours of lecture and one hour of discussion per week. Intellectuals and the state. (F,SP)

138. Modern Democracy. (4) Three hours of lecture and one hour of discussion per week. The political process in modern democracies. (F,SP)

139B. The Industrial State. (4) Three hours of lecture and one hour of discussion per week. The political economy of the modern state. (F,SP)

139C. Comparison of Party Systems. (4) Three hours of lecture and one hour of discussion per week. The study of political party systems. (F,SP)

139D. Comparative Political Economy. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Two lower division courses in social sciences or history or consent of instructor. Political, social, and economic systems. The conflict between political parties and economic institutions. (F,SP)

139E. Development Politics. (4) Three hours of lecture and one hour of discussion per week. Modernization, development and political change. Relating general theoretical formulations to processes of political development.
litical, economic, and social development within several third world contexts. (F,SP)

139B. Development Politics. (4) Three hours of lecture and one hour of discussion per week. Political economy and development in developing countries. Comparative analysis of the theories and practice of development in the light of contemporary experience. Politically sensitive topics such as agrarian, industrial, educational, and regional development and their impact on autonomy, welfare, justice, and human development. (F,SP)

139C. Selected Issues of Development Politics. (4) Course may be repeated for credit as topic varies. Three hours of lecture and one hour of discussion per week. Consent of instructor. See departmental announcements. Topics will vary with instructor. (F,SP)

140A. Authoritarian Government. (4) Three hours of lecture and one hour of discussion per week. Authoritarianism in traditional and revolutionary societies. Tensions between personal and institutional power, illegitimacy and efficiency, political ends and bureaucratic means. (F,SP)

140B. Comparative Communism. (4) Three hours of lecture and one hour of discussion per week. The formation and evolution of communist elites, organizations, and institutions. Contemporary and modern economic modernization, education principles and practices, roles of socio-economic groups in communist society; revolutionary tactics and strategy; foreign policies. Examples drawn from Asia, East Europe, Latin America. (F,SP)

140C. Selected Topics in Communist Politics. (4) Course may be repeated for credit with different topics and consent of instructor. Three hours of lecture and one hour of discussion per week. See departmental announcements. Topic will vary with instructor. (F,SP)

140D. Selected Topics in Comparative Politics. (4) Three hours of lecture and one hour of discussion per week. See departmental announcements. (F,SP)

Area Studies

141A. Soviet Politics. (4) Three hours of lecture and one hour of discussion per week. Introduction to Soviet politics. Political history of the USSR from Lenin through Brezhnev. Emphasis on policy priorities, and the nature of politics as these evolved over time. Law, economies, and society as related to government and politics. (F,SP)

141B. Soviet Politics. (4) Three hours of lecture and one hour of discussion per week. Selected topics in contemporary Soviet politics as exemplified by the Brezhnev era; elites and functional groups; political leadership, political succession, economic and ethnic policy; political stability and the future. (F,SP)

141C. East European Politics. (4) Three hours of lecture and one hour of discussion per week. Selected topics in the political process in relation to social structure and national diversity. A comparison of communist and prewar political systems, and analysis of contemporary political developments. (F,SP)

142A-142B. Middle East Politics. (4) Three hours of lecture and one hour of discussion per week. The Middle East in world affairs, international relations and domestic policies of contemporary states in the Middle East; policies and strategy of major powers; supra-national movements, regional political and security organizations. The area comprises Turkey, Iran, Afghanistan, Israel, and the Arab countries. (F,SP)

143A-143B. Northeast Asian Politics. (4) Three hours of lecture and one hour of discussion per week. The structure and evolution of political institutions in China, Japan, and Korea. The role of the state in such important areas as nationalism, political modernization, and ideology. (F,SP) Ditmer

143C. Southeast Asian Politics. (4) Three hours of lecture and one hour of discussion per week. The impact of cultural variables on political process. The effect of Southeast Asian politics on the "Indian influence," religious values, economic change, patron-client relations, and the psychological roots of colonialism. (F,SP)

143D. Policy Problems of Southeast Asia. (4) Three hours of lecture and one hour of discussion per week. Subject will vary with instructor. (F,SP)

144A. Rapid Growth in East Asia. (4) Three hours of lecture and one hour of discussion per week. Japan, Korea, and Taiwan. This course will argue that the nationalist strategies of these three countries represent significant, and in some ways complementary, variations on a common theme of political and economic development. Japan represents the triumph of flexible "lean production", Korea's strength is in mass production, while Taiwan aims at rapidly changing market niches. (SP) Noble

144B. Politics of Divided Korea. (4) Three hours of lecture and one hour of discussion per week. An overview of modern Korea divided into the Republic of Korea and the Democratic People's Republic of Korea. The course will compare the two Koreas in terms of political, social and economic institutions. (F,SP) Law

145A-145B. South Asian Politics. (4) Three hours of lecture and one hour of discussion per week. A comparative analysis of development and change in the political systems of contemporary South Asia. (F,SP)

146A. African Politics. (4) Three hours of lecture and one hour of discussion per week. Introduction to African politics and 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 contemporary options and strategies dealing with them. Nation-building, political instability, "neo-colonialism," are among the specific topics that are discussed. (F,SP)

146B. African Politics. (4) Three hours of lecture and one hour of discussion per week. In-depth analysis of several African states, focusing on the formation of their contemporary state structures and political systems, and the nature of current political processes and problems. Cases are chosen so as to highlight contrasting political strategies for the pursuit of economic development and social change. For details consult departmental announcements. (F,SP)

146C. Conflict and Change in Southern Africa. (4) Three hours of lecture and one hour of discussion per week. Primary emphasis on the Republic of South Africa, focusing on the evolution of the system of racial rule, the politics of apartheid, and on procedures for political change. Analysis of South African politics is placed within the context of regional political change and of conflict between South Africa and her neighbors. The role of the United States and the United Nations in the process of conflict and change in southern Africa will also be discussed at some length. (F,SP)

147A. Western European Politics. (4) Three hours of lecture and one hour of discussion per week. The origins and development of state and society in Western Europe from the Middle Ages to the Industrial Revolution. Feudalism, the estate society, absolutism, constitutionalism. State building, authority, and social relations. (F,SP)

147B. Western European Politics. (4) Three hours of lecture and one hour of discussion per week. The British people and their country, geography, society, and economy. The British political system. The British Constitution. Institutions of government, parliament, cabinet, monarchy, administration, the courts. Regionalism and local government. Public policy. (F,SP)

147D. Southern European Politics. (4) Three hours of lecture and one hour of discussion per week. National-building, political development, and current political problems in Southern European countries. Comparison with the politics of continental Europe. (F,SP)

147E. U.S.-European Relations. (4) Three hours of lecture and one hour of discussion per week. A lecture course which assumes no previous study of U.S.-European relations. This course will review the early history of the Atlantic Alliance, especially the creation of NATO, and the conflicts that were common between U.S. and Europe in the 1950's and 1960's. It will also focus on more recent sources of conflict, including detente, crisis outside of the NATO area, military burden sharing, money and trade. (F,SP)

147F. The Politics of France. (4) Three hours of lecture and one hour of discussion per week. The development of French politics in the twentieth century. Political parties and institutions of government. Economic and foreign policies. (F)

147G. Government and Politics of Germany. (4) Three hours of lecture and one hour of discussion per week. (F)

148A-148B. Latin American Politics. (4) Three hours of lecture and one hour of discussion per week. Political institutions, groups and parties in Latin American countries. Basic characteristics of political processes in Latin America; problems of political development and modernization and political change. Comparative study of political systems, institutions, and political behavior. (F,SP)

149. Selected Topics in Area Studies. (4) Course may be repeated for credit with different topic and consent of instructor. Three hours of lecture and one hour of discussion per week. See departmental announcements. Topic will vary with instructor. (F,SP)

Public Law and Jurisprudence

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. Three hours of lecture and one hour of discussion per week. The nature of the American legal system; the relationships of judges, lawyers, police, political officials, bureaucrats, press, and, general public; the political and social aspects of the legal process. (F)

151. The Jury System. (4) Students who have taken 151B during the 1983-84 or 1984-85 academic year will receive no credit for 151B. Three hours of lecture and one hour of discussion or conference per week. The role of the jury in the judicial and political system. Selection and behavior of jurors on the local, state, and federal level. (F,SP)

157A-157B. Constitutional Law of the United States. (4) Three hours of lecture and one hour of discussion per week. Fundamental principles of constitutional law, leading cases, causes, and consequences of legal decisions. (A, Civil Rights) A. Civil Rights (B, Civil Liberties. (F) Staff

158. Selected Topics in Public Law and Jurisprudence. (4) Three hours of lecture and one hour of discussion per week. See departmental announcements. (F,SP)

Political Behavior

161. Public Opinion, Voting and Participation. (4) Three hours of lecture and one hour of discussion per week. The nature of public opinion, attitude formation, electoral turnout and choice; political cleavages; the role of the mass public. (F,SP)

162. Communications and Politics. (4) Three hours of lecture and one hour of discussion per week. The role of mass communication, propaganda, political persuasion, and information campaigns in the political process. (F)

163A-163B. Religion and Politics. (4) Three hours of lecture and one hour of discussion per week. Credit will not be awarded for more than one of 163A-163B. Three hours of lecture and one hour of discussion per week. Credit will not be awarded for more than one of 163A-163B. Three hours of lecture and one hour of discussion per week. (F)

1. Human Condition and Human Responses
Public Organization, Administration, and Policy

181. Public Organization and Administration. (4) Three hours of lecture and one hour of discussion per week. The role of bureaucracy in the American political system. An introduction to theories of organizational behavior. The effects of administrative structure upon the creation and distribution of public benefits. (F,SP)

182. Public Policy and Administration in Developing Countries. (4) Three hours of lecture and one hour of discussion per week. The political economy of policy-making and administration for economic development in selected developing countries. (F)

183. Administrative Behavior. (4) Three hours of lecture and one hour of discussion per week. Systematic study of the decisions made by government leaders and the processes by which these decisions are reached. (F,SP)

185. Public Policy and Decision Analysis. (4) Three hours of lecture and one hour of discussion per week. Variations in decision-making and policy analytical approaches, concepts of rationality in politics, analysis of the political uses of policy analysis, game theory, bargaining as applied to policy issues. (F)

187. Seminar: Bureaucracy and the Modern State. (4) Three hours of seminar and one hour of conference per week. A review of the impact of the modern bureaucracy, its implications for the character of the state and the character of the modern political system. (F)

187C. Seminar: Technology and Politics. (4) Three hours of lecture and one hour of discussion per week. The relationship of technology to social/political change, scope of challenges of democratic governance of technical developments, the basis for technological dissent, roots and premises of democracy and technological change in the future development of public policy. (SP)

188. Selected Topics in Public Organization and Policy. (4) Three hours of lecture and one hour of discussion per week. See departmental announcements. (F,SP)

Sub-National Government and Politics

170. Comparative State Politics. (4) Three hours of lecture and one hour of discussion per week. The role of the states in the federal system; the structure and operations of state government, including political institutions, parties, interest groups, and the determinants of policy outcomes. (SP)

171. California Politics. (4) Three hours of lecture and one hour of discussion per week. An inquiry into the political environment of the state—historical, economic, political—its political institutions, its political leaders, its political parties, interest groups, and citizens; and the policies resulting from the interaction of environment and institutions. (F)

175A. Urban and Metropolitan Government and Politics. (4) Three hours of lecture and one hour of discussion per week. Metropolitan region: planning, decision-making, and administration. (SP)

175B. Urban and Metropolitan Government and Politics. (4) Three hours of lecture and one hour of discussion per week. Metropolitan region: planning, decision-making, and administration. (SP)

176. The Unseen America. (4) Three hours of seminar per week. An analysis of political processes in a social setting. Social science methods and philosophies; on-site observation of "seen" parts of local community: war veterans, elderly, alcoholics, prisoners, military personnel, etc. Frequent field trips led by undergraduate student coordinators. Classroom discussions also directed by undergraduate student coordinators under the direction of the sponsoring faculty. (F)

177A-177B. Political Internship Program. (4) Three hours of internship per week. Two seminars to be taken in addition to normal workload and fieldwork per week. Must be taken on a passed/not passed basis. Prerequisites: Consent of faculty sponsor and department chairperson. Juniors and seniors only. Supervised experience in field positions with California state and local government for 15-20 hours per week, and coordinated course work. (F,SP)

178. Selected Topics in Sub-National Politics. (4) Three hours of lecture and one hour of discussion per week. See departmental announcements. (F,SP)

179. Undergraduate Colloquium on Political Science. (1-3) Course may be repeated for credit. One hour of credit must be taken each term. May not be taken on a passed/not passed basis. Political issues facing the state of California, the United States, or the international community. (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 role of bureaucracy in the American political system. An introduction to theories of organizational behavior. The effects of administrative structure upon the creation and distribution of public benefits. (F,SP)

182. Public Policy and Administration in Developing Countries. (4) Three hours of lecture and one hour of discussion per week. The political economy of policy-making and administration for economic development in selected developing countries. (F)

183. Administrative Behavior. (4) Three hours of lecture and one hour of discussion per week. Systematic study of the decisions made by government leaders and the processes by which these decisions are reached. (F,SP)

185. Public Policy and Decision Analysis. (4) Three hours of lecture and one hour of discussion per week. Variations in decision-making and policy analytical approaches, concepts of rationality in politics, analysis of the political uses of policy analysis, game theory, bargaining as applied to policy issues. (F)

187. Seminar: Bureaucracy and the Modern State. (4) Three hours of seminar and one hour of conference per week. A review of the impact of the modern bureaucracy, its implications for the character of the state and the character of the modern political system. (F)

187C. Seminar: Technology and Politics. (4) Three hours of lecture and one hour of discussion per week. The relationship of technology to social/political change, scope of challenges of democratic governance of technical developments, the basis for technological dissent, roots and premises of democracy and technological change in the future development of public policy. (SP)

188. Selected Topics in Public Organization and Policy. (4) Three hours of lecture and one hour of discussion per week. See departmental announcements. (F,SP)

Special Studies

H190A-H190B. Honors Seminars. (4) Four hours of 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 grades awarded upon completion of thesis. Applications and details through the Undergraduate Office. (F,SP)

191. Experimental Courses. (3) Three hours of lecture per week. See departmental announcements. (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 related lecture course. (F,SP)

H195A-H195B. Senior Honors Thesis. (4-7) Hours each week, to be arranged. Prerequisites: Senior honors candidate. Independent research and theses. The honors thesis is to be written with faculty sponsor. Prerequisites: Consent of faculty sponsor and department chairperson. Independent study of an advanced topic resulting in a substantial research paper. (F,SP)

196. Special Research Project. (1-4) Course may be repeated for credit. Must be arranged for and supervised by faculty sponsor. Prerequisites: Consent of faculty sponsor and department chairperson. Independent study of an advanced topic resulting in a substantial research paper. (F,SP)
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) Three hours of seminar per week. Comparative analysis of the politics of economic development. The theories and practice of political action of the state and other organizations related to agricultural, industrial, and educational development and their implications for national autonomy, prosperity, justice, and human development. Students from other disciplines are welcome. (F,SP)

209A. Comparative Political Economy. (4) Emphasis on three models of modern society—"post-industrial," "mass," and "corporatist"—as they apply to countries labelled capitalist and socialist, pluralist and single-party. The aim: to evaluate convergence theory and explore divergent paths of development among rich 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 of conference per week. Comparative analysis of the politics of social problems among 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 fields (e.g., regarding 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) Course may be repeated for credit with different topic and consent of instructor. Three hours of seminar per week. Themes to be specified by instructor. 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 within 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)

218. Contemporary Theory and Political Science. (4) Three hours of seminar per week. The properties of theory—both classical and contemporary—as employed in the discipline. Theoretical selections will vary with each offering. (F)

217. Politics and Culture. (4) Three hours of seminar per week. Prerequisites: Consent of instructor. An 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.

218A-218B. Colloquium in Political Theory. (4,4) 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 and one hour of conference per week. Themes to be specified by instructor. See departmental announcements. Topic will vary with instructor. (F,SP)

International Relations

220A. Theories of International Relations. (4) Three hours of seminar per week. Prerequisites: Previous work in social science or consent of instructor. The application and utility of major concepts featured in the study of international relations. Relation of various strands of political and social theory to international relations. (F)

220B. Theories of International Relations. (4) Three hours 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 of economic relations, science and technology, health, education, warfare, 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: 220 or 220A. Themes in the study of nationalism and imperialism, especially since World War II; the role of Congress and the Executive Branch in the making of security policy; arms racing and 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. Prerequisites: Consent of instructor. Soviet perceptions, priorities, policy toward Western 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 detente; character and evolution of Soviet-American relations in the 1970s; the future of super-power collaboration and conflict. (SP)

228. National Security Policy. (4) Three hours of 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; arms racing and 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. The Pacific Rim. (4) Three hours of seminar per week. The purpose of this course is to provide a reasonably comprehensive overview of what is usually known as the "Pacific Rim." The course will focus on economic growth, regional security, and democratization. Also listed as Asian Studies 200. (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 references 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, political succession, the character of contemporary Soviet policy-making; economic 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 diversity. The relationship between national tradition, social structure and contemporary politics. (SP)

242. Topics in Middle East Politics. (4) Three hours of seminar per week. Prerequisites: 142A or 142B or consent of instructor. An advanced seminar designed to encourage synthesis of empirical research and theoretical reflection. Focused each year on a specific topic. (F,SP)

243A. Chinese Domestic and Foreign Politics. (4) Three hours of 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) Three hours of discussion per week. An examination of the development of 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 discussion will be required. (F, SP)

243C. Japanese Politics. (4) Three hours of seminar per week. Japanese domestic politics—issues in historical development; political bureaucratic and legal structures; studies in economic policymaking. (F, SP) Noble

244A. The Analysis of Contemporary China. (4) Three hours of seminar per week. This is the first of a two-semester sequence designed to provide the incoming graduate student with a basic grounding in the politics of contemporary China. The focus will be on wide reading and comprehension of the available analytical literature, its sequel will be devoted to integrating that reading with primary source materials. There are no prerequisites, though undergraduate coursework in Political Science and/or Chinese can certainly be useful. (F, SP) Staff

244B. The Analysis of Contemporary China. (4) Three hours of seminar per week. This second semester concentrates on the acquisition of bibliographic and historical sources and an application of the acquisition research skills. The seminar is chronologically divided into three sections: 1. Two weeks on the problems of conceptualization and methodology; 2. Four weeks focused on the period from the end of the nineteenth century until 1949; 3. A final period of oral reports on student research topics. (SP) Staff

244C-244D. Collective Action in Modern China. (4-4) Three hours of seminar per week. Credit and grade are to be earned on completion of the sequence. This course will explore the character and impact of popular movements in modern China, covering rebellion, banditry, millenarianism, secret societies, and urban riots in imperial and modern times. The course will begin with the May Fourth Movement and development of the communist revolution; the Hundred Flowers, Civil Revolution, Democracy Wall, and 1989 Uprising. The first semester will focus on the late imperial and Republican periods (nineteenth century until 1949) while the second semester will focus on dissent in the People's Republic of China (1949 to the present). (F,SP) Perry

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 kingdom. (SP)

245B. Southeast Asian Politics. (4) Three hours of seminar per week. Evaluation of the strengths and weaknesses of current literature in an attempt to design studies advancing the substantive knowledge as well as the theoretical and methodological sophistication of Southeast Asian studies. (F)

246. African Politics. (4) Three hours of seminar per week. Politics of Sub-Saharan Africa; relations of state and society in the context of weak states; state building; societal pluralism; the political role of ethnicity; civil wars; political and economic development; the processes of repression and restructuration; conflict and class formation; political order and development; modernization and equity; and interstate conflict and international order. (F)

247A-247B. Western European Politics. (4-4) Three hours of seminar per week. Major themes of politics and international relations of Western Europe. (F)

247C. Theories of German Political Development. (4) Three hours of discussion per week. This course focuses on alternative explanations of the "German Problem," why was Germany involved in so much warfare in its transition from oligarchic rule to mass democracy? Why the Nazi revolution? Why Auschwitz? (F,SP) Austin

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 distribution, political structure and institutions, and political culture). (F,SP)

249. Selected Topics in Area Studies. (4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Prerequisites: Consent of Instructor. See departmental announcements. 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 legal institutions and 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, jurisprudence 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; the origin and consequences of legal decisions, 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 juror selection and trials. Emphasis on jury selection and on the effects of jury membership composition on jury functioning and jury decisions. (SP)

259. Selected Topics in Public Law. (4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Prerequisites: Consent of Instructor. See departmental announcements. Topic will vary with instructor. (F,SP)

Political Behavior

261. Political Behavior. (4) Three hours of seminar per week. A comprehensive review of the major topics in political behavior through intensive examination of the theories, findings, and proceedings of the most significant studies in the field. (F)

262. Voting Behavior and Public Opinion. (4) Three hours of seminar per week. Examination of the basic literature on voting behavior, public opinion and student research on individually selected topics in this field. (F)

269. Selected Topics in Political Behavior. (4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Prerequisites: Consent of Instructor. See departmental announcements. Topic will vary with instructor. (F,SP)

American Government and Politics

271A-271B. American Government. (4-4) Three hours of seminar per week. Credit and grade to be awarded upon completion of sequence. Overview of the American political system. The system in comparative perspective. Social and demographic foundations of American government. The American system in the light of democratic theory. (F,SP)

272A-272B. National Policy Making. (4-4) Three hours of seminar per week. Credit and grade to be awarded upon completion of sequence. Formerly 272. National policy-making processes, confrontation on Congress, the role of the organizations among policy making institutions. (F,SP) Staff

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. Study of American public policy doctrines, policy formulation, evaluation, and implementation, including the role of social science research in policy making. (SP)

276. Federalism and Intergovernmental Relations. (4) Three hours of seminar per week. Class covers the national-state relations and changes of federalism brought about by increased national activities since the New Deal. (F)

278A-278B. The American System in Comparative Perspective. (4-4) Three hours of seminar per week. Credit and grade to be awarded upon completion of sequence. Read, discuss, and analyze studies of the American system in order to identify its main features and evaluate the principal theories about why the system has those features and what consequences are. (F,SP)

279. Selected Topics in American Government. (4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Prerequisites: Consent of Instructor. See departmental announcements. Topic will vary with instructor. (F,SP)

Public Organization, Administration, and Policy

280A. Public Organization Theory. (4) Three hours of seminar per week. A survey of the literature on organization and management with a focus on 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 and coordinate bureaucracies in different countries 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, governmental planning and reprogramming, and administrative decision-making. (F)

281A-281B. Budgeting. (4-4) Three hours of seminar per week. Budgeting in diverse contexts—from ancient to modern times, local, state and national governments, poor and rich countries. Topics include budget theory, strategies and outcomes, program budgeting, state power and financial capability, decentralization, diffusion of financial norms and technology. The emphasis is on comparative analysis. (F)

282. Management Information Systems. (4) Three hours of seminar per week. Major emphasis on the problem of converting data into information, and 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 bureaucrats and bureaucratic politics in political decision making, including consideration of individual incentives, inter-agency relations, bureaucratic-legislative relations, bureaucratic-executive relations and the problems of democratic control. (F)

287. Development Administration. (4) Three hours of seminar per week. The problems of administering economic development programs in poor countries. Particular emphasis is placed on rural development, the politics of development, the bureaucratic structure to control and coordinate agencies, and the relative organization of the management system in the development administration. (SP)

289. Research Topics in Public Organization. (4) Three hours of seminar per week. Content of course will alternate between budgeting and information systems. (F,SP)

Special Studies

290. Dissertation Research. (4) Course may be repeated for credit. Three hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Seminar to aid students in initiating, carrying-out, and completing dissertation research. Problems of planning dissertation research, the preparation of research design, proposals for doctoral research and writing and presenting the results of completed research. Presentations by graduate students working on their dissertations. (F,SP)
Population Studies
(College of Letters and Science)

There is no undergraduate major in population studies. For courses in this field, please see the "Demography" listing in this catalog.

Psychology
(College of Letters and Science)

Department Office: 3210 Tolman Hall, 642-5292
Chair: Sheldon Zedeck, Ph.D.

Professors:
S. Marc Breedlove, Ph.D. University of California. Behavioral neuroscience; developmental neuroendocrine neurobiology.
Joseph C. Campos, Ph.D. Cornell University. Social psychology; perception.
Constance Steiner, Ph.D., University of Washington. Social psychology; sex roles.
Robert E. Fairchild, Ph.D. Wayne State University. Social psychology; interpersonal attraction.
Mark A. Hovland, Ph.D. University of California. Memory, psychology of perception, judgment, social psychology, personality.
Susan I. Schacter, Ph.D. University of California. Memory, attention, perception.
Edward T. Diener, Ph.D. University of Wisconsin. Social psychology; personality, motivation, happiness.
Robert J. Sternberg, Ph.D. Yale University. Social psychology; personality, social judgment.
Kimberly D. Blum, Ph.D. University of California. Social psychology; judgment.
Sheldon Zedeck, Ph.D. Bowling Green University. Social psychology; personality, judgment.

Associate Professors:
Alison Goggin, Ph.D. University of Oregon. Thought and language development.
James A. Little, Ph.D. University of California. Social cognition.
Barbara M. Spence, Ph.D. University of Oregon. Social psychology; personality.
Paul J. D'Agostino, Ph.D. University of California. Social psychology; personality.

Adjunct Professors:
ivana M. Helson, Ph.D. University of California. Psychology of women; creativity.

Affiliated Professors:
Martin Barsky, Ph.D. (Optometry)
Curtis J. Harris, Ph.D. (Optometry)
William McKinley Runyan, Ph.D. (Social Welfare)
Lorraine E. Snowdon, Ph.D. (Social Welfare)
Elliott Turkel, Ph.D. (Education)

Visiting Professor:
Alvin F. Zander, Ph.D. University of Michigan. Small group processes.

Psychology has two main components: the study of the mind and the study of behavior. The mind is a complex system of interacting processes that enables us to understand the world and ourselves. The study of behavior involves understanding how people and organisms respond to their environment. Psychology is a science that examines the fundamental processes that underlie our experiences, thoughts, feelings, and actions. It is a discipline that seeks to understand and explain behavior, as well as how people think and feel. 

Corrections:
1. On leave, spring, fall
2. On leave, fall
3. Recalled to active service
4. Recipient of Distinguished Teaching Award

The fact that psychology is so diverse means that there are many different fields of study, each with its own particular focus and methodology. Some fields of psychology are more closely related to the biological sciences, while others are more closely related to the social sciences. Some fields of psychology are more concerned with understanding the mind and behavior, while others are more concerned with understanding the social and cultural context in which people live. This diversity means that there are many different careers available to people who study psychology. Some careers in psychology might involve working directly with people, such as therapists or counselors, while others might involve working in research or in the development of new products or technologies. There are many different ways to study psychology, and it is important to choose a program that is right for you.
Psychology 1 is prerequisite for all upper division courses. Additional requirements are also stated for certain courses.

107. Buddhist Psychology. (3) Three hours of lecture per week. Based on tradition of direct observation of working of ordinary mind in everyday life situations. Provides contrasting perspective to present theories of cognition, perception, motivation, emotion, social interaction, and neurosis.

108. Environmental Psychology. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 101 recommended. Survey of environmental psychology, including environmental perception and assessment; cognitive representations of the large environment; the use of data analytical techniques and dispositions; analyses of behavior settings; human spatial behavior; behavioral effects of density; psychological factors in environmental planning design.

108L Laboratory in Environmental Psychology. (1) Three hours of laboratory per week. Prerequisites: 101 recommended. For 108.Demonstrations, exercises and field-projects in environmental psychology.

109. History of Psychology. (2) Two hours of lecture and one hour of discussion per week. Prerequisites: One course in each of the three breadth areas required for the major. Development of scientific study of human and animal behavior. Consideration of history of particular subject areas—such as biological, comparative, developmental, personality, and social psychology—as well as general trends.

Quantitative Psychology

101. Research and Data Analysis in Psychology. (4) Three hours of lecture and two hours of discussion per week. Prerequisites:二者 completion of the quantitative prerequisites for the major or consent of the instructor. Examination of experimental methods in the development of feminine and masculine roles, including personality, social processes, biology, and culture.

24. Freshman/Sophomore Seminars. (2-4) Course may be repeated for credit as topic varies. Seminar format. Prerequisites: Prior to the 101 course is prerequisite for all upper division seminars. Freshman and sophomore seminars offer the opportunity to develop intellectual topics with a faculty member in a small seminar setting. These seminars are offered in all campus departments and topics vary from department to department and semester to semester. (F,SP) Staff

45A. Freshman Seminars. (1) Two hours of seminar per week. Must be taken on a pass/no pass basis. Prerequisites: Prior to the 101 course is prerequisite for all upper division seminars. Open to students in the Psychology major. (F,SP) Staff

53B. Freshman Seminars. (1) Two hours of seminar per week. Must be taken on a pass/no pass basis. Prerequisites: Prior to the 101 course is prerequisite for all upper division seminars. Open to students in the Psychology major. (F,SP) Staff

99. Supervised Independent Study and Research. (1-3) Course may be repeated for credit. Must be taken on a pass/no pass basis. Prerequisites: 1 or consent of instructor and 3.4 GPA or higher. In-depth investigation of topics for credit and for those who wish to undertake a program of individual inquiry on a topic in psychology. (F,SP)

Upper Division Courses

Psychology 1 is prerequisite for all upper division courses. Additional requirements are also stated for certain courses.

107. Buddhist Psychology. (3) Three hours of lecture and one hour of discussion per week. Based on tradition of direct observation of working of ordinary mind in everyday life situations. Provides contrasting perspective to present theories of cognition, perception, motivation, emotion, social interaction, and neurosis.

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Quantitative Psychology

101. Research and Data Analysis in Psychology. (4) Three hours of lecture and two hours of discussion per week. Prerequisites: 二者 completion of the quantitative prerequisites for the major or consent of the instructor. Examination of experimental methods in the development of feminine and masculine roles, including personality, social processes, biology, and culture.

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45A. Freshman Seminars. (1) Two hours of seminar per week. Must be taken on a pass/no pass basis. Prerequisites: Prior to the 101 course is prerequisite for all upper division seminars. Open to students in the Psychology major. (F,SP) Staff

53B. Freshman Seminars. (1) Two hours of seminar per week. Must be taken on a pass/no pass basis. Prerequisites: Prior to the 101 course is prerequisite for all upper division seminars. Open to students in the Psychology major. (F,SP) Staff

99. Supervised Independent Study and Research. (1-3) Course may be repeated for credit. Must be taken on a pass/no pass basis. Prerequisites: 1 or consent of instructor and 3.4 GPA or higher. In-depth investigation of topics for credit and for those who wish to undertake a program of individual inquiry on a topic in psychology. (F,SP)

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Quantitative Psychology

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24. Freshman/Sophomore Seminars. (2-4) Course may be repeated for credit as topic varies. Seminar format. Prerequisites: Prior to the 101 course is prerequisite for all upper division seminars. Freshman and sophomore seminars offer the opportunity to develop intellectual topics with a faculty member in a small seminar setting. These seminars are offered in all campus departments and topics vary from department to department and semester to semester. (F,SP) Staff

45A. Freshman Seminars. (1) Two hours of seminar per week. Must be taken on a pass/no pass basis. Prerequisites: Prior to the 101 course is prerequisite for all upper division seminars. Open to students in the Psychology major. (F,SP) Staff

53B. Freshman Seminars. (1) Two hours of seminar per week. Must be taken on a pass/no pass basis. Prerequisites: Prior to the 101 course is prerequisite for all upper division seminars. Open to students in the Psychology major. (F,SP) Staff

99. Supervised Independent Study and Research. (1-3) Course may be repeated for credit. Must be taken on a pass/no pass basis. Prerequisites: 1 or consent of instructor and 3.4 GPA or higher. In-depth investigation of topics for credit and for those who wish to undertake a program of individual inquiry on a topic in psychology. (F,SP)
Biological Psychology

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 relations between behavioral and biological processes. Topics include sensation and perception processes, neural maturation, natural bases of motivation, and learning. (F) Martinez

111. Sensory Processes: Vision. (3) Four hours of lecture per week. Prerequisites: 110 or consent of the instructor. Examination of various aspects of visual perception, binocular vision, object detection, motion, and object recognition in relation to anatomy and physiology of the visual system.

111L Laboratory in Vision. (2) Four hours of laboratory 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.

112. Sensory Processes: Hearing. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Completion of biological prerequisites for the major and consent of instructor. Lectures covering a broad range of topics related to the psychology of hearing and the physiology of the auditory system.

113. Biological Clocks: Physiology and Behavior. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Completion of biological prerequisites for the major and one of the following: 110, a course in neurobiology, or a course in mammalian physiology. A consideration of the biological clocks that generate daily, seasonal, and annual rhythms in various species of animals. Emphasis on endocrine substrates, developmental and adaptive significance of estrous cycles, feeding rhythms, sleep-wakefulness cycles, reproductive and hibernation cycles, body weight and migratory cycles.

114. Biology of Learning and Neural Plasticity. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 110 or consent of the instructor. A study of neurological and experimental investigations of the biological substrates of learning, memory and formation and demyelination related to the growth and maturation of the nervous system.

115A. Introduction to Comparative Psychology. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 1. Formerly 115. Studies of animal behavior in evolutionary perspective, including analysis of behavior development, reproduction, aggression, territoriality.

115B. Animal Behavior. (4) Students will receive no credit for 115B after taking Integrative Biology 145. Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1A-1B or 11, or Entomology 100, Molecular and Cell Biology 140 or 142, 160 recommended. An introductory course to animal behavior and behavioral neuroscience in an evolutionary context, including but not limited to analysis of behavior, genetics and development, learning, aggression, reproduction, adaptiveness, and physiological substrates. Two midterm exams and a term paper. Also listed as Integrative Biology 144, Entomological Sciences 122, and Interdepartmental Studies 122. Offered even-numbered years.

116. Hormones and Behavior. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Completion of biological prerequisites for the major and consent of instructor. Course covers mammalian physiology recommended. Neural and endocrine mechanisms underlying behavior, especially reproduction, of non-human mammals. Process of sexual differentiation and influences of hormones emphasized. Hormonal influences on feeding, sleep, and aggressive behavior.

117. Biological Psychology and Problems of Human Dysfunctions. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 110. A survey of contemporary psychological approaches to problems of human disfunction, including mental disorders, behavior changes following human brain injury and disease, and mental subnormality. Emphasis on neural and cognitive processes in models of these problems and areas of potential application of basic research development.

118. Topical Seminar in Biological Psychology. (3) Course may be repeated for credit with different topic and consent of instructor. Three hours of lecture per week. Prerequisites: Consent of instructor. For a precise schedule of courses check with the Student Services Office each semester.

119. Drugs and Behavior. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 110 or consent of instructor. A survey course exploring the basic principles of psychopharmacology. The major focus of the course is on the relationship between 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. Basic Issues in Cognitive Science. (4) Students will receive no credit for 120B after taking 120A. Three hours of lecture and one hour of discussion per week. Theoretical foundations and current controversies in cognitive science will be discussed. Basic issues in cognition including perception, memory, categorization, thinking, judgment, and decision making will be explored. Worldviews of philosophy, psychology, computer science, and philosophy. Particular emphasis will be placed on the nature, implications, and limitations of the computational model of mind. Also listed as Cognitive Science 100 and Interdepartmental Studies 125.

121. Animal Cognition. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 1 and 5 or Statistics 2. This course focuses on how animals process information. Topics include learning and memory, sensory processes, navigation and migration, communication, and cross-species comparisons of behavior. Material will be drawn from the fields of ethology, psychology, and animal behavior, and to a lesser extent, the neurosciences literature.

122A. Introduction to Human Learning and Memory. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 110 is recommended. Theoretical and experimental analysis of human learning and memory; short-term and long-term memory; coding and retrieval processes; transfer and interference phenomena.

122B. Advanced Topics in Human Learning and Memory. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 122A or consent of instructor; 101 is recommended. Detailed analysis of special problems in human learning and memory.

123. Concepts and Categories. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Consent of instructor; 101 recommended. Theoretical constructs and experimental methods in the study of human cognition with particular emphasis on the nature of concept formation. Topics include category structure, prototypes, conceptual organization, meaning, thought and cross-cultural comparisons.

124. Psycholinguistics. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Introductory course in linguistics or consent of instructor. Introduction to psycholinguistics, emphasizing effects of psychological variables on the learning and use of language, language development and behavior on psychological processes; special attention to psychological applicability of modern linguistic theory and to social psychological aspects of language behavior.

125. Second Language Learning and Bilingualism. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Consent of instructor. An introduction to principal theoretical constructs in second language learning and auditory perception. Topics will include psycholinguistics; perception of color, space, shape, and motion; pattern recognition and perceptual attention.

127A. Cognitive Neurosciences. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Upper division course in Cognitive or Biological Psychology or consent of instructor. This course will examine recent research in the neurobiological basis of cognition. Material will include the study of brain injury and normal brain function, neurophysiological research in animals, the study of normal cognitive processes in humans with non-invasive behavioral and physiological techniques (e.g., PET scan, brain waves), and the study of models of mental functioning including visual perception and object recognition, attention, motor control, language, and development.

128. Topical Seminars in Cognitive Psychology. (3) Course may be repeated for credit with different topic and consent of instructor. Three hours of seminar per week. Prerequisites: Upper division course in Cognitive or Biological Psychology or consent of instructor. For a precise schedule of offerings check with the Student Services Office each semester.

129. Scientific Approaches to Consciousness. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Cognitive Science 1 or consent of instructor. This course will examine the nature of human consciousness from the interdisciplinary perspective of cognitive science. It will cover topics from the philosophical, physical, and computational points of view. Also listed as Cognitive Science 102 and Interdepartmental Studies 124.

Clinical Psychology

130. Clinical Psychology. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 1. Theoretical and empirical approaches to the explanation of psychological dysfunction. The relation between theories of psychopathology and theories of in...
141. Developmental Psychology. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 101 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.

142. Child Development During Infancy. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 130 or consent of instructor. An introductory course in the psychology of infant development with special attention to the first year of life. Emphasis upon methods of observation and experimentation.

143. Child Language Development. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 101 or consent of instructor. Survey of theory and research in development of language and speech development. Examination of stress in language acquisition, variation in linguistic features, register, social features of participants and situation. Analysis of the social and linguistic rules, and strategic use to convey social meaning.

144. Cognitive Development. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 130 or consent of instructor. Conceptual overview and small group discussion of issues involved in mental health work. Students meet two hours per week for five hours per week in a mental health setting approved by the instructor. In a given semester, a specific focus may be adopted for the course. Check with the Student Services Office each semester.

145. Personality Psychology. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 101 or consent of instructor. A consideration of general and systematic issues in the study of personality and an evaluation of major theories and points of view.

146. Social Psychology. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 130 or consent of instructor. An introduction to the field of social psychology. It covers the psychology of evidence; the use of psychological data to make legal policy decisions; decision-making by juries, judges and parole officers; bargaining and conflict resolution; attitudes toward the law; and behavioral compliance with the law.

147. Psychology in an International Context. (3) Three hours of seminar per week. Prerequisites: Consent of instructor. Examination of the role and status of psychological services in other countries and cultures, including analysis of the role of psychologists and the psychology of the international community.

148. An Introduction to the Theory and Practice of Professional Psychology. (3) Three hours of seminar per week. Prerequisites: Consent of instructor. Theoretical examination of development of professional psychology and ethnic minority groups in society. Consideration of social justice and the professional role of psychologists in the international community.

149. Personality and Mental Health. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 130 or consent of instructor. A consideration of individual differences in the organization of human attachments. Recent advances in our understanding of attachment theory and intervention.

150. Principles of Counseling. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 130 or consent of instructor. Theory and research on children's counseling and therapy. Examination of the theories of counseling and therapy, and the application of these theories in the counseling process.

151. Assessment of Individual Differences. (3) 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, intelligence, and aptitudes. Emphasis upon methods of test interpretation and psychodiagnosis; demonstrations and exercises in the methods of personality assessment.

152. Stress and Adjustment. (3) Three hours of lecture and one hour of discussion per week. Prerequisites: 150 and consent of instructor. Examination of the role of stress and adjustment in mental health.

153. Psychology of Creativity. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Junior standing or consent of instructor. Examination of theories and research in creativity, including the role of creativity in the arts, and the relationship between creativity and personality and social behavior.

154. Psychology of Abnormal and Social Psychology. (3) Three hours of lecture and three hours of laboratory per week. Prerequisites: 150 and consent of instructor. Examination of the relationship between abnormal behaviors and social behavior.

155. Historical and Social Development. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 101 or consent of instructor. Examination of the historical and social development of psychology, including the role of psychology in the development of social and political systems.

156. Language and Social Interaction. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: Not open to students with credit for 154 or equivalent course. Theory and research on the social and cultural context of language use. Examination of the role of language in social interaction, including analysis of the social and cultural contexts of language use.

157. Psychology of Cognition. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 130 or consent of instructor. Examination of the role of psychology in the development of social and political systems.

158. Psychology of Personality. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 101 or equivalent course. Theory and research on the psychological development of personality and the role of language in social interaction.

159. Psychology of Social Development. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 101 or consent of instructor. Examination of the role of personality and social development in the development of social and political systems.

160. Personality and Social Development. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 101 or consent of instructor. Examination of the role of personality and social development in the development of social and political systems.

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182. Personality and Social Development. (3) Two hours of lecture and one hour of discussion per week. Prerequisites: 101 or consent of instructor. Examination of the role of personality and social development in the development of social and political systems.

Special Course Offerings

190A. Cluster Seminars. (1) Two hours of seminar per week. Must be taken on a passed/not passed basis. 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.

190B. Cluster Seminars. (1) Two hours of seminar per week. Must be taken on a passed/not passed basis. 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.

190C. Cluster Seminars. (1) Two hours of seminar per week. Must be taken on a passed/not passed basis. 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.
194. Advanced Survey of Psychology, (3) Three hours of lecture per week. Prerequisites: Background in psychology or related discipline; consent of instructor. This seminar will discuss developments in psychology in the last century. The reading will include selected chapters from the following texts: Psycology, published in 1890, and recent surveys summarizing the current state of knowledge on the issues that James discussed.

H195A-H195B. Special Study for Honors Candidates, (1-3) Course may be repeated for credit. Individual conferences. Must be taken on a pass/no pass basis. Individual conferences. Must be repeated for credit. Individual conferences. Must be repeated.

197. Field Study in Psychology, (1-3) Course may be repeated for credit. Individual conferences. Must be taken on a pass/no pass basis. Prerequisites: 1; appropriate upper division work in psychology (to be determined by instructor). Consent of instructor. Supervised experience relevant to specific aspects of psychology in off-campus settings. Individual and/or group meetings with faculty. Enrollment is restricted by regulations of the Berkeley Division listed elsewhere in this catalog. (F,SP)

198. Directed Study Group, (1-3) Course may be repeated for credit. Individual conferences. Must be taken on a pass/no pass basis. Prerequisites: 1; appropriate upper division work in psychology (to be determined by instructor). Consent of instructor. Group study of a selected topic or topics in psychology. Enrollment is restricted by regulations of the Berkeley Division listed elsewhere in this catalog. (F,SP)

199. Supervised Independent Study and Research, (1-3) Course may be repeated for credit. Individual conferences. Must be taken on a pass/no pass basis. Prerequisites: Consent of instructor. Enrollment is restricted by regulations of the Berkeley Division listed elsewhere in this catalog. (F,SP)

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 adviser and consent of the instructor.) Courses beginning each decade are designated as semesters and are designed to provide the background essential for students planning to concentrate in a particular specialization. The seminars are sufficiently general, however, for students from other areas of psychology to obtain breadth of training in complementary areas of study. It is anticipated that participants need report in any given semester, but all are expected to attend and to enter into the discussions. Required course for all students in the quantitative graduate program.

Biological Psychology
210A-210B. Graduate Survey of Biological Psychology, (4) Four hours of lecture per week. Prerequisites: Consent of instructor. A two-semester survey of the field of biological psychology. Both semesters are required for all graduate students in biological psychology. Other graduate students may take either or both semesters for credit. First semester covers basic neural and sensory processes; second semester is concerned with learning, neural plasticity and ethology.

211. Hormones and Behavior, (3) Three hours of lecture per week. Prerequisites: 210A-210B. A consideration of the influence of hormones on reproductive behaviors, including emphasis on the processes of sexual behavior and the controls of sexual behavior, seasonal reproduction and hormonal involvement in non-reproductive processes, including eating, social behavior, learning and memory. Emphasis on mammalian systems. (Fall)


217. Drugs and Behavior, (3) Three hours of lecture per week. Prerequisites: 210A-210B. This course attempts to explain how drugs influence behavior. Principles of pharmacology, cytology of nerve cells, neuropharmacological mechanisms and synaptic functions are emphasized. The anatomy, neurochemistry and pharmacology of neurotransmitter systems are reviewed. The effects of drugs on animals and human systems will be studied. Finally the course will focus on the effects of drugs on complex behaviors such as motivation, cognition, learning and memory.

218. Research Reviews on the Biological Basis of Cognition and Learning, (1) Course may be repeated for credit. One hour of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisite: Consent of instructor. Discussion of recent papers on the comparative and physiological study of learning and cognition.

219. Biological Seminar, (1) Course may be repeated for credit. One and one-half hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. 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.

Cognitive Psychology
220A. Proseminar: Cognition, (3) Three hours of lecture per week. Theoretical and experimental analysis of biological psychology, especially, creative problem solving and productive thinking. Topics include creative and dispositional factors in convergent and divergent thinking, computer simulation, and the measurement and training of problem solving effectiveness.

