Courses and Curricula

Colleges and Schools are presented alphabetically as indicated in the Table of Contents. Following the Colleges and Schools is a list of Special Studies. Departments are treated as subdivisions within Colleges, Schools, and Special Studies. If you are unable to locate the department of your choice, consult the Index.

Prerequisites for courses should be noted carefully, although they are sometimes waived at the discretion of the instructor.

Courses with double numbers (for example, English 1A-1B) are two-quarter sequences beginning in the quarters indicated. Courses with triple numbers (for example, Mathematics 1A-1B-1C) are three-quarter sequences normally beginning in the fall quarter. Except as noted, each course in a sequence is normally prerequisite to one following, and a student may normally receive credit for completion of the first 1/3, 2/3, or 1/2 of a sequence. Course numbers preceded by the letter H are special honors courses, subject to such general restrictions as may be imposed by the department.

The number in parentheses following the course title indicates the credit value; the abbreviation in parentheses indicates the quarter in which the course is offered: (F) fall, (W) winter, (Sp) spring.

Course numbers are assigned as follows:

1–99
Lower division courses, including courses designated by a letter. Open to freshmen and sophomores; not acceptable for upper division credit.

100–196
Upper division courses. Ordinarily open to students who have completed at least one lower division course in the given subject, or two years of college work.

197
Field study (upper division). Effective fall 1973, the student is limited to ten units of credit for courses numbered 197, with a maximum of five units in any one quarter. This is not retroactive for any student who had accumulated more than ten quarter units of credit for 197 by the end of the spring quarter 1973, but such a student may not enroll in subsequent quarters for additional credit.

198
Directed group study (upper division). Students should not expect to use more than a total of ten units of 198 credit for a bachelor’s degree without the permission of their dean.

199
Supervised independent study and research courses for undergraduates (upper division), which may be graded only Passed or Not Passed. Students must be in good standing (2.00 grade-point average or better). They must obtain the prior consent of the instructor who is to supervise the study, the major adviser, and the chairperson of the department in which the study is to be conducted (or the equivalent). This approval must be based upon a written proposal submitted to the chairperson. The instructor shall indicate consent in writing—for example, by initialing the student’s study list adjacent to the 199 entry. The applicants shall show that their background is adequate for the proposed study, and must have completed at least 90 units of undergraduate work. The total units in any one quarter in 199 courses may not exceed 5. On the advice of the instructor or instructors concerned, the dean of a student’s college or school may recommend exceptions to the limitations listed.

200–299
Graduate courses. Adequate preparation, subject to instructor’s approval, is normally 18 upper division units of work basic to the subject matter of the course.

300–399
Professional courses for teachers or prospective teachers.

400–499
Professional courses which, like teaching courses, are acceptable toward academic degrees only within the limitations prescribed by the various colleges or schools or the Graduate Division.

601
Special study for graduate students in preparation for the master’s examination.

602
Special study for graduate students in preparation for the Ph.D. qualifying examination.

Note: The University offers a number of experimental courses. Information on these courses is contained in this Catalog under (1) the Collegiate Seminar Program and (2) the Personalized System of Instruction, both presented under Special Studies; (3) some of the Interdepartmental Studies courses, also under Special Studies; and (4) all courses numbered 91, 191, and 291 in various departmental course listings throughout this Catalog.
School of Business Administration

The School of Business Administration offers curricula leading to the Master of Business Administration degree and to the more specialized Master of Science degree. These curricula afford opportunity for advanced and specialized training based on the functional undergraduate curriculum in Business Administration or upon undergraduate study in other fields. Beyond these requirements, additional courses within a subject matter field may be taken. Advisers will assist students in the selection of these courses.

The following subject matter fields are available:

- Accounting
- Applied Economics
- Finance
- General Management
- Industrial Relations
- Production Management
- Real Estate
- Urban Land Economics
- Transportation

Graduate School of Business Administration

The Graduate School offers curricula leading to the Master of Business Administration degree and to the more specialized Master of Science degree. These curricula afford opportunity for advanced and specialized training based on the functional undergraduate curriculum in Business Administration or upon undergraduate study in other fields.

The core courses for the master’s degree include basic work in economic analysis, quantitative decision models and techniques, microeconomic, macroeconomic, and legal environment of business, income, price, and organizational behavior. All graduate students must maintain a B average in all courses and must pass a comprehensive examination.

You may pursue a program leading to the Ph.D. in Business Administration if you wish to prepare for university and college teaching and research or for high-level research positions in business or government.