220B. Proseminar: Perception and Discrimination Learning, (3) Three hours of 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.

220C. Proseminar: Human Learning and Memory, (3) Three hours of 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.

220D. Proseminar: Problem Solving, (3) Three hours of 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.

220E. Proseminar: Perception, (3) Three hours of 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.

220F. Graduate Issues In Cognitive Science, (3) Three hours of seminar per week. Prerequisites: Graduate standing or consent of instructor. This course will consist of an introduction to a research area of interest at the graduate level. The class will include consideration of topics in perception, reasoning, decision-making and learning from the perspectives of different disciplines. Areas that will be explored include Cognition as a Computational System, decision and the measurement and training of problem solving effectiveness.

220G. Proseminar: Judgment and Decision Making, (3) Three hours of seminar per week. This course will examine how people make judgments, choices, decisions, and evaluations. Descriptive models will be compared to rational models of beliefs and actions. Topics will include probability judgment, perception of color, space, shape, and motion, pattern recognition, and perceptual attention.

220H. Graduate Issues in Cognitive Science, (3) Three hours of seminar per week. Prerequisites: Graduate standing or consent of instructor. This course will consist of an introduction to a research area of interest at the graduate level. The class will include consideration of topics in perception, reasoning, decision-making and learning from the perspectives of different disciplines. Areas that will be explored include Cognition as a Computational System, decision and the measurement and training of problem solving effectiveness.

220I. Graduate Issues in Cognitive Science, (3) Three hours of seminar per week. Prerequisites: Graduate standing or consent of instructor. This course will consist of an introduction to a research area of interest at the graduate level. The class will include consideration of topics in perception, reasoning, decision-making and learning from the perspectives of different disciplines. Areas that will be explored include Cognition as a Computational System, decision and the measurement and training of problem solving effectiveness.

Clinical Psychology
230. Proseminar: Clinical Psychology, (3) Three hours of 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, mod
231A. Clinical Psychology. (3) Three hours of lecture per week. Examination of the interaction between psychological and physiological processes, with particular emphasis on the interplay between psychophysiological and clinical psychology. Topics to be covered include stress and coping, memory and learning, personality and psychopathology, social psychology, and applied psychophysiology.

231B. Clinical Issues in Neuropsychology. (3) Three hours of lecture per week. An examination of clinical issues related to neuropsychological and psychiatric disorders. Topics will include neuropsychological theories and case studies, neuropsychological assessment of professional roles and institutions.

231C. Assessment of the Child in the Family and School. (3) Three hours of lecture per week. An introduction to the clinical method of assessing children in the context of their family and school settings.

231D. Minority Mental Health. (3) Three hours of lecture per week. Overview of concepts and research findings relevant to understanding and contributing to the mental health of minority communities.

231E. Expectations and the Prevention of School Failure. (3) Three hours of lecture per week. Examination of the theory and research on expectations processes in the classroom and in schooling, with particular attention on classroom and school practices which enhance the social processes of instruction and promote the development of competence in children.

232A-232B. Laboratory in Clinical Assessment. (5-2) Three hours of lecture per week. Credit and grade to be awarded on completion of sequence. Prerequisites: First-year status as graduate student in clinical psychology or enrollment in limited training program in clinical psychology. The clinical interview and principles and methods of intellectual, objective, and projective clinical assessment. Readings, discussion, and supervised experience in clinical assessment. Required of all clinical students. (F)

234A. Theories of Psychotherapy. (3) Three hours of lecture per week. Examination of the major theories of psychotherapy and personal change. Orientations that can be covered include psychodynamic approaches, behavioral and cognitive-behavioral techniques, the humanistic schools, and systems theory.

234B. Theories of Child and Family Therapy. (3) Three hours of lecture per week. Analysis of major approaches to promoting developmental change in children, couples and families. To be offered every other year.

234C. Theories of Community Intervention. (3) Three hours of lecture per week. Examination of the research underlying social and community approaches to the promotion of mental health and the prevention of psychopathology. Special emphasis on intervention, with a special focus on consultation.

235. Clinical Research. (3) Three hours of lecture per week. Strategies of research in the clinical sciences; clinical methods of gathering and interpreting data; case examples from the research in progress of participants in the seminar.

237A. Intervention: Adult Psychotherapy. (1) Course may be repeated for credit. One hour of lecture per week. Prerequisites: Limited to second and third year clinical psychology students or consent of instructor. Psychological intervention with adults.

237B. Intervention: Child and Family Therapy. (1) Course may be repeated for credit. One hour of lecture per week. Prerequisites: Limited to second and third year clinical psychology students or consent of instructor. Psychological intervention with children and families. (F-SP)

237C. Intervention: Community. (1) Course may be repeated for credit. One hour of lecture per week. Prerequisites: Limited to second and third year clinical psychology students or consent of instructor. Consultation, program evaluation, program development, and community mental health planning.

237D. Intervention: Assessment. (1) Course may be repeated for credit. One hour of lecture per week. Prerequisites: Limited to first-year clinical psychology students or consent of instructor. Psychological assessment of children and adults.

237E. Intervention: Clinical Decision Making. (1) Course may be repeated for credit. One and one-half hours of lecture 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.

239. Clinical Seminar. (1) Course may be repeated for credit. One and one-half hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing or consent of instructor. Reading and discussion 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.

240A. Seminar: Biological and Perceptual Development. (3) Three hours of lecture per week. Survey of the biology of the nervous system and behavior; the cellular interactions during development in animals and humans, including neurogenesis, synaptogenesis, cell death and synapse elimination; perceptual development, including development of the eye and ear, of the central visual and auditory pathways, visual and auditory perception; and the genetic and experiential determinants of neural and perceptual development.

240B. Seminar: Emotional, Social and Psychopathological Development. (3) Three hours of lecture per week. Current theory and research on the origins and maintenance of normal and pathological socioemotional development in infancy. Exploration of biological, psychological, familial, and cultural factors affecting socioemotional development through childhood and adolescence. Focus includes how normal or pathological trajectories are maintained in some children, while others shift into or out of clinically diagnosable disorders.

240C. Seminar: Development in Infancy. (3) Three hours of lecture per week. Focus on cognitive and social development during the first two years of life. Specific areas of focus are: (1) learning, memory, and categorization; (2) social interaction; and (3) attachment theory, including variables related to individual differences in attachment organization.

240D. Seminar: Cognitive and Language Development. (3) Three hours of lecture per week. Theory, research, and methods of the processes and structures of intellectual growth from birth to adulthood. Specific areas of focus include conceptual, metacognitive, prelinguistic, and sociolinguistic development.

246. Developmental Seminar. (1) Course may be repeated for credit. One and one-half hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing or consent of instructor. Topics in developmental psychology. Required course for all students in the developmental psychology graduate program.

250A. Perspectives In Personality: Overview. (3) Three hours of lecture per week. Introduces the perspectives and research programs of the personality faculty to graduate students in their first year. Each week, attention is directed to the work of a different faculty member associated with the personality field.

250B. Perspectives In Personality: Trends and Issues. (3) Three hours of lecture per week. Considers historical and current trends and issues in personality, such topics as (1) the concept of disposition; (2) person by environment transactions; (3) observational assessment of persons; (4) personality systems; (5) personality development and concepts of structure, and (6) formulations of personality system-social system interactions.

250C. Perspectives In Personality: Stress and Coping Processes. (3) Three hours of lecture per week. Explores the ways stress and coping processes affect health, functioning and adaptation in all of the different personality systems and research. Focuses on human psychological studies of coping and adaptation. Occasionally may deal with theories of affect and its links to cognition.

250D. Principles and Pragmatics of Personality Measurement. (3) Three hours of lecture per week. Methods of personality measurement and assessment, with particular attention to the qualities, attributes, talents and dispositions considered in the everyday evaluation of people make. Required course for all students in the personality graduate program.

251A-251B. Personality Assessment. (5-2) Three hours of lecture and three to five hours of laboratory per week. Prerequisites: PhD candidacy or permission of instructor. Perspectives in personality psychology or consent of instructor. Lectures and laboratory work on personality assessment, including the history and background of assessment and the design of an assessment program, conducting an assessment, and case conferences, preparation of research reports, and methods of data analysis.

259. Personality Seminar. (1) Course may be repeated for credit. One and one-half hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing or 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.

Social Psychology

280A-280B. Proseminar Course In Social Psychology. (3-3) Course may be repeated for credit. Three hours of lecture per week. Extensive coverage of theoretical and research literature. Topics include history and systems, attitudes and attitude change, intergroup processes, multi-actor interaction, small groups, and organizational behavior. Required course for all students in the social psychology graduate program.

281. Research Methods In Social Psychology. (3) Three hours of lecture per week. Survey of various research methodology courses and seminars 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.

289. Social Seminar. (1) Course may be repeated for credit. One and one-half hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. 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 course for all students in the social psychology graduate program.
Public and Nonprofit Management

The Interdisciplinary Program in Public and Nonprofit Management was terminated as of June 30, 1992. The School of Public Policy and the School of Business Administration currently have the lead in developing course work in public and nonprofit sectors management. Please call Professor John Elwood of Public Policy (642-4512) for information about courses in public management or Professor Frances Van Loo of Business Administration (642-4722) for information about courses in nonprofit management.

Graduate Courses

IDS 204. Animal Behavior Research Reviews. (1) Course may be repeated for credit. One and one-half hours of seminar per week. Prerequisites: Graduate standing; basic course in animal behavior; consent of instructor. Students will learn sampling and observation methods, recording formats, data analysis, and written presentation of observational data. Lecture and discussion will focus on comparative animal behavior. Animals will be those in the vertebrate colonies at the Field Station for Behavior Research. Sponsoring departments: Anthropology, Integrative Biology, and Psychology.

Graduate Courses

IDS 232A-232B. Understanding Families: Methods in Family Research. (1,1) Two hours of seminar every other week. Prerequisites: Consent of instructor. This seminar 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 relations, 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. Sponsoring departments: Psychology and Social Welfare.

IDS 236. Cognitive Science Research Discussion. (1) Course may be repeated for credit. One and one-half hours of seminar per week. Prerequisites: Graduate standing; satisfactory/unsatisfactory basis. Students will study research articles and discuss various methods of the presentation of psychological material. Discussion will be in a seminar format. The topics to be covered will be announced. (F, SP)

IDS 271. Seminar in Neuropsychology. (3) Course may be repeated for credit. Three hours of lecture and two hours of laboratory per week. Prerequisites: Consent of instructor. A laboratory introduction to the observational study of comparative animal behavior in a semi-naturalistic setting. Students will learn sampling and observational methods, recording formats, data analysis, and written presentation of observational data. Lecture and discussion will focus on comparative animal behavior. Animals will be those in the vertebrate colonies at the Field Station for Behavior Research. Sponsoring departments: Anthropology, Integrative Biology, and Psychology.

IDS 290. Thinking. (2) Two hours of seminar per week.
IDS 290. Perception. (2) Two hours of seminar per week.
IDS 290. Language and Communication. (2) Two hours of seminar per week.
IDS 290. Personality. (2) Two hours of seminar per week.
IDS 290. Biological. (2) Two hours of seminar per week.
IDS 290. Cognition. (2) Two hours of seminar per week.
IDS 290. Social. (2) Two hours of seminar per week.
IDS 290. Professional Courses

IDS 290. Instructional Methods of the Presentation of Psychological Material. (1) Course may be repeated for credit. One hour of lecture per week. Prerequisites: Consent of instructor. This course will emphasize skills, group dynamics, and barriers to controlling tobacco use. (F,SP) Novotory

Programs

For a description of programs in public health, see page 108.

Schoolwide Public Health Courses

Graduate Courses

282. Introduction to Community Oriented Primary Care. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: Consent of instructor. A laboratory introduction to the observational study of comparative animal behavior in a semi-naturalistic setting. Students will learn sampling and observational methods, recording formats, data analysis, and written presentation of observational data. Lecture and discussion will focus on comparative animal behavior. Animals will be those in the vertebrate colonies at the Field Station for Behavior Research. Sponsoring departments: Anthropology, Integrative Biology, and Psychology.

Advanced to candidacy; limited to clinical psychology graduate students or consent of instructor. Individual programs of practice and supervision in approved off-campus agencies. (F, SP)

Interdepartmental Studies Courses

Upper Division Courses

IDS 123. Animal Behavior Laboratory. (3) Course may be repeated for credit. One hour of lecture, three hours of laboratory, and one hour of discussion per week. Prerequisites: Biology 1 or 11; or Integrative Biological Science 31; or Anthropology 106; and/or consent of instructor. A laboratory introduction to the observational study of comparative animal behavior in a semi-naturalistic setting. Students will learn sampling and observational methods, recording formats, data analysis, and written presentation of observational data. Lecture and discussion will focus on comparative animal behavior. Animals will be those in the vertebrate colonies at the Field Station for Behavior Research. Sponsoring departments: Anthropology, Integrative Biology, and Psychology.

Public and Nonprofit Management

The interdisciplinary Program in Public and Nonprofit Management was terminated as of June 30, 1992. The School of Public Policy and the School of Business Administration currently have the lead in developing course work in public and nonprofit sectors management. Please call Professor John Elwood of Public Policy (642-4512) for information about courses in public management or Professor Frances Van Loo of Business Administration (642-4722) for information about courses in nonprofit management.

IDS 290. Thinking. (2) Two hours of seminar per week.
IDS 290. Perception. (2) Two hours of seminar per week.
IDS 290. Language and Communication. (2) Two hours of seminar per week.
IDS 290. Personality. (2) Two hours of seminar per week.
IDS 290. Biological. (2) Two hours of seminar per week.
IDS 290. Cognition. (2) Two hours of seminar per week.
IDS 290. Social. (2) Two hours of seminar per week.
IDS 290. Professional Courses

IDS 290. Instructional Methods of the Presentation of Psychological Material. (1) Course may be repeated for credit. One hour of lecture per week. Prerequisites: Consent of instructor. This course will emphasize skills, group dynamics, and barriers to controlling tobacco use. (F,SP) Novotory

Programs

For a description of programs in public health, see page 108.

Schoolwide Public Health Courses

Graduate Courses

282. Introduction to Community Oriented Primary Care. (3) Two hours of lecture and three hours of laboratory per week. Prerequisites: Consent of instructor. A laboratory introduction to the observational study of comparative animal behavior in a semi-naturalistic setting. Students will learn sampling and observational methods, recording formats, data analysis, and written presentation of observational data. Lecture and discussion will focus on comparative animal behavior. Animals will be those in the vertebrate colonies at the Field Station for Behavior Research. Sponsoring departments: Anthropology, Integrative Biology, and Psychology.
Interdepartmental Studies Courses

Upper Division Courses

IDS 114A-114B. Advances in Aging: Alzheimer's Disease; Biological and Social Dimensions. (2,2) Two hours of 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, topics for Intervention) and present lectures on all aspects of each topic (biomedical, health, socio-economic, legal and ethical). Invited speakers with special expertise in these areas will participate. Sponsoring departments: Sociology, Social Welfare, Public Health, and Molecular and Cell Biology.

IDS 119. Multidisciplinary Studies and Field Experience in Aging. (2) Two hours of seminar per week for seven weeks and six hours of fieldwork. Prerequisites: Upper division or graduate student and consent of instructor. Study of adults 70 years and over. Students will visit older patients from local geriatric clinic and confer with clinic staff. One-hour weekly seminar consists of lecture on aging by faculty from specific discipline. Other hour is devoted to case presentation by student on a patient's condition. Course grade based on student participation and final paper demonstrating understanding of interdisciplinary nature of aging and caring for older people. Sponsoring departments: Sociology, Social Welfare, Public Health, and Molecular and Cell Biology. (F)

IDS 191. Public Health and Nuclear War. (2) 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 throughout the lecture, discussion, and directed readings include the physical and medical effects of nuclear detonation, as well as the economic, psychological, and health dimensions of deterrence, controllability, and cost of destruction. A course resolution and other preventive measures will be explored and tested. Sponsoring departments: Public Health and PACS.

Programs

For a description of programs in public policy, see page 107.

Lower Division Courses

6. Freshman-Sophomore Seminar. (3) Three hours of seminar. Prospective candidates must present themselves to the instructor for consideration. Examines a variety of current public policy problems in the political, social, and economic areas, and proposals to solve them, e.g., reforms of the political process, racial or gender equity, attention will be paid to both the substance of the policy problem and ways to evaluate alternative solutions. Topics will vary from year to year. Open to freshmen and sophomores.

7. Consult the Freshman Seminar brochure for current topics. (SP)

Note: Students interested in Public Policy 6 must talk to instructor before course registration.

10. Contemporary Policy Issues and Controversies. (3) Two hours of lecture and one hour of discussion per 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) Three hours of seminar per week. Freshman-Sophomore Seminar. This course will trace the evolution of the modern American university from its medieval and colonial origins. Special attention will be given to its modes of organization, governance and finance, its patterns of student life and subcultures.

Upper Division Courses

101. Introduction to Public Policy Analysis. (3) Three hours of lecture per week. $68A. A systematic and critical approach to evaluating and designing public policies. Combines theory and application to particular cases and problems. Diverse policy topics, including environmental, health, education, communications, safety, and arts policy issues, among others. (FSP) Bardach

108. Arts and Cultural Policy. (3) Three hours of lecture per week. Survey of government policy toward the arts (especially direct subsidy, copyright and regulation, and indirect assistance) and its effects on artists, audiences, institutions, and public policy. Other topics may include foreign relations, US policy, and the social and economic roles of participants in the arts. Readings, field trips, and case discussion. (SP)

160. Civil Rights, Courts and the Policy Process. (3) Three hours of lecture per week. An examination of the role of judges and courts in making policy about civil rights. Actual court decisions and records will be reviewed to determine what a civil right is, to see how courts get involved in creating and defining civil rights, to consider the limitations on courts as policy makers in this area, and to discuss how judges and courts could be more effectively related to the making of civil rights policy. (F)

161. Policy on Inner-City Poverty and Unemployment. (3) Three hours of lecture per week. Examines problems of inner-city poverty and unemployment. Reviews policy-making process in this area, and past and present policy responses to the problems. More effective policies, drawing on a mix of theoretical experiences and national perspectives, will be considered.

162. Women's Rights and Public Policy. (3) Three hours of lecture 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.

163. Strategies in Using the Governmental Process. (3) Three hours of lecture per week. Exploration of the strengths 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 resolve current socioeconomic policy problems. Policy conflicts in such areas as workforce, abortion, child care, two-fer wages, comparable worth, minimum wage, trangate and constitution of Supreme Court Justices, will be examined. (F)

164. Impact of Government Policies on Poor Children and Families. (3) Three hours of lecture 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 tax programs; housing; health care; and child abuse. (F)

165. Women's Rights and the Economy. (3) Three hours of lecture per week. Deals with gender equity since suffrage. Examines correlations between economic conditions in the U.S. and the prospects for advancing women's rights. Primary focus will be on legislation relative to women in the labor force; access to jobs and education; equal pay; pension disability; child care and community issues. (SP)

166. Science and Technology Policy: Values in Conflict. (3) Three hours of lecture 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 policy questions will be examined, as well as specific issues including nuclear technologies, the computer revolution, and biotechnology. (SP)

167. Regulating New Technologies. (3) Three hours of lecture per week. This course addresses the student with a basic understanding of the political and economic reasons for traditional regulation, the regulatory institutions and processes. It then introduces the student to new public policy issues in a variety of industries which are driven by change in technology. These issues question the institutions responsible for regulation and ask whether the institution and traditional tools are capable of addressing public policy issues in the future. (SP)

168. Political Communications and Public Policy. (3) Three hours of seminar per week. Prerequisites: Open to upper-division undergraduates and graduate students with consent of instructors. Explores the interdependent relationships between the media and political behavior. Emphasis will be placed on the process of making decisions. Focus will be on getting their political 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. (SP)

169. Contemporary Issues in the American Political Economy. (3) Three hours of lecture per week. Prerequisites: Economic Analysis, Political Economy, or Introduction to International Economics. Survey of several major economic issues of the 1980s, including supply-side economics; the federal deficit and its implications; new technologies and their effects on growth and employment; financial markets; the horizontal and vertical integration of income; and recent trends in social policy. The course will emphasize a nontraditional understanding of the economic issues involved, as well as the historical and political background of these issues. (SP)

170. The Moral Challenge of Public Action. (3) Three hours of lecture per week. Those who seek to serve the public's multiple and often contradictory interests are constantly confronted with questions of what is morally responsible. In trying to resolve some of those questions, this course provides reflection on the challenges and responsibilities of policy-making in a democracy. Using case studies ranging in importance from clear reasoning about the values involved in public
171. Educational Governance and Policy-Making. (3) Three hours of lecture/discussion per week. Examines how educational policy is made and who becomes involved in the enterprise. Case histories of such matters as the education voucher, decentralization, teacher collective bargaining and financing public schools are discussed. These cases illustrate the elements of policy-making including formulating issues, collection of data, anticipating implementation problems.

172. Health Care Policy Analysis. (3) Three hours of lecture per week. This course examines problems which arise in the design and implementation of health care policy. It will focus primarily around the institutional and cost issues of U.S. health care policy. Emphasis will be placed upon contemporary health policy issues and in-depth analysis of alternative proposals for reform. This will be accomplished by drawing upon recent health services and health policy research. (SP) Krip

173. Acquired Immune Deficiency Syndrome (AIDS) and Public Policy. (3) Three hours of lecture per week. AIDS poses important and pressing challenges for rapid and nonincremental responses by public policymakers. The issues discussed will include such topics: What have policy responses been influenced by the fact that most victims belong to socially disadvantaged groups? What local public health strategies are being used? What has been the role of the U.S. government in the AIDS policy debate? Are there ethical and moral questions that face policymakers and the public? How can the ethical and moral questions be addressed in public policy? These and other related questions will be addressed in this course. (SP) Krip

174. Issues in Environmental Policy. (3) Three hours of lecture per week. Prerequisites: An introductory course in environmental science (environmental science, geology, or environmental studies). Students will be introduced to the basic concepts of environmental policy and the role of science in policy-making. This course will examine the role of science in the development of environmental policy, the relationship between science and policy, and the role of scientific knowledge in policy-making. (SP) Krip

175. Making Legislative Policy. (3) Three hours of lecture per week. Practical factors influencing government policy in Sacramento. Effect of constituents, legislators, lobbyists, the media, the Administration, local government, and labor and management on legislation. Different policy topics include selected environmental and local issues, the current tax revolt and the budget process.

176. Quantitative Approaches to Policy Analysis. (3) Three hours of lecture per week. Introduces students to a set of quantitative tools used in examining policy issues and discusses what constitutes an appropriate role for analysis in policy-making. Techniques covered include computer modeling, decision theory, and cost-benefit analysis. Case studies present students with realistic problems and examples.

177. Public Policy-Making Issues in California: An Introductory Course. (3) Three hours of lecture per week. This course examines public policy-making in California by applying concepts such as advocacy vs. analysis; incrementalism vs. pluralist decision-making leadership, and centralization/democratization of structural and political issues to the topical areas of education, health, physical infrastructure and technology. Budgetary, administrative, legislative and judicial aspects of policy-making are reviewed and assessed.

178. Public Policy-Making Issues in California: An Advanced Course. (3) Three hours of lecture per week. This course examines public policy-making in California by applying concepts such as advocacy vs. analysis; incrementalism vs. pluralist decision-making leadership, and centralization/democratization of structural and political issues to the topical areas of education, health, physical infrastructure and technology. Budgetary, administrative, legislative and judicial aspects of policy-making are reviewed and assessed.

179. Public Policy, Budgeting. (3) Three hours of lecture per week. The role of public budgeting in an agency and how it affects policy-making is explored. This course covers issues such as: government budgeting, the budgeting process, and the relationship between budgeting and policy-making. Students will be introduced to the budgeting process and how it relates to policy-making. They will also be introduced to the role of budgeting in shaping policy, and how budgeting decisions can affect policy-making. (SP) Ellwood

181. Energy Policy. (3) Three hours of lecture per week. This course examines the role of energy policy in the development of America's "energy problem" especially policy choices affecting energy demand and conservation, energy supply and exploitation of finite energy resources and the role of alternative renewable energy sources such as solar and wind power. Solar subsidies, building and appliance efficiency standards, the strategic petroleum reserve, accelerated development of western coal and other policies will be examined.

182. Political Skill In The Making of Public Policy. (3) Three hours of lecture 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 actual regulatory and reauthorization structures. Focused on professional and citizen activist roles.

183. Developing, Implementing and Evaluating Social Policies and Programs. (3) Three hours of lecture per week. An examination of the substance of various American current social policies and programs, such as those in the area of day care, family and drug treatment. Special attention will be given to those policies and programs developed and in problems in implementing and evaluating them effectively.

184. The Economics of Public Program Solving. (3) Three hours of lecture per week. Prerequisites: Economics 100A or 101A or equivalent. Lectures will cover extensions and applications of microeconomic theory as required for use in economic analysis of public programs and policies. Students will learn to apply microeconomic theory to analyze the economic consequences of policies. Techniques will be drawn from diverse policy applications: welfare reform, national health insurance, public employment, energy shortage, public regulation and others.

185. An Introduction to the Politics of Policy Administration. (3) Three hours of lecture per week. Starting with an overview of policy-making processes in the U.S., this course examines the functions of advice, which provides the basis for policy formulation, the role of political parties, and the role of interest groups. Emphasis will be placed upon the role of political parties in the policy process, the role of interest groups in policy-making, and the role of political parties in the policy process. (SP) Krip

186. Equal Opportunity, Affirmative Action, and Public Policy. (3) Three hours of lecture per week. An examination of the conflicts of values and interests in equal opportunity policy, with emphasis on affirmative action, minoritv admissions in higher education and the policy controversies embodied in recent court cases. The role of the courts and the political process in the determination of such policies will also be considered.

187. Legal Institutions and Public Policy. (3) Three hours of lecture per week. Issues of public policy are increasingly resolved by the judiciary. How does judicial policy-making differ from policy-making as carried out elsewhere in government? How has the involvement of the courts in issues of public policy changed over time? Which issues were the courts more likely to rule on? The course will consider the role of the courts in public policy-making. (SP) Krip

188. Policy Issues in Urban and Industrial America. (3) Three hours of lecture per week. Prerequisites: Math 1A-B and Economics 102A or consent of instructor. This course will cover the following topics: (1) Urbanization; the history and description of the city, the growth and decline of the city, and the role of government in the city. (2) Industrialization: the growth and decline of the industry, the role of government in the industry, and the role of government in the industry. (3) The Consumer Product Safety: We will discuss the origins of the consumer product safety movement, and the role of government in the consumer product safety movement. (4) Hazardous Wastes: We will examine the development of the hazardous wastes movement, and the role of government in the hazardous wastes movement. (SP) Ellwood

189. Ethnic Diversity and Public Policy. (3) Three hours of lecture per week. Prerequisites: Upper division eligibility. This course explores the role that ethnically diverse values and interests play in shaping policy issues, such as immigration reform, multicultural education, and affirmative action. In analyzing these issues, it uses the perspectives of three

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

190. Directed Group Study. (4) Course may be repeated. Prerequisites: Consent of instructor. Group study of a selected topic or topics in Public Policy. Meetings to be arranged and attendance at four advanced colloquia throughout the term. (SP) O'Hare

191. Introduction to Public and Nonprofit Management. (3) Three hours of seminar per week. Studio/labatory in the design of non-profit organizations. Emphasis on policy analysis, public management, and political science. Especially intended to integrate elements of professional programs in public policy and related areas. Students will design, in groups and individually, programs and projects for public and nonprofit organizations, including the public sector, including statutes, regulations, and implementation projects. Comparative reviews will feature invited guests. (SP) O'Hare

192. Introduction to Public and Nonprofit Management. (3) Three hours of seminar per week. Seminar on special topics according to student interest. (SP) O'Hare

193. Arts and Cultural Policy. (3) Three hours of lecture per week. This course examines the role of government in the arts (especially direct subsidy, copyright and regulation, and indirect assistance) and its effects on artists, audiences, and institutions. Emphasizes "highbrow" arts, US policy, and the social, cultural, and political impact of various arts on society. Seminars will be based on a critical examination of significant policy issues and events in the arts. Readings, field trips, and case discussions. One paper in two drafts required for undergraduate credit; graduate credit awarded for an additional short paper to be arranged and attendance at four advanced colloquia throughout the term. (SP) O'Hare

194. Directed Group Study. (4) Course may be repeated. Prerequisites: Consent of instructor. Group study of a selected topic or topics in Public Policy. Meetings to be arranged and attendance at four advanced colloquia throughout the term. (SP) Green

195. Directed Group Study. (4) Course may be repeated. Prerequisites: Consent of instructor. Group study of a selected topic or topics in Public Policy. Meetings to be arranged and attendance at four advanced colloquia throughout the term. (SP) Green

196. Directed Group Study. (4) Course may be repeated. Prerequisites: Consent of instructor. Group study of a selected topic or topics in Public Policy. Meetings to be arranged and attendance at four advanced colloquia throughout the term. (SP) Green

197. Directed Group Study. (4) Course may be repeated. Prerequisites: Consent of instructor. Group study of a selected topic or topics in Public Policy. Meetings to be arranged and attendance at four advanced colloquia throughout the term. (SP) Green

198. Directed Group Study. (4) Course may be repeated. Prerequisites: Consent of instructor. Group study of a selected topic or topics in Public Policy. Meetings to be arranged and attendance at four advanced colloquia throughout the term. (SP) Green

199. Directed Group Study. (4) Course may be repeated. Prerequisites: Consent of instructor. Group study of a selected topic or topics in Public Policy. Meetings to be arranged and attendance at four advanced colloquia throughout the term. (SP) Green

200. Directed Group Study. (4) Course may be repeated. Prerequisites: Consent of instructor. Group study of a selected topic or topics in Public Policy. Meetings to be arranged and attendance at four advanced colloquia throughout the term. (SP) Green

201. Directed Group Study. (4) Course may be repeated. Prerequisites: Consent of instructor. Group study of a selected topic or topics in Public Policy. Meetings to be arranged and attendance at four advanced colloquia throughout the term. (SP) Green

202. Directed Group Study. (4) Course may be repeated. Prerequisites: Consent of instructor. Group study of a selected topic or topics in Public Policy. Meetings to be arranged and attendance at four advanced colloquia throughout the term. (SP) Green
course is to develop and hone these skills. Using cases and readings from all levels of American government, the course will allow the student to gain an understanding of the effects and consequences of public sector budgeting, its processes and participants; and the importance of governmental budgeting. Graduate level of Public Policy 179. (SP) Ellwood

210A-210B. The Economics of Public Policy Analysis. (4) Three hours of lecture/discussion and one hour of session per week. Prerequisites: Open only to students in the Graduate School of Public Policy. The ories of microeconomic behavior of consumers, producers, and bureaucrats are developed and applied to specific policy areas. Ability to analyze the effects of alter- native policy actions in terms of 1) the efficiency of resource allocation; and 2) equity is stressed. Policy ar- eas are selected to show a broad range of actual ap- plications of theory and a variety of policy strategies. (F,SP) Friedman, Banker

220. Law and Public Policy. (4) Four hours of lec- ture/discussion per week. Prerequisites: Open only to students in the Graduate School of Public Policy. The course examines the political and organizational factors involved in developing new policies, choosing among alternatives, gaining acceptance, assuring im- plementation, and coping with unanticipated conse- quences. Materiales will include case studies, theoretical, empirical, and interpretive works from several disciplines. (F,SP)

240A-240B. Decision Analysis, Modeling, and Quantitative Management. Four hours of lecture per week. Prerequisites: Open only to students in the Graduate School of Public Policy. An Integrated course on the use of quantitative techniques in public policy analysis, planning, and management. Includes the use of large-scale econometric models to analyze policy-relevant data. The course develops a facility in distilling the policy role of numbers through an analysis of case studies and statistical data sets. (F,SP)

Graduate Courses

250. Political and Organizational Environment of Policy Analysis. (3) Three hours of lecture per week. This course is intended for students not in the Gradu- ate School of Public Policy interested in developing skills in relating political and organizational factors to the analysis of public policy. Explores political feasibility, especially the ways in which political and organiza- tional constraints are defined, and the implementation of alternative policies. Attention is given to the political role of the analyst, planner or adviser. (F)

251. Microeconomic Organization and Policy Analysis. (3) Two hours of seminar and one hour of confer- ence per week. Prerequisites: Business Administra- tion 220 or equivalent, and consent of Instructor. Research seminar to develop public policy analyses based on microeconomic the- ories of organization, including collective demand mechanisms, behavioral theory of regulatory agencies and bureaucracies, and productivity in the public sec- tor. (F) Friedman

252. The Politics of Policy Advising. (3) Three hours of seminar and one hour of conference per week. An examination of the political environment sur- rounding policy analysis and the application of analy- tical information to policy-making. By exploring the interac- tions of clients and advisers, engineers, planners, policy analysts, and other professionals, we will be in a better position to assess the likely effectiveness of their advising. Ellwood

253. Methods of Policy Evaluation. (3) Three hours of seminar per week. Prerequisites: Consent of In- structor. This course covers several different methods of evaluating public programs. The first part will cover the descriptive issue of whether programs have their intended effects. The second part will focus on impact evaluation, concentrating on different evalu- ation designs. The second part of the course will cover normative approaches, especially cost-benefit analy- sis. The course will examine the political influence of evaluation results. (SP)

254. Organizational Analysis and Public Policy. (3) Three hours of lecture per week. Prerequisites: Consent of Instructor. Examines organizations as instru- ments of public policy and as influences upon the def- inition of public policy. Both normative and analytical approaches are discussed with a variety of case studies. (SP)

255. Advanced Quantitative Models in Policy Analy- sis. (3) Three hours of lecture per week. Prerequi- sites: Consent of Instructor. Examination of the appli- cation of static and dynamic models to allocation, organization and implementation problems in the public sector. Focus is on the use of theoretical perspectives and case studies. Specific consideration is devoted to organizational effectiveness and problems of organizational design and reorgani- zation. (SP)

256. The Public Policy of Economic Stabilization and Growth. (3) Three hours of session per week. Prerequisites: Consent of instructor. Formerly 256 and former Public Administration 220. Applications of microeco- nomics, 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)

257. Implementation and the Policy Process. (3) Three hours of seminar per week. Prerequisites: Consent of instructor. This course concentrates on the process of implementing new public policy and the problems resulting from the implementation process itself. The seminar will address the role of the public sector in the policy process and the potential impacts of various reforms. Graduate students will be exposed to a multiprofessional teaching approach. Using cases and readings from all levels of American goy- ernment, the course will allow the student to gain an understanding of the effects and consequences of public sector budgeting, its processes and participants; and the importance of governmental budgeting. Graduate level of Public Policy 179. (SP) Ellwood

258. The Elusive Pursuit of Toxics Management. (3) Three hours of seminar per week. Addresses the complicated governmental and public responses to evolving toxics issues, from Love Canal and Bhopal to the present. We will examine policy questions stemming from recent technological innovations. (SP)

259. Cost-Benefit Analysis. (3) Three hours of seminar per week. Prerequisites: Business Administra- tion 220 or equivalent, and consent of Instructor. This course develops an understanding of the cost-benefit analysis technique and its role in public policy making. Includes the use of large-scale econometric models to analyze policy-relevant data. The course develops a facility in distilling the policy role of numbers through an analysis of case studies and statistical data sets. (F)

260. International Comparative Study of Science and Technology Policy. (3) Three hours of seminar per week. This course will analyze industrial and sci- ence policy from international perspective. It will pro- vide theoretical foundations to understanding public policy's role in science and technology, and assess case studies to determine the benefits, science and policy implications of the role of government in science and technology. (SP)

261. Policy in Higher Education. (3) Three hours of seminar per week. This seminar will explore current problems and issues in higher education, with attention to the forces that shape public policy in this area. Topics will include the history and structure of higher education, its political context, fi- nance, function, and governance. (SP)

262. California Energy and Coastal Protection Pol- icy Analyses. (3) Three hours of seminar per week. This seminar explores the role of ideologies, the pro- fessions, the decision-making process, and analysis in the California Coastal, Public Utilities, and Coastal Commission. Case studies familiarize students with the agencies and with useful analytical and management techniques involving, for example, costs of nuclear power plants, offshore oil drilling, non- nuclear electricity generation, and deregulation of natu- ral gas and telecommunications services. (SP)

263. Seminar in Mass Communication Policy. (3) Three hours of lecture per week. Prerequisites: Consent of Instructor. Examination of selected public pol- icy issues involved in the regulation and operation of the mass media. Particular attention will be directed at policy questions stemming from recent technological innovations. (SP)

264. Striving for Quality in Public Management. Three hours of seminar per week. Using case ma- terials and current governmental policy issues to improve the performance of various public agencies. Cases are drawn from a variety of policy areas, but emphasize public health, education, social services, law enforcement, and management. (F) Bardach

265. Policies for Youth. (3) Three hours of seminar per week. Prerequisites: Consent of Instructor. This seminar deals with the transition between youth and adulthood in advanced industrial societies. The seminar will consider some of the problems associated with these transitions, and public and private efforts that might be made by public and private agencies to deal with these problems in the U.S. and abroad. (SP) Maudon

266. Health Policy in the Public and Private Sec- tors. (3) Two hours of session per week. Prerequi- sites: A course in microeconomic theory or health eco- nomics. An examination of health in the market and the role of the private market. Topics In- clude health care finance and insurance, profit and nonprofit health care institutions, and the adequacy of the supply of health care professionals. (SP)

267. Constitutional Law and Limits of Power. (3) Three hours of seminar per week. Prerequisite: Consent of Instructor. This seminar will examine the structure of the Constitution and the limits on governmental power and the effect of the federal and state governments. (SP)

268. Environmental Policy and Regulation. (3) Three hours of seminar per week. Prerequisites: Consent of instructor. This seminar will examine and analyze the developing world from political, organizational, and regulatory perspectives. Special emphasis is placed on the role of government in the control of pollution, especially as it relates to the development of new and existing technologies. (SP)

269. Policy Analysis in an International Setting. (3) Three hours of lecture per week. Prerequisites: Basic Political Science and Economics. This course will ex-amine and analyze the developing world from political, organizational, and regulatory perspectives. Special emphasis is placed on the role of government in the control of pollution, especially as it relates to the development of new and existing technologies. (SP)

270. Scientific Evidence and Public Policy. (3) Three hours of seminar per week. Examination of the role of scientific evidence in formulating and carrying out public health policies. Discussion of how uncer-
281. Production and Operations Management in the Public Sector. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. Public and nonprofit organizations depend on production processes that range from assembly line to custom "craft" projects. Students in this course will learn not only basic scientific and modern management methods can improve this production, but how to better manage and design service and product operations. Case discussion in class; and statistical/operations analysis using conventional spreadsheet software. (F) O'Toole

282. Financial Management in the Public Sector. (3) Three hours of lecture per week. Prerequisites: Consent of instructor. As in the private sector, financial analysis and assessment of controlling public sector and nonprofit organizations. This course introduces fund accounting methods and then examines critical management challenges in government and nonprofit sectors, emphasizing the financial dimensions of these, standard tools for administration of funds, and the use of finance as a means of balancing present choices and future needs. (SP) Ellwood

283. Organizational Decline and Turnaround Management. (3) Three hours of seminar per week. Prerequisites: Consent of instructor. Examines how organizations behave when faced with resource cutbacks. An analysis of differences in the response of public and private sector to financial stress, with attention to the threat posed by organizational decline to traditional pluralistic politics. Case studies will be drawn from a variety of sources: the experiences of New York City's fiscal crisis of 1975-76 and the behavior of local governments in California following passage of Proposition 13.

284. Financial Innovation and Public Policy. (3) Three hours of seminar per week. An examination of the impact of public policy on the nation's rapidly changing financial markets. Selected cases of private markets under public regulation will be studied, including regulatory issues in the venture capital market, the development of alternative mortgage instruments, the investment of public funds in other areas of public intervention in the allocation of capital.


286. The Uses and Abuses of Social Science in Social Policy Making. (3) Three hours of seminar per week. Examinations of applications of social science research in social policymaking by government through case materials in the field of human resources as policy. Linkages between research and policy-making and the dissemination and application of research findings will be emphasized.

287. Directed Advanced Study. (1-12) Course may be repeated for credit. Open to qualified graduate students wishing to pursue special study and research under direction of a member of the staff. (F,SP)

288. Supervised Research Colloquium. (1-9) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing. Open to qualified graduate students wishing to pursue supervised research under direction of a member of the staff. Discussion and analysis of dissertation research projects, including conceptual and methodological problems of designing and conducting policy research. (F,SP)

289. Directed Advanced Study. (1-12) Course may be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Be a Ph.D. student in Public Policy in third year or beyond. Students are expected to have varied educational backgrounds with a biological or resource management bachelor's degree. Programs are individually developed in consultation with the graduate academic advisor to meet personal standards for rating as a range conservationist, satisfy the Society for Range Management's educational requirements for certified rangeland managers, or fulfill professional and educational needs of students who have taken courses in the discipline of rangeland science. Students work with an interdisciplinary faculty actively involved in basic and applied research on a variety of topics including rangeland ecology, land restoration, plant animal interactions, and resource policy.

290. Independent Study for Professional 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 requirements for the doctoral degree. (F,SP)

Range Management
(Office of Natural Resources, Interdepartmental Graduate Groups)


Lynn Hurting, Ph.D. (Forestry and Resource Management) Forest ecology and silviculture.

Graduate study in range management prepares students for professional careers, research, or further graduate work. Students are expected to have varied educational backgrounds with a biological or resource management bachelor's degree. Programs are individually developed in consultation with the graduate academic advisor to meet personal standards for rating as a range conservationist, satisfy the Society for Range Management's educational requirements for certified rangeland managers, or fulfill professional and educational needs of students who have taken courses in the discipline of rangeland science. Students work with an interdisciplinary faculty actively involved in basic and applied research on a variety of topics including rangeland ecology, land restoration, plant animal interactions, and resource policy.

Student Advisory Committee:
Barbara Allen-Diaz, Ph.D. (Forestry and Resource Management) Rangeland ecology and management.

Assistant Professors:

Cara D'Antonio, Ph.D. (Integrative Biology) Plant population biology.

Lynne Ringer, Ph.D. (Forestry and Resource Management) Range and animal ecology.

Mary E. Power, Ph.D. (Landscape Architecture) Geography, geographical information systems in landscape analysis and environmental planning.

John D. Radke, Ph.D. (Landscape Architecture) Geography, geographical information systems in landscape analysis and environmental planning.

Specialists:

Richard B. Starlford, Ph.D. (Forestry and Resource Management) Wildland ecosystems and management.

Graduate Adviser: Mr. Bartolome.

Graduate study in range management prepares students for professional careers, research, or further graduate work. Students are expected to have varied educational backgrounds with a biological or resource management bachelor's degree. Programs are individually developed in consultation with the graduate academic advisor to meet personal standards for rating as a range conservationist, satisfy the Society for Range Management's educational requirements for certified rangeland managers, or fulfill professional and educational needs of students who have taken courses in the discipline of rangeland science. Students work with an interdisciplinary faculty actively involved in basic and applied research on a variety of topics including rangeland ecology, land restoration, plant animal interactions, and resource policy.

"On leave, spring, fall" indicates that the professor is on leave during those terms.

"Recalled to active service" indicates that the professor is recalled to active service.

"recipient of distinguished Teaching Award" indicates that the professor has been awarded this distinguished teaching award.
Religious Studies

Group Major Office: Division of Undergraduate and Interdisciplinary Studies, 301 Campbell Hall, 642-6984

Advisory Committee: Daniel Boyarin, Chair (Near Eastern Studies); Robert Bellah (Sociology); William D. Sanders (Philosophy); Lloyd E. Risser (Eminents), William Brinn (Near Eastern Studies, Emeritus), Hubert Dray-

fus (Philosophy), Susanna Elm (History), Eirich Gruen (History), Linda Hess (South/ Southeast Asia Studies), Steven Knapp (English), Lewis Lancaster (East Asian Languages), William Simms (Anthropology). Student Affairs Officer: Marty Gaetgens (Undergraduate and Interdisciplinary Studies, 301 Campbell Hall, 642-6984).

Group Major in Religious Studies

The religious studies major provides opportunities for securing a broad background in the liberal arts while at the same time allowing for a focus on a thematic concern or a particular religious tradition. 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 theology nor 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, religious organizations, 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 philosophy of religion and courses that examine the thematic tradition or cultural phenomena such as myth, ritual, transformative experience, and comparative ethics. The religious traditions that may be included as major fields of emphasis or as supplementary 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 religion-related courses taught within each department as history, sociology, and near eastern studies. As a supplement to these courses, the program offers a smaller number of courses sponsored by religious studies, including thematic topics of religion and introductory courses (i.e., several courses 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 transcript. GTU courses cover 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 by the School of Undergraduate Studies. Students are referred to that office for all 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 158 (Religious Studies), Philosophy 126 (Phil-

osphy of Religion), Sociolgy 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 (Mystical Traditions 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 student affairs officer 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 upper division courses available in religious traditions include the following:

Bethlehem: East Asian Languages (Chinese) 120, 122, 120, South Asian 130, Additional courses: East Asian Languages (Chinese) 140, South Asian 127, 140, 140, Recommended: Students intending to do graduate work in Bethlehem should study Tibetan, Chinese, Sanskrit, Tamil, or Hindi.


Christianity: Religious Studies 120A, or History 185A, Religious Studies 120B or History 156A, History 185B or 156B, Religious Studies 115, Additional courses: (Greek) 105, English 107, English 110A-110B, History 108, Italian 109A- 109B, Italian 130, Near Eastern Studies 131, 132, 134, Philosophy 152, 182, 184, Religious Studies 190 (when topic is Christian), Recommended: Students intending to do graduate work in Christianity should study Latin, Greek, or German.

Minor Program: Students in the College of Letters and Science may complete one or more minors of their choice, normally in a field both academically and administratively distinct from their major. Students wishing to receive a minor in religious studies must register in the group major office and work out a plan of study with an adviser. Students must take Religious Studies 10A and 10B and five upper division courses chosen from the approved list on file in the group major office. All courses must be completed on a letter-grade basis. A minimum of three of the five upper division courses must be completed at Berkeley, and a minimum overall grade-point average of 2.0 is required.

Honors Program: Students may elect to attempt graduation with honors if they have done well in both general university work and the major courses at the beginning of their senior year. Required are upper division work in a language relevant to the student's academic program (with consent of adviser) and the submission of a bachelor's thesis as a culmination of one or two semesters of the sequence, Religious Studies H195A-H195B. The thesis must be approved by both the adviser and the student's thesis director, if these are different.

Lower Division Courses

90A-90B. Introduction to Religious Studies. (4-4) Three hours of lecture per week. Two-semester sequence designed as a survey of major religious traditions and an introduction to major themes in the comparative study of religions. Methodological and theoretical issues in the history and study of religion will be introduced with the exploration of intercultural religious phenomena such as ritual, myth, the concept of the sacred, religious community, and ethical guidance. (F,SP) Staff

Upper Division Courses

104. Babylonian Religion. (3) Three hours of lecture per week. A survey of Babylonian religious beliefs and practices based on indigenous texts and monuments. Also listed as Near Eastern Studies 104 and IDS 104. (F,SP) Staff

115. Mysticism. (3) Three hours of lecture per week. Studies in the literature and poetry of various mystical traditions, including readings of scripture, lyrical poetry, spiritual discourse, autobiography, etc. The relationship of several forms of mysticism to their religious traditions will be treated. Staff

120A. Origins of Christianity. (4) Three hours of lecture and one hour of discussion per week. Prerequi-

sites: 90A or 90B, History 4 or consent of instructor. Variables of early Christianity. Conflicts of interpretation of both Old Testament and Christian message; Marcon; the Gnostics; virginity-martyrdom; radical prophecy; the idea of heresy. (F) Elm

120B. Origins of Christianity. (4) Two hours of lecture and two hours of seminar per week. Prerequi-

sites: 90A or 90B, History 4 or consent of instructor. Variables of early Christianity. Conflicts of interpretation of both Old Testament and Christian message; Marcon; the Gnostics; virginity-martyrdom; radical prophecy; the idea of heresy. (F,SP) Staff

130. Introduction to Judaism. (4) Three hours of lecture and one hour of discussion per week. Prerequi-

sites: 90A or 90B or consent of instructor. The nature of classical Judaism, its major cultural and intellectual expressions in the Middle Ages, and transformations in the modern era. (SP) Boyarin

190. Topics in the Study of Religion. (3) Course may be repeated for credit. Three hours of lecture per week. Selected topics or problems in the study of religion. (F,SP) Staff

H195A-H195B. 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) Staff

198. Directed Group Study. (1-4) Course may be re-

peated for credit. Independent study. Must be taken on a passed/not passed basis. Tutorial instruction in areas not covered by regularly scheduled courses. (F,SP) Staff

199. Supervised Independent Study. (1-4) Course may be repeated for credit. Independent study. Must be taken on a passed/not passed basis. (F,SP) Staff
Rhetoric (College of Letters and Sciences)

Department Office: 2125 DeWitt Hall, 642-1415

Professors: Anthony J. Cascardi, Ph.D. Harvard University, Philosophy; Carol J. Clore, Ph.D. University of California at Berkeley, Oral literature and theory, medieval literature, film and video; David Cohen, Ph.D. Cambridge University, J.D. University of Pennsylvania, Classical rhetoric, rhetoric and language; Evelyn Fox Keller, Ph.D. Harvard University, Science, feminist, women's studies

Arthur J. Quinn, Ph.D. Princeton University, Philosophy; Anthony J. Cascardi, Ph.D. Harvard University, Philosophy; Todd G. Willy (Emeritus), Ph.d. University of Iowa. The study of texts and communicative events of all kinds, including film, history, law, literature, oral traditions, religion, philosophy, political theory, and science. Students learn a range of theories and methodologies, with which to approach public discourse. Classical traditions of rhetoric assume an act of communication that involves a personal voice and a concrete audience; modern theories of interpretation often question the very notion and applicability of this communicative model, concentrating instead on textual strategies and the institutional context of discourse. The department's undergraduate program aims to educate students to be sophisticated readers of argumentative and narrative discourses as well as of law, politics, journalism, religion, and science. Students in the major progress from the basic study of the nature of argument and interpretation to the study of specific historical periods and of rhetoric and then complete their work with refinement of both in courses, focusing on the analysis of texts.

Major Program

Students who entered the program before fall 1991 and have not taken Rhetoric 10 offered beginning fall 1991 should check with the department regarding requirements for the major and minor. Note: Rhetoric 10 offered fall 1991 and thereafter is NOT equivalent to Rhetoric 1B.

Undergraduate courses in rhetoric are grouped into three categories: Argument; Narrative, and Law, Politics, Journalism, Religion, and Science. As of fall 1991, students must fulfill the following requirements for the major: six courses numbered 10, 100, 101, and five additional upper division courses, which must include at least one course from each of the three categories.

I. Argument. These courses explore the philosophical basis of rhetoric practice and familiarize the student with the history of Western and non-Western intellectual traditions from the Classical period to our own time and/or focus on refining the rhetorical skills introduced in lower division courses: Rhetoric 10A-10B, 10C-10D, 10E-10F, 110J, 110A, 110D, 121A, 132, 137, 166, 177.

II. Narrative Discourse. These courses examine such text types as oral traditions, lyric poetry, history, the novel, and film, and consider, in part, the relation between rhetoric and culture: Rhetoric 121B, 122, 124, 125, 127, 128, 129, 135, 139, 138, 142, 156, 176, 178.


Rhetoric 10 must be completed with a grade of C- or better before declaring the major and is a prerequisite for all upper division courses unless otherwise specified. Rhetoric 30 must be completed by the end of the student's junior year. Rhetoric 100 and 101 should be completed during the student's junior year, before taking other upper division rhetoric courses. A grade of C- or better in courses 20 and 30 is required to receive credit toward completion of the major program. Rhetoric 10 is a prerequisite to 30.

Passed or Not Passed. No course taken passed or not passed may be used to satisfy a requirement for the major or minor.

Honors Program. A thesis is required of majors seeking the bachelor's degree with honors. Four units of credit (2 units each semester) for Rhetoric 1H90 may be applied toward graduation as upper division units and fulfillment of one major upper division elective. To receive honors in the major, candidates must complete the 4-unit honors thesis course with a grade of A- or better; have a grade-point average of 3.5 or better; take 10 upper division rhetoric courses, and have an overall grade-point average of at least 3.5.

Minor Program

Students in the College of Letters and Science may complete one or more minors of their choice, normally in a field both academically and administratively distinct from their major.

To receive a minor in rhetoric, students must complete the following:

Required Courses: Rhetoric 10, Rhetoric 100.

Elective Courses: Four upper division rhetoric courses numbered between 101 and 179.

Graduate Program

The department offers an interdisciplinary Ph.D. program focusing on the study of public discourses, rhetorical theory, and the history of rhetoric. Within the three broad and gradate areas, faculty and graduate student interests range from science, film, and literature to law, political theory, and philosophical discourse. During their first two years, graduate students explore major areas in the history and theory of rhetoric and pursue a variety of optional tracks in these areas. In their third year, they concentrate in greater depth in preparation for their doctoral qualifying examinations and dissertation research. Because of the department's commitment to interdisciplinary research, graduate students are encouraged at every stage of their careers to work with faculty in other departments.

For the M.A. degree in rhetoric, six semester courses are required of which at least five must be graduate courses in rhetoric. They must include the following: Rhetoric 200 (The Classical Origins of the Rhetorical Tradition) and 205 (Modern Rhetorical Theory).

Lower Division Courses

Note: Check with department for exact course offerings during the year.

1A. The Craft of Writing. (4) Three hours of lecture per week. Prerequisites: Subject A or examination. Rhetorical approach to reading and writing argumentative discourse. Close reading of selected texts; written themes developed in discussion and analysis of rhetorical strategies. (F,SP)

1B. The Craft of Writing. (4) Three hours of lecture per week. Prerequisites: 1A or equivalent. Intensive argumentative writing drawn from controversy stimulated through selected readings and class discussion. (F,SP)

2. Fundamentals of Public Speaking. (3) Three hours of lecture per week. Must be taken on a passed/not passed basis. Practice in the oral presentation of ideas. (F,SP)

10. Introduction to Practical Reasoning and Critical Analysis of Argument. (4) Three hours of lecture per week. An introduction to practical reasoning and the critical analysis of argument. Topics treated will include: the definition of rhetoric, the expressive, the regulatory, the critical, and the ethical, as well as various non-logical appeals. Also, the course will treat in introductory fashion some ancient and modern attempts to relate rhetoric and logic. (F,SP)

24. Freshman Seminars. (1) Course may be repeated with credit as topics vary. One hour of seminar per week. Sections 1-2 to be graded on a letter-grade basis. Sections 3-4 to be graded on a passed/not passed basis. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an academic interest under the guidance of a faculty member in a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP)

30. Rhetorical Theory and Oral Argument. (4) Three hours of lecture/discussion per week. Prerequisites: 10 or permission of instructor. Examination of basic principles of rhetoric and strategies of argumentation, with practice in oral argument. (F,SP) Staff

32. Fundamentals of Oral Interpretation. (4) Three hours of lecture per week. Prerequisites: 10 or consent of instructor. Use of oral performance as a critical instrument in the rhetorical analysis of literature, primarily lyric poetry. (F,SP)

39. Freshman/Sophomore Seminar, (2-4) Course may be repeated for credit as topics vary. Seminar format. Sections 1-3 to be graded on a letter-grade basis. Sections 4-6 to be graded on a passed/not passed basis. Prerequisites: Priority given to freshmen and sophomores. Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. (F,SP) Staff

Upper Division Courses

Note: Because there have been changes to major and minor requirements, please check with the department for any changes in prerequisites of rhetoric courses or curriculum.
100. The Rhetorical Tradition. (4) Three hours of lecture and one hour of discussion per week. Examination of the major texts of rhetorical theory in Classical antiquity, with consideration of various modern ex-
terpretations of the theory. (F,SP) Bartoch

101. Modern Rhetorical Theory. (4) Three hours of lecture per week; upper division standing. Close reading of the works of modern writers on language whose point of view can be described as rhetorical: Richards, Burke, Cassirer, and others. (F,SP) Staff

105. Rhetorical Theory and Practice in Historical Eras. Three hours of lecture per week. Examination of two or three historical periods and their practice in an author or speaker's presentation of self in relation to the character of an intended audience. (F,SP) Staff

105A. Middle Ages. (4) Staff

105B. Renaissance. (4) Shapiro

105C. Seventeenth Century. (4) Staff

105D. Enlightenment. (4) Staff

105E. Nineteenth Century. (4) Staff

110. Advanced Argumentative Writing. (4) Three hours of lecture per week plus individual conferences. Prerequisites: Any 1A-1B sequence or upper division standing. Major topics covered: study and practice of advanced techniques of argumentation for students with well-developed writing skills. Ethical, logical and pathetic appeals; control of register and tone; audience awareness; variety of real audiences: genre studies. (F,SP) Staff

110J. Advanced Nonfiction Writing. (4) Three hours of lecture per week plus individual conferences. Prerequisites: Any 1A-1B sequence or upper division standing. Major topics covered: study and practice of advanced techniques of argumentation for students with well-developed writing skills. Ethical, logical and pathetic appeals; control of register and tone; audience awareness; variety of real audiences: genre studies. (F,SP) Staff

110M. Advanced Argumentative Writing. (4) This course is equivalent to 110M. Three hours of lecture per week plus individual conferences. Prerequisites: Any 1A-1B sequence or upper division standing. Major topics covered: study and practice of advanced techniques of argumentation for students with well-developed writing skills. Ethical, logical and pathetic appeals; control of register and tone; assessment of a wide variety of real audiences: genre studies. (SP) Gutteriez

121A-121B. Rhetoric of Fiction. (4,4) Three hours of lecture per week. Prerequisites: A is prerequisite to B. A. Form: Definition and techniques of narrative, including voice, point of view, time orders, and related matters.
B. Content and Context: Interpretation of authorial intention in selected works of modern fiction, in terms of their cultural and historical contexts. Staff

122. Rhetoric of Drama. (4) Three hours of lecture per week. Prerequisites: 30. Examination of the way the character is created in drama by repetitive rhetorical patterns and the ways themes are defined by manipulation of such patterns. (F) Staff

124. Rhetoric of Poetry. (4) Three hours of lecture per week. Prerequisites: Any 1A-1B sequence or upper division standing. Upper division standing. Studies in the relationships between poetic theory and poetic practice from Aristotle's Poetics to the present day. (F,SP) Staff

125. Poetics and Poetry. (4) Three hours of lecture per week. Prerequisites: Upper division standing. Rhetorical analysis of the realist novel in the context of intellectual and social history. The course will explore the development of literary realism in relation to the social problems of industrialization and urbanization in nineteenth-century Europe. (F,SP) Maschuch

127. Novel and Society. (4) Course may be repeated for credit with consent of instructor. Three hours of lecture per week. Prerequisites: 121A and 121B. Intensive analysis of novelistic discourse with specific reference to social context. Focus on authorial intention as a form of social practice. (F) Maschuch

128. Novel into Film. (4) Three hours of lecture per week. Close examination of the adaptation of written fiction to the screen and problems arising from the transformation of five novels, which will be read, into their filmed versions. (SP) Staff

129. Theories of Film. (4) Three hours of lecture per week plus viewing sessions. Prerequisites: One UC film course. Classical theories of film by Eisenstein, Anheim, Krauss, Bazin, Metz, and others. Only one or two films will be analyzed in each depth to test the power of various theories. Staff

130. Political Oratory. (4) Three hours of lecture per week. Theory and practice of deliberative oratory, with emphasis on the study of actual speeches from Thucy-
dides, the Attic orators, Cicero, Sallust, Tacitus, and 18th- and 19th-century British and American parlia-
mentary orators. (F) Staff

131. Rhetoric of Religious Discourse. (4) Three hours of lecture per week. Consideration of the rhetoric of hermeneutics or biblical interpretation with special emphasis on issues of symbolic and allegorical language as the bearer of culturally significant information. (F) Quinn

132. Rhetoric, Culture and Society. (4) Three hours of lecture per week. Prerequisites: 100; Upper division standing: Analysis of rhetorical practice in the context of social and cultural change with particular reference to the historical development of industrial to industrial society in the west. Maschuch

135. Rhetoric of Narrative Genres in Nonliterate Societies. (4) Course may be repeated for credit with different instructor. Three hours of lecture per week. Investigation of the rhetorical and cultural principles common to various generic narrative, both prose and po-
etic, in nonliterate societies. Mythic, epic and folk narratives considered as well as written works from cultures in transition. (SP) Connelly

136. Rhetorical Approaches of Folklore. (4) Course may be repeated for credit with consent of instructor. Three hours of lecture per week. Performance, persuasion and play in rhetorical perspective. The course will explore performance genres on the margins of orality/literacy in diverse cultures, including particularly contemporary Arab folk cultures, medieval European vernacular traditions, and contemporary American popular cultures. Connelly

137. Comparative Rhetoric. (4) Course may be repeated for credit with different instructor. Three hours of lecture per week. Prerequisites: 100, 101 or non-Western language preparation. Rhetorical theory in cross-cultural perspective. The course will explore "other" rhetorics, i.e., non-Western—seeking to dis-
cover the ways in which diverse peoples have codified their rhetorical systems. The course will also investiga-
tate rhetorical methods applied to other cultures. Connelly

138. Rhetoric and Literature under the Roman Empire. (4) Three hours of lecture per week. Prerequisites: 100, 101 or non-Western language preparation. Rhetorical theory in cross-cultural perspective. The course will explore "other" rhetorics, i.e., non-Western—seeking to dis-
cover the ways in which diverse peoples have codified their rhetorical systems. The course will also investiga-
tate rhetorical methods applied to other cultures. Connelly

152. Rhetoric of Constitutional Discourse. (4) Three hours of lecture per week. The rhetorical context of The Federalist. Examines the tradition of Anglo-American constitutional argumentation in the eight-
teenth century, its sources, and its implications. Read-
ings include Locke, Hume, Montesquieu, pamphlets of the American Revolution, Antifederalist writings.

153A. Race and Order in the New Republic. (4) Three hours of lecture per week. This course will ex-
plain how the social issue of race in the new American republic shaped the political founding of the United States in 1787. We will investigate the processes of race at the time of the founding, try to understand the origins of those perceptions, and examine how they af-
fected the founding and establishment of a new nation. This course satisfies the American cultures require-
ment.


155. Rhetoric of Imperialism. (4) Three hours of lec-
ture per week. Analysis of rhetorical patterns in official and public documents relating to English, French, and other imperial expansion policies in the 19th cen-
tury; special attention to Middle Eastern and African spheres of interest. (F) Staff

156. Rhetoric of the Political Novel. (4) Three hours of lecture per week. Investigation of major 19th and 20th century works of fiction in which political stances are explored as dominant themes; close reading of au-
thorial viewpoints and rhetorical strategies. (SP) Staff

157A. Rhetoric of Modern Political Theory. (4) Three hours of lecture per week. Formerly 157. Study of the textual strategies of important works of modern European and American political theory from the 17th through the 19th centuries. (F) Dolan

157B. Rhetoric of Contemporary Political Theory. (4) Three hours of lecture per week. Study of the tex-
tual strategies of important works of 20th century Eu-
ropean and American political theory. (SP) Dolan

158. Advanced Problems in the Rhetoric of Polit-
ical Theory. (4) Three hours of lecture per week. Close study of selected works of modern political the-
ory, including debates over the nature and interpre-
tation of political theory and the role of the political the-
orist. Specific themes and readings vary from year to year. Limited enrollment. (SP) F. Dolan

159A. Great Theorists in the Rhetoric of Political, and Legal Theory. (4) Three hours of lecture per week. Prerequisites: Permission of instructor. This course focuses on the development of one or two theo-
rists or an important theme or issue, with close read-
ings of major texts as well as attention to important commentators. (F,SP) Staff

159B. Great Themes in the Rhetoric of Contem-
porary Political and Legal Theory. (4) Three hours of lecture per week. Prerequisites: Permission of in-
structor. This course concentrates on aspects of 20th century political, social, and legal theory that are too extensive to be treated comprehensively as one section of the course in most semesters. (SP) F. Dolan

160. Introduction to the Rhetoric of Legal Dis-
course. (4) Three hours of lecture per week. The ap-
161. Rhetoric of Legal Argumentation. (4) Three hours of lecture per week. Analysis of the special function of rules and values in legal argumentation; emphasis on the interplay of interpretation and policy in the definition of social values through legal persuasion. (SP) Stanfield Constantine

164. Rhetoric of Legal Theory. (4) Three hours of lecture per week. Rhetorical methodology applied to close analysis of the argumentative framework of important works in modern legal theory. (F) Constantine Gutierrez

166. Rhetoric, Law, and Politics in Ancient Greece. (4) Three hours of lecture per week. Examination of the role of rhetoric in Greek legal and political thought. Cohen

167. Advanced Topics in Law and Rhetoric. (4) Three hours of lecture per week. Prerequisites: At least one course from 160, 161, 164 or 165. In-depth consideration of particular topics concerning rhetorical aspects of legal theory, legal philosophy, legal argumentation, etc. (F) Constantine Gutierrez

170. Rhetoric of Social Science. (4) Three hours of lecture per week. Analysis of the ways in which political scientists, sociologists, anthropologists, economists and psychologists address the authority-based nature 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 object knowledge. (F) Constantine Gutierrez

171. The Problem of Mass Culture and the Rhetoric of Social Theory. (4) Three hours of lecture per week. Examination of the textual strategies whereby the masses and mass culture emerge as objects of anxiety, hope, and scrutiny for social theorists of the 19th and 20th centuries. Dolan

172. Rhetoric of Social Theory. (4) Three hours of lecture per week. Rhetorical analysis of theorists from Durkheim and Weber, as well as Marx, Ricardo and Bentham, to contemporary representatives of social and economic thought. Quinn

173. Rhetoric of Historical Discourse. (4) Three hours of seminar per week. Consideration of the heuristic practices of selected narrative historians such as Gibbon and Carlyle; historical discourse considered as a sasquatch. Quinn

174. Rhetoric of Scientific Discourse. (4) Three hours of lecture per week. Examination of the character/istic 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 normativity. Quinn

175. Rhetoric of Philosophical Discourse. (4) Three hours of lecture per week. Introduction to theoretical issues involved in applying rhetorical analysis to philosophical discourse; intensive analysis of selected philosophical works. Quinn

176. The Problem of Evil and the Rhetoric of the Modern West. (4) Three hours of lecture per week. This course will focus upon the problem of evil as one of the central concerns of nineteenth-century philosophical fiction. With the post-Enlightenment breakdown of traditional theological and metaphysical justifications, the search for new strategies of explanation of the sources of evil emerges as a significant motif in the late 18th- and 19th-century novel. (SP) Masuch

177. Language, Truth and Dialogue. (4) Three hours of lecture per week. Examination of philosophical dialogues from Plato to Heidegger. Focus on the interaction within the dialogue, the participation required of the nonarguer, and the relation of such interaction and participation to thinking, speaking and knowing.

178. The Rhetoric of the Novel. (4) Course may be repeated for credit. Three hours of lecture/discussion per week. Prerequisites: Any 1A-1B sequence or upper-division course in English, philosophy, or general humanities. A study of the origins and transformations of the novel as a genre, with special reference to the relationships between the rhetoric of novelistic discourse and the social history of the modern individual. Readings will be drawn from primary and secondary sources in the Western tradition, in translation where appropriate. (F) Cascardi

179. The Rhetoric of Political Journalism. (4) Three hours of lecture per week. Prerequisites: Juniors and Seniors; 30 or consent of instructor. Examination of the rhetoric of radio, television, newspapers, magazines, and fiction books with the emphasis on how arguments are made within the stated professional goal of objectivity. The focus will be on four issues of contemporary concern: the power of the media, the degrading environment, the prevalence of racism, and the perpetuity of warfare. (SP) Fradkin

190A-H190B. Honors Thesis. (2-2) Tutorial. Students must take two units of H190A and two units of H190B. Credit and grade to be awarded on completion of successful oral defense. Reviewing with waz. Prerequisites: GPA in Rhetoric and 3.5 GPA overall. Formerly H190A. 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. (F,SP)

196. Special Topics, (4) Course may be repeated for credit with different topic. Three hours of lecture/seminar per week. Prerequisites: Consent of instructor. Group instruction and investigation of topics not accommodated in regular course offerings. (F,SP) Gutierrez, Mella, Silverman

198. Supervised Group Study, (1-3) Course may be repeated for credit. Tutorial. Must be taken on a pass/fail basis. Prerequisites: Junior standing and approval of adviser. Instruction for 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. Tutorial. Must be taken on a pass/fail basis. Prerequisites: 3.0 GPA. For special projects that cannot be otherwise accommodated. (F,SP)

Graduate Courses

200. Classical Origins of the Rhetorical Tradition. (4) Three hours of seminar per week. Prerequisites: Graduate status. A detailed examination of the development of the Western rhetorical tradition in ancient Greece and Rome. This course is normally required of all graduate students. (F,SP) Bartsch, Cohen

205. Contemporary Rhetorical Theory and Criticism. (4) Three hours of seminar per week. Prerequisites: Graduate status. Intensive examination of the central issues confronting rhetorical criticism in the twentieth century. Normally required of all graduate students. (SP) F. Dolan

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. (SP)

230. Advanced Studies in History of Rhetoric. Course may be repeated for credit as topic varies. Three hours of seminar per week. Prerequisites: Graduate status. Rhetoric in the specified historical era, both as expounded by theorists and as it permeated various forms of discourse. Special topics to be announced.

230A. Ancient Greece. (4) (F,SP)

230B. Ancient Rome. (4) (F,SP)

230C. The Middle Ages. (4) (F,SP)

230D. The Renaissance. (4) (F,SP) Shapiro

230F. The Enlightenment. (4) (F,SP) Dolan

230G. The Nineteenth Century. (4) (F,SP) Staff

230H. The Twentieth Century. (4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Prerequisites: Graduate status. Rhetoric in the specified historical era, both as expounded by theorists and as it permeated various forms of discourse. Special topics to be announced. (F)

240. Rhetorical Theory and Criticism. Course may be repeated for credit as topic varies. Three hours of seminar per week. Prerequisites: Graduate status. Advanced investigation of the rhetorical dimensions of various modes of discourse. Special topics to be announced.

240A. Poetry. (4,SP)

240B. Novel. (4) (SP) Staff

240C. Oral Literature. (4,SP) Mella

240D. Non-Fictional Prose. (4) (SP)

240E. Political Discourse. (4,SP) Shapiro

240F. Legal Rhetoric and Philosophy. (4,SP) Constance

240G. Rhetorical Theory. (4) (SP) Dolan

240H. Rhetorical Theory and Criticism: Gender and Science. (4) Three hours of lecture per week. A considerable literature has emerged over the last decade arguing for the importance of gender as an analytic category in the history of science. This seminar will examine the import of such analyses for our reading of more traditional accounts of specific periods in modern scientific history. Will aim at relating the questions that have been posed by feminists, and developing techniques for further analysis of the role that cultural norms of gender have played in the history of science.

240J. Film Theory. (4) Course may be repeated for credit as topic varies. Three hours of seminar per week. Prerequisites: Graduate status. Advanced investigation of the rhetorical dimensions of various modes of discourse. Special topics to be announced. (F) Silverman

270. Proseminars in Rhetoric. (2-4) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Graduate status. Bibliographic explorations of rhetorics not covered by ordinary offerings. (F,SP) Connelly

291A. Oral Performance: Noetics and Poetics. (4) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Consent of instructor. This seminar will explore how oral performance traditions organize and manage knowledge. Emphasis will be placed upon the totality of the performance, with a focus upon music as a codeterminant of the meaning and catalyst for composing the text. Also listed as Interdepartmental Studies 291A, Music 291A and Southeast Asian 291A. Connelly

291B. Genes, Embryos, and Shifting Maps of Persons and Parenthood. (4) Three and one-half hours of seminar per week. Prerequisites: Graduate status. Students will investigate a broad range of reproductive issues in which emerging technologies force people to articulate and map new meanings of personhood, parenthood, rights, and responsibilities. Sponsoring department: Rhetoric, Women's Studies, and Jurisprudence and Social Policy. Staff

295. Special Study. (1-4) Course may be repeated for credit. Individual tutorial. Prerequisites: Graduate advisor approval. Open to qualified graduate students wishing to pursue special topics under the direction of a member of the staff. (F,SP)

299. Directed Research. (1-9) Course may be repeated for credit. Individual tutorial. Prerequisites: Graduate advisor approval. Open to graduate students who have passed their Ph.D. qualifying examinations. (F,SP)

On leave, spring, fall
On leave, fall

Recipient of Distinguished Teaching Award
601. Individual Study for Master's Students. (1-5) Course may be repeated for credit. Individual arrangement. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate status. Individual study for degree or language examinations in consultation with faculty advisor. (F,SP)

602. Individual Study for Doctoral Students. (1-5) Course may be repeated for credit. Individual arrangement. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate status. Individual study in consultation with faculty advisor. (F,SP)

Professional Courses

300. Problems in Teaching Rhetoric. Course may be repeated for credit. Two hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Appointment as a graduate student instructor. (F,SP) Shapire

300A. Instruction in Teaching Argumentative Writing and Rhetorical Analysis. (2) Prerequisites: Appointment as a graduate student instructor. (F,SP) Soceno, Miller

300B. Instruction in Teaching Public Speaking. (2) Prerequisites: Appointment as a teaching assistant. (F,SP) Soceno, Miller

300C. Instruction in Teaching Oral Interpretation, (2) Prerequisites: Appointment as a graduate student instructor. (F,SP)

301A-301B. Pedagogical Practice. (4-4) Course may be repeated for credit. Three hours of lecture per week plus two hours of seminar per week. Prerequisites: Appointment as graduate student instructor. Satisfactory/unsatisfactory basis. Prerequisites: Appointment as a graduate student instructor. Supervised classroom teaching. (F,SP)

Romance Philology

(College of Letters and Science)

Program Office: 4125 Dwinelle Hall, 542-2144 or 422-2112

Professors:
Jerry R. Credick, Ph.D., University of California at Berkeley, Medieval Hispanic literature, literature
Joseph J. Deck, Ph.D., Ohio State University, Medieval French literature
Charles S. Fauhaber, Ph.D., Yale University, Medieval Spanish literature
Suzanne Fleischman, Ph.D., University of California at Berkeley, French literature, Romance linguistics
Ruigero Stefanini, Dottore in Lettere universita di Firenze, Italian philology
Yakov Markov, Ph.D., Emeritus University of Berlin, Romance, comparative, historical linguistics.

Graduate Adviser: Ms. Fleischman.

The Ph.D. Program. The Group in Romance Philology administers a program designed to train graduate school teachers and research scholars in the fundamental disciplines of Romance Philology, Romance historical linguistics, and the medieval Romance literatures. Prerequisites are an M.A. or its equivalent in a relevant discipline (e.g., one of the modern Romance languages, linguistics, classics, comparative literature) and a good knowledge of at least one, preferably two, modern Romance languages. Or as admitted, the student must pass reading examinations in French, Italian, Spanish, Latin, and German. There are no formal course or unit requirements. The program is tailored to the needs and interests of the individual student; courses may be taken in a variety of departments but especially French, Italian, Spanish and Portuguese, Linguistics, Comparative Literature, Classics, and Medieval Studies. The student's progress in the program will be evaluated by the faculty of the group at the end of the second term in the program. Permission to proceed will be granted only if the group believes that the student shows promise of completing the degree within a reasonable length of time.

In the qualifying examination (three hours, oral) the student is held responsible for seven fields of interest, four of which are obligatory (history of French and Spanish literature to 1500, of Italian literature to 1400; traditional historical and philological criticism as applied to written texts; comparative Romance linguistics, with emphasis on the historical grammar of French, Italian, and Spanish; highlights in the history of Romance linguistics). The other three disciplines are related to the dialectology of a particular language, the history or literature of one of the minor Romance languages, a field in general linguistics, or other relevant topics.

Normative time for completion of the degree is five years, three for preparation of the qualifying examination, two for the dissertation.

Graduate Courses

200. Linguistic History of the Roman Empire. (3) Three hours of lecture per week. The spread of Latin over the Western Mediterranean area, and its gradual change into the Romance dialects, with emphasis on substrata and superstrata. (F,SP)

201. Late Latin Language and Literature. (3) Three hours of lecture per week. The internal history of colloquial Latin and Late Latin, down to the Carolingian period. (F) Srafr

202. General Romance Linguistics. (3) Three hours of lecture per week. Problems of methodology in historical linguistics applied to the major and minor Romance languages. Fleischman

203. Old Provençal. (3) Three hours of lecture per week. A history of the Old Provençal or (Occitan) literary language and 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. Problems and methods in diachronic morphology and syntax and their interrelations. Topics vary from year to year. Fleischman

205. From Roman Dialect Geography to Sociolinguistics. (3) Three hours of lecture per week. Classical and experimental methods of eliciting, recording, and interpreting dialectal data, with equal attention to regional and social dialects. Staff

207. Hispano-Romance Dialectology. (3) Three hours of lecture per week. Problems and methods in the study of the major linguistic areas of the Iberian Peninsula, in diachronic and synchronic projection. (SP) Preliminary meetings

208. Romance Etymology. (3) Course may be repeated for credit. Three hours of lecture per week. Aspects and techniques in the study of Romance etymology. Staff

209. Studies in Italo-Romance. (3) Three hours of lecture per week. General survey and specific research projects in the field of Italian dialectology following diachronic, synchronic, and socio-linguistic approaches. Attention will be given to connections with surrounding Romanesque areas such as Friulian, Rheto-Romanic, Sardinian, Stefanini

211. Highlights in the History of Romance Linguistics. (3) Three hours of lecture per week. The major schools and scholars that dominated the scene over a century and a half (1800-1950) and the vital problems raised by them. Staff

212. The Romance Epic. (3) Three hours of lecture per week. Problems in the study of French, Spanish, and Provençal epic: genesis, development, textual transmission, style, structure, themes, and relationships to other genres. Duggan

213. Old Catalan. (3) Three hours of lecture per week. Material is usually the first documents of the Catalan language to the works of the major authors of the XV century. Faulhaber

220. Seminar in Romance Philology. (3) Course may be repeated for credit as topic varies. Three hours of seminar per week. (F,SP)
Scandinavian
(University of California at Berkeley)

Department of Scandinavian

Graduate Program

Alms of the Program. The graduate program in Scandinavian offers opportunities for graduate study in the field of Scandinavian languages and literatures. The program leads to the Master of Arts degree and the Doctor of Philosophy degree. The program is designed for students who wish to pursue advanced study in Scandinavian languages and literatures, including Danish, Norwegian, and Swedish. The program provides opportunities for specialization in areas such as literature, history, and folklore. The program is open to students with a strong background in Scandinavian languages and literatures, including those who have completed an undergraduate degree in Scandinavian studies.

Requirements for the Master of Arts degree.

1. Course requirements: A total of 24 units of graduate coursework is required, including the following:
   --door courses: A minimum of 6 units is required, including courses in literature, history, and folklore.
   --field courses: A minimum of 12 units is required, including courses in literature, history, and folklore.
   --thesis: A minimum of 6 units is required, including a thesis on a topic in Scandinavian studies.

2. Comprehensive examination: A comprehensive examination is required of all students in the program. The examination covers a broad range of topics in Scandinavian studies, including literature, history, and folklore. The examination is administered in the spring semester of the second year of study.

3. Graduate seminar: All students are required to attend a graduate seminar each semester. The seminar is designed to provide students with an opportunity to explore a specific topic in Scandinavian studies in depth.

4. Language proficiency: Students are required to demonstrate proficiency in at least one Scandinavian language. Proficiency is assessed through language exams and coursework.

5. Thesis: A thesis is required of all students in the program. The thesis should be a significant contribution to the field of Scandinavian studies.

6. Honors Program: The honors program is designed for students who wish to pursue advanced study in Scandinavian studies. The program provides opportunities for specialization in areas such as literature, history, and folklore. The program is open to students with a strong background in Scandinavian languages and literatures, including those who have completed an undergraduate degree in Scandinavian studies.

Requirements for the Doctor of Philosophy degree.

1. Course requirements: A total of 24 units of graduate coursework is required, including the following:
   --door courses: A minimum of 6 units is required, including courses in literature, history, and folklore.
   --field courses: A minimum of 12 units is required, including courses in literature, history, and folklore.
   --thesis: A minimum of 6 units is required, including a thesis on a topic in Scandinavian studies.

2. Comprehensive examination: A comprehensive examination is required of all students in the program. The examination covers a broad range of topics in Scandinavian studies, including literature, history, and folklore. The examination is administered in the spring semester of the second year of study.

3. Graduate seminar: All students are required to attend a graduate seminar each semester. The seminar is designed to provide students with an opportunity to explore a specific topic in Scandinavian studies in depth.

4. Language proficiency: Students are required to demonstrate proficiency in at least one Scandinavian language. Proficiency is assessed through language exams and coursework.

5. Thesis: A thesis is required of all students in the program. The thesis should be a significant contribution to the field of Scandinavian studies.

6. Honors Program: The honors program is designed for students who wish to pursue advanced study in Scandinavian studies. The program provides opportunities for specialization in areas such as literature, history, and folklore. The program is open to students with a strong background in Scandinavian languages and literatures, including those who have completed an undergraduate degree in Scandinavian studies.

Preparation for the Graduate Program.

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.

Preparation.

Availability of Graduate Faculty.

The Department of Scandinavian offers graduate study in the fields of Scandinavian languages and literatures. The graduate faculty includes scholars with expertise in areas such as literature, history, and folklore. The faculty includes scholars who have completed degrees from leading universities in the United States, Europe, and Scandinavia.

Prospective Students.

Prospective students are encouraged to contact the graduate program coordinator for information about the program and the graduate faculty. The coordinator can be reached at the following address:

Graduate Program Coordinator
Department of Scandinavian
University of California at Berkeley
Berkeley, CA 94720

Tel: (510) 642-5484
Fax: (510) 642-5484
E-mail: scandinavian@berkeley.edu

Application Information.

Prospective students should submit the following materials to the graduate program coordinator:

1. Application form
2. Statement of purpose
3. Transcripts
4. Three letters of recommendation
5. GRE scores (optional)

The deadline for the fall quarter is January 1. The deadline for the spring quarter is November 1. The program can be completed in two to three years.

Financial Assistance.

Financial assistance is available in the form of teaching and research assistantships, fellowships, and grants. Prospective students are encouraged to apply for financial assistance through the graduate program coordinator.

Teaching Assistantships.

Teaching assistantships are available for students who are enrolled in the graduate program. Teaching assistantships provide financial support and include a stipend and tuition remission.

Research Assistantships.

Research assistantships are available for students who are enrolled in the graduate program. Research assistantships provide financial support and include a stipend and tuition remission.

Fellowships.

Fellowships are available for students who are enrolled in the graduate program. Fellowships provide financial support and include a stipend and tuition remission.

Grants.

Grants are available for students who are enrolled in the graduate program. Grants provide financial support and include a stipend and tuition remission.

For more information about financial assistance, please contact the graduate program coordinator.

University of California at Berkeley
Department of Scandinavian
Berkeley, CA 94720
Tel: (510) 642-5484
Fax: (510) 642-5484
E-mail: scandinavian@berkeley.edu

Sample Courses.

The following courses are offered in the graduate program in Scandinavian studies:

1. Introduction to Scandinavian Literature
2. History of Scandinavian Literature
3. Scandinavian Folklore
4. Scandinavian Mythology
5. Scandinavian Religion
6. Scandinavian Art
7. Scandinavian Music
8. Scandinavian Dance
9. Scandinavian Film
10. Scandinavian Theater
11. Scandinavian Philosophy
12. Scandinavian History
13. Scandinavian Politics
14. Scandinavian Economics
15. Scandinavian Sociology
16. Scandinavian Anthropology

These courses provide an introduction to the field of Scandinavian studies and are designed to provide students with a comprehensive understanding of the culture, history, and literature of Scandinavia.

For more information about the graduate program in Scandinavian studies, please contact the graduate program coordinator.

Graduate Program Coordinator
Department of Scandinavian
University of California at Berkeley
Berkeley, CA 94720
Tel: (510) 642-5484
Fax: (510) 642-5484
E-mail: scandinavian@berkeley.edu
127. Scandinavia from 1520-1800. (4) Three hours of lecture and one hour of discussion per week. Scandinavian society, history, and culture from the Reformation through the Enlightenment. (F) Larson

128. Scandinavia from 1800-the Present. (4) Three hours of lecture and one hour of discussion per week. Scandinavian society, history, and culture from the Napoleonic Era to the present. (SP) Larson

140A. Introduction to Danish, Norwegian, and Swedish Literature: 1700-1850. (4) Three hours of lecture per week. Prerequisites: 140A or equivalent. Major works of early 1800s. Reading and analysis of representatives works from the eighteenth to mid-nineteenth centuries. (SP) Larson

140B. Introduction to Danish, Norwegian, and Swedish Literature: 1850-1920. (4) Three hours of lecture per week. Prerequisites: 140A or equivalent and 140A. Formerly 140. Introduction to Danish, Norwegian, and Swedish literature. Reading and analysis of representative works from the mid-nineteenth to the present. (F,SP) Larson

149. Major Studies. (1) One hour of discussion per week. Prerequisites: Knowledge of a Scandinavian language. Additional work, for majors in Scandinavian and other departments 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 "major" course and also read assignments in the Scandinavian language language. Written a short paper. (F,SP) Staff

150. Studies In Scandinavian Literature. (4) Three hours of lecture per week. Variable subject matter; see departmental announcement for description. Sample topics: Scandinavian romanticism; the Modern Breakthrough in Scandinavia. (SP) Staff

160. Scandinavian Myth and Religion. (4) Three hours of lecture per week. Religious beliefs and practices during the Viking Age in Scandinavia and their manifestations in later recordings. Readings and discussion in English. (SP, F) Larson

165. Scandinavian Folklore. (4) Three hours of lecture per week. Scandinavian folklore, emphasizing oral narrative traditions (legends and folk belief, folktales, ballads, poetry, proverbial expression). Comparison of American and European folklore. Readings and discussion in English. (SP) Lindsay

170. Arctic Folklore and Mythology In Nordic lands. (4) Three hours of lecture per week. Survey of the folklore and mythology of the principal non-Scandinavian peoples of the Nordic lands: Finns, Saami, Greenland Inuit. Comparative evidence from other circumpolar traditions and from ancient and modern Scandinavian folklore. Readings and discussion in English. (SP, F) Lindsay

198. Group Study for Advanced Undergraduates. (2-4) Course may be repeated for credit. Directed study. Must be taken on a passing/not passing basis. Prerequisites: Two years of study of one Scandinavian language. Advanced readings and interpretation of Scandinavian texts. (F,SP)

199. Independent Study and Research. (2-4) Course may be repeated for credit. Directed study. Must be taken on a passing/not passing basis. Prerequisites: Two years study of one Scandinavian language. Courses in Scandinavian literature, culture, or history. Supervised study; restricted enrollment. (F,SP)

Graduate Courses

200. Introduction to Graduate Study In Scandinavia. (4) Three hours of seminar per week. A problem-oriented course concerned with major areas of graduate study in Scandinavia: linguistics and philology, folklore, history, literary criticism. (F) Nylander

201A. Old Norse. (4) Three hours of lecture per week. An introduction to the language of medieval Iceland and Norway. Grammar, historical phonology, and texts. (F) Clovis, Lindow

201B. Norse Literature. (4) Three hours of lecture per week. Prerequisites: 201A or equivalent. Literary production of the early 10th and 11th centuries. Reading and analysis of representatives works in the original language. (SP) Clovis, Lindow


206. Studies in Philology and Linguistics. (4) Three hours of lecture per week. Prerequisites: 201A or equivalent. Variable subject matter; see departmental announcement for description. Sample topics: runology; history of the Scandinavian languages; dialectology. (SP) Clovis

220. Early Scandinavian Literature, (4) Three hours of lecture per week. Prerequisites: 201A or equivalent. Variable subject matter; see departmental announcement for description. Course normally focuses on one of two areas: Eddic and skaldic poetry or sagas (royal family, legendary, epic, eposical). (SP) Clovis, Lindow

221. Early Scandinavian History and Culture. (4) Course may be repeated for credit. Three hours of seminar per week. Historical topics from the Viking Age to the Renaissance. Emphasis is on extra-European sources. (F) Clovis, Nylander

230. Reformation Through the 18th Century. (4) Three hours of lecture/discussion per week. Reading and analysis of representative literary and cultural works. (F) Larson

235. Studies In Romanticism and Realism. (4) Course may be repeated for credit. Three hours of lecture per week. Variable subject matter; see departmental announcement for description. Reading and analysis of representative works. (F) Nylander, Sanders

240. Modern and Contemporary Scandinavian Literature. (4) Course may be repeated for credit. Three hours of lecture/discussion per week. Reading and analysis of representative works. Topics vary from semester to semester; see departmental announcement for description. (F) Nylander, Sanders

249. Graduate Studies. (1) Course may be repeated for credit. One hour of lecture per week. Prerequisites: Graduate standing in Scandinavian. Additional work in connection with one of the following courses: Scandinavian 107, 108, 115, 116, 117, 120, 125, 165. With instructor's permission, reading of any written work in the "main" course and also reading assignments in the Scandinavian languages, and a final written paper. (SP) Staff

250. Seminar In Scandinavian Literature. (4) Course may be repeated for credit. Three hours of seminar per week. Investigation of selected authors, topics, or problems. Variable subject matter; see departmental announcement for description. (SP) Staff

286. 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. Supervised study. Must be taken on a satisfactory/unsatisfactory basis. (F,SP)

601. Individual Study for M.A. Candidates. (1-4) Course may be repeated for credit. Supervised study. Must be taken on a satisfactory/unsatisfactory basis. (F,SP)

602. Individual Study for Doctoral Candidates. (1-8) Course may be repeated for credit. Supervised study. Must be taken on a satisfactory/unsatisfactory basis. Individual study in consultation with the major professor. For doctoral candidates. (F,SP)

Science and Mathematics Education

Group Office: 4533 Tolman Hall, 642-4206

Faculty:

Alice M. Apoglio, Ph.D. Stanford University, Artificial intelligence and expert systems, methods, engineering education, qualitative reasoning. (Computer Science)

Marvin C. Covington, Ph.D. University of California at Berkeley, Classroom learning dynamics, student motivation and creative thinking. (Psychology)

Marian D. Diamond, Ph.D. University of California at Berkeley, Neuroanatomy, environment, asymmetry, hormones. (Psychology-Anatomy; Director, Lawrence Hall of Science)

Andrew A. d'Esessa, Ph.D. Massachusetts Institute of Technology, Computers in education, instruction in physics and mathematics, learning/behavioral epistemology. (Physics)

Bernard R. Gifford, Ph.D. University of Rochester, Organizational theory, policy analysis, resource allocation, implementation, financial management, technology and education. (Chancellor's Professor)

Marina Keeler, Ph.D. Stanford University, Scientific reasoning, cognition and technology, programming and problem solving. Individual differences associated with gender. (Professor, Education)

Lawrence F. Lowry, Ed.D. University of California at Berkeley, Science and mathematics education, teacher education. (Education)

Carolyn Meier, 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 David Miller, Ph.D. Oregon State University, Science and computer-based education, history of science. (Education)

John Ogbu, Ph.D. University of California at Berkeley, Comparative studies of minority education, cultural ecology of education, education and comparative sociology. (Anthropology)

Peter Pirolli, Ph.D. Carnegie-Mellon University, Intelligent computer instruction, acquisition of cognitive skill in programming. (Computer Science)

Michael Ranney, Ph.D. University of Pittsburgh, Problem solving, computational models of cognition, naive physics, artificial intelligence, tutoring systems. (Education)

Alan H. Schoenfeld, Ph.D. Stanford University, Psychology of mathematical thinking and problem solving. Individual differences and gender. (Education and Mathematics)

Glen T. Seaborg, Ph.D. University of California at Berkeley, Science education, educational policy, science education for the general public, the transmutation elements. (Chair, Department of Chemistry)

Barbara Y. White, Ph.D. Massachusetts Institute of Technology, Artificial models, artificial intelligence, expert systems, computer-based learning environments, measurable outcomes, Instructional Design and Computer Science; Chairman of SESA

M. I. Charles Woodson, Ph.D. University of California at Los Angeles, Science education, educational policy, educational applications of computers, measurement theory. (Education and Computer Sciences)
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/engineering, or mathematics with the pursuit of current trends in the area of education. Students enrolled in the program will be expected to attain in their chosen scientific discipline a degree of competence comparable to that of a departmental Ph.D. candidate in that discipline. Their thesis research will consist of a project dealing with the development of improved educational approaches research on new instructional models or basic research on learning or cognition 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, students 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 being educational or psychological research in these areas will also be 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. Practice 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. Prerequisites: Consent of instructor. Practical experience on an educational research or development program on campus or elsewhere for 6-12 hours per week. (F,SP)

220B. Research Design in Science and Mathematics Education. (3) Three hours of lecture/discussion per week. Prerequisites: 220B 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. (F,SP)

220C. Instructional Design in Science and Mathematics Education. (3) Three hours of lecture/discussion per week. Prerequisites: 220B or consent of the instructor. Survey of literature on design of instruction in science and mathematics, including development of 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) Course may be repeated for credit. Two hours of lecture and three hours of laboratory per week. Prerequisites: One course in programming. Design and implementation 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 educational systems. (F,SP)

292. Research Seminar and Colloquium. (1) Course may be repeated for credit. Two hours of lecture/discussion per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Development of thesis proposal under supervision of faculty member. (F,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. Prerequisites: Consent of instructor. 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. Independent study activities under supervision of a faculty member. (F,SP)

602. Individual Study for Qualifying Examination. (1-6) Course may be repeated for credit. Course does not count toward student's regular load or residence requirements. Individual conferences. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Consent of instructor. Individual study, under the supervision of a faculty member, designed to prepare the student for Ph.D. qualifying examination. (F,SP)

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

Slavic Languages and Literatures

Department of Letters and Science

Professors:

Ronelle Alexander, Ph.D., Harvard University, Yugoslav literatures, Slavic linguistics
Robert P. Hughes, Ph.D., University of California, Russian and Slavic linguistics
Hugh McLear, Ph.D., Harvard University, Russian literature
Johanna Nichols, Ph.D., University of California, Slavic and Slavic linguistics
Walter Schamuschla, Ph.D., University of Frankfurt, Czech literature and linguistics
Alan Tambeker, Ph.D., Harvard University, Slavic linguistics
Joan Grossman, Ph.D., University of California, Slavic linguistics
Olga Radovsky Hughes, Ph.D., Emeritus
Simon Karkowski, Ph.D., Emeritus
Francis J. Whitfield, Ph.D., Emeritus

Associate Professors:

David Friek, Ph.D., Yale University, Polish language and literature
Inna Paperno, Ph.D., Stanford University, Russian literature

Assistant Professors:

Erik Selnow, Ph.D., University of California, 20th-century Russian literature and culture
Norman R. Martin, Ph.D., University of California, 20th-century Russian literature and culture

Senior Lecturers:

Olgierd Astromoff, M.A., University of California, Russian language and literature
Henriek Yakshus, Ph.D., Moscow State University, Russian, teaching methodology
Serge Kassiel, M.A., Emeritus
Olga Gorokhin-Vasilev, Ph.D., Emeritus

Lecturers:

Arkady Alexiev, Ph.D., University of California, Russian language, Slavic linguistics
Agnes Mikitz, DePaul University, Hungarian
Gyorgy Pirdovika, Ph.D., A.I. Gezhen Pedagogical Institute, Leningrad

Major Adviser: Mr. Friek.