For detailed information, consult the Announcement of the Graduate School of Business Administration.

LOWER DIVISION COURSE

1. Introduction to Accounting. (5) Two 1 1/2-hour lectures and 3 hours of discussion per week. Prerequisite: sophomores standing. Required for admission to the School of Business Administration. The identification, measurement, and reporting of the effects of economic events on enterprises; the contemporary model and its origins.

The Staff (Mr. Wheeler in charge) (F, W, Sp)

UPPER DIVISION COURSES

Prerequisites: basic micro and macro economic theory; Statistics 20 or equivalent, Mathematics 16A—16B or equivalent, and Computer Science 3 or equivalent are required for nearly all upper division courses. Junior standing is required for selected courses.

100. The Price System and Business Enterprises. (5) Four and one-half hours of lecture per week. Prerequisite: must have completed basic micro and macro economic theory; Mathematics 16A—16B or equivalent. Economic analysis applicable to the problems of business enterprises with emphasis on the determination of the level of prices, outputs, and inputs; effects of the state of the competitive environment on business and government policies. The Staff (Mr. Alhadeff in charge) (F, W, Sp)

101. Business Fluctuations and Forecasting. (5) Four and one-half hours of lecture per week. Prerequisite: course 100. Analysis of the operation of the market system with emphasis on methods suitable for economic instability; analysis of public and business policies which are necessary as a result of business fluctuations.

The Staff (Mr. Alhadeff in charge) (F, W, Sp)

102. Advanced Managerial Economics. (5) Three 1 1/2-hour lectures per week. Prerequisite: courses 100 and 101. Advanced analysis of the theory and practice of decisions making in business firms, utilizing the concepts and techniques of managerial economics. The Staff (Mr. Meyer in charge) (W)

103. Theory and Models of Economic Forecasting. (5) Three 1 1/2-hour lectures per week. Prerequisite: courses 100 and 101 or the equivalent. Theory and analysis of the long-run and short-run forecasts of economic activity. The Staff (Mr. Meyer in charge) (W)

110. Legal Environment of Business. (5) Three 1 1/2-hour lectures per week. An analysis of the law and the legal process, emphasizing the nature and functions of law, legal reasoning and the operation of law
111. Social and Political Environment of Business. (3) Four and one-half hours of lecture per week. Prerequisite: senior standing. Study and analysis of American business in a changing social and political environment. Historical role of business and labor and social institutions. Role of business in the development of social values, goals, and national priorities. The expanding role of the corporation in dealing with social problems and issues. Mr. Pratt, Mr. Vogel, Mr. Harris, Mr. Brown, Mr. Epstein (F, W, Sp)

114. Legal Aspects of Business Transactions. (3) Three 1 1/2-hour lectures per week. Prerequisite: course 1. A review of the legal implications of certain common business transactions and situations, including contracts arising in sales, installation, finance, sales financing, joint ventures, joint ownership, and solvency determination. The Uniform Commercial Code. Mr. M. Smith (W)

115. Legal Aspects of Real Estate. (3) Three 1 1/2-hour lectures per week. Prerequisite: course 1. An analysis of the rights and the regulation thereof in the public interest. Mr. Cerf, Mr. M. Smith (F, W, Sp)

120. Managerial Accounting. (5) Two 1 1/2-hour lectures and two hours of discussion per week. Prerequisite: course 1. The use of accounting systems and their outputs in the process of managing an enterprise. The nature and accounting characteristics of profit and loss statements, financial statements, and the role of government participation in the operation of our business community. Discussion of current problems and the evaluation of utility services regulations, pricing and marketing, and taxation. Mr. Conant (F)

121. Financial Accounting I. (5) Three hours of lecture and two hours of discussion per week. Prerequisite: courses 1 and 120. Required for those specializing in accounting. An intermediate level course in the theory and practice of financial accounting. The measurement and reporting of the economic effects of events involving working capital and long-term plant assets. Mr. Rhodes, Mr. R. Freeman (F, W, Sp)

122. Financial Accounting II. (5) Three hours of lecture and two hours of discussion per week. Prerequisite: course 121. Required for those specializing in accounting. Continuation of course 121. Accounting for intangible and fixed assets, long-term debt, depreciation, liability, cash management, and the income statement. Mr. Rhodes, Mr. R. Freeman (F, W, Sp)

123. Problems of Financial Reporting. (5) Three hours of lecture and two hours of discussion per week. Prerequisite: course 122 or the equivalent. Accounting for partnerships; consolidated financial statements; adjustments of accounting data using price indexes; accounting for the financial effects of pension plans, other advanced accounting problems. Mr. Ohlson (F, Sp)

124. Cost Accounting. (5) Three hours of lecture and two hours of discussion per week. Prerequisite: courses 1 and 120. Intensive study of basic cost accounting principles and refinements of the cost accounting system. Determination of costs of products or activities in various types of enterprises. Mr. Crichfield (F, W, Sp)

125. Administrative Accounting. (4) Three 1 1/2-hour lectures per week. For students interested in administration or management who are not enrolled in the School of Business Administration. Students will not receive credit for courses taken in this subject. Prerequisite: introduction to accounting and its uses in analyzing, planning, and controlling the operations of organizations. Mr. Ohlson (F, Sp)

126. Auditing. (5) Three hours of lecture and two hours of discussion per week. Prerequisite: course 121. Completion of course 122 strongly recommended. An intensive study of the field of auditing with verification of financial and related information, including ethical, legal and other professional issues, historical developments, and current concerns. Mr. Bourell (F, W, Sp)

127. Accounting Systems for Management Informa-

128. Accounting Systems for Management Informa-

mation. (5) Three hours of lecture and one and one-
half hours of discussion per week. Prerequisite: course 124 or consent of the instructor. The study of accounting systems, including computer-oriented systems, with an emphasis on the objectives and func-
tions of the management decision-making process. The COBOL language will be used. Mr. Bourell (W)

129. Federal Income Taxation. (5) Four and one-
half hours of lecture per week. Prerequisite: courses 1 and 120. Required for those specializing in taxation. Mr. Conant (F)

130. Financial Management. (5) Four and one-
half hours of lecture per week. Prerequisite: courses 100 and 120. Arranged. Prerequisite to 146B. Static models of decision analysis: value of information and influence of uncertainty on optimal policy. Simple one or two period models with experimentation; influence of learning on optimal policy. Dynamic policy analysis: implications of following any fixed policy. Dynamic models of policy choice. Mr. Kohlberg (W)

147. Computers and Modern Organizations: Theory and Application. (5) Four and one-half hours of lecture per week. Prerequisite: a course in programming and familiarity with English language. A survey course concerned with the importance of computers in organizations including small, large, and very large. Topics include history of development of computer, characterizing of scientific and business problems, information storage and retrieval, compilers, problem-oriented languages, simulation models, current developments in computer systems. Mr. Bresnach (F, Sp)

150. Organizational Behavior. (5) Four and one-half hours per week. A general descriptive and analytical study of organizations from the point of view of management. Problems of motivation, leadership, social structure, groups, communications, hierarchy and control in complex organizations. The interaction between technology, environment, and human behavior. Discussion of alternative theoretical models. Mr. Freeman, Mr. R. Freeman, Mr. M. Miles, Mr. Pfeffer (F, W, Sp)

151. Management of Human Resources. (5) Four and one-half hours per week. Prerequisite: courses 150 or permission of the instructor. The design of systems of rewards, assessment, and manpower development. The interaction of selection, placement, training, personal adjustment, and labor unions within the organizational structure. Role of the staff manager. Introduction of change. Implications of behavioral research for management problems and policies. Mr. Malm (F, Sp)

154. Industrial Relations. (5) Four or four and one-
half hours of lecture per week. Prerequisite: students will not receive credit for both courses 154 and 155. An analysis of manual, white collar and professional employee relations. Background and functioning of collective bargaining systems. Functioning of labor markets and wage and income security issues. Questions of public policy in labor economics and industrial relations. Mr. Estenson (F, W)

155. Labor and the Law. (5) Four and one-half hours of lecture per week. Analysis of the issues arising out of legislative, administrative, and judicial efforts to deal with labor-management issues. Examinations of labor-management issues and their economic and political significance. Comparative analyses of industries and systems in public and private employment, and in other countries. Mr. Strauss (Sp)

160. Marketing. (5) Four and one-half hours of lecture per week. Prerequisite: courses 107G and 108G or Mathematics 16A-16B and Statistics 2 or equivalent. Course 164A is not prerequisite to 146B. Static models of decision analysis: value of information and influence of uncertainty on optimal policy. Simple one or two period models with experimentation; influence of learning on optimal policy. Dynamic policy analysis: implications of following any fixed policy. Dynamic models of policy choice. Mr. Kohlberg (W)