Graduate Adviser: Mr. Hughes (Literature), Ms. Nichols (Linguistics).

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 international students from other disciplines. Many of its literature courses require no knowledge of any foreign language. Courses in non-Slavic languages of Eastern Europe, specifically, Georgian, Hungarian, and Lithuanian, are available as staffing permits. Instructors' course descriptions with reading lists and prerequisites are posted outside the department office.

Slavic House is a campus residence for 18 undergraduate and graduate students who are studying a Slavic language (though their major need not be in the Slavic Department). Preference for residence is given to those who have completed one year of study of a Slavic language. A program of lectures, films, field trips, and discussions on Slavic cultures is conducted throughout the year. Information about Slavic House residence and activities is available in the department office.

Major Program in Russian

The core major of the department integrates the study of the Russian language (Group I: Language), Russian literature (Group II: Literature), and the cultural context of language and literature (Group III: Context). Students normally complete one year of Russian language and one other lower division literature course before declaring the major. Total units required: 52-56.

Group I: Language Skills

Lower Division. 20 units. Slavic 1, 2, 3, 4 (or the equivalent).
Upper Division. 10 units. Slavic 103A, 103B, 120 (or the equivalent). (These language skill courses ordinarily will be waived for native speakers who pass a proficiency examination.)

Group II: Literature

Lower Division. 6 units. Slavic 45, 46.

Upper Division. 10-14 units. One course with readings in Russian (Slavic 180, 181, 182, 189) and two courses in Russian literature (Slavic 39, 133, 134, 134A, 134B, 134C, 134D, 134E, 134N), or, for one of the two courses, a relevant course from another program; for example, comparative literature may be substituted with the permission of the major adviser.

Group III: Context

Upper Division. 6-8 units. Two courses selected from a range of offerings in historical Russian culture (Slavic 130, 138, 148), the literatures of other Slavic peoples (Slavic 150, 160, 170), folklore or linguistics (Slavic 37, 137, 147), or, for one of the two courses, a relevant course from another program; for example, history may be substituted with the permission of the major adviser.

Total lower division units are 26. Total upper division units are 27-30.

Honors Program

The honors program focuses on writing an honors thesis. The honors student works in conjunction with a member of the faculty (the thesis director), normally in the fall semester of the student's senior year (in the course H55). The completed thesis is read by the major adviser and another member of the faculty. One additional upper division course is also required. Students with a minimum GPA of 3.5 overall and in courses for the major are invited to consult with members of the faculty in the upper division semester. With the department, which includes a preliminary statement of the topic to be investigated and the names and signatures of the members of the honors committee. The committee consists of a faculty director and one additional faculty member.

Major Programs in Other Slavic Languages

With advance consultation, students can arrange majors in Czech, Polish, or Serbo-Croatian analogous to the core major in Russian. In addition to Slavic 1 and 2 (10 units) and two lower division courses in literature and culture (37, 38, 39, 45, 46) (8 units), 10 units of the relevant elementary language (25A, 25B, 26A-26B, 27A-27B) are required. Eight units of intermediate language (Slavic 115A-115B, 116A-116B, 117A-117B), 3 units of the survey course in the respective literature (150, 160, 170), 7 units of two additional courses in the relevant major (151-152, 156-157, 159-160, 151-152, 161-162, 171-172), and a plan of study, designed in advance in consultation with the major adviser, consisting of three relevant courses (9-12 units) in Russian or European literature and history, and required. The major consists of 26 lower division semester units and 27-30 upper division units. Total units required: 53-56.

Minor Programs

Students in the College of Letters and Science may complete one or more minors of their choice, normally in a field both academically and administratively distinct from their major. In addition to required work in the Russian major during their last term of course work in the minor. Earlier consultation with a departmental major adviser concerning completion of the minor is advised.

Minor in Russian Language. Slavic 103A and 103B, 104A or 104B, 120, 160 or any course in the Slavic language and literature major, is not open to native speakers of Russian. (Note: 102 and 120 are not repeatable for credit in the minor program.)


Minor in Slavic Language and Literature. Prerequisites: Slavic 25A, 25B, 26A-26B, or 27A-27B. Two advanced language courses (Slavic 115A-115B, 116A-116B, or 117A-117B); one relevant literature survey (Slavic 150, 160, or 170); two courses in the relevant literature and topics (151-152, 156, 159); and one course in the relevant literature and topics (151-152, 156, 159). Native speakers of Polish, Serbo-Croatian, and Czech cannot minor in those languages.

Certificate in Russian and East European Studies

Slavic students who wish to enroll for the certificate must be in the Ph.D. program and have completed one year of study. Students who wish to enroll for the certificate earlier need the approval of their graduate advisor. See the index and the graduate assistant for additional information.

Admission to Graduate Study

Candidates for higher degrees must have completed an undergraduate major program in Slavic languages and literatures or received equivalent training. Prospective and current students are encouraged to acquire a background in other related fields: European languages and literature; 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 Latin, 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 a screening (permission-to-proceed examination) by the end of their second semester in order to continue in the Ph.D. program. Continuing students who earned an 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 the required courses 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) Required skills and methods courses: Pre-seminar in literary scholarship, Old Church Slavic, two semesters of a second Slavic language; and in the major language—stylistics, descriptive grammar, proficiency maintenance; (b) Period and genre courses (selected from the following): Eighteenth-century literature, Slavic Literary Theory, Sentimentalism and Romanticism, Realism, Modernism, Poetry, and Contemporary Literature; (c) Graduate seminars: at least one is required.

Linguistics Program: (a) Required skills and methods courses: Pre-seminar in Old Church Slavic, Old Church Slavic, three seminars of a second Slavic language; and in the major language—stylistics, descriptive grammar, proficiency maintenance; (b) Period and genre courses (selected from the following): Eighteenth-century literature, Slavic Literary Theory, Sentimentalism and Romanticism, Realism, Modernism, Poetry, and Contemporary Literature; (c) One period or genre literature course.

All candidates for the M.A. must demonstrate adequate proficiency in their major language, pass the department's French or German reading examination, and two written and one oral comprehensive M.A. examination.

Ph.D. Requirements. Literature: The Ph.D. program in Slavic literature consists of study on the history of the major Slavic literature to include the medieval period, the cultural context of the major literature, and the relationship of the major literature to other European literatures. Twentieth-century Slavic literary history. History of a second Slavic literature. One semester at the advanced level of a second Slavic language. 2) An extended written research project under faculty supervision and evaluation on a topic relative to the student's field of study and interests. 3) Written and oral Ph.D. examinations. 4) A dissertation.

Linguistics: The Ph.D. program in Slavic linguistics consists of (1) required courses taken by students who have earned the M.A. degree from the department's French or German reading examinations. Instruction in language-teaching methodology is provided for graduate student instructors and prospective teachers of Russian, Polish, Czech, and Serbo-Croatian. Internships (Slavic 310) are available in the teaching of literature or Slavic linguistics.

Czech

Lower Division Courses

26A-26B. Introductory Czech. (5-5) Five hours of lecture per week. Prerequisites: 26A is prerequisite to 26B. Beginner's course. Sequence beginning fall. (F,SP) Staff

Upper Division Courses

116A-116B. Advanced Czech. (4,4) Three hours of lecture per week. Prerequisites: 26B is prerequisite to 116A; 116A is prerequisite to 116B. Formerly 116 and 117A. Sequence beginning fall semester. (F,SP) Staff

Schamschula

160. Survey of Czech Literature. (3) Three hours of lecture per week. Outline history of Czech literature from the tenth century to the present, including major authors and movements. Staff

161. Readings in Czech Literature. (4) Course may be repeated for credit with consent of instructor. Three hours of lecture per week. Prerequisite: 116A and 117A. (4) May be taken concurrently. Studies in Czech literature or linguistics, or conversation, depending on the needs of the students enrolled. Schamschula

162. Topics in Czech Language and Literature. (3) Course may be repeated for credit with consent of instructor. Three hours of lecture per week. Prerequisite: 116A. May be taken concurrently. Studies in Czech literature or linguistics, or conversation, depending on the needs of the students enrolled. Schamschula
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 beginning fall, (F,SP) Staff

Upper Division Courses

115A-115B. Advanced Polish. (4,4) Three hours of lecture per week. Prerequisites: 25B is prerequisite to 115A; 115A is prerequisite to 115B. Formerly 108 and 109A. Sequence beginning fall semester. (F,SP) Yaukush

150. Polish Literature and Intellectual Trends. (3) Three hours of lecture per week. A survey of the major writers, works and trends of the Polish literary tradition from the Middle Ages to the present. Special attention devoted to the Renaissance, the age of Romanticism and the modern period. No knowledge of Polish required. (F,SP) Frick

151. Readings in Polish Literature. (4) Course may be repeated for credit with consent of instructor. Three hours of lecture and two hours of reading per week. Prerequisites: 115A. Selected readings in Polish tailored to the academic interests of students enrolled. Frick

152. Topics in Polish Language and Literature. (3) Course may be repeated for credit with consent of instructor. Three hours of lecture per week. Prerequisites: 115A, 151. Staff.

154. Polish Literature of the Twentieth Century. (3) Three hours of lecture per week. An investigation of Polish poetry, prose and drama in the 20th century. All students will discuss the following topics: Polish modernism of the turn of the century, the literature of independent Poland, Polish literature during World War II and in People's Poland, as well as Polish literature in emigration. No knowledge of Polish required. Frick

Russian Language

Lower Division Courses

1. Elementary Russian. (5) Five hours of lecture and two hours of language laboratory per week. Formerly 1 and a portion of 2. Beginner's course. (F,SP) Staff

2. Elementary Russian. (5) Five hours of lecture and two hours of language laboratory per week. Prerequisites: 111A or 111B. Formerly a portion of 2 and 3. (F,SP) Staff

3. Intermediate Russian. (5) Five hours of lecture and one hour of language laboratory per week. Prerequisites: 14, or equivalent. Formerly 4 and a portion of 5. (F,SP) Staff

4. Intermediate Russian. (5) Five hours of lecture and one hour of language laboratory per week. Prerequisites: 14, or equivalent. Formerly a portion of 5 and 6. (F,SP) Staff

13. Russian Conversation. (2) Course may be repeated once for credit. Two hours of lecture and one hour of language laboratory per week. Prerequisites: 3 (which may be taken concurrently). Life and language in the Russian's world. (F,SP) Staff

14. Russian (Self-Paced). 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-unit requirement. If units beyond those contracted for are completed, credit will be given. (F,SP) Astromoff

14A. Russian (Self-Paced). (1-5) One to five hours of self-paced per week. Prerequisites: Graduate student standing or consent of instructor.

14B. Russian (Self-Paced). (1-5) One to five hours of self-paced per week. Prerequisites: 14A or equivalent. Graduate student standing or consent of instructor.

14C. Russian (Self-Paced). (1-5) One to five hours of self-paced per week. Prerequisites: 14B or equivalent. Graduate student standing or consent of instructor.

14D. Russian (Self-Paced). (1-5) One to five hours of self-paced per week. Prerequisites: 14A or equivalent. Graduate student standing or consent of instructor.

40. Reading in Russian: First Course. (3) Three hours of reading 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) Three hours of lecture per week. Prerequisites: 4, 14D, 20 or equivalent. For advanced students to improve their pronunciation and bring it closer to native level (Superior proficiency level). Course work covers standard pronunciation of educated Russians and makes use of remedial methodology to correct phonetic mistakes and develop stable articulation habits necessary for correct Russian pronunciation, intonation, oral and written exercises, reading literary texts, dialogues of neutral and emphatic intonational coloring, and wide use of audio tapes. (F,SP) Staff

102. Readings in Specialized Russian. (3) Course may be repeated for credit with consent of instructor. Three hours of lecture and two hours of reading per week. Prerequisites: 4, 14D, or equivalent. Selected readings in scholarly (scientific and technical), journalistic and business styles to familiarize the student with the vocabulary, grammar, and phraseology. (F,SP) Staff

103A-103B. Advanced Russian. (4,4) Four hours of lecture per week. Prerequisites: 4, 14D, or equivalent. Course covers three main aspects of advanced Russian: grammar, syntax, and reading. Grammar is reviewed. Course taught in Russian. (F,SP) Astromoff

104A. Word Formation and Word Order in Russian. (3) Three hours of lecture per week. Prerequisites: 14B or equivalent. Emphasis on word formation, syntax and word order in Russian. (F,SP) Astromoff

104B. Advanced Russian Composition. (3) Three hours of lecture per week. Formerly Slavic 104. Emphasis on writing, translation, and lexical analysis. (SP) Astromoff

114. Advanced Self-Paced Russian for Native Speakers. (1-6) Course may be repeated for a maximum of 6 units. Individual conferences. Prerequisites: Oral proficiency; consent of instructor. Advanced self-paced course designed specifically for native speakers of Russian born in Russia or abroad who have never studied Russian grammar formally. Students master grammar at their own pace. (F,SP) Astromoff

120. Advanced Russian Conversation. (2) Course may be repeated for a maximum of 4 units. Three hours of conversation per week. Prerequisites: 4, 14D, 21B or equivalent. Exploring Russian culture through oral communication. (F,SP) Alexeev

Russian Literature

Lower Division Courses

38. Great Writers of Russian Literature. (3) Three hours of lecture per week. Readings in English of representative texts from the Russian literary tradition. (F,SP) Staff

45. Nineteenth-Century Russian Literature. (3) Three hours of lecture per week. Formerly 45 and a portion of 46. Development of Russian literature from Pushkin to Chekov. No knowledge of Russian required. Prerequisite to admission to the Slavic major and recommended for prospective graduate students. (F) Staff

46. Twentieth-Century Russian Literature. (3) Three hours of lecture per week. Formerly a portion of 46 and 47. Development of Russian literature from 1900 to the present, including poetry, prose and drama. No knowledge of Russian required. Prerequisite to admission to the Slavic major and recommended for prospective graduate students. (SP) Staff

Upper Division Courses

130. Medieval Russian Culture. (3) Three hours of lecture per week. Introduction to Eastern Orthodox culture of Old Russia, including literature, painting, and other visual arts. (F,SP) Staff

133. The Novel in Russia and the West. (3) Course may be repeated for credit with consent of instructor. Three hours of lecture per week. Study of major Russian and Western (European and American) 19th- and 20th-century novels, and their interrelations. Variable reading list. Staff announcement for description for Fall, (F,SP) Papp."
138. Topics in Russian and Soviet Film. (4) Course may be repeated for credit as topic varies. Three hours of lecture and two hours of screen viewing per week. This course will examine the Russian contribution to film history with particular attention to the role of the cinema in Soviet culture and Russian film's complex ties to literary and political movements. Variable topics. (F,SP) Nesper

147R. Slavic Studies Research. (1) Individual consultation. Research project to be approved by the instructor. Prerequisites: Consent of Instructor. Special research project to be coordinated with lecture course for Slavic 147. Supervised by the instructor of the lecture course in which the student is also enrolled. Final research paper of 10-15 pages required. (F,SP) Alexander

148. Topics in Russian Cultural History. (4) Course may be repeated for credit. Three hours of lecture/discussion per week. This course examines various dimensions of Russian culture—social, political, artistic, literary and cultural life. The theory and method of cultural studies will be addressed, as well as concrete historical material pertaining to Russia. Topical and period variable. Instruction and texts in English, but readings will draw on knowledge of Russian. Students are encouraged to do some reading in the original. (F,SP) Alexander

180. Studies in Russian Literature. (4) Course may be repeated for credit with consent of Instructor. Three hours of lecture per week. Prerequisites: 103A (which may be taken concurrently). Variable subject matter; see departmental announcement for description. Staff

181. Readings in Russian Literature. (4) Three hours of lecture per week. Prerequisites: 103A (which may be taken concurrently). Study and analysis of the development of the Russian literary language and short story in the eighteenth century to the present. Required for Russian-emphasis majors. (F) Hughes

182. Pushkin. (4) Three hours of lecture per week. Prerequisites: 103A (which may be taken concurrently). A survey of the writer's principal artistic works, treated in relation to his life and to developments in Russian and European literature. (F,SP) McLean

188. Russian Prose. (4) Course may be repeated once for credit with consent of instructor. Three hours of lecture per week. Prerequisites: 103B (may be taken concurrently). Course conducted in Russian. Reading, analysis, and interpretation of representative authors from the nineteenth century to the present. (F) Hughes

Serbo-Croatian

Lower Division Courses

27A-27B. Introductory Serbo-Croatian. (5-5) Five hours of lecture per week. Prerequisites: 27A is prerequisite to 27B. Beginner's course. Sequence beginning Fall semester. (F,SP) Staff

Upper Division Courses

117A-117B. Advanced Serbo-Croatian. (4-4) Three hours of lecture per week. Prerequisites: 27B is prerequisite to 117A; 117A is prerequisite to 117B. Formerly 112 and 113A. Sequence begins fall semester. (F,SP) 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. (F,SP) Alexander

171. Readings in Yugoslav Literatures. (4) Course may be repeated for credit with consent of instructor. Three hours of reading per week. Prerequisites: 117A. Selected readings in Serbo-Croatian, tailored to the academic interests of students enrolled. Alexander

172. Topics in Serbo-Croatian. (3) Course may be repeated for credit with different topics. Three hours of lecture 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. Alexander

179. Contemporary Yugoslav Short Story and Novels (3) Three hours of lecture per week. Close reading of the prose works of selected contemporary Yugoslav authors such as Andric and Krize. Alexander

General and Other Slavic

Lower Division Courses

28A-28B. Introductory Bulgarian. (5-5) Five hours of lecture per week. Prerequisites: 28A is prerequisite for 28B: consent of Instructor. Formerly 11. Sequence begins in the fall. Practical instruction in the Bulgarian language with a focus on integrated skills (reading, grammar, conversation). Course offered as staffing permits. (F,SP) Alexander

37L. Languages and Peoples of Eastern Europe and the Former USSR. (3) Students will receive no credit for 37L after taking 37R or 37W. Three hours of lecture per week. An introduction to the languages and peoples of Eastern Europe and the USSR; languages and language families, ethnic origins, traditional culture, contemporary issues. No knowledge of any foreign language is required. (F,SP) Nichols

37R. Languages and Peoples of Eastern Europe and the Former USSR. (4) Students will receive no credit for 37R after taking 37L or 37W. Three hours of lecture plus individual consultation per week. An introduction to the languages and peoples of Eastern Europe and the USSR; languages and language families, ethnic origins, traditional culture, contemporary issues. No knowledge of any foreign language is required. Additional research and writing (typically a term paper). For students wishing practice in and feedback on writing, or wishing an additional unit of credit for their analysis. The origin and ancient history of the coursework will include library research and one or more papers. No knowledge of a foreign language required. Additional class meeting and regular reading and writing assignments totaling approximately 9000 words of writing. Course is for students who have already fulfilled the 1A part of the Reading and Composition requirement. (F,SP) Nichols

38. Seminar for Lower Division Students. (3) Course may be repeated once for credit. Three hours of seminar per week. Variable topics involving the cultural histories, languages, or literatures of Slav. Coursework will include research and one or more papers. No knowledge of a foreign language required. (F,SP) Staff

99. Individual Study. (1-4) Course may be repeated for credit. Individual conferences. Must be taken on a passed/not passed basis. Prerequisites: Students must have completed 30 units of undergraduate study and have a minimum GPA of 3.0. Supervised cooperative study of topics in Eastern European and the Former USSR: languages and literatures not covered by regularly scheduled courses. (F,SP) Staff

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Individual conferences. Must be taken on a passed/not passed basis. Prerequisites: Overall GPA of 3.0. (F,SP) Staff

Slavic

Graduate Courses

200. Graduate Colloquium. No credit. 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 lecture per week. Prerequisites: Graduate standing; 103B or equivalent; consent of instructor. Advanced work in speaking, writing, and comprehension of content; vocabulary and usage; logical organization and paragraph structure; knowledge of syntactic patterns and semantic relationships; use of expository and literary devices; argument evaluation, scanning and skimming. Texts from technical literature of the social sciences. Topical(s) and field(s) will vary according to student needs. Conducted partly or wholly in Russian. (F,SP) Staff

202. Advanced Russian Readings for the Social Sciences. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 102 and 103B, 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 and paragraph structure; knowledge of syntactic patterns and semantic relationships; use of expository and literary devices; argument evaluation, scanning and skimming. Texts from technical literature of the social sciences. Topical(s) and field(s) will vary according to student needs. Conducted partly or wholly in Russian. (F,SP) Staff
240. Russian Oral Tradition. (4) Three hours of lecture per week. Prerequisites: 103B. Key readings and topics in the history, method, and theory of oral tradition. (F) Stickel, Nichols, Timberlake

240. Russian Oral Tradition. (4) Three hours of lecture per week. Prerequisites: 103B. Key readings and topics in the history, method, and theory of oral tradition. (F) Stickel, Nichols, Timberlake

242. Eighteenth-Century Russian Literature. (4) Three hours of lecture per week. This course is a survey of Russian literature from the late seventeenth century through the age of Peter the Great. Topics include the period of the Stroganovs, the development of the modern novel, and the emergence of the modern novel. (F) McLean

242. Eighteenth-Century Russian Literature. (4) Three hours of lecture per week. This course is a survey of Russian literature from the late seventeenth century through the age of Peter the Great. Topics include the period of the Stroganovs, the development of the modern novel, and the emergence of the modern novel. (F) McLean

245A. Russian Sentimentalism and Romanticism (1790s-1820s). (4) Three hours of lecture per week. Prerequisites: 103B or comparable background. This course surveys the development of Russian literature from the late eighteenth century to the early nineteenth century, focusing on the period of romanticism. (F) McLean, Paperno

245A. Russian Sentimentalism and Romanticism (1790s-1820s). (4) Three hours of lecture per week. Prerequisites: 103B or comparable background. This course surveys the development of Russian literature from the late eighteenth century to the early nineteenth century, focusing on the period of romanticism. (F) McLean, Paperno

246. Contemporary Russian Literature (1920-present). (4) Three hours of lecture per week. Prerequisites: 245A or 103B. This course surveys the development of Russian literature from the early twentieth century to the present, focusing on the period of the Russian Revolution. (F) Hughes

246. Contemporary Russian Literature (1920-present). (4) Three hours of lecture per week. Prerequisites: 245A or 103B. This course surveys the development of Russian literature from the early twentieth century to the present, focusing on the period of the Russian Revolution. (F) Hughes

285. Eastern Christianity: History and Thought. (4) Three hours of lecture per week. A survey of the religion of the East, its history, and its influence on the modern world. (F) Orlov, Hughes, McLean

285. Eastern Christianity: History and Thought. (4) Three hours of lecture per week. A survey of the religion of the East, its history, and its influence on the modern world. (F) Orlov, Hughes, McLean

282. Proseminar: Aims and Methods of Linguistic Scholarship. (4) Three hours of seminar per week. This course is an introduction to the methods and techniques used in linguistic scholarship. (F,SP) Staff

282. Proseminar: Aims and Methods of Linguistic Scholarship. (4) Three hours of seminar per week. This course is an introduction to the methods and techniques used in linguistic scholarship. (F,SP) Staff

283. Historical Grammar of Slavic Languages. (4) Three hours of lecture per week. Prerequisites: 230 or permission of the instructor. This course surveys the development of the history of the Slavic languages, focusing on the period from the late Middle Ages to the modern period. (F) Nichols, Timberlake

283. Historical Grammar of Slavic Languages. (4) Three hours of lecture per week. Prerequisites: 230 or permission of the instructor. This course surveys the development of the history of the Slavic languages, focusing on the period from the late Middle Ages to the modern period. (F) Nichols, Timberlake

345. South Slavic Linguistics. (4) Three hours of lecture per week. Prerequisites: 220. This course surveys the development of the history of the South Slavic languages, focusing on the period from the late Middle Ages to the modern period. (F) Alexander

345. South Slavic Linguistics. (4) Three hours of lecture per week. Prerequisites: 220. This course surveys the development of the history of the South Slavic languages, focusing on the period from the late Middle Ages to the modern period. (F) Alexander

328. Eighteenth-Century Slavic Literary Theory. (4) Three hours of lecture/demonstration per week. Prerequisites: 281, 282, 221, one of the following: 245, 246, 287; approval of instructor. This course surveys the development of the history of the Slavic literatures and languages, focusing on the period from the late Middle Ages to the modern period. (F) Stickel

328. Eighteenth-Century Slavic Literary Theory. (4) Three hours of lecture/demonstration per week. Prerequisites: 281, 282, 221, one of the following: 245, 246, 287; approval of instructor. This course surveys the development of the history of the Slavic literatures and languages, focusing on the period from the late Middle Ages to the modern period. (F) Stickel

328. Eighteenth-Century Slavic Literary Theory. (4) Three hours of lecture/demonstration per week. Prerequisites: 281, 282, 221, one of the following: 245, 246, 287; approval of instructor. This course surveys the development of the history of the Slavic literatures and languages, focusing on the period from the late Middle Ages to the modern period. (F) Stickel

382. Proseminar: Aims and Methods of Literary Scholarship. (4) Three hours of seminar per week. This course surveys the development of the history of the Slavic literatures and languages, focusing on the period from the late Middle Ages to the modern period. (F) Stickel

382. Proseminar: Aims and Methods of Literary Scholarship. (4) Three hours of seminar per week. This course surveys the development of the history of the Slavic literatures and languages, focusing on the period from the late Middle Ages to the modern period. (F) Stickel

382. Proseminar: Aims and Methods of Literary Scholarship. (4) Three hours of seminar per week. This course surveys the development of the history of the Slavic literatures and languages, focusing on the period from the late Middle Ages to the modern period. (F) Stickel

East European Studies

Europe and the Levant: Ideas and Institutions

1A-1B. Introductory Hungarian (5,5) Students who have taken 10 units of 1A or 10 units of 1B may not receive credit for 1A+1B. Students who have taken both 1A and 1B may not receive credit for 1A. Five hours of lecture per week plus laboratory. Prerequisites: 1A is prerequisite for 1B.

On leave, spring

On leave, spring
to 1B. Course sequence begins each Fall semester.
(F,SP) Mikhailk

Upper Division Courses

100. Readings In Hungarian (2) Course may be repeated for credit. Two hours of reading per week. Prerequisites: 1B or equivalent. (F,SP) Mikhailk

Related Courses in Other Departments

For linguistics courses, please see the graduate adviser in Slavic linguistics. For literature courses, please check with the appropriate department in addition to the graduate adviser in Slavic literature.

Social and Administrative Health Sciences

(School of Public Health)

Department Office: 515 Searle Warren Hall, 642-9441 Chair: Teyh-wol Hu, Ph.D.

Professors:

Stacey Buck, Ph.D., Johns Hopkins University. Nutritional epidemiology, antecedents, Interventions
Jeanne S. Barger, Ph.D., University of California at Berkeley. Health organization; program evaluation
William A. Hensley, M.D., University of Denver. Health attitudes, beliefs, and behavior
Ralph A. Calabrese, M.P.P., Ph.D., Syracuse University. Health behavioral sciences, psychology
Leonard J. Duhl, M.D., Albany Medical College. Planning, administration
Jeffrey W. Dwork, M.D., M.P.H., University of Rochester. Population and community health sciences
Emmett B. Hoes, M.D., New York University. Birth defects, genetics, bioethics
Tahkian, Ph.D., University of Wisconsin. Econometrics, policy analysis, health
Ron C. LaFla, M.D., Women's Medical College of Pennsylvania. Community oriented primary care
Mendell M. Dwork, Dr.P.H., University of California at Berkeley. Aging policy; social support
Thomas G. Wuthrich, Ph.D., Stanford University. Organizational theory and research
Zaharia S. Sabri, Ph.D. Pennsylvania State University. International health policy, planning
Richard M. Schaefer, Ph.D. New York University. Health economics and finance
David B. Starkweather, Dr.P.H., University of California at Los Angeles. Organization and management theory
William A. Vega, D.Crmin, University of California at Berkeley. Community mental health
Richard M. Bailey, D.B.A. (Emeritus)
Jasem H. Barmak, M.D., M.S.P.H. (Emeritus)
Hendri, Ph.D., M.D., M.S., (Emeritus)
Frank Falenak, M.D., F.R.C.P (C) (Emeritus)
William Griffiths, Ph.D. (Emeritus)
Ruth L. Huenememp, Sc.D. (Emeritus)
Edith L. Whiteman, Ph.D. (Emeritus)
Shelton Morgan, M.D. (Emeritus)
Donald Miller, M.D. (Emeritus)
Denise N. Williams, M.D., M.P.H. (Emeritus)
Ph.D. (Emeritus)

Adjunct Professor:

Carol D. Wexler, Ph.D. (Emeritus)

Lecturers:

Gary K. Stewart, M.D., M.P.H.
Constance M. Weisner, Dr.P.H.
Catherine B. Tassan, M.P.H.

Advisory Committee:

Adjunct Program:

Raul Caetano, M.D., M.P.H., Ph.D. (Adjunct) (Emeritus)

Adjunct Assistant Professor:

James E. Jackson, M.D., M.P.H. (Clinical)

Adjunct Associate Professor:

Raul Caetano, M.D., M.P.H., Ph.D.

Adjunct Assistant Professor:

Constance M. Weissman, D.P.H.

Affiliated Professors:

Eugene Brandis, Ph.D. (Public Policy)
James M. Caan, Ph.D. (Business Administration)
Frederick C. Collins, Ph.D. (City and Regional Planning)
Harold S. Leaf, Ph.D. (UC San Francisco)
Lorraine T. Midani, Ph.D. (Social Welfare)
Steven W. Stennis, M.D. (Histology-Anatomy)
Paola S. Timires, Ph.D. (Physiology-Anatomy)

Lecturers:

Elizabeth Baker, M.P.H.
Doris Debro, R.D., Dr.P.H.
Marjorie Golstein, M.S.
Bernard Gregor, Ph.D.
Sandra Heilman, Dr. P.H.
Robert A. Hossig, M.D.P.H.
Jean Morton, M.S.W., M.P.H.
Robert O'Grady, R.N., Dr.P.H.
Abby S. Rincon, Ph.D.
Francis C. Squidgers, M.P.H.
Sandra Shavers, M.D.
Gary K. Stewart, M.D., M.P.H.
Catherine B. Tassan, M.P.H.
Constance M. Weissman, Dr.P.H.

Field Program Supervisors:

Francis C. Squidgers, M.P.H.

Associate Field Program Supervisors:

Elizabeth Baker, M.P.H.
Doris Debro, R.D., Dr.P.H.
G. Jean Morton, M.S.W., M.P.H.
Robert O'Grady, R.N., Dr.P.H.

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 for careers in many possible areas. 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 competence must be demonstrated before 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, 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 in preventive medicine and 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, 188, 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

24. Freshman Seminar In Public Health. (1) Course may be repeated for credit. One hour of lecture/discussion per week. Prerequisites: 76 and 175 or 176 and consent of instructor. Theory and practice of policy, planning, implementation, and evaluation of health promotion programs in a college setting. Comparison of different methodologies (peer education, teaching, problem posing, organizational change), contact areas (stress, nutrition, alcohol and drugs, AIDS, sexuality, women's health).
191. Drugs, Health and Society. (2) Two hours of lecture and one hour of discussion per week. Introduces undergraduates to concepts basic to understanding the relationships between drugs, health and society. Using broad multidisciplinary perspective, examines legal and illegal drugs and their effects on personal and community health. Prevention of drug abuse and community organization, and individual levels will be examined. (SP) Kodama

197. Field Study In Public Health. (1-4) Course may be repeated for credit. Must be taken on a passed/not passed basis. 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)

200. Introduction to Public Health and Health Care Systems. (2-4) Four hours of lecture and two hours of discussion per week. An introduction to basic and critical perspectives of health, to social forces shaping health care policy, and to fundamental components of organized health care systems as they are influenced by ethical, technological, and economical dilemmas. Variable-unit course; 4 units for 2 modules; 2 units for Social and Behavioral Aspects of Health Systems; Exemption examinations offered for both modules. (F) Wallack, Cataldo

207. New Paradigms: The City and Health. (3) Three hours of lecture per week. An analysis of the relationship of urban development and the health of its populations. The problems of diversity, politics, participation, governance, economic development, poverty housing, community infrastructures, planning and policy will be emphasized. Healthy cities as an organizing framework for the New Public Health will be used as a model of coping with health and related concerns. Concern will be international in scope. (SP) Duhl

208. Medical Care Organization. (3) Three hours of lecture/discussion per week. Prerequisites: 207. An in-depth analysis and evaluation of the health and medical care delivery systems. Alternative methods for organizing and financing are discussed. Lecture and case materials on selected topics will be presented. (F) Schaffter

210. The Hospital As a Social and Economic Institution. (3) Two hours of lecture per week. Development of the hospital as a social and economic institution: role in health care delivery, ownership patterns, governance, medical and administrative structures and operations, quality controls, financing. (SP) Starkweather

211. Health Politics and Policy. (3) Three hours of lecture/discussion per week. Introduction to some of the major analytic concepts in public science and their applications to current health care policy. Topics include power, interests, conflict, equity, liberty, paternalism, security, rights, rules and representation. (SP) Schaffter

212. Legislation and Organization for Health and Social Services. (2) Two hours of lecture per week. Description and analysis of the principal federal health and social legislation, translation of legislation into organizational policy, and implications for planning service delivery systems. (SP) Schaffter

216. Introduction to Health Economics. (3) Three hours of lecture/discussion per week. Prerequisites: Principles of economics (macro or micro) and consent of instructor. An introduction to health economics designed to provide an overview of the field: production and utilization of health care services, health insurance, preventive health programs, cost-benefit analysis, issues of competition and regulation. (F) Robinson

217. Health Care Competition and Regulation. (2) Two hours of seminar per week. Focuses on competition and regulation as alternative approaches to influencing the way they relate to the administration of health services. Selective contracting by health insurers and state Medicaid programs, rate regulation, Medicare’s Prospective Payment System. (F) Bloom

218. Macroeconomics of Health. (3) Three hours of lecture per week. Prerequisites: 216 or consent of instructor. Application of basic concepts of microeconomics and public finance to the provision of health services. Alternative methods of financing health services, from public and private sources are examined. (SP)

219. Advanced Health Economics. (3) Two hours of lecture, one hour of laboratory, and two hours of discussion per week. Prerequisites: 216 or a recent graduate course in microeconomics. An economic analysis of the production and distribution of health care. The impact of competition and regulation of the health care industry on providers and consumers is analyzed. Economic models of health care are compared to the empirical evidence. (SP) Schaffter

220. Health Information Systems. (3) One hour of lecture and two hours of discussion per week. The technical and organizational aspects of information system design and implementation. Through lectures, extensive readings and a community-based project, students learn the theoretical and application to small and large organizations. (SP)

221. Managerial Accounting In Health Care. (3) Three hours of lecture per week. Principles of managerial accounting in health care organizations, with emphasis on government and community service agencies. (SP)

222. Health Care Finance. (3) Three hours of lectures, discussion per week. Prerequisites: Knowledge of basic financial accounting or consent of instructor. Introductory theory and practice related to financing, investment, and reimbursement policy. Students who demonstrate mastery of introductory financial accounting may enroll for three units; others must complete an additional one-unit accounting section offered concurrently. (SP)

223. Advanced Financial Management and Regulation of Health Care Institutions. (3) Three hours of lecture/discussion per week. Prerequisites: (1) 222 or Bus 370; (2) The hospitalization management must meet prerequisites (1); the other prerequisites meet prerequisites (2). Financial management and regulation of health care institutions: the impact of 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

224. Health Care Payment Systems. (3) Three hours of lecture/discussion per week and optional section. Analysis of the payment systems and performance of payment and reimbursement systems in the United States. (SP)

225. Health Care Organizations and Environments. (3) Three hours of lecture/discussion per week. Introduction to health administration, focusing on theoretical management, current issues, and as they relate to the administration of health services. Cases, simulation, and structured experiences will be used to tie theory to practice. (SP) Bloom

226. Advanced Organization Theory and Health Institutions. (3) Three hours of lecture/discussion per week. Prerequisites: 225 or 222, or consent of instructor. Study of current approaches to the theories of innovation and change as they relate to the administration of health services. Emphasis is placed on price and non-price competition. HMOs, selective contracting by health insurers and state Medicaid programs, rate regulation, Medicare’s Prospective Payment System. (F) Starkweather

227. Advanced Health Organizations and Environments. (3) Three hours of lecture per week. Prerequisites: 225 or 222, or consent of instructor. Study of current approaches to the theories of complex organizations, inter-organizational relationships and control, conflict and change. (F) Starkweather

228. Concepts and Issues in MCH and Community-Oriented Primary Care. (3) Three hours of seminar per week. This seminar will consider concepts in the field of public health care services. Inherent in maternal and child health care are complex care programs, including: community, community-oriented, primary care, family, family-centered, culturally-sensitive, service systems, and children with special health care needs. (SP) Lashof, Platt

229. The Role of Public Health In Community Planning. (3) Three hours of lecture per week. The theories and methods of community planning and their implications for public health are described. Students are also introduced to the opportunities available to public health professionals to participate in the planning process. (F,SP) Catalanò
230. Quantitative Methods for Health Policy and Administration. (4) Three hours of lecture and two hours of discussion per week. Prerequisites: BEHS 130A or consent of instructor. Application of quantitative analysis and research methods to problems and decision-making in health service systems and facilities; introduction of selected quantitative techniques; emphasis on identifying and formulating systems and problems amenable to solution through use of quantitative techniques. (SP) Hu

231. Advanced Quantitative Methods for Health Policy and Administration. (2) Two hours of lecture and one hour of laboratory/discussion per week. Prerequisites: Business Administration 204B or 230 or equivalent. Emphasis on 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) Hu

232. Public Health and the Economy. (3) Three hours of lecture per week. Students are introduced to the literature that suggests that the performance of a regional economy affects the health of the population it supports. Controversies in the theoretical and empirical support for this point of view are discussed. The implications of the work for public health practice are described. (SP) Catano

233. Research Issues in Health Services. (3) Three hours of seminar per week. Critical analysis of selected topics in health services research, including approaches to solving research issues, theoretical considerations, and implications for policy and delivery systems. (SP) Rivasi

234. Research Methods for Health Services I. (3) Three hours of lecture per week. Prerequisites: 217, BEHS 130A-130B (can be concurrent). Review of multivariate statistical methods including time series for analyzing health service data, regression analysis, experimental design, and data modeling. (F) Hu

235. Research Methods for Health Services II. (3) Three hours of seminar/discussion 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) Hu

236. Doctoral Seminar in Public Health Application of Time Series Analysis. (3) Two hours of lecture and one hour of laboratory per week. Prerequisites: Consent of instructor. An introduction to time-domain analyses of official government time series data in the study of health and social phenomena. Applications in forecasting and hypothesis testing will be demonstrated. (F) Catano

240. Cultural Theory in Public Health. (3) Three hours of lecture per week. The use of theory in a public health context, with focus on understanding the role of culture in the perception, recognition, presentation, treatment, and prevention of health problems. Existing theory is critically examined from a multidisciplinary perspective, with attention to conceptualization, integration of theory, and application to health behavior development. The implications of the proposed applications of culture to health are developed. (SP) Block

241. Social Theory in Public Health. (3) Three hours of lecture/discussion per week. A presentation of the current and recent empirical analyses of the relationships among social factors and health. Major theoretical perspectives are presented as frameworks in which major social phenomena are discussed, including demographic factors, lifestyle factors, and health system factors, and their impacts on health status. (F) Morgan

242. Behavior Theory in Public Health. (3) Three hours of seminar 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) Bruvold

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) D'Onofrio

244. Advanced Health Education: Group Work. (3) Three hours of discussion/laboratory per week. Must be taken on a satisfactory/unsatisfactory basis. 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 understanding of small group dynamics, and to provide students with experience of being influenced in such ways as to protect, promote, or restore the public health. (SP) Brown

245. Health Education in Medical Care Settings. (3) Three hours of lecture/discussion per week. Prerequisites: Graduate standing. Overview of trends and issues in patient education, including planning, staffing, and evaluating programs. Consideration of educational concepts and principles, and health behavior models as they 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) Three hours of seminar per week. Prerequisites: Major in Public Health Education or consent of instructor. An examination of social-psychological concepts and theories basic to the practice of public health education, including analysis of community organization process, theory, and research. (F) Minkler

247. Mass Communications in Public Health. (3) Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. Review general theories, models, and assumptions of use of mass communications to communicate health information and assess various American health campaigns. Study unplanned health campaigns—i.e., using content analysis techniques to understand influence of prime time television programming on drinking patterns and problems, as well as implications of advertising in various media. Examine the structure of the mass communication system and its implications for public health. (SP) Wallace