NOTE: For key to symbols, see page 36.
162. Retailing. (5) Three 1 1/2-hour lectures per week. Prerequisite: course 160 or 160G. Historical and development of retail management types; geographical structure of retail trade, assortments of goods and services; store management, government regulations. Mr. Moore (W)

163. Advertising. (6) Three 1 1/2-hour lectures per week. Prerequisite: course 160. Basic concepts and functions of advertising; consumer buying behavior, buyer motivation, problems in utilizing advertising and measuring its effectiveness. Mr. Nicosa (F, Sp)

164. Industrial Procurement. (5) Four and one-half hours of lecture and discussion per week. Prerequisite: course 160. The interaction of buyer and seller in a non-ultimate consumer environment. The problems met in purchasing by industrial firms including government and federal buying policies; vendor selection; quantity and quality determination; and relation of buying price, production cost, and sales effort. Mr. Winslow (W)

165. Marketing Management. (5) Three 1 1/2-hour lectures per week. Prerequisite: course 160. Analysis of marketing functions primarily in manufacturing firms including product introduction, selection, pricing and sales administration; development of marketing organization within the firm. Mr. Pruden, Mr. Moyer (F, W)

166. Wholesaleing. (5) Three 1 1/2-hour lectures per week. Prerequisite: course 160. The meaning and importance of wholesaling; the structure of wholesaling; the agency structure of wholesaling; internal managerial aspects; government regulations; trends and costs, profits, and efficiency. Mr. Pruden, Mr. Moyer (F, W)

169. Marketing Policies and Problems. (5) Four and one-half hours of lecture per week. Prerequisite: course 160 or consent of instructor. The functions of marketing including geographic market structures, consumer behavior, price policy, consumerism, and other topics. Course may be repeated for credit. Mr. Coverdale (Sp)

170. Physical Distribution and Transportation Management. (5) Three 1 1/2-hour lectures per week. Problems in transportation of personal and physical distribution of goods. Provision of transportation facilities by government and transportation services by professional organizations. Mr. Smith (Sp)

174. The Financial Management of Real Estate Resources. (5) Four and one-half hours of lecture per week. Prerequisite: course 160. Real estate development and equity financing; mortgage mortgage structure; effects of credit on demand; equity investment criteria; public policies in real estate finance and urban development. Mr. Smith (W)

180. Introduction to Real Estate and Urban Land Economics. (5) Three 1 1/2-hour lectures per week. The nature of real property, market analysis, construction, cycles, mortgage lending; equity investment; real estate administration, metropolitan growth; urban land utilization; real property value; public policies. Mr. W. Smith (F, W, Sp)

181. Valuation of Real Property. (5) Three 1 1/2- hour lectures per week. Prerequisite: course 180 or equivalent. Critical examination of basic valuation techniques and methods; the role of value estimates in private land-use and real estate investment decisions and in the implementation of public policies affecting real property development. Mr. W. Smith (W)

183. The Financial Management of Real Estate Resources. (5) Four and one-half hours of lecture per week. Prerequisite: course 160. Real estate development and equity financing; mortgage mortgage structure; effects of credit on demand; equity investment criteria; public policies in real estate finance and urban development. Mr. Auerbach (F, Sp)

186. Introduction to International Business. (5) Four and one-half hours of lecture per week. Prerequisite: satisfactory performance in international courses. Foreign trade, foreign exchange, balance of payments; foreign market analysis and operational strategy of a firm; management problems and development potential of international operations. Mr. Burns (Sp)

190. Introduction to Organization and Decision. (5) Four and one-half hours of lecture per week. Normative model of rational behavior under uncertainty; games and the theory of competition in organizations; computer simulation of organizational behavior; approaches to organization design. Mr. Auerbach (F, Sp)

191. Experimental Courses. (5) Four hours of lecture per week. Prerequisite: consent of instructor. Courses will vary from year to year and will be announced at the beginning of each quarter.

199. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis.

The Staff (Mr. Meyer in charge) (F, W, Sp)

FIRST-YEAR COURSES FOR GRADUATE STUDENTS

Note: The following first-year courses are open only to graduate students in the School of Business Administration. Other students require prior approval from the Associate Dean of the Graduate School of Business Administration.