248. Training as an Educational Methodology. (3) Three hours of lecture/discussion per week. Prerequisites: Theories of learning, educational theories, concepts, and principles of training as a field and as a process. Examines the types of educational situations in which training is, as an intervention, it best applied. Analysis of training approaches, including the justification of training as an educational methodology. (F) 249. Social Movements and Public Health. (3) Three hours of lecture/discussion per week. An examination of major theories of social movements and their application to public health including nativist and revitalization movements, resource mobilization theory, status conflict and deprivation theories and the identity-oriented paradigm. Case studies from public health movements such as organizing in the gay community for AIDS health care. Focus on movements related to reproductive issues, alcohol and drugs, and self-help will be explored to assess relevance of social science theory. (F) Herd

251A. Assessment of Nutritional Status. (3) Three hours of lecture/discussion per week. Prerequisites: Graduate standing in public health. Concepts, methods, and limitations of the determination and interpretation of nutritional status; application of methodologies for determining and interpreting data; technical, social, and political implications of nutritional assessments and related community programs. (SP) Sabry

251B. Public Health Nutrition. (3) Three hours of lecture per week. Prerequisites: 251A. Evaluation of nutrition programs. (Second semester core course.) (F) Sabry

251C. Nutrition Intervention Programs. (3) Three hours of lecture/discussion per week. Prerequisites: Graduate standing and consent of instructor. Interventions for chronic disease prevention, including food and nutrition education, behavior change, and other programs to reduce the risk of chronic disease. (SP) Sabry

251L. Laboratory in Public Health Nutrition. (3) Three hours of lecture and two hours of lecture per week. Prerequisites: 251A, 208, or concurrent enrollment. The course is taken concurrently with SAHS 251A in Fall Semester and with SAHS 259 in Spring Semester. Students observe and participate in the work of community nutritionists. (F,SP) Disbrow

252. Current Development in Public Health Nutrition. (3) Three hours of lecture/discussion per week. Prerequisites: Previous coursework in advanced nutrition, or consent of instructor. An examination of current literature related to public health nutrition issues and problems; implications for programs and research; applications to communication with health professionals and the public. (SP) Abrams


254. Nutrition and Aging. (3) Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. The effect of nutrition on the aging process and the evaluation of the food and nutritional needs of the elderly from a biological, psychological, and social perspective; with emphasis on impediments to satisfy these needs and the necessary intervention programs. (SP) Sabry

255. International Nutrition. (3) Three hours of lecture/discussion per week. Prerequisites: Consent of instructor. A survey of the development of the nutritional frameworks for the development of the international nutrition programs and projects. (SP) Sabry

259A. Public Health Aspects of Nutritional Care: Selected Facilities. (3) Course may be repeated for credit. One hour of lecture/discussion and eight hours of fieldwork per week. Prerequisites: Completion of 259A or consent of instructor. The organization and delivery of nutrition care services facilities such as health departments, ambulatory health care settings, child care and education facilities, skilled nursing facilities, and senior nutrition programs. Included are nutrition education and counseling, food service programs, mass media education, and research. (SP,SP) Sabry

257. National Food and Nutrition Policy. (2) Two hours of lecture/discussion per week. Prerequisites: Some educational or work experience in the nutrition field, or consent of instructor. Understanding the functioning of the administrative, judicial, and legislative branches of the United States government in the nutrition policy arena. (SP) Sabry

259B. Under-Nutrition in the United States. (2) Two hours of lecture per week. Introduction to data on under-nutrition, focusing on micronutrients such as vitamin A and iron. Discussion of the role of dietary factors in diseases such as diabetes, obesity, and anemia, and the social and political implications of the spread of obesity. (SP) Sabry

259C. Nutrition Intervention Programs. (3) Three hours of lecture/discussion per week. Prerequisites: Graduate standing and consent of instructor. Interventions for chronic disease prevention, including food and nutrition education, behavior change, and other programs to reduce the risk of chronic disease. (SP) Sabry
260A. Problems and Programs: The MCH Infrastructure and Political Area. (1) Three hours of lecture/discussion per week for five weeks. Prerequisites: MCH major or consent of instructor. The public health perspective of maternal and child health: advocacy and legislation, the historical development of maternal and child health programs in the United States and the present structure and future relationships of the federal, state, and county maternal and child health programs. (F) O'Grady, Morton

260B. Problems and Programs in Maternal and Child Health: Needs Assessment. (2) Three hours of lecture/discussion per week for ten weeks. Prerequisites: Major in M.C.H. or consent of instructor. Strategies for conducting needs assessments in maternal and child health. Examination of the effects of major social and economic forces on U.S. society on the identifying needs of target populations in maternal and child health. Focus on the rationale and applications of needs assessment in local communities and state health departments. Various approaches used to evaluate health needs in diverse maternal and child health populations and communities are examined. (F) Guendelman

260C. Delivering Maternal and Child Health Services. (2) Course may be repeated for credit. Two hours of seminar per week. Research methods and issues in maternal and child health, with emphasis on epidemiologic methods. Specific adverse reproductive outcomes, risk factors and prevention. Will include critiques of published studies and techniques of proposal writing. (SP) Ekenzari

261. Human Growth and Development: The Life Cycle. (Spain). (2) Two hours of lecture/discussion per week. Focus into man: human biological bases; somatic growth; psychological, behavioral, and cognitive development; nutritional and socioeconomic factors, and public health issues. (SP) Faktor

262. International Maternal and Child Health. (2) Two hours of lecture/discussion per week. Assessment of resources in health care, infants, and children on worldwide basis; special emphasis on issues, problems, policies, and programs affecting MCH and family planning in developing countries. (F) Hosang

263. Evaluation and Improvement of Perinatal Health: International Perspective. (3) Three hours of lecture per week. The course is designed for students planning to do perinatal program development or research. Perinatal outcome variables and their measurement, factors that affect the quality of outcomes and strategies to improve perinatal outcome will be considered. Readings address both national and international issues. (SP) Gould

264. Application of Genetics to Maternal and Child Health. (3) Three hours of lecture per week. Basic principles of, and recent advances in, genetics, and their application to public health programs. (SP) Hook

265. Reproductive Hazards of Industrial Chemicals. (3) Three hours of lecture per week. Prerequisites: BEHS 122 or BEHS 130. The course will provide the student with the scientific knowledge necessary to assess the hazards of chemical exposure to humans and female reproduction. The scope of the course includes the effects of chemical exposures in the workplace and in the environment. Current and critical scientific articles are critiqued. Non-chemical hazards, e.g., radiation, are not discussed. (F) Ekenzari

266. Programs for Children and Youth with Special Health Care Needs. (2) Two hours of lecture/discussion per week. Organization, funding, delivery, and evaluation of programs for handicapped children, youth, and families at national, state, and local levels. Main focus on physical handicaps and developmental disabilities. (SP) O'Grady

267. Family Issues, Child Care, and Public Health. (2) Two hours of seminar per week. Prerequisite: Graduate standing or consent of instructor. Examines family needs and critical issues in health promotion for families with children from demographic, life cycle, and policy perspectives. Role of child care as a family support will be studied. (F)

268. Population Dynamics, Family Planning, and Health. (2) Two hours of lecture/discussion per week. Introduction to family planning policies and service delivery systems. Interrelationships between population dynamics, economic, family, and health development. Role of family planning in international health development and activities. (F) Stewart

269. Biomedical and Behavioral Aspects of Family Planning. (2) Two hours of lecture/discussion per week. The physiology of reproduction, methods of fertility control, and recent advances in contraception, sterilization, and abortion. Current issues in family practice. (SP) Stewart

270. Ethnic and Cultural Diversity in Health Status and Behavior. (3) Three hours of lecture/discussion per week. Prerequisites: Graduate standing or consent of instructor. Examines ethnic cultural diversity in health behavior as a basis for public health programs. Consideration of U.S. ethnic minority groups and cultural groups in non-Western societies. Health status and behavioral characteristics of these various groups and anthropological theory (social class, acculturation, political economy). Influence of socio-cultural background on concepts of health, illness and health-seeking behavior. Implications for planning public health programs and policies. (SP) Foster

271. Indian Health Care: Past, Present, and Future. (2) Course may be repeated for credit. Two hours of lecture per week. Introduction to the Indian health field to better prepare students for services in Indian health programs to provide students with the capacity to analyze policy, program, and practical problems of providing Indian health care; constructively to criticize pertinent Indian health issues; and to develop alternative approaches to solve Indian health problems. The course is intended to draw students from all disciplines within the school of public health. (SP) Hodge

272. Aging: Value and Social Policy Issues. (3) Three hours of lecture per week. Prerequisites: Graduate standing in public health or related discipline. This seminar examines key themes and issues central to understanding the historical development of public health education, public policy, and aging. (SP) Minkler

273. Aging, Health and Functioning. (3) Three hours of lecture per week. Prerequisites: Graduate standing. An examination of conceptual and analytic issues associated with the assessment of aging and cognitive functioning in clinical, epidemiologic, and health services research. Special attention will be given to measures of quality of life, quality of care, and active life expectancy in studies of older populations. (F) Santoro

274. Occupational Health Education. (2,3) Two hours of lecture per week and three hours of optional fieldwork. Participants from various disciplines survey current issues in occupational health: the scope of hazards faced by workers; an overview of social, legal, and political forces that impact occupational safety and health; health education programs designed to prevent occupational illness and injury; and practical skills for planning and implementing effective occupational health programs. (SP) Baker

275A-275B. Clinical Aspects of Human Genetics. (3,3) Three hours of lecture per week. Prerequisites: Consent of Instructor. Formerly Genetics 235A. The clinical delineation of human genetic diseases, including those due to single gene and polygenic disorders. Genetic diagnoses, clinical management, and developmental aspects of disease states. (F,SP) Hook

276. Substance Abuse Prevention. (3) Three hours of 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 growing community and inter-drug problems and their preventive strategies and their effectiveness. (F,SP) Morgan

279. Problems and Programs in Mental Health. (3) Three hours of lecture/discussion per week. Examines historical development of mental health issues in the community, specifically policy, program goals, local needs assessments, and federal, state, and county interactions. Then takes a closer look at the contemporary community mental health environment, impacts of recent budgetary policies, stress on the importance of community needs, and projections of future trends and policy options. (SP) Vega

280. Research Methods: Logics and Design. (3) Three hours of lectures and group discussions per week. The study of logic, theory, concepts, and methods of behavioral research as they apply to public health. (F) Ceccoli

281. Research Methods: Program Evaluations. (3) Three hours of lectures/discussions per week. The study of methods, concepts, and uses of evaluation research as they apply to public health. (SP) Rundall

283. Advanced Methods: Field Applications. (3) Three hours of lecture/discussion per week. Critical analysis of selected research topics in health, including topics to conduct an epidemiologic study; selected individual, family, and community issues, methodological problems in planning and conducting field investigations, and management of large-scale research projects. (SP) Hayden

284. Advanced Methods: Interpretive Research. (3,4) Three hours of lecture/discussion and one optional three hour laboratory per week. Prerequisites: Doctoral student in Public Health or a related discipline, or consent of instructor. The study of observational and related methods used to describe and assess the health behavior and health care delivery. (F) Morgan

285. Advanced Methods: Interviews and Questionnaires. (3,4) Three hours of lecture/discussion and one optional three hour laboratory per week. Prerequisites: Doctoral student in Public Health or a related discipline, or consent of instructor. The study of interviews, questionnaires, and other methods used in health and related surveys. (SP) Rundall

286. Advanced Methods: Measures and Inferences. (3-4) Three hours of lecture per week. Course focuses on one optional three hour laboratory per week. Prerequisites: Doctoral student in Public Health or related discipline, or consent of instructor. The study of quantitative methods for measuring health attitudes, beliefs, and behaviors. (F,SP) Bruvold

290. Health Issues Seminar. (1-4) Course may be repeated for credit. One to four hours of seminar per week. A discussion of current developments and issues in public health of interest to faculty and students of the Department as a whole. Content varies from year to year, depending upon current issues and interests. (F,SP)

292. Seminars for M.P.H. Students. (1-4) Course may be repeated for credit. One to four hours of seminar per week. Current topics and special issues in the field. (F,SP)

293. Dr.P.H. Seminar. (1-4) Course may be repeated for credit. Four hours of seminar per week. Discussion and analysis of dissertation research projects, as well as of conceptual and methodological problems in planning and conducting health research. (F,SP)

294. Post-Residency Seminar. (2-3) Two to three hours of lecture per week. Prerequisites: Residency in administration, planning, or evaluation. Advanced analysis of field residency experiences as related to academic work, theoretical and practical issues in public health, and professional practice in the student's public health department. Critical analysis of integration of concepts and skills as this furthers each student's professional development. (F,SP)
Social Sciences

Social Welfare (School of Social Welfare)

School of Social Welfare Office: 120 Haviland Hall, 642-4341
Harry Specht, Ph.D.
Academic Administrator: Paul Terrell, Ph.D.
Field Work Coordinator: Donald Clammer, Ph.D.
Assistant Dean for Administration: James C. Steele

Professors:
Michael Austin, Ph.D. University of Pittsburgh, Management and planning
Richard P. Bart, Ph.D. University of California at Berkeley.
Eloise Gabrielle, Ph.D. University of Michigan, Child welfare, mental health
Jewell Terhil Gibbs, Ph.D. University of California at Berkeley. Adolescent psychology, minority mental health
Neil Gilbert, Ph.D. University of Pittsburgh, Social policy and planning
Hendryx Miller, D.S.W. Columbia University, Research, mental health
Leone S. Miller, Ph.D. University of California at Berkeley. Economics and social service
William McGilley Runyan, PhD. Harvard University. Adult development
Steven P. Segal, Ph.D. University of Wisconsin. Mental health
Lorraine R. Snowdon, Jr., Ph. D. Wayne State University. Social policy
Harry Specht, Ph.D. Brandeis University, Social planning, professional evaluation
Emil Grosswendt (Emeritus), Ph.D.
Reich M. Kramer (Emeritus), D.S.W.
James W. Sturges (Emeritus), Ph.D.
Maurine McKeary (Emeritus), Ph.D.
Robert Frazer (Emeritus), Ph.D.
Margaret S. Schubert (Emeritus), Ph.D.
Kenneth T. Wiltse (Emeritus), D.S.W.

Assistant Professors:
Lorraine Midlack, Ph.D. Johns Hopkins University. Health services, substance abuse
Evelyn Schrader, Ph.D. Stanford University, Gerontology
Yu-Wen Ying, Ph.D. University of California at Berkeley. Psychotherapy

Assistant Professors:
Mary Ann Mason, J.D. University of San Francisco, Ph.D. University of Pennsylvania. Social policy
Kurt C. Organski, Ph.D. Arizona State University.
Latin/Minor Psychosocial adaptation, psychology

Coordinator of Field Work/Associate Adjunct Professor:
Barbara L. Kenney, Ph.D. University of Michigan. Field education

Field Work Consultants/Lecturers:
Anna-Theessa Agaste, M.S.W.
Doris Britt, M.S.W.
Barb Cornet, M.S.W., M.P.H.
Joan Dunkel, M.S.W.
Gwendolyn Foster, M.S.W.
Rafael Frenkel, M.S.W.
Peter Menpole, M.S.W.
Barrie K. Robinson, M.S.S.W.

Academic Admisistration/Lecturers:
Paul Terrell, D.S.W. University of California at Berkeley. Social policy

Lecturers:
C. Angela Grovene Miller, D.S.W. University of California at Berkeley
Jill Duen-Berrick, Ph.D. University of California at Berkeley
Renee Gross, M.D. University of Maryland, M.P.H.
University of California at Berkeley
Eva J. Klein, Ph.D. City College of New York, Graduate Center
Michael Lehn, Ph.D. Smith College of Social Work
Telora Paslow, D.S.W. University of California at Berkeley
Doris Phillips, D.S.W. University of California at Berkeley
Angela Rizzoli-Gosford, M.S.W. Boston University
Margaret Watson, D.S.W. University of California at Berkeley

Undergraduate Group Major Adviser: Mr. Terrell.

Undergraduate Program, College of Letters and Science

The Department of Social Welfare administers an undergraduate major in social welfare in the College of Letters and Science. The group major, leading to the degree of Bachelor of Arts, offers a sequence of social welfare courses and social science electives of general interest to liberal arts students. It provides students with an opportunity to test their career interest in social work prior to employment or graduate professional education. Applicants to the major will be considered throughout the year.

Major Requirements

Lower Division. Psychology 1, Sociology 1 or 2, and Statistics 2 or equivalent. Recommended: Anthropology 3, Economics 1, Political Science 1.

Upper Division. A minimum of 29 upper division units, including 100, 102, 103, and 105: a minimum of five courses chosen from the list of restricted social science electives—three of the courses taken in one department and two selected from other departments. For a list of courses acceptable for the Social Welfare Undergraduate Office, 117 Haviland Hall.

Honors Program. Eligible social welfare majors, upon recommendation of their advisors, may enroll in a special honors course (Social Welfare H189) to prepare an honors thesis. Prerequisite: Social Welfare 100, 102. The senior thesis will be a creative and integrative character, the product of a research project of special interest to the student. A faculty committee will approve it for honors, and faculty. For admission to the Honors Program, an overall grade-point average of 3.3 and a grade-point average of 3.3 in the major are required. To graduate with honors, a grade-point average of 3.3 overall and a 3.5 in the major are required.

Graduate Program

For program description, see page 108.

Lower Division Courses

20AC. Social Welfare Through Literature: The Problem of Race and Ethnicity in the U.S. (3) Two hours of seminar per week plus individual consultation. A vision of the social problem of race and ethnicity in America as perceived by creative writers. This course satisfies the American cultures requirement. (F) H.

29. Freshman/Sophomore Seminar, (2-4) Courses may be repeated for credit as topic varies. Seminar format. Sections 1-2 to be graded on a letter-grade basis. Sections 3-4 to be graded on a passed/not passed basis. Prerequisites: Preference given to freshmen and sophomores. Sections 4 will be open to other students. Students are advised to consult the Social Welfare Undergraduate Office, 117 Haviland Hall for information. (F, SP, Fall, Spring) Staff.

98. Group Study in Social Welfare, (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Group study on selected social welfare topics. Open to freshmen and sophomores. (F, SP) Staff.

Upper Division Courses

100. Social Welfare Policy. (3) Two hours of lecture and one hour of discussion per week. Analysis of social welfare policies and programs including public assistance, social insurance, social services, and health and mental health. (SP) Terrell

102. Social Work As A Profession. (2) One hour of lecture and one hour of discussion per week. This course examines social work as a profession: What social workers do (the practice of the profession); where they do it (the organizational context of professional practice); and the rules of conduct they follow (the ethics of the profession). (SP) Agaste

103. Practice in Social Work. (2) Two hours of lecture and one hour of laboratory/discussion per week. An introduction to the basic skills of interpersonal helping and problem solving and to related theory and research. (F) Agaste

104. Field Study in Social Work. (4) Fifteen days of fieldwork plus two hours laboratory per week. Must be taken on a passed/not passed basis. Prerequisites:

Interdepartmental Studies Courses

Graduate Course

IDS 250. 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. Methods of program evaluation are reviewed. Sponsoring departments: Nutritional Sciences, Agricultural and Resource Economics and Social and Administrative Health Sciences. (SP) Staff.

Social Sciences (College of Letters and Science)

The social sciences field major was closed to new majors at the end of Summer Session 1982. The interdisciplinary studies field major (ISP), established in fall 1982, includes the former field majors in social sciences and humanities. The ISF major thus affords undergraduates a thoroughly interdisciplinary framework for their studies. The program allows students to establish areas of concentration in the humanities, the social sciences, or in areas that draw on both.

For further information, see the interdisciplinary studies field major listing in this catalog.
103. Supervised field work in social agencies plus university-based integrative seminars. Open only to social welfare majors meeting minimum requirements. (SP) Staff

105. Social Problems and Social Welfare. (2) Two hours of lecture per week. Course examines social problems and policy responses from the perspective of state and local policymakers, program administrators, and direct service workers. Focus on resource allocation in a context of fiscal, organizational, and political constraint. (SP) Duerr-Berrick

H195. Senior Honors Course. (1-3) Course may be repeated for credit. Individual consultation. Prerequisites: 100. Preparation of an honors thesis. (SP) Staff

187. Field Studies in Social Welfare. (1-3) Field work in community agencies and individual conferences with faculty. Must be taken on a passed/not passed basis. Supervised experience relevant to specific aspects of social welfare in off-campus organizations. Regular individual meetings with faculty sponsor and written reports required. (F,SP) Staff

188. Group Study for Advanced Undergraduates. (1-3) Course may be repeated for credit. Lecture and discussion. Must be taken on a passed/not passed basis. Group study on selected social welfare topics. (F,SP) Staff

189. Supervised Independent Study and Research. (1-3) Course may be repeated for credit. Tutorial conference. Must be taken on a passed/not passed basis. Enrollment is restricted by regulations specified in the General Catalog. (F,SP) Staff

Graduate Courses

200. Human Behavior and the Social Environment. (2) Two hours of lecture per week. The psychological, interpersonal, and social development of the person across the life cycle in the context of different social environments. (F) Staff

205. Psychosocial Problems and Psychopathology. (2) Two hours of 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) Staff

210A. Stress and Coping in Adulthood. (2) Two hours of lecture per week. Prerequisites: 200. Descriptions, measurements, and major theories concerning the etiology of stress and coping in the adult (25-65 years). (SP) Organista

210B. Infant Development. (2) Two hours of lecture per week. Prerequisites: 200. Topics and issues in infant development, including infant mental health, parent-child relationships, behavior assessment, predictors of competence, and intervention with high risk infants. (F) Staff

210C. Aging Processes. (2) Two hours of lecture per week. Prerequisites: 200. Sociological, psychological, and physiological variables relevant to the assessment of older persons. (SP) Scharlach

210D. Life Histories and Case Studies. (2) Two hours of lecture per week. Prerequisites: 200. Theoretical and practical problems in the study of adult individuals. Focus on the intellectual and social processes involved in the formulation, critical examination, and reformulation of clinical case studies and psychosocial treatment. (F) Staff

210E. Human Development and Social Policy. (2) Two hours of lecture per week. Prerequisites: 200. Selected topics in human development and their relevance for social planning and administration. Attention to theoretical and methodological issues in the 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. (2) Two hours of lecture per week. Prerequisites: 200. Focus on the networks of individuals and the institutions they refer to in order to render assistance in times of physical or emotional strain. How networks operate; their accomplishments and limitations; the role and skills of professionals in assessing and utilizing networks for clients. (SP) Snowden

210G. Perspectives in Personality: Personality Theory and Therapy. (2) Two hours of lecture/discussion per week. Major approaches to personality theory, including psychodynamic, behavioral, psychometric, and humanistic theory, as well as work in culture and personality, the study of personality and adjustment across the life span. Examination of personal interactions in the lifetime and relations between the self, work, and social historical context of Freud, Skinner, Rogers, Eysenck, Margaret Mead, and others, with attention to the origins, course, and (often) course of each tradition. Also listed as Psychology 250E and Interdepartmental Studies 210H. (SP) Runyan

220. Introduction to Social Welfare Policy. (2) Two hours of lecture per week. Analysis of issues in social welfare policy and recent trends shaping the development of the American welfare state. (F) Gilbert

222. Mental Health and Social Policy. (2) Two hours of lecture per week. Mental health policies and programs at the national, state, and local levels; major factors influencing the provision of mental health services; reciprocal relationships between mental health policy and social welfare. (SP) Swelch

223. Designing Solutions to Mental Health Problems. (2) Two hours of 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 social workers. (SP) Swelch

226. Social Policy and Gerontology. (2) Two hours of 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. (F) Gilbert

227. Advanced Study in Aging Policy. (2) Two hours of lecture per week. Advanced study in special program and policy areas. Staff

230. Social Policy: Children and Families. (2) Two hours of lecture per week. Introduction to current problems, programs, and policies in child, youth, and family welfare. (SP) Barth

231. Advanced Study in Children and Family Policy. (2) Two hours of lecture per week. Advanced study in special problem and policy areas. Staff

234A. Law and Social Welfare: Children and Families. (2) Two hours of lecture per week. Legal information and policy discussion for social workers and other human service providers in the child and family welfare field. Staff

234B. Law and Social Welfare: Health and Mental Health. (2) Two hours of lecture/discussion per week. Addresses major legal issues in Health and Mental Health encountered by social workers. Topics include reproductive rights, AIDS, right to treatment. (SP) Manon

234C. Legal Issues in Aging. (2) Two hours of lecture/discussion per week. Legal information, policy discussion, and advocacy skills for social workers and other human service providers in the field of aging. (F) Staff

239A. Social Welfare in the Workplace. (2) Two hours of seminar per week. Course reviews characteristics of and controversies in modern employee services. Examines employer-sponsored programs in mental health, substance abuse, family counseling, and other direct and indirect services. Staff

239B. Drug and Alcohol Policy. (2) Two hours of lecture per week. 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 models of substance abuse. In addition, the development and evaluation of alcohol and drug abuse treatment will be discussed. (SP) Midanik

239C. Health Policy—A Social Welfare Perspective. (2) Two hours of lecture per week. Reviews major issues and programs in the health care field. Course considers the roles of the public, voluntary, and private sector; the implications of policies and programs for society and the individual client. (SP) Midanik

239D. Women’s Issues. (2) Two hours of lecture per week. The changing roles of women in society and their impact. Topics include socio-economic status, 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 a systemic framework to investigate impacts on women. (F) Staff

239E. Social Policies Affecting Indian Children, Families, and Communities. (2) Two hours of lecture per week. Overview of major social policies and their impact on Native Americans. Examines special relationships of Indian tribes and the federal government and its consequence for human services formulation and delivery and issues of termination, relocation, self-determination, urban and rural communities, and policies. Staff

239G. The Family in Transition: Issues—Policy and Practice. (2) Two hours of lecture per week. Introduces students to recent trends in family structure, examining divorce, remarriage, single-parent and two career families, and homosexual and bisexual families with children. Social policy as reflected in law and legislation will be assessed.

240. Introduction to Social Welfare and the Profession of Social Work. (1) Fifteen hours of lecture per semester. Course examines the history, development, and mission of the field and profession, fundamental social work values and the organizational context of practice. (F) Specht

241. Foundations of Social Work Practice. (2) Two hours of lecture/discussion per week. Introduction to fundamental values, knowledge, processes, and skills of social work practice. (F) Staff

243. Direct Practice in Child and Family Settings. (2) Two hours of lecture per week. Prerequisites: 241. Direct intervention models for addressing the behavioral, emotional, and situational problems of children and families in child welfare, mental health, medical, school, and community settings. (SP) Ageson

244. Direct Practice in Mental Health Settings. (2) Two hours of lecture/discussion per week. Prerequisites: 241. Planning, implementing, and evaluating services for clients with major mental disorders or at risk for developing mental illness. Review of intervention models addressing the needs of clients for basic resources, social rehabilitation, and clinical treatment. (SP) Herrera, Manolescu

245. Direct Practice in Health Settings. (2) Two hours of lecture/discussion per week. Prerequisites: 241. Examines the rationale for therapeutic models used by social workers in health care; the interaction of health care policies and practices; interdisciplinary leadership; and the ethical dimensions of practice. (SP) Dunkel

246. Direct Practice in Aging Settings. (2) Two hours of lecture/discussion per week. Prerequisites: 241. Comprehensive assessment of the elderly, normal and abnormal; dimensions of the aging process; and interdisciplinary models for working with the elderly. (SP) Scharlach

250A. Social Work with Groups. (2) Two hours of lecture per week. Prerequisites: 241. Practice regarding the formation, sustainability, and termination of groups. Emphasis on the role of the social worker in facilitating inter-personal processes in groups. (SP) Staff

*On leave, spring, fall
*On leave, fall

Recalled to active service
Recipient of Distinguished Teaching Award
250B. Family Therapy. (2) Two hours of lecture per week. Prerequisites: 241. Theoretical frameworks and intervention skills for family work. (F,SP) Paskin, Riscoll-Gould

250C. Brief Therapy and Crisis Intervention. (2) Two hours of lecture per week. Prerequisites: 241. Examines the clinical application of crisis intervention and brief psychotherapy from an historic and psychodynamic perspective. Provides assessment criteria for assessing clients for brief treatment and techniques for intervention. (F) Herrera

250D. Psychotherapeutic Methods with Adults. (2) Two hours of lecture per week. Prerequisites: 241. Treatment planning and applications for clinicians. Examines supportive treatment, depression and suicide management, and the use of cognitive behavior therapy and assertive psychotherapy and other intervention models. (F) Laughran

250E. Comparative Psychotherapies. (2) Two hours of lecture/discussion per week. Prerequisites: 241. Examines common and unique elements in the major theoretical orientations to the practice of psychotherapy. Staff

250F. Family Relationships and Aging. (2) Two hours of lecture/discussion per week. Prerequisites: 241. Course examines how the aging process affects family dynamics. Particular attention given to relationships between adults and their parents and grandparents, as impacted by psychological, social and physical changes in later life. Examines strategies for improving family functioning. (SP) Scharfach

250J. Social Work With Latino Populations. (2) Two hours of lecture/discussion per week. Prerequisites: 241. Examines major social problems and mental health issues confronting Chicanos and other Latino groups in the U.S. Emphasis on the assessment and treatment of psychosocial problems. (SP) Organista

250K. Psychosocial Issues and Interventions in the HIV Epidemic. (2) Two hours of lecture for seven and one-half weeks. Prerequisites: 241. Course provides an understanding of the impact of the HIV epidemic on social systems, population groups, communities, families and individuals. A range of interventions, based on the bi-psycho-social model will be discussed.


250M. Curriculum and Career Counselling In Schools. (1) Fifteen hours of seminar per semester. This course is designed to help students meet the career and curriculum development components of the P.P.S. credential in school social work. Addresses theories and assessment techniques in career counseling and the structure and goals of curricular students must be concurrently enrolled in a school-based field placement.

250N. Social Work with Chronically Mentally Ill Adults. (2) Two hours of seminar per week. Prerequisites: 241. Theories and techniques of direct intervention useful in helping those with major mental disorders develop alternative coping strategies and appropriate life situations associated with the illness. Emphasis on concepts and techniques for establishing and maintaining helping relationships. Topics will include dangerous behavior, acute psychotic episodes, long-term chronic disabling, enhancing social skills and social support systems, and the interaction of medication and social functioning. Staff

250Q. Direct Treatment of Children. (2) Two hours of lecture per week. Prerequisites: 241. Examines the psychological implications for intervention techniques between therapist, child, and family. Topics form the basic knowledge and repertoire of skills for clinicians working with children. Staff

250R. Social Work with Adolescents. (2) Two hours of lecture/discussion per week. Prerequisites: 241. This course is designed to prepare the student to participate in the treatment of disturbed and delinquent adolescents. Psychosocial, psychodynamic, sociocultural and ecological perspectives on adolescents will be examined. A variety of early intervention and treatment modalities will be explored. (SP) Gibbs

250S. School Social Work. (2) Two hours of lecture per week. Prerequisites: 241. Course addresses the competencies required for the California Pupil Personnel credential. Examines the organizational context of school social work; practice models for working with parents, children and youth in the educational context; issues of child abuse, psychosocial and educational assessment; and career and curriculum counseling. (SP) Staff

250T. Treatment of Children and Youth. (2) Two hours of lecture/discussion per week. Prerequisites: 241. Examines treatment methods used to help children and their families. This course is task-centered, designed to help children and their families learn cognitive and social skills to achieve discrete treatment objectives. Methods reviewed are derived from family therapy, behavior therapy, and special education. Staff

250U. Substance Abuse Treatment. (2) Two hours of lecture per week. Prerequisites: 241. Course provides an introductory overview of various theories and methodologies currently used in the diagnosis and treatment of substance abuse and related disorders. Though the bulk of the course will be devoted to the disease model and corresponding interventions, some attention will be given to prevention and epidemiology. Emphasis will be placed on how one can apply social work knowledge and skills to the prevention/intervention of substance abuse problems. (F) Manoleas

251. Introduction to Management and Planning. (2) Two hours of lecture/discussion per week. Introduction to the distinctive roles and tasks of managers and planners in the field of social welfare. Focus on (1) the theoretical foundations of organizational behavior and the practice of management and planning, and (2) aspects of managerial and planning processes with special attention to their social, political and technical interdependence. (SP, AP) Austin

252. Social Agency Management. (2) Two hours of lecture per week. Basic theories, areas of knowledge, and practice skills for the administration of human services. Topics include program development and implementation, relations with community groups, staff development, supervision, training and finance. Staff

254A. Program Development and Proposal Writing. (2) Two hours of lecture per week. Principles and methods of program design and proposal writing. Corbet

254B. Efficiency in Social Welfare Administration. (2) Two hours of lecture per week. Theories of organizational behavior and the practice of administration. Special problems of conflict, and change in human service organizations.

254C. The Good Bureaucrat. (2) Two hours of lecture per week. An analysis of the problems and opportunities faced by service providers in bureaucracies. Addresses the question: "How can the professional manage the bureaucratic environment of service giving rather than be managed by it?"

254D. The Management Cycle. (2) Two hours of lecture per week. Basic skills in human services management; particularly planning, budgeting, monitoring, and assessment of results. Staff

254E. Boards, Legislators, and Volunteers. (2) Two hours of lecture per week. Study of the structure, functions, and dynamics of task groups; various conceptions of leadership; board-executive and professional-volunteer relationships, techniques and skills for conducting meetings, conferences, and workshops. Staff

255. Community Organizing. (2) Two hours of lecture/discussion per week. Study of the theory and practice of community organization. Staff

256. Social Welfare Planning. (2) Two hours of lecture per week. Philosophies and models of the social planning process, problem analysis, designing and assessing alternatives, performance assessment and evaluation. Consideration of the politics of planning and policy analysis. Staff

258A. Community Planning. (2) Two hours of lecture per week. Theory and practice of planning as an explicit social, political, and technical process. Examines roles, tasks, and value choices. Compares alternative systems of planning. (F)

270. Access to Human Services Among Low Income and Minority Populations. (2) Two hours of seminar per week. Course examines mental health and mental illness as culture-bound conceptualizations and demonstates culture-specific biases of Western views and interventions. Explores mental health needs of U.S. minority groups and intervention techniques.

274. Immigrants and Refugees: Policy Issues and Clinical Concerns. (2) Two hours of seminar per week. Course focuses on the assessment and treatment of refugees, Hispanics, and American Indians. While the major emphasis is on clinical treatment of families, the course also addresses issues of the child welfare, health care, and juvenile justice systems. Issues of race and ethnicity will also be explored. (F-SP) Organista, Gibbes

279. Seminar in the History and Philosophy of Social Welfare. (2) Two hours of seminar per week, Primarily for doctoral students. A review of efforts to conceptualize the field of social welfare and to analyze its historical development.

280. Introduction to Social Welfare Research. (2) One hour of lecture and one hour of discussion per week. Introduction to the theory and practice of research in social welfare. (SP) Staff

282A-282B. Seminar in Social Welfare Research. (2,2) Two hours of seminar per week. Prerequisites: 241. Problem formulation, design, and implementation. (F,SP) Staff

287. Introduction to Library Resources and Faculty Research. (2) Two hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. Students will be introduced to the tasks and tools of library research in social welfare, including reference works, bibliographic aids, and computer data bases. Individual faculty members will present their research, emphasizing methodology, outcomes and contribution to social welfare. (F)

288. Report Writing and Editing. (1) One hour of seminar per week and individual consultation. Must be taken on a satisfactory/unsatisfactory basis. Primarily for doctoral students. Supervised practical experience in planning, editing, and coordinating reports, articles, or proposals. Social welfare topics. Staff

289A. Research Methods and Techniques in Social Welfare. (2) Two hours of lecture per week. The logic and structure of the basic research methods and techniques in social welfare. Special emphasis on qualitative research techniques and the design of research that produces reliable and valid results. (F) Midkink

289C. Introduction to Regression. (3) Four hours of lecture/discussion per week. Prerequisites: Behavioral and Environmental Health Sciences 130A-130B, or
equivalent. Course addresses the strengths and weaknesses inherent in linear regression analysis. Problems, detection, and treatment are explored in a laboratory course on "hands-on" computer laboratory format. (F) L. Miller

289D. Estimating Models with Qualitative and Limited Dependent Variables. (3) Four hours of lecture/discussion and computer laboratory per week. Prerequisites: 289D or equivalent. Examines linear stochastic models and estimation of events measured with limited dependent variables. Course objectives include: recognizing limited dependent variables; modeling; estimating; and understanding the statistical theory and computational methods underpinning estimation. Exercises use a "hands-on" computer laboratory format. Application to dissertation work is emphasized. (SP) L. Miller

296. 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 student work. Prerequisites: Consent of instructor. Designed to permit qualified graduate students to pursue special study in a subject area of their choosing under the direction of a faculty member. (F,SP) Staff

296. 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 student work. Prerequisites: Consent of instructor. Designed to permit qualified graduate students to pursue research in a subject area of their choosing under the direction of a faculty member. (F,SP) Staff

299. Individual Research for Graduate Students. (1-12) Course may be repeated for credit. One unit will be awarded for each four hours per week of student work. Prerequisites: Consent of instructor. Designed to permit qualified graduate students to pursue research in a subject area of their choosing under the direction of a faculty member. (F,SP) Staff

602A. Individual Study for Doctoral Students. (1-6) Course may be repeated for a maximum of 16 units. Course does not satisfy unit or residence requirements for doctoral degree. One unit will be awarded for each 4 hours of student work. 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. (F,SP) Staff

Sociology
(College of Letters and Science)
Department Office: 410 Barrows Hall, 642-4766
Chair: Neil R. Fligstein, Ph.D., 643-4679
University Professor:
Neil J. Smelser, Ph.D., Harvard University. Theory, economics, social change

Professors:
Robert N. Bellah, Ph.D. (Eliot Chair) Harvard University. Theory, religion, Japanese society
Victoria E. Bonnell, Ph.D. Harvard University. Historical, labor, Soviet society
Michael Burawoy, Ph.D. University of Chicago. Labor, comparative, political economy
Nancy J. Chodorow, Ph.D. Brandeis University. Feminist theory, family
Robert E. Cole, Ph.D. University of Illinois. Organizations, work, Japanese society; quality
Troy Streib, Ph.D. Northwestern University. Deviance, social movements, law
Harry Edwards, Ph.D. Cornell University. Race, sport, family
Peter Evans, Ph.D. Harvard University. Comparative development, rural America, state industrialization
Claude S. Fischer, Ph.D. Harvard University. Urban networks, history, technology
Neil R. Fligstein, Ph.D. University of Wisconsin. Social stratification and class, methodology and statistics, complex organizations
Todd A. Gitlin, Ph.D. University of California at Berkeley. Media, culture
Leo A. Goodman, Ph.D. D.S.C. (Hon.) (Class of 1938) Professorial Chair) Princeton University. Social sciences' statistical estimation methods
Alene R. Hochschild, Ph.D. University of California at Berkeley. Feminist methods
Michael Hiust, Ph.D. Indiana University. Demography, methods, sociology
Kristin Luker, Ph.D. Yale University. Gender, population, migration
Richard J. Otte, Ph.D. Stanford University. Thought reform, social psychology
H. Franz Schurmann, Ph.D. Harvard University. Organizations, cities, China, America
Robert Blauner, Emeritus, Ph.D. University of California at Berkeley. Race, gender, work, age
Kenneth I. Cohen, Emeritus, Ph.D. University of California at Berkeley. Theory, social evolution
John A. Clausen (Emeritus), Ph.D. University of Chicago. Socialization, technology, life-cycle
Kingsley Davis (Ford Professor of Sociology and Consulting Professor, Emeritus) Harvard University. Demography, family, urbanization, population
Charles Y. Glock, Emeritus, Ph.D. Columbia University. Survey, attitudes, race
William Kornhauser (Emeritus), Ph.D. University of Chicago. Political sociology, social movements
David Matza (Emeritus), Ph.D. Princeton University. Deviance, social control
Philip Schraacke (Emeritus), Ph.D., Dr. jur. h.c. Columbia University. Theory, law, organizations/institutions

Associate Professors:
Thomas Gold, Ph.D. Harvard University. Modernization, development, comparative, China
Jerome Karabel, Ph.D. Harvard University. Education, stratification, intellectuals, political
Martin Sacks (Emeritus), Ph.D. Massachusetts Institute of Technology. Deviance, political, urban, youth
Ann Swidler, Ph.D. University of California at Berkeley. Culture, religion, organizations

Assistant Professors:
Jorge Ariditi, Ph.D. State University of New York, Stony Brook. Sociology, historical sociology, sociology of knowledge, culture
Laura Enquist, Ph.D. University of California at Santa Cruz. Latin America, rural sociology, social policy
Kim Voss, Ph.D. Stanford University. Labor, movements, historical, methods

Adjunct Associate Professors:
Carol Huffman, Ph.D. University of California at Berkeley. Medical sociology, senescence
James Wiley, Ph.D. (Emeritus), Vanderbilt University. Methods, medical, family

Affiliated Professors:
Glenn Carroll, Ph.D. (Business Administration) Stanford University. Organizations, methods, ecology, urban
Mark Cullen, Ph.D. (Environmental Planning) University of Paris. Urban, political, economic, technology
W. Russell Elle, Jr., Ph.D. (Architecture) University of California at Berkeley. Urban, political
Gail Leppold, Ph.D. (Political Science) Harvard University. Soviet Union, institutions, space
James R. Lincoln, Ph.D. University of Wisconsin. Organization, management, social welfare, organizations
Shelton M. Muehrig, Ph.D. (Law and Society) University of California at Los Angeles. Criminal justice, the sociology of modern society
Philippe Nonet, Ph.D. (Law and Jurisprudence) Columbia University. Sociology, law, urban, historical

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

On leave, fall

On leave, spring

The Major
Students intending to major in sociology are advised to prepare themselves by taking background work in such areas as history, philosophy, cultural anthropology, psychology, economics, and political science.

Prerequisite Courses for the Major. A student must have successfully completed Sociology 1 and 5 as well as a course in either statistics or logic prior to entrance into the major. Students who have received credit for more than two upper-division sociology courses before taking an introductory sociology course must substitute another core course for Sociology 1.

Upper Division. A student must take the following courses:
2. Three courses from the following core list: 110, 111, 112, 115, 116, 125, 130, 131, 132, 143, 150, 160, 170, 172, 182.
3. Three additional courses which must be upper-division sociology courses numbered 181C-190C, or graduate sociology courses (subject to instructor approval). Courses taken from the core list in excess of the three required, or additional upper-division seminar courses, will count as electives, as will non-core courses.
4. One 90 or 190 seminar.

Honors Program. 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 conferring with a major advisor. Students must successfully complete Sociology 110B, 119A, 190B, Senior Honors Thesis and Seminar.

Students who plan to go on to graduate work in sociology or other related disciplines and professions are strongly urged to take both Sociology 105 and 106.

The Graduate Program
Information about the graduate program and admissions may be obtained from the departmental graduate office, 422 Barrows Hall. Applications are accepted for the fall semester only.

Courses. For more detailed information about the courses that follow, course descriptions are available in the departmental office, 410 Barrows Hall, several weeks before the beginning of each semester.

Lower Division Courses
1. Introduction to Sociology. (4) Not open to students who have taken 3, 5A or 3AC. Two hours of lecture and two hours of discussion per week. Introduces students who are considering Sociology 1 to the basic topics, concepts, and principles of the discipline. This course is required for the major; 1 or any version of 3 is prerequisite for other sociology courses; students not considering a sociology major are directed to any version of 3. (F,SP)

3. Principles of Sociology. (4) Students will not receive credit for 3 or 3AC after taking 1. Deficiency in 3AC cannot be removed by completing 3. No credit for 3 after 3AC. Three hours of lecture per week. An overview of sociology for students who will not major in the field. Sociological approaches to the study of fundamental problems of group life—social organization, culture, interaction processes and socialization—the use of the techniques of modern social science. Satisfies prerequisites for other sociology courses, but not for major.

3AC. Principles of Sociology. (4) Students will not receive credit for 3 or 3AC after taking 1. Deficiency in
3 may be removed by completing 3AC. No credit for 3AC after 3. Three hours of lecture per week. Compar- ing the experience of three out of five ethnic groups (e.g., Americans, Asian Americans, Chicanos/Latinos, European Americans, and Native Americans) we shall examine historically how each people entered American society and built communities and transformed our conceptual processes. Students will be introduced to the sociological perspective, character- istic methods of research, and such key concepts as culture, community, class, race, social change, and social movements. This course satisfies the American cultures requirement.

5. Evaluation of Evidence. (4) Three hours of lecture and two hours of discussion per week. A review of methodological problems in assessing data relating to social life. Topics to be covered include: posing a so- ciological research question, gaining access to data, measuring, establishing correlation and causal connection among data, and relating data to theoretical context. (F,SP)

24. Freshman Seminars. (1) Course may be repeated for credit as topic varies. One hour of seminar per week. Sections 1-2 to be graded on a letter-grade basis. Sections 3-4 to be graded on a pass/fail basis. The Berkeley Seminar Program has been designed to provide new students with the oppor- tunity to explore an intellectual topic with a faculty member in a small seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester.

39. Freshman/Sophomore Seminar, (2-4) Course may be repeated for credit as topic varies. Seminar format. Sections 1-2 to be graded on a letter-grade basis. Sections 3-4 to be graded on a pass/fail basis. Prerequisites: Priority given to freshman and sophomores. Freshman and sophomore seminars offered on a letter-grade basis. Students will be introduced to an intellectual topic with a faculty member and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester.

90. Freshman/Sophomore Seminar. (4) Course may be repeated for credit as topic varies. Two hours of seminar per week and individual conferences. Prerequi- sites: Must be a freshman or sophomore. Selected specific topics in sociology, a survey of topics with an emphasis of introducing students to the process of sociological inquiry.

Upper Division Courses

101A. Sociological Theory. (5) Three hours of lecture and two hours of discussion per week. Prerequi- sites: 1 or 3 or 3AC or consent of instructor. History of social thought as a source of present-day problems and hypotheses. (F,SP)

101B. Sociological Theory. (5) Three hours of lecture and two hours of discussion per week. Prerequi- sites: 101A. History of social thought as a source of present-day problems and hypotheses. (F,SP)

101C. Contemporary Sociological Theory. (4) Three hours of lecture per week. Prerequisites: 101A or 101B or consent of instructor. A systematic study of the work of selected social theorists of the post-World War II era. This course will stress the diversity of these theories. The primary figures in the field and will follow a comparative approach to the study of theory. The choice of theorists to be covered will vary according to the instructor.

102. Advanced Study In Social Theory. Three hours of lecture per week. Prerequisites: A course in social theories. This course is designed for students under this number who pursue involving pursuit in subfields of socio- logical theory. The courses examine a general back- ground 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. Pro- blems of research design, measurement, and data col- lection, analysis, and interpretation. Attention will be directed 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 tech- nical issues in quantitative research methods. Topics will include, according to discretion of instructor, a practicum in data collection and/or analysis.

110. Organizations and Institutions. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. Systematic and comparative analysis of family structure and change. Marriage, reproduction, child-rearing, marital dissolution.

112. Sociology of Religion. (4) Three hours of lecture and two hours of discussion per week. Course will indicate the place of religious consciousness in human action and analyze social and cultural forces, including the role of religion in human society. Will include a general theory of the nature of religious experience, religious symbolism, and the basic aspects of religious community.

113. Sociology of Education. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC 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 and one hour of discussion 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 and one hour of discussion per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. The labor force and social control within and of occupa- tions and professions (professionalization, professional associations vs. labor unions, codes of ethics, legal controls); social structure of the workplace, work experience of the participants, relation of both to community and society.

117. Sport As a Social Institution. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. Analysis of sport as social institu- tion, its structure and functions; male-female roles in sport; economics of sport; the roles of coach, athlete, fan—their interpersonal relationships and com- plexities; current turmoil in sport and the ideological struggle which has emerged.

125. Urban Sociology. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. Urban sociology—urbanization; metropolitan areas; location and types of cities, social and demographic characteristics of urban populations.

126. Population. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. Population in historical context as well as detailed coverage of population problems in contempo- rary society including population growth and the economy, aging of populations, contraceptive revolution, suburbanization and environment.

127. Comparative Population Histories of the United States. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. Examines the population histories of the various racial and ethnic groups which form the contemporary U.S. population. Particular attention will be given to the his- torical patterns of European Americans, Asian Americans, and Chicanos/Latinos; however, other ethnic and religious groups will be considered as well. Attention will be given to the basic demographic processes (fertility, mortality) and how each of these by these populations has historically been formed and changed. This course satisfies the American cultures requirement.

130. Social Stratification. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC 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 United States Experience. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. A sociological perspective on the动态 ethnic relations in the United States: Examination of historical experi- ences, contemporary circumstances and future prospects of racial and ethnic populations with par- ticular attention to trends in relations between the dominant society and the Afro-American, Native-American, Asian-American and Latino sub-cultures. Political and social consequences of racial and ethnic stratification are explored.

131B. Race and Ethnic Relations: International Comparisons. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC, or consent of instructor. A broad survey of race and ethnic relations in a wide va- riety 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.

132. Race and Ethnic Relations: Selected Topics. (4) No credit for 132 after taking 132AC. Deficiency in 132AC may not be removed by taking 133. Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC, or consent of instructor. There will be variation in focus of attention, depending on instructor in charge. Founda- tional issues include consideration in depth of specific theoretical issues, or an examination of race relations from an international comparative approach. This course satisfies the Amer- ican cultures requirement.

132AC. Race and Ethnic Relations: Selected Top- ics. (4) Three hours of lecture per week. No credit for credit. No credit for 132AC after taking 132. Deficiency in 132 may be removed by taking 132AC. Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. We will look at the origins of the modern civil rights movement in the 1950s and consider some of the major issues of the early 1960s: the resurgence of racism, the controversy over affirmative action, problems of the "underclass," and race and gender. Lectures and readings will focus on the Black Civil Rights movement, the Chibano movement and the Asian movement, and the responses of White Americans in the 1970s. We will focus on the day-to-day realities of the racial crisis of the 1960s and 1970s. This course satisfies the American cultures requirement.

133. Gender and Society: The Sociology of Women. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. We will explore the sociology of women’s varying roles, statuses, and life opportu- nities. Consideration of the feminist movement, past and present, with special emphasis on struggles concerning defining definitions of women’s “nature” and po- tential.

134. Gender and Society: The Sociology of Men. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. The position of men in American society examined from standpoint-
135. Gender and Society: Sexual Diversity and Social Change. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. An examination and analysis of the significance of homosxuality in contemporary U.S. society. Included: traditions of Western thought and the role of institutions and social processes that shape social change, contemporary social, political movements, 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 3AC or consent of instructor. The development and analysis of political processes in organized groups, the social basis of political decision-making, of social class, 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 3AC 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 3AC or consent of instructor. Violent and peaceful procedures in the pursuit of national objectives; analysis of attempts to mitigate the causes of war.

143. Policy, Economy, and Society. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. Focus on three major themes of the contemporary United States: government, resources, and cities. Stress on the importance of translating the 1980's. Examination of how each sector is impacted by policy sources, current economic trends, and social conflicts.

144. Ethnic Politics. (4) No credit for Sociology 144 after taking 144AC. Deficiency in 144AC cannot be removed by taking 144. Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC 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.

144AC. Ethnic Politics. (4) Course may be repeated for credit. No credit for 144AC after taking 144. Deficiency in 144AC may be removed by taking 144AC. Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. Analyzes the role that race and ethnicity play in American politics by examining their impact on both white and non-white groups. We will begin by looking at the development of race and ethnicity as salient political issues in American society. Next, we examine how various ethnic groups have been selected for inclusion into the political process and we investigate the patterns of ethnic political leadership. This course satisfies the American cultures requirement.

150. Social Psychology. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. An examination of major theoretical approaches in social psychology. The approaches may include: symbolic interactionism, neo-behaviorism, psychodynamic analyses, cognitive theories, interpersonal processes, and the language 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 3AC or consent of instructor. An examination of the development and growth of personality, and of varieties of personality, as a consequence of social experience and the effects 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 3AC or consent of instructor. An examination of the social communication and implications of behavior in non-structured and structured social groups. Topics such as status relations, communications, 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 3AC or consent of instructor. Social and cultural factors associated with the social 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) No credit for 156 after taking 153. Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. Thought reform (i.e., coersion, 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.

160. Sociology of Culture. (4) Three hours of lecture and two hours of discussion per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. Study of human meaning systems, particularly as manifested in art, literature, music, and other media. Includes study of the production, reception, and aesthetic experience of cultural forms.

162. Sociology of Literature. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC 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.

183. Contemporary Chinese Society. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. The course will focus on recent developments in Chinese society and their effects on the population. The growth of the middle-class, urbanization, and new patterns of social interaction will be analyzed. The course will also provide an opportunity for students to study contemporary Chinese society in greater detail.

188. Sociology in the United States. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. The course will focus on the development and analysis of political processes in organized groups, the social basis of political decision-making, of social class, occupational groups, and religious groups, and the influence of cultural values.

191. Field Study in Sociology. (1-4) Course may be repeated for credit. Individual conferences. Must be taken on a passed/not passed basis. Prerequisites: 1 or 3 or 3AC or consent of instructor. Supervised experience relevant to specific aspects of sociology in off-campus organizations. Regular individual meetings with faculty sponsor and written reports required.

194. Directed Research. (1-3) Must be taken on a passed/not passed basis. Prerequisites: 1 or 3 or 3AC or consent of instructor. Supervised experience relevant to specific aspects of sociology in off-campus organizations. Regular individual meetings with faculty sponsor and written reports required.

195. Independent Research. (1-3) Must be taken on a passed/not passed basis. Prerequisites: 1 or 3 or 3AC or consent of instructor. Supervised experience relevant to specific aspects of sociology in off-campus organizations. Regular individual meetings with faculty sponsor and written reports required.

198. Directed Study for Undergraduates. (1-4) Course may be repeated for credit. Individual conferences. Must be taken on a passed/not passed basis. Prerequisites: 1 or 3 or consent of instructor. Supervised experience relevant to specific aspects of sociology in off-campus organizations. Regular individual meetings with faculty sponsor and written reports required.

199. Field Study in Sociology. (1-4) Course may be repeated for credit. Individual conferences. Must be taken on a passed/not passed basis. Prerequisites: 1 or 3 or consent of instructor. Supervised experience relevant to specific aspects of sociology in off-campus organizations. Regular individual meetings with faculty sponsor and written reports required.

200. Proseminar. (1) One hour of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. This course is required of all first-year graduate students and is supervised by a regular faculty member. The seminar will familiarize students with faculty and their various research interests and of opportunities for funding and assistantships. It consists of presentations by faculty on their current research projects and by representatives of Organized Research Units on their mission and programs of research, and opportunities for assistantships.

201. Sociological Theory. (4) Four hours of lecture per week. Prerequisites: Consent of instructor. Representative of major theoretical traditions in sociology with attention to such topics as institutionalism, revolution, transformation of social structure, social life, political authority, institutions and culture viewed from an historical and comparative perspective.

202. Sociology in the United States. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. Various aspects of American values and behavior patterns over time; sources of differences from other developed nations.

203. Soviet Society. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. Soviet Russia from 1917 to the present. Social structure, political processes, the development of collective conscious, and contemporary Soviet society.

204. Contemporary Chinese Society. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. The course will focus on recent developments in Chinese society and their effects on the population. The growth of the middle-class, urbanization, and new patterns of social interaction will be analyzed. The course will also provide an opportunity for students to study contemporary Chinese society in greater detail.

206. Advanced Study in Sociology. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. The course will focus on recent developments in Chinese society and their effects on the population. The growth of the middle-class, urbanization, and new patterns of social interaction will be analyzed. The course will also provide an opportunity for students to study contemporary Chinese society in greater detail.

208. Sociology of Work and Society. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. The course will focus on recent developments in Chinese society and their effects on the population. The growth of the middle-class, urbanization, and new patterns of social interaction will be analyzed. The course will also provide an opportunity for students to study contemporary Chinese society in greater detail.

210. Sociological Theory. (4) Four hours of lecture per week. Prerequisites: Consent of instructor. Representative of major theoretical traditions in sociology with attention to such topics as institutionalism, revolution, transformation of social structure, social life, political authority, institutions and culture viewed from an historical and comparative perspective. 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.

212. Advanced Study in Sociology. Theory. (4) Course may be repeated for credit. Two hours of seminar per week. Must be taken on a passed/not passed basis. Prerequisites: 1 or 3 or consent of instructor. This course will introduce students to advanced study in sociology with attention to such topics as institutionalism, revolution, transformation of social structure, social life, political authority, institutions and culture viewed from an historical and comparative perspective. 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.

213. Interdisciplinary Behavior in Small Groups. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. An examination of the social communication and implications of behavior in non-structured and structured social groups. Topics such as status relations, communications, coalitions, and interpersonal conflict are examined in light of field and laboratory research.

215. Sociology of Illness and Medicine. (4) Three hours of lecture per week. Prerequisites: 1 or 3 or 3AC or consent of instructor. Social and cultural factors associated with the social experience of illness. Analysis of the socially-defined "sick role" and the systems of which it is a part.
at least one 202 before taking the qualifying examination.

202A. Classical Sociological Theory. (3)

202B. Contemporary Sociological Theory. (3)

202C. Systematic Sociological Theory. (3)

205. Supervised Preparatory Course Work. Prerequisites: Consultation with and approval of regular faculty member responsible. Introductory study of a sociological field, among those listed in the 200 series, including participation in the appropriate undergraduate course in that field. Also includes individual meetings with the faculty sponsor, who may stipulate additional requirements.

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) Course may be repeated for credit as topic varies.

271A-271B. Methods of Sociological Research. (4; 4) Four hours of lecture per week. Prerequisites: Consent of instructor. Credit and grade to be assigned at the end of each semester. A two-semester sequence course introducing logic and analytic techniques commonly employed in sociological research. The methodological problems encountered in field work, historical and comparative inquiry, experimental research, and survey analysis. The first semester concentrates on techniques for gathering evidence; the second semester focuses on numerical techniques for analyzing evidence.

271C. Intermediate Quantitative Methods. (3) Three hours of lecture per week. Prerequisites: 271B. Intensive instruction in multivariate statistics common to quantitative analysis in social research. The course covers multiple regression and methods for adapting quantitative analysis in sociological research. Some experience with SPSSX is assumed.

272. Studies in Sociological Research Methods. Course may be repeated for credit. Two hours of lecture per week. Prerequisites: Consent of instructor. Courses under this number involve pursuing graduate study in subfields of sociological research methods.

272A. Logic of Inquiry. (3)

272B. Survey Research. (3)

272C. Comparative and Historical Research. (3)

272D. Advanced Quantitative Research. (3)

272E. Participant Observation. (3)

272F. Mathematical Sociology. (3)

272H. Demographic Methods. (3)

272I. Experimental Methods. (3)

273. Advanced Seminars in Research Methods. Course may be repeated for credit. Two hours of seminar per week. Seminar in advanced sociological research methods.

273A. Survey Research. (3)

273B. Comparative/Historical Research. (3)

273C. Participant Observation. (3)

273D. Mathematical Sociology. (3)

273E. Demographic Methods. (3)

273F. Interview Methods. (3)

280. Advanced Study in Substantive Sociological Fields. Course may be repeated for credit. Two hours of lecture per week. Prerequisites: Undergraduate preparation in the field; completion of a 205 in the field or an equivalent determined by the instructor. Courses under this number involve pursuing graduate study in substantive sociological subfields. The courses prepare familiarity with the fields of study. Consult departmental catalog for current descriptions.

280A. Law and Deviance. (3)

280B. Race and Ethnic Relations. (3)

280C. Political Sociology. (3)

280D. Organizations. (3)

280E. Industrial Sociology. (3)

280F. Family and Life Cycle. (3)

280G. Social Stratification and Class Analysis. (3)

280H. Development and Modernization. (3)

280I. Religion. (3)

280J. Urban Sociology. (3)

280K. Social Psychology. (3)

280L. Gender. (3)

280M. Culture. (3)

280N. Education. (3)

280O. Health and Medicine. (3)

280P. Area Studies. (3)

280Q. Economy and Society. (3)

280R. Professions. (3)

280S. Social Movements. (3)

285. Dissertation Seminar. (3) Course may be repeated for credit. Three hours of lecture per week. Must be taken on a pass/no credit basis. Prerequisite: Consent of instructor. The seminar is a forum for intensive work in preparing dissertation members at any stage, from initial planning of the dissertation to the job presentation talk. We will be especially concerned with reflexive issues: the choice of problem and method as a sociological, political, personal, and market issue; the place of the researcher in research; sociology as a discipline and interdisciplinary. Problems of organization, scope, theoretical and empirical emphasis will also be addressed.

290. Seminar. (3) Course may be repeated for credit. Two hours of seminar per week. Prerequisites: Consent of instructor. Advanced study in modern sociology. The specific topics will be announced at the beginning of each semester.

295. Independent Study for Graduate Students in Sociology. (1-12) Course may be repeated for credit. Independent study, variable hours. Must be taken on a satisfactory/unsatisfactory basis. Prerequisite: Consent of instructor. Independent by arrangement with faculty.

298. Directed Group Studies for Graduates. (1-9) Course may be repeated for credit. Independent study, variable hours. Must be taken on a satisfactory/unsatisfactory basis. 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. Independent conferences.

Soil Science (College of Natural Resources)

Department Office: 108 Hilgard Hall, 642-0541
Chair: Harvey Doner, Ph.D.

Professors:
Harvey E. Doner, Ph.D., University of California at Riverside. Soil chemistry; trace elements, surface reactions
Mary K. Firestone, Ph.D., Michigan State University. Soil microbiology, nitrogen cycling
T. N. Narasimhan, Ph.D., University of California at Berkeley. Pedology
Paul L. Gersper, Ph.D., Ohio State University, Soil physics, soil biophysics
John Hart, Ph.D., University of Wisconsin. Ecossystems modeling, environmental impacts
Garrison Sposito, Ph.D., University of California at Berkeley. Soil chemical pedology

Associate Professors:
Ronald G. Ammons, Ph.D., University of California at Riverside. Pedology
Keith Loague, Ph.D., University of British Columbia. Soil and wetland hydrology

Note: The College of Natural Resources is presently reorganizing its course offerings. Please consult the description of the college in the Colleges and Schools section in the front of this catalog for a brief description of programs proposed for the college in the future. For current information about program requirements and course offerings, please consult the undergraduate office listed in the front of the catalog. Units may not be used to meet unit or residency requirements for the master’s or doctoral degree.

The Department

Soil Science is a multidisciplinary department. Course offerings of the department support the undergraduate major in the soil environment.
Undergraduate Program

The soil environment major is designed for students who are interested in one of the most basic and important of the earth's resources, soil, and in areas of interaction between soils and living organisms, environmental elements, human activities and institutions. It is an innovative major that allows students considerable latitude in constructing an individualized program of study, although based on a common core of courses that give soliarity and cohesiveness to the major.

Working closely with an advisor, students are encouraged to use imagination and creativity in constructing a course program to prepare for graduate studies or careers in both the public and private employment sectors. Depending on the particular combination of soil science, cognate area, and elective courses selected, students can qualify for graduate studies or employment in agriculture, soil and water management, environmental protection, soil survey, consulting, etc.

Courses offered by the Department of Soil Science serve students in the College of Natural Resources and across the campus in such diverse but related studies as forestry, conservation and resource studies, botany, biochemistry, geology and geography. Students are encouraged to explore the courses available, and to participate in a variety of specializations. soil microbiology, soil-plant relationships, nutrient cycling, hydrology, forest soils, and pedology.

Graduate Program

The department offers M.S. and Ph.D. degrees in soil science. The emphasis is on background training, the development of research abilities, and field research and scientific investigation. Areas of specialization include soil microbiology, chem-istry, soil-plant relationships, nutrient cycling, hydrology, forest soils, and pedology.

Lower Division Courses

10. Soils and Their Significance to Society. (3) Three hours of lecture per week. Introduction to soils, their properties, classification, distribution, and significance to society. Interrelation of soils and landscape characteristics in relation to land use, and repercussions of land misuse. (F) Gersper

17. Soil and Water Conservation. (2) Two hours of lecture per week. Formerly 170. Introduction to the water cycle and soil behavior as they impact soil and water conservation. Effects of urbanization on water conservation. (Sp) Firestone

180. Soil Chemistry Laboratory. (2) Two hours of laboratory per week. Prerequisites: 170 or 172. Laboratory work to complement the study of soil chemistry, with emphasis on problems in California. Soil erosion and water quality control methodologies. Conservation techniques as related to sustainable agriculture and global change. (Sp) Sposito

Upper Division Courses

100. Soil Characteristics. (4) Two hours of lecture and three hours of laboratory per week. Prerequisites: Chemistry 1A and Introduction to physical, engineering, and organic properties of soil. Methods of soil description, identification, geographic distribution and use; the role of soil in supplying water and nutrients to plants; and soil organisms. Soil management for agriculture, forestry, and urban use will also be discussed. Includes a Saturday field trip. (F) McColl

101. Development and Classification of Soils. (3) Three hours of lecture per week. Prerequisites: Geology 102 and Chemistry 1A. This course is designed for students interested in the development and classification of soils as related to geography, environmental factors, and time. Soils as functioning parts of ecosystems; use of soil as an archeological and paleoclimatic studies; anthropogenic effects on soil ecosystems. (Sp) Amundson

101F. Field Study of Soil Development. (1) Five day-long field trips. Prerequisites: Completion of or concurrent enrollment in 101. Five day-long Saturday field trips to locations in central California. The field study of soil development and morphology. Methods of soil morphological descriptions; study of factors controlling soil formation; relationship of soil morphology to land use; quaternary geology of central California; use of soils in dating landscapes. (Sp) Amundson

110. The Soil As a Medium for Plant Growth. (3) Three hours of lecture per week. Prerequisites: Chemistry 1A, 3A, or consent of instructor. Introduction to soils and principles which control nutrient availability in soil-plant systems. Ion movement, water potential relationships, plant-microbial interactions are emphasized. Characteristics and functions of acid, alkaline, and saline soils. (F) Staff

120. Soil Chemistry. (3) Three hours of lecture per week. Prerequisites: Chemistry 1A and Math 16A or equivalent. Recommended 100, 101 or Geology or equivalent. Physicochemical properties of soils influencing the distribution of environmentally and plant nutritionally important elements; the role of adsorption, solubility, and complexation in their mobility in soil; and an evaluation of the influence of soil minerals and organic matter on their distribution between solid and aqueous phases. Offered odd years. (Sp) Doner

120L. Soil Chemistry Laboratory. (2) Six hours of laboratory per week. Prerequisites: 110 or 112. 120 may be taken concurrently. The application of routine and special laboratory techniques for the study of soil chemical properties. Offered odd years. (Sp) Doner

130. Soil Microbiology. (2) Two hours of lecture per week. Prerequisites: 110 or 112. Introduction to soil microorganisms: diversity, ecology, and activity in relation to biogeochemical cycling, rhizosphere, and soil organic matter. Offered even years. (Sp) Firestone

130L. Soil Microbiology Laboratory. (2) Six hours of laboratory per week. Prerequisites: 130 or taken concurrently. Laboratory work to complement the study of soil microorganisms, their isolation and handling, and the measurement of their activities in soil. Planned to accompany lectures in 130. Offered even years. (Sp) Firestone

140. Soil Physics. (4) Two hours of lecture and six hours of laboratory per week. Prerequisites: 130 and Math 16. Physical characterization of soils; soil water potentials; transport of water, gases, and heat in soil. Offered even years. (F) Staff

150. Soil Hydrology. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: 140. An introduction to the fundamental hydrologic processes and modeling concepts. The emphasis is on forested and rangeland catchments with applications to wildland watershed management. Also listed as Forestry and Resource Management 119 and IDS 150. Offered even years. (F) Loague

175. Soil Resource Evaluation. (3) Three hours of lecture per week. Prerequisites: 100 or equivalent or consent of instructor; 101 or equivalent recommended. Review of land-use patterns and land-management practices in relation to soil resource suitability and environmental impact. Evaluation of soil use capability and repercussions of land misuse. Interpretation of soil research data and soil survey information in making land-use decisions. Offered odd-numbered years. (F) Gersper

190. Senior Seminar, (1) One hour of seminar and one hour of discussion per week. Prerequisites: Senior standing. Student seminars directed to integrating the natural science, economic, and political aspects of soil resource management or soil biology. (Sp) Staff

190. Directed Group Study. (1-3) Course may be repeated for credit. One hour of discussion per week. Prerequisites: Undergraduate standing. Selected topics in soil science for advanced undergraduates. (F) Staff

199. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. One hour of discussion per week. Prerequisites: Undergraduate standing. Selected topics in soil science for advanced undergraduates. (F) Staff

Graduate Courses

202. Modeling Ecological and Meteorological Phenomena. (3) Three hours of lecture per week. Prerequisites: Energy and Resources 102 or permission of Instructor. Modeling methods in ecology and meteorology; stability analysis; effects of anthropogenic systems (also listed as Energy and Resources 202 and IDS 202). Offered odd years. (F) Hart

220. Advanced Soil Chemistry. (2) Two hours of lecture per week. Prerequisites: 120; Chemistry 130A or equivalent. Trace element chemistry and adsorption of trace metals; organic-mineral interactions; and application of chemical thermodynamics to soil systems. Offered odd years. (F) Doner

221. Soil Surface and Colloid Chemistry. (3) Three hours of lecture per week. Prerequisites: Chemistry 130A or consent of instructor. Structure and colloidal stability of macromolecules; nature of the solid-liquid interface in soils; solute adsorption mechanisms and theoretical models; soil colloidal phenomena; interface forces and chemical factors influencing solute transport. Offered odd years. (F) Sposito

230. Advanced Soil Microbiology and Biochemistry. (3) Three hours of lecture per week. Prerequisites: 130. Microbial processes and their role in soil nutrient transformations. The ecology of microbes in the soil environment. Offered even years. (F) Firestone

240. Soil Physics. (3) Three hours of lecture per week. Prerequisites: 140. Special topics in soil physics and hydrology of the plant environment with emphasis on the soil-plant-atmosphere flow of water. Offered even years. (F) Staff

243. Coupled Processes in Soils. (3) Three hours of lecture per week. Prerequisites: 140. Special topics in soil physics and hydrology of the plant environment with emphasis on the soil-plant-atmosphere flow of water. Offered even years. (F) Staff

250. Vadose Zone Modeling. (3) Three hours of lecture per week. Prerequisites: 150, Fortran, Parallel Differentials, and consent of instructor. An introduction to finite-difference and finite-element methods of numerical modeling. Applications are for soil hydrology, contaminant transport, and streamflow generation. Offered odd years. (F) Loague

251. Advanced Topics in Hillslope Hydrology. (3) Coursework to be repeated for credit. Three hours of seminar per week. Prerequisites: 150, Geology 102, and permission of instructor. Seminar will focus on runoff generation mechanisms and hillslope development processes. Topics will vary and include unsaturated and preferential flow, erosion and solute transport. Current papers from the literature are reviewed. Also listed as Forestry and Resource Management 219 and IDS 251. Offered even years. (Sp) Loague, Dietrich

261. Ecological and Social Dimensions of Global Change. (2) One and one-half hours of discussion per week. Prerequisites: 140. One-hour seminar for students majoring in soil science. This seminar will explore the possible social and ecological impacts of global change, focusing on the role of soil processes associated with the following human responses to global change: adaptation, prevention, and no response. Emphasis is placed on developing predictive models of how the soil ecosystem (including its supporting human communities) respond to global change. Also listed as Energy and Resources 291, Geography 244, Integrative Biology 272 and IDS
South and Southeast Asian Studies (College of Letters and Science)

Department Office: 1203 Dwinelle Hall, 642-4564
Chair: P.S. Jaini, Ph.D.

Professors: 
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. Buddhist, Jainism, Hinduism
J.F. Staal (Einhutus), Ph.D., University of Madras. Comparative philosophy, Sanskrit, Jain
Armin Sweeney, Ph.D., University of London. Malay/Indonesian language and literature, oral tradition

Associate Professors: 
Bruce R. Pray, Ph.D., University of Michigan. Hindi/Urду language and literature
Baranad A. van Noort, Ph.D., University of California. Sanskrit, grammar, linguistics, paleography

Assistant Professors: 
Linda Hess, Ph.D., University of California. Hindi literature, popular
Sylvia Twon, Ph.D., University of California. Modern Indonesian literature

Senior Lecturer: 
Usma R. Jain, M.A., University of California. Hindi language

Lecturers: 
Kaushik Hart, M.A., Annamalai University. Tamil language and literature
Sally Sutherland, Ph.D., University of California. Sanskrit language, Indian mythology

Major Advisers: Hindi-Urду, South Asian Civilization, Mr. Pray; Sanskrit, Mr. Goldman; Tamil, Mr. Hart; Malay-Indonesian, Mr. Sweeney.

Graduate Advisers: Mr. Goldman; Mr. 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 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 disciplines. Programs of study thus can be designed to fit the needs of students with a wide range of interests. Opportunities exist for a limited number of students to participate in both archaelogical projects and language training programs in the field. The departmental programs are enriched by the resources of the Centers 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 emphasis are: lower division: (1) South Asian 1A-1B; (2) South Asian 5A-5B.

In addition, specific requirements for each South Asian emphasis are as follows:

1. South Asian Language

A. Hindi-Urdu: (1) Hindi-Urdu 1A-15; (2) Hindi-Urdu 100A-100B; (3) South Asian 124; one other South Asian literature course in translation or one advanced Hindi-Urdu literature course; (4) South Asian 127 and one other course from List II below; (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 is optional.

C. Tamil: (1) Tamil 1A-1B; (2) Tamil 100A-100B; (3) South Asian 127 and one other course from List II below; (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 138, 139; Anthropology 133 or Anthropology 134; prerequisite, consent of instructor; (3) nine upper division units to be chosen from lists I through V below.

III. South Asian Civilization

A. General requirements for a minor in South Asian Civilization are: lower division units plus 18 upper division units to be distributed as follows: (a) one literature course from List I below; b) South Asian 127 and one other 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 fine arts from List IV below; (2) remainder of required upper division units (either 15 or 18 as indicated above) to be selected from Lists I through V below.

Courses recommended for fulfillment of the upper division unit requirement for the South Asian emphasis:

List I. Literature: South Asian 121, 122, 124, 165.


List III. History and Social Science: South Asian 108, 130, 136; History 109A, 114A, 114B; Anthropology 184; Political Science 145A, 145B.


List V. Archaeology: Relevant courses in anthropology, geography, geology, statistics, or other departments as the student’s specific field of archaelogy requires.

With written permission from the student’s adviser, other relevant courses may be substituted for not more than two of the courses listed above, particularly if 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 emphasis, 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) Southeast Asian 122, 123, 124, 128; (4) 6 upper division units to be chosen from Lists I through III below.
List I: Religion and Philosophy: South Asian 127, 128, 131, 140, 155.

List II: Social Science: Anthropology 160, 161 (with consent of instructor); Anthropology 185, 186; Geography 165; Political Science 142C, 143D.

List III: Fine Arts: History of Art 137; Music 133A, 140 (with consent of instructor).

Minor Program

Students in the College of Letters and Science may complete one or more minors of their choice, normally in a field that is different and administratively distinct from their major.

Minor in South Asian Civilization: This will provide students with a general introduction to the rich, diverse, and ancient cultures and civilizations of India, Pakistan, and Bangladesh. Required courses: Five upper-division courses from lists I-V.

1. South Asian 121, 122, 124; Hindi-Urdu 100A-100B; Sanskrit 101A-101B; Tamil 100A-100B.
3. South Asian 108, 130; History 114A, 114B; Anthropology 184; Political Science 145A, 145B.
4. A History 136A, 136B; Music 133A, 133B.
5. Relevant courses in anthropology, geology, geography, 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: 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. or B. or equivalent, some minimal academic background in South or Southeast Asian languages and area studies. Students should in general be prepared to have undergone training equivalent to that both academically and in 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 choose to pass the written and oral qualifying examinations in three chosen fields of specialization. All M.A. students are required to take the departmental colloquium, 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, e.g., Dutch, French, German, 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 will be determined for this requirement after admission to the department. In addition, first-year proficiency in a second area-related language is required for the M.A. emphasis in Hindi and Urdu. Malay/Indonesian, Sanskrit, and Tamil, to be satisfied by passing a reading examination or by earning a satisfactory grade (B or better) in relevant course work. For the Malay/Indonesian emphasis, the language is to be chosen from: Sanskrit; Arabic; Javanese, Balinese, 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 the general field, 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. For 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 will normally be advised to apply for admission to the M.A. program, even though their eventual goal is the Ph.D. degree. At the conclusion of the M.A. program, they will be informed as to whether they are eligible for admission to the Ph.D. program. Students with an M.A. degree from another university will be expected to make up deficiencies in preparation and to fulfill the requirements for the M.A. degree in this department, except for the comprehensive examination.

The Ph.D. degree is offered according to Plan A (as of fall 1984). Beyond the course requirements for the M.A., students in the South Asian language emphases will complete an appropriate course in linguistics to be chosen in consultation with the graduate adviser and individual supervisors. 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 coursework, including: 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 groups: French, German, Japanese, and Russian. Under special circumstances students may offer another language with the approval of the adviser. The foreign language requirement is normally met by passing a reading examination in each language. This requirement must be met before a student can take the qualifying examinations.

Before being admitted to candidacy for the Ph.D., a student must demonstrate competence in the languages in his or her program, and must pass a written and oral qualifying examination in three fields of specialization. One of these fields may be in the area of study outside the department, to be decided in consultation with the graduate adviser. Examples of fields within the department are Hindi literature, Dravidian linguistics, Vedic, Prakrit, the Sanskrit grammarians; outside the department examples are Indian history and Indian art. Fields such as Indian philosophy and Buddhism can be studied both within and outside the department. For the Malay/Indonesian emphasis, examples of fields within the department are classical Malay literature, traditional drama, oral literature, Indonesian literature, Malay literature, Malay literature, dialect studies; outside the department, literature, near eastern studies and linguistics. Students in the Ph.D. program, students should consult with the graduate adviser and submit a statement of field, indicating in how few languages they will prepare themselves through reading and course work for their qualifying examinations. The examinations will be administered by a committee appointed by the Graduate Council.

After admission to candidacy, the student will complete the Ph.D. dissertation according to Plan A. The dissertation will conform to procedures and regulations set by the Graduate Division and the Graduate Council.

South and Southeast Asian

Upper Division Courses

H195. Senior Honors. Prerequisites: Consent of instructor. To be eligible for admission to the honors program, students must have and maintain a minimum GPA 3.5 in all courses completed for the major. In addition, the student must enroll in the final semester of the senior year in H195, a course of supervised research to be guided by an instructor chosen in consultation with the major advisor. On the basis of research the student will prepare and submit an honors thesis for evaluation.

H195A. South Asian Studies. (3) (F,SP)
H195B. Tamil. (3) (F,SP)
H195C. Hindi-Urdu. (3) (F,SP)
H195D. Malay/Indonesian. (3) (F,SP)
H195E. Southeast Asia Studies. (3) (F,SP)
H195F. Sanskrit. (3) (F,SP)

198. Directed Group Study for Upper Division Students. Course may be repeated for credit. Must be taken on a passed/not passed basis. Tutorial instruction in areas not covered by regularly scheduled courses. Four-unit limit per term.

196A. South Asian Studies. (1-4) (F,SP)
196B. Tamil. (1-4) (F,SP)
196C. Hindi-Urdu. (1-4) (F,SP)
196D. Malay/Indonesian. (1-4) (F,SP)
196E. Southeast Asia Studies. (1-4) (F,SP)
196F. Sanskrit. (1-4) (F,SP)

199. Supervised Independent Study and Research. Course may be repeated for credit. Must be taken on a passed/not passed basis. Four-unit limit per term, (F,SP)

199A. South Asian Studies. (1-4) (F,SP)
199B. Tamil. (1-4) (F,SP)
199C. Hindi-Urdu. (1-4) (F,SP)

*On leave, spring, fall
*On leave, fall
*Recalled to active service
©Recipient of Distinguished Teaching Award
South Asian

Lower Division Courses

1A. Introduction to the Civilization of India. (4) Three hours of lecture and one hour of discussion per week. Readings, lectures, and discussions in the culture and civilization of India from the Indus Valley and Brahminic civilization to the advent of Islam. Special emphases on the development of religious, philosophical, and aesthetic systems of traditional India. (F) Hess

1B. Introduction to the Civilization of India. (4) Three hours of lecture and one hour of discussion per week. Readings, lectures, and discussions in the development of Indian culture from the advent of Islam to the present. Special emphases on the role of the medieval religious movements of Islam and Indian Islam and the conflict of traditional and modern values in contemporary India. (SP) Hess

5A. Great Books of India. (4) Three hours of lecture and one hour of discussion per week. Reading and composition based on 10 classic works of Indian literature. Satisfies the Literacy requirement. (F) Staff

5B. India in the Writer's Eye. (4) Three hours of lecture and one hour of discussion per week. Reading and composition in connection with the western and western representations of India, and other Asian cultures, in great works of modern literature. Satisfies the Literacy and Reading and Composition requirement. (F) Staff

Upper Division Courses

10B. Psychology and Traditional India. (3) Three hours of lecture per week. Literary works of ancient India are read in English translation and supplemented by critical writings of modern scholars. Prerequisites: For candidates for master's degree. Three hours of lecture per week. Readings and discussions of the main traditions of mystical thought and practice, both Hindu and Muslim. (F) Pray, van Nooten

110A-110B. Origins of South Asian Civilization. (3) Three hours of lecture per week. Readings and discussions of the development of the Buddhist sangha and its impact on the peoples of South and Southeast Asia. (SP) Jaini

112. Poetry and Religion in India. (3) Three hours of lecture per week. A study of medieval poetry of devotional Hinduism and Indian Sufism, through readings in English translation. Emphasis on works in the regional spoken languages, and on the role of devotional and mystical movements in the development of religious literature. Staff

124. Modern Indian Literature. (3) Three hours of lecture per week. Lectures and discussion of 19th and 20th century Indian literature in English translation and original works in English. In addition to studying the intrinsic importance of the literature, this course will stress the interpretation of Indian society and culture through literature. (F) Pray

127. Brahmanism and Hinduism. (3) Three hours of lecture per week. Readings in selected translations from the Hindu scriptures—the Vedas, the Upanishads, and the Epics including the Gitas. These will be supplemented by critical studies of texts on Hindu caste system and the formation of various castes within the tradition. (SP) Staff

128. Medieval and Modern Hinduism. (3) Three hours of lecture per week. Prerequisites: 127. This course will include history, texts, practices, and sociopolitical relevance of Hinduism from approximately the 5th century CE to the present. (SP) Pray

139. Women in India: Religion and Society. (3) Three hours of lecture per week. Readings and discussion of the mainstream traditions of Indian and Muslim relations and interactions with western feminist understandings and the potential for mutual learning. Staff

140. Hindu Mythology. (3) Three hours of lecture per week. Readings and discussion of the development of the Buddhist sāṅgha and its impact on the peoples of South and Southeast Asia. (SP) Pray

141. Religion in South India. (3) Three hours of lecture per week. Readings and discussion of the development of the Buddhist sāṅgha and its impact on the peoples of South and Southeast Asia. Emphasis will be on sources translated directly from Indian languages. Staff

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 those regularly taught in the department. Staff

155. Philosophies of India. (3) Three hours of lecture per week. The philosophies of India, Hindu and Buddhist, beginning with the Vedic period and concentrating on the classical systems. Staff

165. Jainism and Other Heterodox Systems. (3) Three hours of lecture per week. Selected readings from the Jain scriptures and commentaries culminating in the 12th century A.D. Rise of other heterodoxies, particularly in the Vaisnavas in the South and the Nāaths and Sāṃskāras in the North. Jaini

166. India's Most Popular Epic: The Ramayana. (3) Three hours of lecture per week. In its Sanskrit and vernacular versions, the Ramayana 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 ideal models for man, woman, family, society, and state. Studying texts and varieties of performance, we will learn what the Ramayana is and how it lives in the culture. 

**Graduate Courses**

201. Readings in Jaina Sanskrit Texts. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Some familiarity with linguisitics and 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. 

202. Indian Paleography. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: One semester of Sanskrit. A survey of the palaeographical materials in South and Southeast Asia and readings from early inscriptions in various Indian alphabets.

210. Panini and the Indian Linguistic Tradition. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Some familiarity with linguistics and the elements of an Indian language or consent of instructor. A survey of the concrete and abstract grammar and grammar review. 

212. Indian Philosophical Texts. (3) Course may be repeated for credit. Two 11/2-hour classes per week. Prerequisites: Consent of instructor. Readings of Sanskrit texts on Indian philosophy (e.g., Sankara or other Vedanta and Mimamsa) for students with some knowledge of Sanskrit. 

215A-215B. Readings in Indian Buddhist Texts. (3,5) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Consent of instructor. 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. 

293. Seminar in South Asian Archaeology. (3) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Consent of instructor. Discussions of and research into a major aspect or problem of South Asian archaeology. Subject to be selected through consultation of students and instructor. 

297. Archaeological Project in South Asia. (12) Forty hours of fieldwork per week. Prerequisites: Consent of instructor, 110A, 110B or equivalent courses in archaeology, anthropology, natural science, or other related subjects. An intensive three-month 40-hour per week experience at a major archaeological site. Fieldwork, 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 determined by the director. 

**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. 

A. Mainland Southeast Asia: Covers the modern-day nations of Burma, Cambodia, Thailand, etc., with special emphasis on the impact of Hinduism and Buddhism. 

B. Insular Southeast Asia: Covers the modern-day nations of Indonesia, Malaysia, and the Philippines. Special emphasis on a major social and political context, with discussions on the impact of the colonial experience and the question of modernization vs. tradition. 

**Upper Division Courses**

122. Orality and Literacy in Insular Southeast Asia. (3) Three hours of lecture per week. This course examines the ways knowledge is organized in societies of insular Southeast Asia. It explores the shaping, storing, and retrieval of knowledge, commencing with oral tradition, progressing through manuscript and print culture into this electronic age. 

123. The Poetry of Indonesia and Malaysia 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. Ancient and modern poetry. 

124. The Shadow-Play in Southeast Asia. (3) Three hours of lecture per week. Introduction to shadow play in 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. 

128. Introduction to Modern Indonesian and Malaysian Literature in Translation. (3) Three hours of lecture per week. The course will examine the role of contemporary literature in Indonesian/Malaysian society. Emphasis on the socio-political aspects of the literature in historical context. Genres discussed will include poetry, the novel, the short story, and drama. 

**Hindi-Urdu**

**Lower Division Courses**

1A-1B. Introductory Hindi and Urdu. (5,5) Five hours of lecture and one hour of laboratory per week. Prerequisites: 1A-1B. Readings in Hindi and Urdu are offered exceeding the introductory level. Grammar, reading, and writing. Course work in Hindi and Urdu literature, leading to mastery of grammatical structures and essential vocabulary and achievement of basic reading and writing competence. 

120. Third-Year Hindi. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Two years of Hindi or equivalent. Readings in literature, politics, religion, social issues; use of film, radio, and TV. Advanced exercises in composition and essay-writing; grammar review. 

121. Hindi Literature. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Two years of Hindi or equivalent. 

**Upper Division Courses**

100A-100B. Intermediate Hindi and Urdu. (5,5) Five hours of lecture and one hour of laboratory per week. Prerequisites: 1A-1B. Hindi and Urdu literature and expository prose, exploring a variety of literary forms and styles. Systematic study of grammatical and linguistic problems arising from these readings. Advanced exercises in composition, oral and written communicative skills, and cultural competence. 

150. Advanced Hindi. (3) Three hours of lecture per week. Prerequisites: 100A-B. Course will develop writing and speaking skills in a variety of styles. Emphasis will be placed upon the discourse of literary studies. Students will be required to write essays and make oral presentations in Indonesian. 

**Malay/Indonesian**

**Lower Division Courses**

100A-100B. Intermediate Indonesian. (5,5) Five hours of lecture and one hour of laboratory per week. Prerequisites: 1A-1B. Readings in Indonesian texts, including newspapers, journals, and literature exploring a variety of styles. Systematic study of grammatical and linguistic problems arising from these readings. Advanced exercises in composition, oral and written communicative skills, and cultural competence. 

150. Advanced Indonesian. (3) Three hours of lecture per week. Prerequisites: 100A-B. Course will develop writing and speaking skills in a variety of styles. Emphasis will be placed upon the discourse of literary studies. Students will be required to write essays and make oral presentations in Indonesian. 

**Graduate Courses**

210A-210B. Seminar in Malay Letters and Oral Traditions. (3,3) Course may be repeated for credit with consent of instructor. Three hours of seminar per week. Various aspects of Malay language and literature, history and development of the language, classical literature, drama, oral literature, modern literature of Indonesia and Malaysia, and dialect studies. Applies a variety of theoretical approaches to the study of the language and literature. 

232. Readings in Modern Indonesian and Malaysian Literature. (3) Three hours of lecture per week. Prerequisites: Two years of Malay/Indonesian or consent of instructor. Formerly 132. This course will focus on the 20th century literatures of Indonesia and Malaysia. Emphasis will be on the socio-cultural matrix of such modern genres as the novel, the short story, poetry, essays, and more recent work in Indonesia and Malaysia. 

234. Readings in the Traditional Literature of the Malay World. (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Two years of Malay/Indonesian or consent of instructor. Formerly 134. This course serves two functions: It provides an introduction to traditional Malay literature, involving study of texts from various periods and styles. It also offers advanced language instruction: Indonesian will be used in some lectures and in students' papers. 

*On leave, spring, fall
†Recipient of Distinguished Teaching Award
Sanskrit

Upper Division Courses

100A-100B. Elementary Sanskrit, (5-5) Five hours of lecture and one hour of laboratory per week. Elementary term; grammar and practice in reading Sanskrit texts. (F,SP) Sutherland

101A-101B. Intermediate Sanskrit, (5-5) Three hours of lecture per week. Prerequisites: 101B or equivalent. Formerly 200, 201 and 202. Advanced readings in Sanskrit literature, including Sanskrit oratory and bhakti literature. (F,SP) Goldman

203. Vedic Sanskrit, (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: 101B or equivalent. Readings from the Rig-Veda and other Vedic texts, including Brahmanas and Upanishads. Knowledge of German and/or French is recommended. (SP) van Nooten

204. Introduction to Vedic Ritual, (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Two years of Sanskrit or consent of instructor. The main types of domestic (agrya) and Srauta sacrifices. Sources for the study of ritual. The Vedic schools and their principal texts. The Soma sacrifice. The principal recitations, chants, and offerings. Discussion of representative textual passages and records. (SP) van Nooten

206. Middle Indic, (3) Course may be repeated for credit. Three hours of lecture per week. Prerequisites: Two years of Sanskrit or equivalent. Introduction to Middle Indic. An intensive study of texts in one or more of the Prakrit dialects, Pali, or Apabhramsa. (SP) van Nooten

207. Sanskrit Philosophical Texts, (3) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Two years of Sanskrit or equivalent. 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) van Nooten

208. Buddhist Sanskrit, (3) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Two years of Sanskrit or equivalent. Readings in the literature of North Indian Buddhist writers with emphasis on the grammatical features that distinguish it from classical Sanskrit and Pali. (SP) van Nooten

Thal

Lower Division Courses

1A-1B. Introductory Thal, (5-5) Five hours of lecture per week. Survey of grammar, graded exercises, readings drawn from Thal literature, leading to mastery of basic grammatical patterns, essential vocabulary, and achievement of basic reading and writing competence. (F,SP) K. Hart

Upper Division Courses

100A-100B. Intermediate Thal, (5-5) Five hours of lecture per week. Prerequisites: Consent of instructor. Required. This course will explore how oral performance traditions organize and manage knowledge. Emphasis will be placed upon the totality of the performance, with a focus upon music as a codeterminant of the meaning and a catalyst for composing the text. Also listed as South and Southeast Asian Studies 291A and Music 291A. (F,SP) Brinner, Connelly, Sweeney

Interdepartmental Studies Courses

Graduate Courses

IDS 255A-255B. Eastern Frontiers of the Classical World, (4-4) Course may be repeated for credit. Three hours of seminar per week. Prerequisites: Consent of instructor required. This seminar will explore how oral performance traditions organize and manage knowledge. Emphasis will be placed upon the totality of the performance, with a focus upon music as a codeterminant of the meaning and a catalyst for composing the text. Also listed as South and Southeast Asian Studies 291A and Music 291A. (F,SP) Brinner, Connelly, Sweeney

Spanish and Portuguese (College of Letters and Sciences)

Department Office: 4319 Dwinelle Hall, 642-0471
Chair: Charles B. Faulhaber, Ph.D. (spring)
Professor: Arthur L. Askins, Ph.D. University of California at Berkeley. Spanish, Portuguese Renaissance poetry
Milton M. Arcevedo, Ph.D. Cornell University. Linguistics
Antonio J. Casado, Ph.D. Harvard University. Spanish Golden Age literature, literary theory
Aniceto Correal, Ph.D. U. Nacional de San Augustin de Arequipa. Modern Spanish-American literature
J. R. Credico, Ph.D. University of California at Berkeley. Spanish philology, medieval Spanish
Dru Dothee, Ph.D. Harvard University. Modern Spanish literature
Charles B. Faulhaber, Ph.D. Yale University. Medieval Spanish literature
John H. R. Poll, Ph.D. University of California at Berkeley. Modern Spanish literature
Candace Slater, Ph.D. Stanford University. Brazilian literature, Hispanic folk literature
G. Arnold Chapman, Ph.D. (Emeritus)
Luis Endara, Ph.D. (Emeritus)
Louis A. Murillo, Ph.D. (Emeritus)
Benjamin M. Woodbridge, Jr., Ph.D. (Emeritus)

Spanish and Portuguese

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. General Requirements. Students majoring in Spanish are required to complete two courses (upper or lower division) from outside the department, specifically related to the major.

Spanish American

Associate Professors:
Emilie L. Bergmann, Ph.D. Johns Hopkins University.
Spanish Golden Age literature
Wren Kirkpatrick, Ph.D. Princeton University. Modern Spanish American literature
Francine R. Masiello, Ph.D. University of Michigan. Spanish American literature
Julio Ramos, Ph.D. Princeton University. 19th- and 20th-century Spanish American literature

Assistant Professors:
Luiz Francisco Moreira, Ph.D. Cornell University. Comparative literature
Ignacio A. Nares, Ph.D. Indiana University. 16th-century poetry and literary theory

Lecturers:
Agnès Dimitriou, Ph.D. University of California at Berkeley
Susan Herman, Ph.D. Yale University
Héctor Monzón Ken, M.A. University of California at Berkeley
Margavorites Tortora-Ramos, M.A. University of Texas, Austin
Lyris Mikaelmann, Ph.D. Stanford University

Visiting Professors:
Eduardo González-Vihaa, Ph.D. Universidad de Tulcillo (Perú). Spanish language studies. Latin American literature

Major Advisers: Option A: Mr. Dougherty, Mr. Ramos. Option B: Ms. Moreira. Option C: Ms. Slater.

The sequence of undergraduate and graduate programs in 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 a critical understanding of the development and achievements of their literatures in the Old World and in the New, to training in advanced study and independent research. The department's policy is to maintain a balanced strength between language and literature and between Peninsular and Hispanic-American facets of a unified field.

Note: The programs of the Department of Spanish and Portuguese are 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 a critical understanding of the development and achievements of their literatures in the Old World and in the New, to training in advanced study and independent research. The department's policy is to maintain a balanced strength between language and literature and between Peninsular and Hispanic-American facets of a unified field.

The Major in Spanish, Luso-Brazilian, Iberian, or Latin-American Languages and Literatures

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 10 upper division courses totaling at least 30 units in the department, including Spanish 102A and 102B (or 1020); two courses in Spanish literature, one in Medieval or Golden Age and one in Modern; two courses in Spanish-American literature; one course in Spanish linguistics or theoretical approaches to literature; three upper division elective courses in Catalan, Portuguese, or Spanish (but excluding Catalan 101A-101B, Portuguese 102, and Spanish 142, 147, and 197). In addition, students are required to complete two courses (upper or lower division) from outside the department, specifically related to the major.

Single Subject Teaching Credential. Students seeking a single subject credential in Spanish as a single subject must take Spanish 100A, Spanish 102A and 102B or 102C, Spanish 104A-104B, Spanish 107A-107B, Spanish 112, Spanish 113, and Spanish...
Option B: Luso-Brazilian

Lower Division. Portuguese 11 and 12 or Portuguese 101 and 102 (or their equivalents). 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 Portuguese 11, 12, or Portuguese 101 and 102.

Upper Division. A minimum of 10 upper division courses totaling at least 30 units in the department, including Portuguese 103; Portuguese 104 and one other course in Brazilian literature; Portuguese 105 and one other course in Portuguese literature; one course in Portuguese linguistics or theoretical approaches to literature; and four upper division electives from the offerings of the department, two of which may be in a related field of Spanish or Spanish-American language, linguistics, or culture. In addition, students are required to complete two courses (upper or lower division) from outside the department, specifically related to the major.

Option C: Iberian or Latin-American

Lower Division. Spanish 1, 2, 3, 4, and 25 (or their equivalents). 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 equivalent of Spanish 25.

Plan 1: Iberian

Upper Division. A minimum of 10 upper division courses totaling at least 30 units in the department, including Spanish 102A and 102B or 102C; Catalan 101 or Portuguese 101; one course from the literature of Spain, and one course from the literature of Portugal or Catalonia; five other courses in Spanish, Portuguese, or Catalan language, literature, linguistics, or culture, from the offerings of the department. In addition, students are required to complete two courses (upper or lower division) from outside the department, specifically related to the major.

Plan 2: Latin American

Upper Division. A minimum of 10 upper division courses totaling at least 30 units in the department, including Spanish 102A and 102B or 102C; Portuguese 101; one course from the literature of Spanish America; one course from the literature of Brazil; one course in Portuguese language or linguistics, or in Brazilian or Spanish-American literature or culture, from the offerings of the department. In addition, students are required to complete two courses (upper or lower division) from outside the department, specifically related to the major.

If the student from previous training has the equivalent of Portuguese 101, 102, or Catalan 101, any or all of these courses may be excused and replaced by further electives as appropriate.

Honors Program. To be admitted to the honors program in Options A, B, or C, students must have completed at least two semesters of work at Berkeley with an overall grade-point average of at least 3.9 and a grade-point average of at least 3.3 in courses. 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, preferably before, but not later than, the second semester of the senior year, seven core courses: either section A, B, or C, 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 one graduate course, which requires the writing of a major research paper. The special honors course (Portuguese H165 and Portuguese H195) are offered each semester. These courses consist 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. Craddock.

General Requirements: (1) Courses must be completed on a letter-grade basis; (2) A minimum 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 or group; (5) Courses in English translation and Spanish-American literature may not be offered in satisfaction of the elective portions of the minor programs.

The Minor in Spanish Language and Literatures

Prerequisites: Spanish 1, 2, 3, 4, and 25 (or their equivalents). Requirements: Five upper division courses in Spanish/Portuguese language, linguistics, literature, or culture, selected from the offerings of the department.

Procedures: No formal declaration of enrollment in the minor program is required. Upon completion of the program, however, students must file with the undergraduate assistant of the department the Petition for Confirmation of Minor Program Committed, validated by the departmental adviser for the minor program. Students interested in either program should, therefore, work closely with the departmental adviser for the minor program to assure proper fulfillment of the requirements.

Recommended for all programs: Further study in Latin, and in Western European, Semitic, and Latin American history, languages, and literatures.

Latin American Studies. For the group major in Latin American studies, see Latin American Studies in the Index.

Graduate Program

Preparation for Graduate Study. For students interested in Hispanic linguistics, medieval or Golden Age literature, or Colonial Spanish literature, two semesters of college Latin are recommended. Students should note that the M.A. degree program in Spanish also requires a reading knowledge of either the language pertinent to Hispanic scholarship; 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 two foreign languages pertinent to the student's specialization.

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 Hispanic languages and literatures are an A.B. degree with a major in Spanish equivalent to the undergraduate major in Spanish at the University of California at Berkeley (Option A), a reading knowledge of another foreign language, and proficiency in one of the following: postbaccaulaureate work in the Department of Spanish and Portuguese at Berkeley, of which at least six must be in strictly graduate-level (200 series) courses, including Portuguese 101 and 102, and the passing of a comprehensive written and oral examination. The examination covers all periods and genres of Spanish and Portuguese literature as well as the linguistic structure of Spanish.

The Ph.D. Programs. The Department of Spanish and Portuguese administers two doctoral programs.

I. The Program in Romance Languages and Literature (with emphasis in Spanish). This program requires for admission an A.B. degree with a major in Spanish approximately equivalent to an undergraduate major at Berkeley (Option A). No specific courses are required, but students, in consultation with a graduate adviser, will lay out a program designed to pass a qualifying examination preceding advancement to candidacy. As early as possible, they may demonstrate a reading knowledge of Latin, Italian, and French, and by written examination or oral examination, proficiency in one of these languages, and by either written examination or appropriate course work in the others. A reading knowledge of German is recommended. The precise nature of the qualifying examination must depend on the student's choice of two alternative plans of preparation, both of which require a detailed knowledge of Spanish and Spanish American literature and for the student's major program in Romance Philology, with emphasis on Spanish. Plan I requires a reading knowledge of a second Romance literature as a collateral, and of prescribed masterpieces in the third. Plan II requires a command of one or more literatures (language, style, or genre) in both Italian and French literatures. Students whose principal interest is philological should see the statement under Romance Philology.

II. The Program in Hispanic Languages and Literature. Prerequisites for admission are the following: 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 eight courses, including at least one course in em-}
literatures of all periods, Luso-Brazilian 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) Five hours of recitation and one and one-half hours of laboratory per week. **Beginners' course.** Not open to students who have completed three years or more of high school Spanish, or to native speakers. (F,SP) Staff

2. Elementary Spanish, (5) Five hours of recitation and one and one-half hours of laboratory per week. **Beginners' course.** Not open to students who have completed three years or more of high school Spanish, or to native speakers. (F,SP) Staff

3. Intermediate Spanish, (5) Five hours of recitation and one and one-half hours of laboratory per week. **Prequisites:** 1 or equivalent. Continuation of 1. Not open to students who have completed three years or more of high school Spanish, or native speakers. (F,SP) Staff

4. Intermediate Spanish, (5) Five hours of recitation and one and one-half hours of laboratory per week. **Prequisites:** 3 or equivalent. Continuation of 3. Development of concepts taught in Spanish 1-3 and further practice in composition. (F,SP) Staff

5. Elementary Spanish for Hispanic Students. (5) Five hours of recitation and one and one-half hours of laboratory per week. **Prequisites:** Consent of Instructor. An elementary course designed for the Hispanic student with limited oral fluency and no formal training in the language. Structured to use the students' familiarity with the pronunciation of Spanish to develop a communicative ability and to impart a knowledge of the structure of the language equivalent to Spanish 1 and 2. (F,SP) Kerr

8. Spoken Spanish. (4) Five hours of recitation per week. **Prequisites:** 3 or equivalent. Course designed to increase vocabulary and to improve listening comprehension, pronunciation accuracy, grammar control, and speaking fluency by means of oral expression practice. Some reading/laboratory work required. Only for students whose native language is not Spanish. Enrollment limit: 16 students per section. (F,SP) Staff

21. Spanish for Bilingual Students, First Course. (3) Three hours of lecture and one hour of laboratory per week. **Prequisites:** Consent of Instructor. Formerly 71L. An intermediate course for students whose native language is Spanish. (F,SP) Staff

22. Spanish for Bilingual Students, Second Course. (3) Three hours of lecture and one hour of laboratory per week. **Prequisites:** Consent of Instructor. Formerly 71L. An intermediate course for students whose native language is Spanish. (F,SP) Staff

24. Freshman Seminars. (1) Course may be repeated for credit as topic varies. One hour of seminar per week. Sections 1-2 to be graded on a letter-grade basis. Sections 3-4 to be graded on a pass/no pass basis. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Berkeley Seminars are integrally linked to Berkeley seminars, and topics vary from department to department and semester to semester. (F,SP) Staff

25. Reading and Analysis of Literary Texts. (3) Three hours of lecture per week. **Prequisites:** 4 or equivalent. An introduction to literary concepts, terminology, critical analysis with an emphasis on poetry, dramatic, and prose texts. Required of majors and minors. (F,SP) Staff

26. Advanced Spoken Spanish. (3) Three hours of lecture/discussion per week. **Prequisites:** 4 or equivalent. Course designed to develop control of oral communication skills at an advanced level, by means of practices of conversation and presentation in class. Some reading and writing, laboratory attendance, required. Not open to native speakers. (F,SP) Staff

39. Freshman/Sophomore Seminar. (3) Course may be repeated for credit as topic varies. Three hours of seminars designed to introduce undergraduates to areas of Spanish and Latin American literature and culture. (F,SP) Navarrete, Bergmann

40. Hispanic Culture. (2) Two hours of seminar per week. **Prequisites:** Freshman or sophomore standing. A study of Hispanic culture from its origins until modern times. This course will examine the structures of value of the Hispanic people through significant areas of cultural expression, including literature and the visual arts. Within this context, emphasis will be placed on the historical continuity of Hispanic culture and on the transformations of Hispanic societies. Enrollment will be limited.

**Upper Division Courses**

(Unless otherwise indicated, Spanish 25 or its equivalent is prerequisite to all upper division courses.)

100. Introduction to Spanish Linguistics. (3) Three hours of lecture per week. (F) Azevedo

102A. Advanced Grammar and Composition. (3) Three hours of lecture per week. **Prequisites:** 25 or equivalent. (F) Staff

127. Eighteenth Century Spanish Literature. (3) Three hours of lecture per week. **Prequisites:** 25 or equivalent.

128. Contemporary Spanish Literature. (3) Three hours of lecture per week. **Prequisites:** 25 or equivalent. Developments in Spain's literature since 1939.

130. Twentieth-Century Spanish American Poetry. (3) Three hours of lecture per week. **Prequisites:** 25 or equivalent.

131. The Spanish American Short Story. (3) Course may be repeated for credit as topic varies. Three hours of lecture per week. **Prequisites:** 25 or equivalent. Brief panorama of the Spanish-American short story, beginning with Modernism, emphasis on two or three different types, e.g., fantastic, realistic, humorous, etc. (F) Staff

133. Hispanic Avant-Garde Literatures. (3) Three hours of lecture per week. **Prequisites:** 25 or equivalent. Experiments in poetry, novel, and theater during the 1920's, in Spain, Spanish America, or both. (F) Carnero

134. 20th Century Latin American Fiction. (3) Three hours of lecture per week. This course presents major works by some of the best-known Brazilian writers alongside others by equally important Spanish American authors. The course provides a useful introduction to twentieth-century Latin American writing as a whole. Works in Spanish and in Portuguese are available as well as in English, and lectures are in English. Also listed as Portuguese 134. (SP) Moreira

135. Studies in Hispanic Literature. (3) Course may be repeated for credit as topic varies. Three hours of lecture per week. **Prequisites:** 25. (F,SP) Staff

142. The Spanish American Novel in English Translation. (2) Two hours of lecture per week. Discussion of the Spanish-American novel from its beginnings; reading and discussion of selected twentieth-century novels as translated.

147. Spanish Authors in Translation. (2) Two hours of lecture per week. Reading and discussion of selected Spanish authors, in English translation.

161. Spanish Phonetics and Phonology. (3) Three hours of lecture per week. **Prequisites:** 25 or equivalent. An introduction to the phonetics and phonology of Spanish, including spoken Spanish and laboratory exercises. Introduction to structural and generative phonological analysis. (SP) Azevedo
162. Spanish Morphology: Inflection Derivation. (3) Three hours of lecture/discussion per week. Prerequisites: 25. Introduction to the analysis of Spanish words, with emphasis on the word's morphology and the formation of verbs; the formation of words with suffixes, prefixes, and related processes. (SP) Craddock

163. Spanish Syntax. (3) Three hours of lecture/discussion per week. Prerequisites: 25 or equivalent. The study of the phrase structure of Spanish sentences and its implications in discourse. Introduction to various types of syntactic analysis. (F) Azavedo

164. Spanish Dialectology. (3) Three hours of lecture/discussion per week. Prerequisites: 25 or equivalent. Introduction to geographical and social variation in the Spanish-speaking world. (SP) Craddock

165. Coexistence and Conflict: Amerindian, English, and Spanish in the Southwest. (3) Three hours of lecture per week. Prerequisites: 25 or consent of Instructor. After a brief historical introduction, the overall features of the Amerindian languages, Spanish, and English in the Southwest will be presented. The main emphasis will be on their mutual influence, especially with regard to loanwords. Source material includes popular literature and folklore as well as modern linguistic studies. (F) Craddock

179. Advanced Course in Hispanic Linguistics. (3) Course may be repeated for credit as topic varies. Three hours of lecture/seminar per week. Prerequisites: 100 or consent of Instructor. (SP) Craddock

185. Senior Course in Hispanic Literature. (3) Course may be repeated for credit as topic varies. Three hours lecture/seminar per week. Prerequisites: Restricted to majors in Spanish with 90 units university work, including 15 upper division units in Spanish or American literature. Core-jo-No-Polar

H195. Spanish Honors Course. (3) Individual conferences. Prerequisites: 25 or equivalent. Senior honors standing. Limited to senior honors candidates. Directed study centering on the preparation/completion of an honors thesis. See Honors Program, Option A, above. (F,SP) Staff

197. Field Studies. (1-4) Course may be repeated for credit. One to four hours of field work per week, per unit. Must be taken on a passed/not passed basis. Prerequisites: Consent of the instructor. Students will assist in the teaching of Spanish in local elementary and secondary schools. They will meet regularly with the instructor in charge and submit written reports. (F,SP)

198. Supervised Independent Study and Research. (1-4) Course may be repeated for credit. Individual conferences. An extension of the supervised study course taken on a passed/not passed basis. Prerequisites: Senior honors status plus preparation and 25. Enrollment restrictions apply; see the Introduction to Courses and Curricula section of this catalog. (F,SP)

Graduate Courses

200. Proseminar. (1) One and one-half hours of seminar per week. Must be taken on a satisfactory/unsatisfactory basis. This course is designed to give all new graduate students in the department a broad view of the department's faculty, the courses they teach, and their fields of research. In addition, it will familiarize the students with some practical aspects of the graduate career, issues that pertain to specific fields of research, and questions currently being debated across the profession. The readings for the course will consist of 12 photocopied articles or chapters of books provided by the department's faculty. (F)

201. Applied Linguistics. (3) Course may be repeated for credit as topic varies. Three hours of lecture per week. A study of different applications of linguistic theory to the language issues. Typical topics will include contrastive analysis of Spanish, Portuguese, English, and other non-Romance languages, or the application of linguistics to the analysis of literary texts, or discourse analysis.

202. History of the Spanish Language. (3) Two or three hours of lecture per week. Formerly 202A. A survey of the development of Spanish from prehistoric times to the present, particularly in Europe and the Americas, but with due consideration of it elsewhere in the world. The course will be based on a standard textbook with assigned outside readings on specific topics. (SP) Fauthhaber

203. Introduction to the Historical Grammar of Spanish. (3) Two or three hours of lecture per week. Formerly 202B. This course is intended as a preparation for advanced work in historical grammar. Primary consideration will be given to historical phonology and inflectonal morphology, but selected topics in historical word formation and syntax will also be covered. There will be a midterm and final examination, plus a term paper (10 pages) on selected aspects of some variety of Spanish. (SP) Craddock

220. Introduction to Medieval Hispanic Literature. (3) Two or three hours of lecture per week.

221. Major Prose Authors of the Golden Age. (3) Two or three hours of lecture per week. (SP) Bergmann

222. Major Poetry of the Golden Age. (3) Two or three hours of lecture per week.

224. Modern Drama of Latin America. (3) Two or three hours of lecture per week. (SP) Navarrete

225. The Spanish Enlightenment. (3) Two or three hours of lecture per week.

226. Spanish Romanticism. (3) Two or three hours of lecture per week. (SP) Dougherty

227A. The Spanish Novel to 1850. (3) Two or three hours of lecture per week. (F)

227B. The Spanish Novel Since 1850. (3) Two or three hours of lecture per week. (SP)

228. Modern Spanish Drama. (3) Two or three hours of lecture per week. (SP) Navarrete

229. Modern Spanish Poetry (After Romanticism). (3) Two or three hours of lecture per week. (F) Carrero

232. Colonial Spanish American Literature. (3) Two or three hours of lecture per week. (F) Cornejo-Polar

232A. 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 poetics of modernism. Special attention given to the works of Ruben Dario and the heritage of Symbolism in Latin America. (F)

234. The Colonial Period in Spanish America. (3) Two or three hours of lecture per week. (SP) Varela

235. Historical Grammar of Spanish. (3) Two or three hours of lecture per week. (SP) Pecina

236A. Modern Spanish American Prose. (3) Two or three hours of lecture per week.

236B. Modern Spanish American Prose. (3) Two or three hours of lecture per week.

240. Techniques of Literary Scholarship. (3) Two or three hours of lecture/seminar per week. (SP) Askins

242. Literary Theory and Criticism. (3) Course may be repeated for credit as topic varies. Two or three hours of lecture/seminar per week. (F) Cencini

243. Spanish Verbalization. (1) One hour of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. Training in the analysis of Spanish verse, including syllabification, meter, assonant and consonant rhyme, stanza, and rhythm. (SP) Boll

246. Hispanic Paleography. (3) Two or three hours of lecture/seminar per week.

247. Computational Studies in Hispanic Language and Literature. Three hours of lecture per week. Introduces students to the ways in which the computer may be applied to fundamental problems of scholarly research on the Hispanic languages and literatures. Emphasis on existing tools and machine-readable texts and databases. (SP) Fauthhaber

248. Special Topics. (1.5) Course may be repeated for credit as topic varies. Four hours of lecture/discussion per week for five weeks. Topics will vary from semester to semester. Please consult the graduate assistant for current topic. (F,SP) Smith

260. Cervantes. (3) Course may be repeated for credit with different topic and consent of Instructor. Two or three hours of lecture/seminar per week. Prerequisites: Graduation standing or consent of Instructor. The major works of the greatest Spanish writer, such as Don Quixote, the Novelas ejemplares, the Persiles, the Galatea, and the dramatic works. Focus will change according to the needs and interests of members of the course, but will address such issues as the place of Cervantes' work in a historical context, the background contexts of Cervantes' work, and contemporary approaches and movements in Cervantes criticism. (F,SP)

270. The Colonial Period in Spanish America. (3) Course may be repeated for credit. Two or three hours of lecture/seminar per week.

276A. The Spanish American Novel. (3) Two or three hours of lecture/seminar per week.

276B. The Spanish American Novel. (3) Two or three hours of lecture/seminar per week.

278. The Literature of a Single Spanish American Country. (3) Course may be repeated for credit as topic varies. Two or three hours of lecture/seminar per week.

280. Seminar in Spanish American Literature. (3) Course may be repeated for credit as topic varies. Two or three or four hours of lecture/seminar per week. (SP) Slater

285. Seminar in Spanish Literature. (3) Course may be repeated for credit as topic varies. Two or three hours of lecture/seminar per week.

287. Special Seminars in Hispanic Literature. (1.5) Course may be repeated for credit as topic varies. Two 1/2 hours lecture per week for four weeks. Must be taken on a satisfactory/unsatisfactory basis. Special Seminars in Hispanic Literature.

290. Special Study for Graduate Students. (2-5) Course may be repeated 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. (F,SP)

299. Special Advanced Study. (3-6) Restricted to students writing doctoral dissertations. Individual conferences. Prerequisites: Graduation standing. (SP) Staff

601. Individual Study for Master's Students. (3) Course does not satisfy unit or residence requirements for the M.A. Candidate. (3) Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Approval of graduate adviser. Individual study, subject to the approval of the graduate adviser, intended to provide an opportunity for students to prepare for the comprehensive examination for the M.A. degree. May be taken only in the semester in which the examination is attempted. (F,SP)

602. Individual Study for Doctoral Students. (3) Course may be repeated for credit. Course does not satisfy unit or residence requirements for doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Approval of graduate adviser. Individual study, subject to the approval of the graduate adviser, intended to provide an opportunity for students to prepare for the qualifying examination required of candidates for the Doctor of Philosophy degree. May be taken only in the semester in which the examination is attempted or in the immediately preceding one. (F,SP)
Portuguese

Lower Division Courses

8. Spoken Portuguese. (4) Five hours of lecture/discussion per week. Prerequisites: 2 or equivalent. Course designed to increase vocabulary and to improve listening comprehension, pronunciation accuracy, grammar control, and speaking fluency. Basic listening, speaking, reading, and writing skills: Some reading/listening required. Not open to native speakers. (F,SP) Staff

11. Elementary Portuguese. (5) Five hours of lecture and two hours of laboratory per week. Prerequisites: 101 or equivalent. Continuation of Portuguese 11. Not open to students who have taken Portuguese 101 or equivalent, or to native speakers. Completion of this course qualifies students for Portuguese 8, or 25, or 102. (F,SP) Staff

25. Reading and Analysis of Literary Text. (3) Students may not receive credit for 25 if taken after any course numbered 104 through 199. Three hours of lecture per week. Prerequisites: 12 or equivalent. Introduction to literary concepts, terminology, and theory with application to poetic, dramatic, and prose texts. (F) Askins

26. Advanced Spoken Portuguese. (3) Three hours of lecture/discussion per week. Must be taken on a pass/no-pass basis. Prerequisites: 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. (F,SP) Staff

89. Freshman/Sophomore Seminar. (2-4) Course may be repeated for credit as topic varies. Seminar format. Prerequisites: Priority given to freshmen and sophomores. Freshman and sophomore seminars offer lower division students the opportunity to explore an intense topic under the guidance of an instructor and a group of peers in a small-seminar setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. (F,SP) Staff

Upper Division Courses

(Unless otherwise indicated, 20 units of equivalent of Portuguese or other Romance language 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 intensive course for students with no previous study of the language. 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,SP) Wiedmann, Staff

101B. Portuguese for Advanced Students: workshop. (2) Two hours of workshop per week. Prerequisites: Credit of 16-20 units or equivalent of another romance language, or consent of instructor: Must be taken in conjunction with 101A. Independent study. Emphasis on understanding, speaking and writing Portuguese. Taken in conjunction with Portuguese 101A, the course provides an intensive introduction to the language. (F,SP) Staff

102. Readings in Portuguese. (3) Three hours of lecture/discussion per week. Prerequisites: 101A-101B, 12, or equivalent. The continuation of Portuguese 101A-101B, this course focuses on a variety of texts with special emphasis on 20th-century Brazil. Discussion in Portuguese; reinforcement and development of language skills. (F,SP) Wiedemann

103. Advanced Grammar and Composition. (3) Three hours of lecture/discussion per week. Prerequisites: 1 to 4 and 102 or consent of instructor. Advanced work in Portuguese grammatical structures. Practice in writing. (F,SP) Wiedemann

104. Introduction of Brazilian Literature. (3) Three hours of lecture per week. Prerequisites: 4 or equivalent: A survey of Brazilian literature from the beginnings through the 20th century, with attention to the relationships between literature and society. (F) Askins

107A-107B. Survey of Portuguese Literature. (3,3) Two hours of lecture per week. Prerequisites: 4 or equivalent. A survey of Portuguese literature from the beginnings through the 17th century. (F) Askins

112. Portuguese Civilization. (3) Three hours of lecture per week. Prerequisites: 12 or equivalent. This course offers an overview of Portuguese civilization on Portugal since its formation to the present. It looks at key themes in the development of a specifically Portuguese identity, and examines the concept of "Portuguese" in terms of the foundation of not only European, but also African, Asian, and American Portuguese-speaking societies. Course materials include works of poetry, fiction, and non-fiction. (SP) R. Machado

113. Brazilian Civilization. (3) Three hours of lecture/discussion per week. The course presents an overview of major themes in Brazilian cultural expression with emphasis on the 19th and 20th centuries. (SP) Slater

114. Contemporary Brazilian Novel. (3) Three hours of lecture per week. Prerequisites: Twenty units or equivalent of Portuguese or another romance language. (SP) Moreira

125. Camoes. (3) Three hours of lecture per week. Prerequisites: Twenty units or equivalent of Portuguese or another romance language. (F) Askins

128. Twentieth-Century Brazilian Literature. (3) Three hours of lecture per week. Prerequisites: 104 is recommended. In Portuguese: close examination of the most important 20th-century writers from the 1920s through the present. Emphasis on the shifting definition of "brazilieridade" and on new directions in contemporary poetry and fiction. (SP) Moreira

124. Twentieth-Century Latin American Fiction. (3) Three hours of lecture per week. This course presents major works by some of the best-known Brazilian writers alongside others by equally important Spanish American writers. This course may be useful in introduction to twenty-century Latin American writing as a whole. Works in Spanish and in Portuguese are available as well in English, and lectures are in English. Also listed as Spanish 134. (SP) Moreira

135. Studies in Luso-Brazilian Literature. (2-3) Course may be repeated for credit. Twenty units or equivalent of Portuguese or another romance language. (SP) Slater

136. Ideas of Amazonia. (3) Three hours of lecture per week. Intense public interest in the Amazon as a physical, economic, and political reality has resulted in the study of research conducted in paradigms developed in the social, natural, and applied sciences. Utilizes perspectives generated not be the sciences, but by the humanities. It attempts to shed light on contemporary developments in the region and on the larger processes of symbolic creation and transformation—by looking at a long line of cultural representations of the region. (SP) Slater

144. Modern Brazil through the Novel. (3) Three hours of lecture per week. Open to students in all departments of the University. Lectures and discussions in English. Texts available in both English and Portuguese. Students may not receive credit for both Portuguese 144 and 114. (SP)

148. African-Brazilian and Women's Voices in Contemporary Brazilian Fiction. (1) Three hours of lecture/discussion per week. Must be taken on a passed/not passed basis. In this mini-course on contemporary Brazilian fiction, novelist Marilene Felinto will concentrate on new writing by women and African-Brazilians. She will present her own work, as well as that of other young writers, and will stress both roots and innovations. (F) Felinto

150. Introduction to Portuguese Linguistics. (2) Two hours of lecture per week. Prerequisites: Twenty units or equivalent of Portuguese or another romance language.

190. Special Study for Undergraduates. (2-3) Course may be repeated for credit. Prerequisites: Twenty units or equivalent of Portuguese or another Romance language. Restricted to senior honors students with an adequate preparation for special study, and by previous arrangement with members of the departmental staff. (F,SP)

Graduate Courses

201. Comparative Lexicological Studies. (2) Three hours of lecture per week. A study of overlapping lexical areas, with emphasis on the contrastive analysis of selected aspects of English, Spanish, and Portuguese. Recommended as preparation for the linguistic part of the M.A. exam. Students may not receive credit for both Portuguese 201 and Spanish 201. (F)

244. Literature and Oral Tradition. (3) Two hours of seminar per week. Prerequisites: Graduate standing or consent of instructor: This course looks at various theories of literary and orally transmitted literature, as applied to folklore, epics, and anthropology. It applies a number of these to selected Latin American, and above all, Brazilian examples, including contemporary oral and semi-oral material in quite different ways. Requiring knowledge of Spanish or Portuguese is normally required. (F)

275. Critical and Stylistic Studies of a Single Author or Period. (3) Course may be repeated for credit as topic varies. Two hours of seminar per week. (F,SP) Slater

288. Special Study for Graduate Students. (3-6) Course may be repeated 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. (F,SP) Slater
Statistics

(College of Letters and Science)

Department Office: 367 Evans Hall, 642-2781
Gliair: Peter J. Bickel, Ph.D.

Professors: David J. Aldous, Ph.D., Cambridge University, Theoretical and applied probability
Leo A. Goodman, Ph.D., D.Sc. (hon.), Princeton University.
Michael J. Klass, Ph.D., Theoretical and applied probability
Rudolph J. Beran, Ph.D., University of California at Berkeley, Nonparametric inference, asymptotic methods
Joseph L. Hodges, Jr., Ph.D., Stanford University, Probability, modern statistical literature from the 19th century
Philip B. Stark, Ph.D., University of California at Berkeley, Data mining, the Internet
In熨ilar, asymptotic theory
Philip B. Stark, Ph.D., University of California at Berkeley, Nonparametric inference, asymptotic methods
David R. Brillinger, Ph.D., University of California at Berkeley, Mathematical statistics, applied probability
David A. Freedman, Ph.D., Princeton University, Statistical Computing Facility
Kjell A. Doksum, Ph.D., University of California at Berkeley, Applied probability, empirical processes

Associate Professor: Steven Evans, Ph.D., Cambridge University, Probability theory
Assistant Professors: Andrew Gelman, Ph.D., Harvard University, Medical imaging, political science
Jeffrey S. Rosenthal, Ph.D., University of Toronto, Stochastic processes
Deborah Nolan, Ph.D., Yale University, Data mining, probability
Dale Yih, Ph.D., University of California at Berkeley, Biostatistics

Senior Lecturers:
Roger Purves, Ph.D., University of California at Berkeley, Foundations of Statistics

Lecturers:
Juliet P. Shaffer, Ph.D., Stanford University, Linear models, simultaneous inference

The Major

Lower Division Courses. Required: Mathematics 1A-1B and 50A-50B. Mathematics 50A and 50B must be completed with minimum grades of C in each. Transfer students lacking only the material on linear algebra in Mathematics 50A-50B can obtain this material by taking Mathematics 51; they should contact the undergraduate assistant in 367 Evans Hall for further information about requirements for admission to the major. Mathematics courses 20, 21, and 25 require some calculus; 20 is intended for business students and 25 for engineers. Course 201A-201B is a year upper division sequence, emphasizing inference methods used in social and life sciences. Course 134 is a thorough beginning probability course. Course 135 treats inference concepts used in engineering and physical sciences.

The Theoretical

Preparation for Graduate Study. Students interested in the graduate statistics major should include in the undergraduate courses a strong foundation in mathematics and statistics. For Ph.D. degrees of the theoretical type, Mathematics 104, 105, 110, 113, and 185 are needed. For Ph.D. degrees of the applied type and the M.S. degree a year of graduate-level probability and statistics (or courses 200A-200B) and Mathematics 104 and 110 are needed. It is recommended that all students acquire familiarity with computer programming. Ph.D. students are encouraged to acquire fluency in French, German, or Russian.

The Graduate Program

The department offers the M.A., M.S., and Ph.D. degrees. Information concerning the requirements for these degrees is available in the brochure 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 two biostatistics 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 biomedical sciences, or degrees in the biological sciences with a major interest in mathematics and statistics. For further information see Biostatistics. For course listings in Biostatistics, see Biomedical and Environmental Health Sciences.

The Theoretical

When founded in 1938, the Statistical Laboratory was a unit of the Department of Mathematics and combined research with an extensive instruction in mathematical statistics. This instruction program led to A.B., M.A., and Ph.D. degrees in statistics. In 1955, the instruction activities in statistics were taken over by the newly established Department of Statistics.

In recent times the laboratory has been the administration center for sponsored projects of the department. In addition, the laboratory offers a consulting service in statistics for graduate students and faculty in other disciplines. The consultants are graduate students in statistics or biostatistics working under the supervision of a faculty member. The laboratory is currently developing a variety of interdisciplinary research projects involving collaborative work between faculty and students in statistics and other departments.

The Theoretical

The Statistical Computing Facility provides computing support for the department. It currently houses more than 35 networked SUN workstations, 3 4/280 SUN servers, a 4/280 terminal server, an IBM RS 6000/550 compute server, and many terminals, printers, and other peripherals. The laboratory is heavily used by graduate and undergraduate instructional programs. In addition, the facility offers high-level consulting assistance in statistical computing and is active in developing advanced statistical software.

Lower Division Courses

ONLY ONE 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.

*On leave, spring
*Recipient of Distinguished Teaching Award


20. Introduction to Probability and Statistics. (4) Students who have taken 2, 5, 20, 25 or 21 will receive no credit for 20. Three hours of lecture and two hours of laboratory per week. Prerequisites: One semester of calculus. For students with mathematical background who wish to acquire basic concepts. Relative frequencies, discrete probability, random variables, expectation. Testing hypotheses. Estimation. Illustrations from various fields. (F,SP)

21. Introductory Probability and Statistics for Business. (4) Students who have taken 2, 5, 20, 25 or 21 will receive no credit for 21. Three hours of lecture and two hours of laboratory per week. Prerequisites: One semester of calculus. Descriptive statistics, probability models and related concepts; sample surveys, estimates, confidence intervals, tests of significance, controlled experiments vs. observational studies, correlation and regression. (F,SP)

24. Freshman Seminars. (1) Course may be repeated for credit as topic varies. One hour of seminar per week. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore, in small group format and with a faculty member in a small-seminar setting, Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP)

25. Introduction to Probability and Statistics for Engineers. (3) Students who have taken 2, 5, 20, 21 or 25 will receive no credit for 21. Three hours of lecture and one hour of laboratory per week. Prerequisites: A year of calculus. Emphasis on concepts and applications in engineering. Introduction to probability, expectation. Standard discrete and continuous distributions. Regression and correlation. Point and interval estimation. Illustrations from engineering. (F,SP)

422 / Statistics

3.9. Freshman/Sophomore Seminar. (2-4) Course may be repeated for credit as topic varies. Seminar format. Sections 1-2 to be graded on a letter-grade basis. Sections 3-4 to be graded on a pass/fail/no passing basis. Prerequisites: Priority given to freshmen and sophomores. Freshman and sophomore seminars offer lower division students the opportunity to explore an intellectual topic with a faculty member and a group of peers in a small seminar-setting. These seminars are offered in all campus departments; topics vary from department to department and from semester to semester. (F,SP)

95. Directed Group Study. (2) Two hours of group study. Must be taken on a passed/not passed basis. Prerequisite: Consent of instructor. Must be taken at the same time as either Statistics 2 or 21. This course assists lower division statistics students with structured problem solving, interpretation and making conclusions. (F,SP) Purves

Upper Division Courses

101. Introduction to the Theory of Probability. (4) Three hours of lecture and one hour of laboratory per week. Prerequisites: Calculus variable and their distributions and expectation, univariate models, central limit theorem, statistical applications, dependence, multivariate normal distribution, conditioning, simulation and other computer applications. (F,SP)

102. Introduction to the Theory of Statistics. (4) Three hours of lecture and two hours of laboratory per week. Prerequisites: 101. Least squares estimates, t tests, F tests, and the application of these procedures to the design and analysis of experiments. Maximum likelihood estimation. Weighted and likelihood ratio tests in the context of logistic regression and Poisson regression. Computer-based applications. (SP)

131A-131B. Statistical Inferences 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 for estimation and hypothesis testing. Statistical application. Linear estimation and normal regression theory. (F,SP)

131F. Statistical Inference for Social and Life Scientists: Accelerated. (4) Three hours of lecture and two hours of laboratory per week. Prerequisites: 2, 5, 20 or 21. Accelerated version of Statistics 131A-131B. This course is designed for students who had some statistics and want a fast-paced discussion of statistical methods in the social sciences. (F,SP)

134. Concepts of Probability. (3) Three hours of lecture per week. Prerequisites: One year of calculus. An introduction to probability emphasizing concepts and applications. Coverage includes laws of independence, laws of large numbers. Discrete and continuous random variables. Central limit theorem. Selected topics such as: the Poisson process, Markov chains, characteristic functions. (F,SP)

135. Concepts of Statistics. (4) Three hours of lecture and two hours of laboratory per week. Prerequisites: 101 or 134. A comprehensive survey course in statistical theory and methodology. Topics include: descriptive statistics, maximum likelihood estimation, goodness of fit, hypothesis testing, least squares estimation. The laboratory includes computer-based data-analytic applications to science and engineering. (F,SP)

190. Stochastic Processes. (3) Three hours of lecture per week. Prerequisites: 101 or 103A or 134. Random walks, discrete time Markov chains, Poisson processes. Further topics such as: continuous time Markov chains, queuing theory, point processes, branching processes, renewal theory, stationary processes, Gaussian processes. (SP)

151A-151B. Linear Modelling: Theory and Applications. (4-4) Three hours of lecture and two hours of laboratory per week. Prerequisites: 102 or 135. A coordinated treatment of linear and generalized linear models, analysis of variance, model fit, estimation of variance and covariance, random effects, design and analysis of experiments, quality improvement, log-linear models for discrete multivariate data, model selection, robustness, graphical techniques, productive use of computers, in-depth case studies. (F,SP)

152. Sampling Surveys. (4) Three hours of lecture and two hours of laboratory per week. Prerequisites: 101 or 103A or 131A or 134. Theory and practice of sampling methods including stratified, cluster, and double sampling. Sampling with unequal probabilities. Properties of various estimators including ratio, regression, and difference estimators. Error estimation for complex samples. (F,SP)

153. Introduction to Time Series. (4) Three hours of lecture and two hours of laboratory per week. Prerequisites: 101 or 103A or 134 or consent of instructor. An introduction to time series analysis in the time domain and spectral domain. Topics will include: estimation, prediction, and forecasting of seasonal and non-seasonal time series using autoregressive moving average models, forecasting, indicators, harmonic analysis, spectra. (SP)

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. (F)

156. Statistical Inference. (3) Three hours of lecture per week. Prerequisites: Math 50A-50B or 102 or 135. Fundamental concepts of parametric inference such as sufficiency, Inference based on likelihood exponential family models, the maximization of the likelihood function and large sample approximations; fundamental aspects of non-parametric inference such as rank, permutation and goodness of fit tests and estimation of density functions and regression functions. The selection of topics may vary from year to year. (F)

157. Seminar on Topics in Probability and Statistics. (3) Three hours of seminar per week. Prerequisites: Math 50A-50B and consent of instructor. Substantial student participation required. The topics to be presented in the seminar may vary from year to year. The topics will be announced by the middle of the preceding semester, see departmental bulletins.

H195. Special Study for Honors Candidates. (1-4) Course may be repeated for credit. (F,SP) Staff

196. Directed Study for Undergraduates. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. Prerequisite: Consent of instructor. Special tutorial or seminar on selected topics. (F,SP) Staff

199. Supervised Independent Study and Research. (1-3) Course may be repeated for credit. Must be taken on a passed/not passed basis. (F,SP) Staff

Graduate Courses

200A-200B. Introduction to Probability and Statistics at an Advanced Level. (4-4) Three hours of lecture and two hours of laboratory per week. Prerequisites: Two years of calculus and one semester of linear algebra. Probability spaces, random variables, distributions in probability and statistics, central limit theorems, Poisson processes, transformations involving random variables, estimation, confidence intervals, hypothesis testing, linear models, large sample theory, canonical models, decision theory. (F,SP)

205A-205B. Probability Theory. (4) Three hours of lecture per week. Prerequisites: Math 50A-50B or 102 or 135. Elements of real analysis and metric spaces, including compactness, Riemann integral. Knowledge of Lebesgue integral and/or elementary probability is helpful, but not required. Characteristic function methods. Conditional expectations; martingales and theory convergence. Markov chains. Stationary processes. (F,SP)

206A-206B. Stochastic Processes. (3) Course may be repeated for credit with different instructor. The course will cover a variety of topics. The topics to be covered may vary from year to year. Course topics will be selected from the general theory of processes, sample function properties, weak convergence, Brownian motion, diffusions, Levy pro-
cences, Markov processes, martingales, Gaussian pro-
cesses and further topics. (F,SP)
210A-210B. Theoretical Statistics. (4-4) Three hours of lecture and one hour of laboratory per week. Prerequisites: A year of upper division probability and statistics; a course in linear algebra. A survey of mathematical statistics; in particular both small and large sample theorems of hypothesis testing, estimation, and decision theory. Applications to problems in probability, statistics, economics, and other fields. Prerequisite: 200A. (F,SP)


216A-216B. Theory of Nonparametric Inference and Robust Methods in Statistics. (3-3) Three hours of lecture per week. Prerequisites: 216A or 216B. Theory and methods for handling a variety of nonparametric models. Topics include nonparametric versions of normal distributions, regression and condition functions when no specific parametric model is believed to be exactly valid. Typical topics are: the Wilcoxon-Mann-Whitney test, bootstrap estimation, estimation of densities and regression functions, asymptotic optimality. (F,SP)

217A-217B. Asymptotic Methods in Statistics. (3-3) Three hours of lecture per week. Prerequisites: 205A, and 210B or 200B. Theory and methods for handling a variety of nonparametric models. Topics include nonparametric versions of normal distributions, regression and condition functions when no specific parametric model is believed to be exactly valid. Typical topics are: the Wilcoxon-Mann-Whitney test, bootstrap estimation, estimation of densities and regression functions, asymptotic optimality. (F,SP)

220A-220B. Linear Models. (4-4) Three hours of lecture and two hours of laboratory per week. Prerequisites: Matrix algebra, a year of calculus, two semesters of upper division or graduate probability and statistics. Theory of least squares estimation, interval estimation, and hypothesis testing in linear models. Linear fixed and mixed effects models with normally distributed errors. Large sample theory for non-normal linear models. Two and higher order lay-outs, residual analysis. Effects of departures from the underlying assumptions. Robust alternatives to least squares. (F)

232. Experimental Design. (4) Three hours of lecture and two hours of laboratory per week. Prerequisites: 200B or equivalent. Randomization, blocking, factorial design, confounding, fractional replication, response surface methodology, optimal design. Applications. (SP)

235. Large Sample Theory for Applied Statistics. (3) Two hours of lecture and one hour of laboratory per week. Prerequisites: Calculus (at least one year, preferably three semesters); one year of probability and statistics at the undergraduate level. An introduction, with the use of advanced mathematics, to asymptotics. Emphasis is on intuitive understanding rather than proofs. Topics include: limits, order comparisons, convergence in probability and in law, with applications to approximating variances, normal and other approximations to distributions, sample size determination, variance stabilizing transformations. There will be particular emphasis on robustness and asymptotic efficiency. (F)


240. Nonparametric and Robust Methods. (4) Three hours of lecture and two hours of laboratory per week. Prerequisites: A year of upper division probability and statistics. Standard nonparametric tests and confidence intervals for continuous and categorical data; nonparametric estimation of quantities; robust es-

timation of location and scale parameters. Efficiency comparison of classical procedures. (F)


243. Introduction to Statistical Computing. (4) Course may be repeated for credit. Three hours of lecture and two hours of laboratory per week. Prerequisites: Graduating standing and a graduate student in statistics. Discussion, problem review and development, guidance of laboratory classes, course development, supervised practice teaching. (F,SP) Purves

244. Statistical Computing. (4) Three hours of lecture and two hours of laboratory per week. Prerequisites: 102, or equivalent. Frequency-based techniques of time series analysis, spectral theory, linear filters, estimation of spectra, estimation of transfer functions, design, system identification of linear stationary processes, model building. (F,SP)

248. Analysis of Time Series. (4) Three hours of lecture and two hours of laboratory per week. Prerequisites: 102 or equivalent. Frequency-based techniques of time series analysis, spectral theory, linear filters, estimation of spectra, estimation of transfer functions, design, system identification of linear stationary processes, model building. (F,SP)

250. Applied Stochastic Processes. (3) Course may be repeated for credit. Three hours of lecture per week. Topics in probability and statistics offered according to student demand and faculty availability. (F,SP)

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)

272. Statistical Consulting. (3) Course may be repeated for credit. Two hours of session per week. Special topics in probability and statistics. Offered according to student demand and faculty availability. (F,SP)

278B. Statistics Research Seminar. (1-4) Course may be repeated for credit. Two hours of session per week and individual meetings as necessary. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Some course work in applied statistics and permission of instructor. Open to graduate students concurrently with service as a consultant in the department's drop-in consulting service. Participants will work on problems arising in the service and will discuss general ways of handling such problems. There will be working sessions in small groups and occasional lectures on consulting. (F,SP)

278B. Statistics Research Seminar. (1-4) Course may be repeated for credit. Two hours of session per week and individual meetings as necessary. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Some course work in applied statistics and permission of instructor. Open to graduate students concurrently with service as a consultant in the department's drop-in consulting service. Participants will work on problems arising in the service and will discuss general ways of handling such problems. There will be working sessions in small groups and occasional lectures on consulting. (F,SP)

286. Directed Study for Graduate Students. (1-12) Course may be repeated for credit. Prerequisites: Consent of Consultant. Special tutorial or seminar on selected topic. (F,SP) LeCam

296. Directed Study for Graduate Students. (1-12) Course may be repeated for credit. Prerequisites: Consent of Consultant. Special tutorial or seminar on selected topic. (F,SP) LeCam

299. Individual Study Leading to Higher Degrees. (2-12) Course may be repeated for credit. Prerequisites: Consent of Consultant. Special tutorial or seminar on selected topic. (F,SP) LeCam

601. Individual Study for Master's Candidates. (1-8) Course may be repeated for a maximum of 16 units. Prerequisites: Consent of Consultant. Maintains satisfactory unsatisfactory basis. Individual study in consultation with the graduate adviser, intended to provide an opportunity for qualified students to prepare themselves for comprehensive examinations. 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 Candidates. (1-8) Course may be repeated for a maximum of 16 units. Course does not satisfy unit or residence requirements for doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: One year of full-time graduate study and permission of the graduate adviser. Individual study in consultation with the graduate adviser, intended to provide an opportunity for qualified students to prepare themselves for certain examinations required of candidates for the Ph.D. degree. (F,SP) Staff

Professional Courses

300. Professional Preparation: Teaching of Probability and Statistics. (2-4) Course may be repeated for credit. Two or more hours of lecture and two to four hours of laboratory per week. Must be taken on a satisfactory/unsatisfactory basis. Prerequisites: Graduate standing and appointment as a graduate student in statistics. Discussion, problem review and development, guidance of laboratory classes, course development, supervised practice teaching. (F,SP) Purves

301. Undergraduate Statistics Instruction. (1-2) Course may be repeated for credit. Two hours of seminar and two hours of tutorial per week. Prerequisites: Permission of Student Learning Center as well as sophomore standing and at least a B average in two semesters of statistics and mathematics or related field. Designed primarily for undergraduate tutors in statistics, this course treats tutoring as an educational experience. Focuses on tutors’ experiences. Topics include and skills, theories of learning, concept mapping.

Subject A: English Composition

(See College Writing Programs)

Undergraduate and Interdisciplinary Studies

(See College of Letters and Science)

Division Office: 301 Campbell Hall, 442-0180

The mission of the Division of Undergraduate and Interdisciplinary Studies 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 the Division of Undergraduate and Interdisciplinary Studies administers the individual major and the following field and group majors. (For a complete description of the major programs and courses, please see the entries listed alphabetically by major.)

Field Major

Interdisciplinary Studies. The interdisciplinary studies field major (ISF), established in fall 1992, unites the former field majors in social sciences and humanities. The ISF major thus affords undergraduates a thoroughly interdisciplinary framework for their studies. The program allows students to establish areas of concentration in the humanities, the social sciences, or in areas that draw on both.

The field major is especially devised for students who are interested in a liberal arts education. The minor combines breadth—courses drawn from a number of disciplines—with an individual area of concentration tailored to the needs of each student. Students are responsible for developing their own program of studies with the advice and approval of...
a faculty member who will act as their official advisor.

Group Majors

American Studies. A group major in American studies has been approved by the College of Letters and Science. However, the California Post-Secondary Commission, which reviews all new major programs, had not yet made its final determination regarding the new major group when this catalog went to press. For further information about the status of the proposed major, please contact the UGIS office in 301 Campbell Hall, 642-9320.

Celtic Studies. This is an interdisciplinary program focusing on the culture, languages, literature, and history of the Celtic regions, including Ireland, Wales, and sometimes England. Faculty from the departments of English, Rhetoric, Linguistics, and German will participate in teaching the courses. A Celtic studies minor is also available.

Cognitive Science. The major is the cross-disciplinary study of the structure and processes of human cognition and their computational simulation or modeling. This interdisciplinary program has been designed to give students an understanding of questions dealing with human cognition, such as concept formation, visual perception, the acquisition and processing of natural language, and human reasoning and problem solving. The program draws courses within and across fields of psychology, anthropology, biology, education, computer science, linguistics, philosophy, and psychology, as well as specially designed lower and upper division courses in cognitive science.

Environmental Science. This major is designed 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 human studies.

International and Area Studies. The international and area studies teaching program office (207 Moses Hall, 642-4466) administers group majors in Asian studies, Development studies, Latin American studies, Middle Eastern studies, and political economy of industrial societies (PEIS).

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.

Peace and Conflict Studies (PACS). PACS is a multidisciplinary inquiry in the classical tradition of liberal arts education, with a strong emphasis on practical application and experience. The major explores the political and social causes of violence and warfare, processes that lead to ecological and social cooperation, justice, and peace. Students develop areas of concentration within the field in consultation with their faculty advisers.

Religious Studies. The major provides opportunities for securing a broad background in the liberal arts and humanities while at the same time allowing for a focus on a thematic concern or a particular religious tradition. The major views religion from a global perspective and combines aspects of the humanities and social sciences. A religious studies minor is also available.

Other Programs

In addition to the majors listed above, the Division of Undergraduate and Interdisciplinary Studies has developed innovative introductory courses such as Topics in World Civilization, The Development of World Civilization, and upper division colloquia and research courses.

The College Writing Programs (216-Dwainelle Axnnes, 642-5570), designed to help undergraduates establish fluency and control over their reading and writing skills, is also in the Division of Undergraduate and Interdisciplinary Studies.

Undergraduate Research Apprentice Program. The Undergraduate Research Apprentice Program is designed to provide highly motivated undergraduates with semester or year-long opportunities to work closely on either a voluntary or for-credit basis with a senior faculty on research projects. The intent of the program is to promote more productive intellectual relationships between faculty and undergraduate students and to help ease the practical tensions between university's commitments to teaching and its commitment to research. Students enrolled in the program will receive guidance in developing research skills, and mentoring by a specialist in their area of interest. Students selecting as research apprentices may enroll in the program for 1-4 units through UGIS 192. For more information, see Terry Stratham, 315 Campbell Hall, 642-3795.

Lower Division Courses

44A. Topics in Western Civilization. (4) Four hours of lecture and two hours of discussion per week. Prerequisites: Completion of Subject A requirement. Formerly Freshman and Sophomore Studies 44A. How did the possess the Roman empire? 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.

44B. Topics in Western Civilization. (5) Four hours of lecture and two hours of discussion per week. Prerequisites: Completion of Subject A requirement, 44A or equivalent. This course will focus on the development of modern European life, especially the role of the family. 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.

44C. Topics in Western Civilization. (4-5) Four hours of lecture and one to two hours of discussion per week. Prerequisites: 44A-44B recommended but not required. Formerly Freshman and Sophomore Studies 44C. How did the possess the Roman empire? 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.

55A. The Development of World Civilization. (4-5) Three hours of lecture plus two or three hours of discussion per week. The making of the major societies and cultures of the world. A comparative consideration of varieties of human activity in major world areas for the period between 1500 and 1900. (F)

55B. The Development of World Civilization. (4-5) Three hours of lecture and two to two and one half hours of discussion per week. An introductory survey of 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 interdependent politically, economically, socially, and culturally. How did the possess the Roman empire? 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.

66. The Physical World. (4) No credit for 66 after taking Physics 10. Cannot remove a deficit for Physics 10. Three hours of lecture and two hours of discussion per week. Physics 10 is a more rigorous course. An introductory tour of physical science and technology, intended for students specializing in other fields. Emphasis is on recent theories that influence modern technology (atomic particles, the Big Bang) and on technological developments of present importance (e.g., nuclear energy, computers). Mathematical techniques are used, but calculus is not required. (SP) Schwartz

98. Undergraduate and Interdisciplinary Studies. (1) Course may be repeated for credit as topic varies. One hour of seminar per week. Must be taken on a pass/fail basis. Seminar for the group study of selected topics, which will vary from semester to semester. (F,SP)

98X. Directed Group-Study with UGIS 49. (1) One hour of discussion per week. Must be taken on a pass/fail pass/fail basis. Only for students enrolled in either 55A or 55B. An extra weekly session emphasizing writing and speaking skills.

Upper Division Courses

179. Undergraduate Colloquium 179. (1) Course may be repeated for credit. One or one-half hours of lecture per week. Must be taken on a pass/fail pass/fail basis. Undergraduate colloquium. Topics change each semester. Check with department office, 301 Campbell Hall, for current topics.

182. Supervised Research. Course may be repeated for credit. One-on-one faculty/student research. Requires two hours of research per week. Must be taken on a pass/fail pass/fail basis. Directed individual research on topics connected to faculty scholarship. (F,SP)

192A. Humanities. (1-4)

192B. Social Sciences. (1-4)

192C. Biological Sciences. (1-4)

192D. Physical Sciences. (1-4)

192E. Interdisciplinary Studies. (1-4)

Women's Studies

(College of Letters and Science)

Department Office: 350 Campbell Hall, 642-2787

Chair: Irene Tinker, Ph.D.

Professors:

Evelyn Nakano Glenn, Ph.D. (Women's Studies, Asian American Studies). Women, work, the family, race, ethnicity, and gender in the U.S. workplace

June Jordan (Women's Studies, African American Studies). Poetry, creative writing, women and literature

Mary M. Ryan, Ph.D. (Women's Studies, History). History of American women, 19th- and 20th-century U.S. social and cultural history

Carol Stock, Ph.D. (Women's Studies, Education). Social science, technology, and education

Irene Spiekermann, Ph.D. (Women's Studies, City and Regional Planning). Women and international development policy studies

Assistant Professor:

Carolyn Dye, Ph.D. (Women's Studies). English literature, postmodernism and postcolonial feminist theory, travel and gender

Professors:

Daniel Boyarin, Ph.D. (Religious Studies, (Chair), Near Eastern Studies). Representations of the female in the talmud

Geraldine Clifford, Ph.D. (Education) Women in American education, feminist teachers

Karin Fingarette, Ph.D. (Science and Technology Studies). Feminist readings of gender differences within the interrelationship of work and family

Carrie Porter, Ph.D. (English) American literature, American intellectual history

Nancy Polkinghorne, Ph.D. (Anthropology) Medical and psychological anthropology, Europe, Brazil

Associate Professors:

Norma Alfonzo, Ph.D. (Chicana Studies) Latin American, Chicana/Latina, and Puerto Rican literature

Sandra Crokk, Ph.D. (Anthropology) Feminist theory and prehistory, paleolithic Western Europe

Altha Cravey, Ph.D. (Anthropology) Political economies, gender, liminal communities

Sue Schwerk, Ph.D. (English) Politics of 20th-century American women's poetry, gender, and war
The Berkeley Women's Studies Program was founded in 1976 and became a department in 1991. Its objective is to enhance the existing curriculum by introducing the subject of women into serious academic inquiry. Women's Studies seeks to describe the experience of women throughout history, across the world, and from different economic, ethnic, and racial groups. It engages the question of gender itself. Although all societies make gender distinctions, how do they differ from one culture to another, how have definitions of male and female evolved, how are they perpetuated, and how might they be redefined? Women's Studies and Women's and Gender Studies addresses issues of sexual inequality and conflict created by gendered roles and the rapid transformation of these roles in today's increasingly global society.

As we expand the content of the traditional curriculum, we re-evaluate its methods and models as they succeed or fail to account for the experience of women at home or abroad. We have adapted the ideas and research methods of several academic disciplines and produced our own body of feminist theory and scholarship on women. By analyzing the powerful and problematic impact of gender differences, Women's Studies revises and refines our understanding of ourselves and our world.

The Women's Studies Program offers students the opportunity to analyze and pursue through an interdisciplinary curriculum taught by the program's own staff and members of other departments. Students learn to apply the methods and theories of social scientists, historians, literary critics, philosophers, and other scholars to the study of women. They explore a growing body of feminist theory that redefines our understanding of gender, society, and culture. The relationship of scholarship to activism is explored; internships for academic credit are encouraged. After graduation, Women's Studies students enter professional schools in law, medicine, and business; take advanced degrees in Women's Studies and related fields in social science; or pursue careers in health, counselling, teaching, government, business, and community work.

Major Program

Note: The following requirements apply to students who declare the major in fall 1993 and thereafter. Students already in the major may choose to complete requirements for the major under either set of regulations. Please contact the Department of Women's Studies for details of the regulations.

Prerequisites: To declare the women's studies major, students must have completed two lower division courses in the department. One of the courses must be WS 10.

Upper Division Requirements: The requirements for a women's studies major consist of a minimum of 8 upper division courses on women's issues (30-32 units) distributed as follows:

Core courses (20 units): 101, Cultural Representations of Gender; 102, Comparative Gender Systems; 103, Race, Ethnicity, and Gender; 104, Advanced Feminist Theory; 195, Senior Seminar.

Electives (10-12 units): Three electives, at least one in Women's Studies; the other two may be an approved, listed in "Courses in Women and Gender," published each semester by the Department of Women's Studies.

Honors Program: Students must have a 3.5 for honors, a 3.5 for honors, and a 3.7 for highest honors. In all cases, the senior thesis must be deemed excellent.

Minor Program

Students in the College of Letters and Science may complete one or more minors of their choice, nor-

mally in a field both academically and administratively distinct from their major. To be admitted to the minor in women's studies, students must complete WS 10. Minors in women's studies must complete five upper division courses as follows (minimum 24 units): any three of the core courses (WS 101, 102, 103, 104) plus two electives in Women's Studies.

Prerequisites for Nonmajors and Minors

Students who are not majoring or minoring in women's studies but wish to take women's studies core courses (101, 102, 103, and 104) must take WS 10 or its equivalent beforehand.

Lower Division Courses

1A. Freshman Composition. (A) Three hours of lecture and one hour of discussion per week. Prerequisites: Subject A Training in expository, argumentative, and other styles of writing. The assignments will focus on themes and issues in Women's Studies. (SP) Staff

10. Introduction to Women's Studies. (A) Three hours of lecture 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, women's movements, and female art. (F,SP) Kaplan

12. Coming into the World Female. (A) Three hours of lecture per week. Through cross-cultural readings of fiction, autobiographies, and poems, we will identify and examine important problematicalities of experience specific to the female. Intensive reading and class discussion will be matched by intensive critical and creative, student writing. (F) Jordan

14. Contemporary Global Issues for Women. (A) Three hours of lecture per week. A lower division course designed to introduce undergraduate women and men to critical issues of women's rights and to the advocacy groups that have lobbied to enlarge women's human rights. The course will focus on helping students understand the historical context in which a woman's movement emerged in the U.S. and elsewhere, and the role of governments, laws, social force and political actors in helping a movement emerge. (SP) Staff

20. Introduction to Feminist Theory. (A) Four hours of lecture/discussion per week. This course will survey the development of feminist theory, from origins of major feminist ideas, examine the diversity of theory which arose in the 19th and 20th centuries, and will review a range of theoretical approaches in forming contemporary feminist theory. The course will emphasize the reading of original texts written by feminist thinkers. (F) Staff

20W. Writing Intensive Workshop—Feminist Theory. (A) Three hours of seminar and two hours of discussion per week. Prerequisites: English 1A or equivalent. This is an open-to-all course for students who have not completed the second half of the reading and composition requirement. This course is identical to WS 20 above with an additional one-hour session per week. Formerly Women's Studies 120. (F,SP) Staff

24. Freshman Seminars. (A) Course may be repeated for credit as topic varies. One hour of seminar per week. Sections 1-2 to be listed on a letter-grade basis. Sections 3-4 to be graded on a passed/not passed basis. The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore with a faculty member in small-group-setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester. (F,SP)

39. Lower Division Seminar in Women's Studies. (A) Course may be repeated for credit as topic varies. Three hours of seminar per week. Sections 1-2 to be graded on a letter-grade basis. Sections 3-4 to be graded on a passed/not passed basis. Formerly 30. An introduction to feminist studies through the examination of a single problem area. Topics vary; examples include women in the city, the concept of female culture, women and work. (F,SP) Staff

40. Special Topics. (A) 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 non-majors. Topics may vary from semester to semester. Students should consult the Women's Studies announcement of courses for specific special topics. (F,SP) Staff

98. Directed Group Study for Undergraduates. (A) Four hours of lecture/discussion per week. The goal of Women's Studies 101 is to introduce fundamental critical terms and models for understanding both how gender is constructed/reconstructed through cultural representation, and how cultural representation can serve to construct, to varying degrees, the forms cultural representation itself takes. Students will emerge with a well-grounded set of skills for "reading" a variety of cultural representations of women and men, drawn from cinema and popular culture as well as literature. (F,SP) Staff

102. Comparative Gender Systems. (A) Three hours of lecture/discussion per week. The object of this course is to illustrate, through comparative case studies, the dynamics by which gender is constructed in different social life. It will describe patterns of asymmetry, hierarchy and inequality between men and women. (F,SP) Staff

103. Race, Class, Gender. (A) Three hours of lecture/discussion per week. Formerly 125. This course will focus on the construction of race, ethnicity, gender, and class in the context of changing identities, ideologies and institutions. Topics include immigration, migration, nationalism, political economy, work, domination and resistance, family strategies, and sexuality. (F,SP) Staff

104. Advanced Feminist Theory. (A) Four hours of lecture/discussion per week. Formerly Women's Studies 104. A course in 20th century feminist theory, focusing on interdisciplinary theories of women's and its historical context in which feminism evolved. The class will review the origins of major feminist ideas, examine the diversity of theory which arose in the 19th and 20th centuries, and will review a range of theoretical approaches in forming contemporary feminist theory. The course will emphasize the reading of original texts written by feminist thinkers. (F) Staff

111. Special Topic Seminars. (A) Course may be repeated for credit as topic varies. Three hours of seminar per week. This seminar is designed to prepare students with an opportunity to work closely with faculty, investigating a topic of mutual interest in greater depth. Emphasis is on student discussion and collaboration. (F,SP) Staff

112. Feminist Literary Theory. (A) Three hours of seminar per week. Prerequisites: Priority given to Women's Studies majors. Formerly Women's Studies 101. The course is designed to cover literary texts (for majors, and also non-majors). It will cover topics such as ideology, cultural politics, and power. The seminar is open to all students who wish to participate. See department office for current topic. (F,SP) Staff

112. Feminist Literary Theory. (A) Three hours of seminar per week. Prerequisites: Priority given to Women's Studies majors. Formerly Women's Studies 101. The course is designed to cover literary texts (for majors, and also non-majors). It will cover topics such as ideology, cultural politics, and power. The seminar is open to all students who wish to participate. See department office for current topic. (F,SP) Staff

113. Feminist Perspectives in Social Science. (A) Three hours of seminar/discussion per week. Prerequisites: Priority given to Women's Studies majors. Formerly Women's Studies 101. The course is designed to cover social science methods (e.g., participant observation, controlled experiments, in-depth interviews, close-ended questionnaires, content analysis) and the relationship of the social science method to a feminist perspective in social science. (F,SP) Staff

20 on leave, spring
23 on leave, spring
24 Recalled to active service
39 Recipient of Distinguished Teaching Award
132. Women in the University: Gender and Higher Education, (3) Three hours of lecture/discussion per week. The situations and experiences of women in higher education in the United States, employing both historical perspectives and data covering the contemporary scene. A prior knowledge of the history of American education is not assumed. Also listed under Education 122 and Interdepartmental Studies 126. (SP) Clifford

131. Gender and Science, (3) Three hours of lecture/discussion per week. What role has science as a social institution played in the decision and assignment of gender roles and identities? The impact of social and cultural factors on the development of the natural sciences? What differences if any would be the equal and full participation of women make? (F, SP) Staff

136. Immigrant Women, (4) Three hours of lecture per week. Prerequisites: Upper division and consent of instructor. Examine patterns of women's immigration to the U.S., in specific socio-historical and cultural contexts. Special attention to race, ethnic and identity issues from women-centered analysis and policy, also listed as Ethnic Studies 136 and IDS 136. (F, SP)

139. Political Economy of Women's Work, (4) Three hours of lecture per week. Prerequisites: 10 or equivalent, or consent of instructor. This course explores historical, anthropological, economic and sociological approaches to the study of women's labor in capitalistic, patriarchal society. Topics include collective and individual resistance to subordination; the connection between domestic labor and socially organized production, also listed as Ethnic Studies 137 and IDS 137. (F, SP)

141. Women and World Development, (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Consent of instructor. This course will examine women's lives in developing countries and the impact of development programs and modernization, women as rural and subsistence urban microentrepreneurs, and the efforts of the women's movement to change both the theory and practice of development. (F, SP) Tinker

142. Women's Lives Worldwide, (3) Course may be repeated for credit as topics vary. Three hours of lecture per week. Global influences on women's lives have multiplied in the past few decades. New laws and new economic activities have altered traditional gender relationships, not always to the benefit of women. This course will explore a different region of the world each time the course is offered. Topics to be offered: (a) South Asia; (b) East Asia; (c) Southeast Asia; (d) West Asia/North Africa; (e) Africa south of the Sahara; (f) Latin America and the Caribbean; (g) Western Europe; (h) Eastern Europe; (i) other areas as defined. Also listed as International and Area Studies 142. (F, SP) Staff

153A. Images of African American Women in Literature: Slavery to the 20th Century, (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Upper division standing and consent of instructor. Survey the major themes and events in the history of African American literature to the present time; how women have been affected by changes in family structure, sexual mores, employment patterns, legal and educational reforms. (F, SP) Staff

153B. Contemporary Images of African American Women in Literature, (3) Three hours of lecture and one hour of discussion per week. Prerequisites: Reading and composition requirement. Analysis of the cultural, literary and social assumptions that contribute to the various images of the African American women in Western literature and African American writing. Course explores the literature of 19th century African American women, an emerging field in African American literary discourse. Also listed as African American Studies 153A and Interdepartmental Studies 153A. (F) Christian

H155. Women's Studies Senior Honors Thesis, (4) Individual conferences. Prerequisites: 15 upper division units in Women's Studies; 3.3 GPA in all University work and 3.3 GPA in courses in the major. Entails writing a bachelor's honors thesis pertaining to the student's major in Women's Studies. Each student will work under the guidance of a faculty adviser who will guide the student to the completion of a major research project. (F) Staff

197. Women as Advocates, (3) Course may be repeated for credit. Two hours of seminar and ten hours of internship per week. Must be taken on a pass/fail basis. Prerequisites: Preference given to Women's Studies majors. Analysis of the history and purposes of advocacy groups which affect women adversely and of the variety of advocacy groups which have organized to address these problems. Internships will be with both activist and service organizations; students will participate at an entry level staff members while preparing dossier on the organization for seminar presentation. A final student report will summarize the history and growth of the organization. (F, SP) Staff

198. Directed Group Study for Advanced Undergraduates, (1-4) Course may be repeated for credit. Must be taken on a pass/fail basis. Prerequisites: Women's Studies major. Seminars for the group study of selected topics not covered by regularly scheduled classes. Topics will vary from year to year. (F, SP) Staff

199. Supervised Independent Study for Advanced Undergraduates, (1-4) Course may be repeated for credit. Must be taken on a pass/fail basis. Prerequisites: Women's Studies major. Reading and research in topics and areas not covered in regular courses. Topics will vary from year to year. (F, SP) Staff

Graduate Courses

211. Women and World Development, (4) Three hours of lecture and one hour of seminar per week. Prerequisites: Consent of Instructor. This course will examine women's lives in developing countries and the impact of development programs and modernization, women as rural and subsistence urban microentrepreneurs, and the efforts of the women's movement to change both the theory and practice of development. (F, SP) Tinker

219. African American Women in Literature, (4) Two and one-half hours per week. Prerequisites: Graduate student. Students will investigate a broad range of reproductive issues in which emerging technologies force people to articulate and map new meanings of personhood, parthenthood, rights, and responsibilities. (F) Staff

Wood Science and Technology
(Office of Natural Resources,
Interdisciplinary Graduate Groups)

Building 478 Richmond Field Station, 231-9456

Professors:
Jack C. Bell, Ph.D. (Forestry and Resource Management, Forest Products Laboratory)
Valerie H. Englehardt, Ph.D. (Mechanical Engineering) Wayne Wilcox, Ph.D. (Forestry and Resource Management, Forest Products Laboratory)
Robert W. Willerman, Ph.D. (Civil Engineering, Forest Products Laboratory)
David Brink (Emeritus), Ph.D. (Forestry and Resource Management, Forest Products Laboratory)
Arno Schneidewind (Emeritus), Ph.D. (Forestry and Resource Management, Forest Products Laboratory)
Charles R. Wilke (Emeritus), Ph.D. (Chemistry, Chemical Engineering)
Eugene Zavos (Emeritus), Ph.D. (Forestry and Resource Management, Forest Products Laboratory)

Graduate Advisor: Mr. Dood, Mr. Wilcox.

This program is administered by an interdisciplinary 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 requires principal attention to an understanding of the anatomy, mechanics, physics, and chemistry of wood. Specialization through additional study and thesis research is possible under the program in such areas as biology of wood formation; wood physics, including wood moisture and wood heat relations; timber mechanics and wood engineering; conservation of wood artifacts; gluing and glued products; wood quality; wood chemistry, including extractives, fiber utilization and pulping, pyrolysis, and other chemical processes; wood processing, including machining, drying, and treating; and product pathology. For a listing of courses, see the section on Forest Products in this catalog.

The excellent facilities of the Forest Products Laboratory are available for both thesis and special research projects.

Wood science and technology courses appear in this catalog under the heading Forest Products.
The University's first library was in the Bacon-Art and Library Building. The library, pictured here, served the young university until 1911, when Doe Library opened. Renamed Bacon Hall, the building housed the departments of Geology and Geography until it was razed to permit construction of another building.
Criteria Used in Selecting Freshmen

Freshman applicants to Berkeley apply for admission to one of five colleges: Chemistry, Engineering, Environmental Design, Letters and Science, or Natural Resources. The number of spaces for new students is limited and varies by college, as does the demand and competition for admission. For example, the College of Engineering may have no more than 1,000 admission spaces for new freshmen, yet typically nearly 3,000 students apply each fall. For fall 1992, the College of Letters and Science had about 6,700 admission spaces for new freshmen and received more than 15,000 applications. Since Berkeley receives applications from so many more eligible students than there are spaces available, the qualifications of the applicants who are selected for admission generally far exceed the minimum eligibility requirements explained on pages 33-35. The number of available spaces fluctuates from year to year.

For the fall term, the five undergraduate colleges at Berkeley expect to receive a total of about 20,000 freshman applications. In fall 1992 we admitted about 8,700 applicants to enroll a fall freshman class of about 3,400 students. Berkeley’s freshmen admission policy has been developed under the general guidance of University of California Regents’ policy and Berkeley campus Academic Senate recommendations. The policy is regularly reviewed by the Admission and Enrollment Committee of the Academic Senate and the Undergraduate Admission Coordination Board and may be modified in the future.

When reviewing applicants for admission, we ask these questions: What have they accomplished academically? What have they made of their individual opportunities? How will they contribute to the campus’s social and cultural life?

We begin the selection process by ranking all eligible applicants using an academic index score (AIS) derived from their grades and test scores. The academic index ranking is used to select at least 50 percent of the applicants admitted to the College of Letters and Science, College of Natural Resources, College of Environmental Design, and College of Engineering and 60 percent of applicants admitted to the College of Chemistry.

We then evaluate all of the remaining applicants’ grades and test scores. For many, we review the entire application, looking for other academic accomplishments and extracurricular activities, taking into account personal attributes and experiences that might justify special consideration. We pay particular attention to specific applicant circumstances such as California residence, rural high school enrollment, special talent, nontraditional high school enrollment, socio-economic background, disabilities, re-entry status, athletic recruitment, and ethnicity. In our consideration of these circumstances, we look for evidence of intellectual and creative ability, strength of character, leadership, achievement, honors, and commitment to work and community. Applicants to the Colleges of Chemistry, Engineering, and Environmental Design may be given additional consideration for their interest in and knowledge of their intended major.

All of the students admitted through the selection processes described above have completed academic preparation and have achieved grades and test scores that make them UC-eligible. A very limited number of students who do not meet minimum eligibility requirements may be admitted by exception. In most cases, these students have technical deficiencies that are offset by strengths in other areas. Admissions by exception may not exceed five percent of total freshman admissions.

Criteria Used in Selecting Advanced-Standing Students

The Colleges of Chemistry, Engineering, Environmental Design, Letters and Science, and Natural Resources; the School of Optometry and the Walter A. Haas School of Business; and the Department of Ethnic Studies

Advanced-standing students are those who have enrolled in a regular session at any college or university after high school graduation. The summer immediately following high school graduation is not regarded as a regular session.

Lower Division Advanced Standing (Freshmen and Sophomores). Generally there are very few openings for applicants who wish to transfer to Berkeley with fewer than 56 transferable semester units. Members of underrepresented minority groups, applicants with demonstrated hardships, re-entry students, and recruited athletes are considered for admission on a case-by-case basis.

Upper Division Advanced Standing (Juniors). Applicants who wish to transfer to Berkeley as juniors must have completed 56 transferable semester units of college credit (60 units for the major in business administration). In the academic year 1992-93, the eight undergraduate colleges and schools received a total of more than 8,500 advanced-standing admission applications for approximately 3,100 admission spaces. The number of available spaces fluctuates from year to year.

In recent years, almost every major offered at Berkeley has become competitive. Admission to some majors—business administration and all engineering majors, for example—is exceptionally competitive for transfer students because there are so many more qualified applicants than there are spaces available. And, in general, approximately 40 percent of all applicants to the College of Letters and Science are admitted.

Applicants accepted to these programs have very strong academic records and have completed the lower division prerequisite courses. Transfer students are accepted from both two-year and four-year institutions. Substantial preference, however, is given to applicants who are attending a California community college. Additional consideration is also given to residents of California, disabled students, re-entry students, recruited athletes, students qualified for the Educational Opportunity Program, and members of underrepresented minority groups (African Americans, Chicano/Latinos, and Native Americans).

Applicants to all schools and colleges will be selected primarily for strength of academic preparation, a strong grade-point average, and, on a less weighted basis, for other factors such as motivation, extracurricular achievement, or demonstrated hardships as reflected in the applicant essay. Applicants to the Colleges of Chemistry, Engineering, Natural Resources, and Environmental Design may be given additional consideration for their interest in and knowledge of their intended majors.
Applicants to any major in the College of Letters and Science are expected to have completed breadth requirements in reading and composition, foreign language, and quantitative reasoning or the transfer core curriculum (through fall 1993 only), the Intersegmental General Education Transfer Curriculum (IGETC) for California community college transfer students, or the UC Reciprocity Agreement for intercampus transfers from other UC campuses. Effective fall 1993, students entering in the fall semester must have completed at least 56 semester units and all prerequisite courses at their transfer institution(s) by the end of the preceding spring semester.

### Graduation Rates

Berkeley's graduation rates are the highest on record. Using the Student Right-to-Know and Campus Security Act of 1990 guidelines for calculating graduation rates, the Berkeley campus shows the following:

<table>
<thead>
<tr>
<th>Percentage of Students Graduating from Berkeley Within Six Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshmen entering fall</td>
</tr>
<tr>
<td>Freshmen entering fall</td>
</tr>
<tr>
<td>Freshmen entering fall</td>
</tr>
</tbody>
</table>

The average six-year graduation rate for comparable universities is 52 percent, according to a recent national study.

### Self-Paced Courses

Berkeley currently offers a number of self-paced courses. 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 (split grading). If you enroll in 2 units but complete only 4, the instructor will in general increase the unit value on the grade sheet. If, however, you enroll in 4 units but complete only 2, 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 3S, 9A, 9B, 9C, 9D, 9E, Electrical Engineering 40L, 41L; Engineering 77S; Slavic 14A, 14B, 14C, 14D, 114. (The Slavic 14 series is open only to graduate students.)

### 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 underrepresented. PDP serves gifted secondary school minority and women students as well as Berkeley undergraduate and graduate students. High school students with outstanding academic ability are brought to the Berkeley campus, given intensive preparation for university study, and motivated to seek professional careers. Instruction is provided in diverse academic disciplines, counseling and advising are offered, and field trips, guest lectures, theatrical events, and workshops aid pre-college students in defining their career goals.

PDP offers Berkeley undergraduate students special academic assistance and counseling and the opportunity to participate in faculty-supervised laboratory research in a broad range of academic disciplines. The program for 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, and tutorials which augment regular course offerings; laboratory and field placement opportunities as training for research; peer teaching and research assistantships. Students who are about to begin graduate study are also provided with intensive instruction designed to acquaint them with the methodology of graduate work in their disciplines. PDP provides graduate students with individualized faculty orientation workshops, seminars, and lectures by distinguished minority and women scholars. For further information, please go to the program office or call 642-5881.

### University Research Expeditions Program

**Program Office:** 2223 Fulton Street, Fourth Floor, 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 general public the opportunity of joining 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 actively participating in field work. Participants become short-term members of a field research team and assist in wildlife habitat studies, botanical collecting expeditions, ethnographic field work, ecological surveys, fossil excavations, historical studies, and other types of field research.

UREP projects are open to students, staff, and members of the general public. No previous academic or field experience is necessary to participate; instruction in field techniques is provided after participants arrive at their research site. Participants are selected for their interests, skills, experience, and willingness to work and learn. A tax-deductible donation to the University is required to help subsidize the research costs of the projects. Partial scholarships are available to students.
Past UREP projects have included animal behavior observations in Kenya, Argentina, and Australia; archaeological excavations in Italy, China, California, and Latin America; a museum collecting expedition to the Rendille, a 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, Mexico, and Fiji; and ecological studies in Costa Rica, Ecuador, Mexico, Kenya, New Caledonia, and Surinam.

Some of the projects planned for 1993, each approximately two to three weeks in duration, include archaeological surveys and excavations of medieval Irish monasteries and Fremont Indian settlements in Nevada; an excavation of Precambrian fossils on the White Sea in Russia; environmental studies of tropical forests in Costa Rica and Ecuador; a study of the role of art in Mali; and work with native peoples in Ecuador to save their rain forest.

For further information, please contact the University Research Expeditions Program, Dept. COS, 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 immediately preceding the residence determination date for the term during which you propose to attend the University, and you must have given up any previous residence. Residence is established by the concurrence of physical presence and acts indicating your intent to make California your residence. The one-year durational period will be extended until both presence and intent have been demonstrated for one full year. Also, effective fall 1993, you must provide evidence of financial independence in order to be classified as a resident. Physical presence within the state solely for educational purposes does not constitute the establishment of California residence under state law regardless of the length of your stay in California. If you are present in California only during instructional periods, you are presumed to be in the state solely for educational purposes. Only convincing evidence to the contrary will rebut this presumption. The rules outlined above do not apply to adult aliens in the U.S. on nonimmigrant statuses that preclude them from establishing domicile in the U.S.

Indications of your intent to make California your residence can include registering and voting in California elections; designating California as your permanent address on all school and employment records, including military records; Selective Service registration in California; obtaining a California driver’s license or California identification card, if a non-driver; obtaining California vehicle registration; paying California income taxes as a resident, including income earned outside this state from the date residence was established; establishing a residence where your permanent belongings are kept within California; licensing for professional practice in California; presence in California during non-instructional periods; and the absence of these indications in other states during any period for which you claim residence in California. Documentation may be required. No single factor is controlling or decisive; all relevant indications will be considered.

You will be considered financially independent if you can verify that you meet any one of the following conditions: you are at least 24 years of age by December 31 of the year you are requesting resident classification; you are a veteran of the U.S. Armed Forces; you are a ward of the court or both your parents are dead; you have legal dependents other than a spouse; you are married; or a graduate student or professional student, and will not be claimed as an income tax deduction by your parents or any other individual for the tax year immediately preceding your request for resident classification; or you are a single undergraduate student and were not claimed by your parents for the two calendar years immediately preceding your request for resident classification, and you can demonstrate self-sufficiency for two years.

If you are an unmarried minor (under age 18), the residence of the parent with whom you live is considered your residence. If you live with neither parent, your residence is that of the parent with whom you last lived. You must establish your own residence if both your parents are deceased and a legal guardian has not been appointed. If you are an unmarried minor and have a parent living, your residence cannot be changed by your own actions, by the appointment of a legal guardian, or by relinquishment of a parent’s right of control. The California residence of the parent from whom you derive California residency must satisfy the one-year durational requirement. The rules outlined above do not apply to minor aliens in the U.S. on nonimmigrant statuses that preclude them from establishing domicile in the U.S.

Husbands and wives each establish their own residence; neither derives residence from the other.

**Exceptions**

1. If you are a minor U.S. citizen or eligible alien whose California-resident parents move from California to establish residence elsewhere, leaving you in California, you will be entitled to resident classification as long as you enroll in a post-secondary institution within one year of the date that your parents left the state. Your resident classification will continue until you have reached age 18 and have resided in the state the minimum time necessary to become a resident. Once enrolled in the educational institution, you must attend continuously.

2. If you are a U.S. citizen or eligible alien and either a minor or aged 18 and can prove that you lived in California for the entire year before the residency determination date, that you were entirely self-supporting for that year, and that you intend to make California your permanent home, you may be eligible for resident status.

3. If you are a minor U.S. citizen or eligible alien and lived continuously for at least two years before the residency determination date with a California-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 this special classification until you have lived in California long enough to become a resident in your own right. If you are attending an educational institution and the serviceperson is transferred outside California or retires just after serving in California, you may retain your resident classification.

5. If you are a member of the U.S. military stationed in California on active duty, unless you are assigned for educational purposes to a state-supported institution of higher education, you are entitled to resident classification until you have lived in California long enough to become a resident.

6. If you are the child of a resident deceased public law enforcement or fire suppression employee who was killed in the course of duty, you may be entitled to resident classification.

7. If you are the spouse or dependent child of a University of California employee whose permanent assignment is outside California, you may be entitled to resident classification.

8. If you have not been an adult resident of California for more than one year and you are a dependent child of a California resident parent who has been a resident for more than one year immediately before the residence determination date, you may be entitled to a waiver of the nonresident tuition fee until you have resided in California for the minimum time necessary to become a resident so long as you continuously attend a public educational institution.

9. If you are a graduate of a California school operated by the Federal Bureau of Indian Affairs (BIA) and you enroll at one of the University of California campuses, you are eligible for an exemption from the nonresident fee.

10. Financial independence will not be a factor in determining your resident status if you are a graduate student instructor, graduate student teaching assistant, research assistant, junior specialist, postgraduate researcher, graduate student researcher, or teaching assistant who is employed 45 percent or more of full-time employment in the semester for which you seek 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 the Registrar and interview to have your residence status changed before submitting your registration fee payment. You must initiate all changes of status before the late registration period of the semester for which you want to be reclassified. In addition to the indications of residency listed above, California law requires that financial independence be included among the factors considered if your parents live outside California. Financial independence will not be considered if you are a graduate student instructor or research assistant employed on a 0.49 or more time basis for the term for which you seek reclassification. If you are a nonresident student who returns to your former home during noninstructional periods, you will be presumed to be in the state solely for educational purposes, and only convincing evidence to the contrary will rebut this presumption.

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 the Registrar.

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 the Registrar.

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, 300 Lakeside Drive, Seventh Floor, Oakland; CA 94612-3565, within 90 days after the residence deputy notifies you of the final decision.

Waivers of Nonresident Tuition

To the extent funds are available, nonresident tuition scholarships may be granted to spouses and dependents, 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.

Nonresident graduate students with outstanding academic records may be recommended by departments for a nonresident tuition scholarship. Awards may cover full academic year or partial nonresident tuition. Applications are available from the Graduate Fellowship Office and departments. Completed applications should be submitted to departments by April 15.

Organized Research Units

Archaeological Research Facility
Behavioral Research, Field Station for
Business and Economic Research, Institute of
Real Estate and Urban Economics, Center for
Cancer Research Laboratory
Chemical Biodynamics, Laboratory of
Cognitive Studies, Institute of
Earthquake Engineering Research Center
East Asian Studies, Institute of
Chinese Studies, Center for
Japanese Studies, Center for
Korean Studies, Center for
Electronics Research Laboratory
Engineering Systems Research Center
Environmental Design Research Center, Center for
Environmental Engineering and Health Sciences Laboratory
University Professors

Governmental Studies, Institute for
Phoebe A. Hearst Museum of Anthropology
Higher Education, Center for Studies in
Human Development, Institute of
Industrial Relations, Institute of
International Studies, Institute of
Latin American Studies, Center for
Middle Eastern Studies, Center for
Slavic and East European Studies, Center for
South Asia Studies, Center for
Southeast Asia Studies, Center for
Law and Society, Center for the Study of
Lawrence Hall of Science
Management, Center for Research in
Mathematics, Center for Pure and Applied
Personality and Social Research, Institute of
Radio Astronomy Laboratory
Seismographic Stations
Social Change, Institute for the Study of
Space Sciences Laboratory
Extreme Ultraviolet Astrophysics, Center for
Survey Research Center
UC Data
Theoretical Astrophysics Center
Transportation Studies, Institute of
Urban and Regional Development, Institute of
Vertebrate Zoology, Museum of
Virus Laboratory
Earl Warren Legal Institute

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J. W. Peltason

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**Salary and Employment Information/Representative Colleges**

<table>
<thead>
<tr>
<th>Field of Study</th>
<th>Average Monthly Salary of Graduates</th>
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<tbody>
<tr>
<td><strong>Degree Level</strong></td>
<td><strong>Bachelor's</strong></td>
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<tr>
<td>Accounting</td>
<td>$2,280</td>
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<tr>
<td>Bus. Admin. (General)</td>
<td>$2,023</td>
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<tr>
<td>Biological Sciences</td>
<td>$1,869</td>
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<tr>
<td>Computer Science</td>
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<tr>
<td>Engineering</td>
<td>$2,723</td>
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<tr>
<td>Humanities</td>
<td>$1,940</td>
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<tr>
<td>Physical and Earth Sciences</td>
<td>$1,854</td>
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<tr>
<td>Economics</td>
<td>$2,212</td>
</tr>
<tr>
<td>Other Social Sciences</td>
<td>$1,794</td>
</tr>
</tbody>
</table>

*Source: A July 1992 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 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 more in demand than degree earners from representative colleges across the nation.*
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