101G. Economic Analysis for Business Decisions I. (4) Four and one-half hours of lecture per week. Prerequisite: course 107G or equivalent. Economic analysis applicable to the problems of business and the operation of the market system. Determination of prices, inputs and outputs; effects of the state of the competitive environment on business policies. Mr. Mushak, Mr. Koensigeb (F, W, Sp)

102G. Economic Analysis for Business Decisions II. (4) Four and one-half hours of lecture per week. Prerequisite: course 101G. Theories of fiscal and monetary policy, as well as other macroeconomic policies, are a central topic in this course. The issues and the evidence will be discussed during the quarter. Other topics will be approached in light of the U.S. balance of payments situation today to the broader problems associated with economic growth and decay in the world. Mrs. Garcia (F, W, Sp)

104G. Business Computing I. (1) Formerly 106G. Introduction to and history of computers and computer programming for business purposes. Includes the BAS-FORTRAN programming language and exercises designed from finance, production, and marketing. To be coordinated with 107G. Mr. Garman (F)

105G. Business Computing II. (1) Formerly 106G. Advanced programming in FORTRAN. Mr. Burns (Sp), course 104G or equivalent. Scientific use of computers in business. Exercises drawn from accounting, finance, and marketing. To be coordinated with 107G. Mr. Garman (W)

106G. Business Computing III. (1) Formerly 106G. One hour of lecture per week. Prerequisite: course 105G or equivalent. Management information systems. Topics include data management and retrieval, management considerations, the economics of computing, management of computer systems and the equipment selection problem. Mr. Garman (Sp)

107G. Quantitative Analysis for Business Decisions I. (4) Three hours of lecture and one and one-half hours of discussion section per week. Prerequisite: course 101G. Introduction to optimization techniques and to decision making under uncertainty. Topics include linear programming—budgeting systems and benefit-cost analysis; priority settings; inventory and transportation problems; capital budgeting; linear programming—duality and complementary slackness; graph theory—networks and transportation; game theory—zero-sum and non-zero-sum games; minimax and saddle point. Mr. Myers, Mr. Garman (F)

108G. Quantitative Analysis for Business Decisions II. (4) Three hours of lecture and one and one-half hours of discussion per week. Prerequisite: courses 101G, 102G, 107G and 108G or the equivalent. Examines optimal decision problem. Mr. Garman (F, W, Sp)


110G. Macroeconomics. (4) Three hours of lecture per week. Prerequisite: courses 101G, 102G, 107G and 108G or the equivalent. Theories of the aggregate economy and the development of macroeconomic models. Mr. Miles (W)

111G. Political, Social and Legal Environment of Business. (4) Four and one-half hours of lecture per week. A study of basic ideas, concepts, attitudes and institutions in the relations of business, government and society. Mr. Katz, Mr. Chet (W)

120G. Accounting I: Financial Reporting. (4) Three hours of lecture and one and one-half hours of discussion per week. Prerequisite: admission to the Graduate School or consent of instructor. Analysis of financial statements. Mr. Vitola, Mr. Sadowski (F, W, Sp)

121G. Accounting II: Managerial Accounting. (4) Three hours of lecture and one and one-half hours of discussion per week. Prerequisite: course 120G or equivalent. Management is dependent upon an infor-
tems. Credit and grade awarded upon completion of full sequence. Mr. Hoggatt, Mr. Garman (W, Sp)

207. Seminar in Applied Economics. (4) 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 during the winter quarter each year. Mr. (Sp)

209. Introduction to Management Science. (4) Formerly 109G. Three hours of lecture and one-half hours of discussion section per week. Prerequisites: courses 106G, 107G, and 108G or equivalent. Survey of the techniques of management science and their applications in making business decisions. Although focusing primarily on linear models, the course is designed to produce dynamic programming, PERT, Markov chains, and queuing theory. Three hours of lecture per week. Prerequisites: courses 106, 107 or 108. Mr. Koenigsberg (F, W, Sp)

211. Seminar on the Modern Corporation. (4) Three hours of meetings per week. Prerequisite: course 110G or equivalent. A pursuit in depth of a few issues rising out of the role of the large corporation in modern society, including corporate social policy and responsibility, implications of social science contributions, and limitations and implications of corporate power, and other issues which appear to be appropriate and topical at the time. Of the course. Mr. Totel (W, Sp)

217. The Interaction of Business and Political Science. (4) Three hours of lecture per week. Prerequisite: course 110G or equivalent of consent of instructor. Theory of the mixed economy, role of government in business, the government's role in the economy including government purchasing, regulation, resource allocation, economic stabilization, planning and development, etc. and theoretical analysis of re-search, 

219. Seminar in Political, Social, and Legal Environment of Business. (4) Three hours of lecture per week. Prerequisite: course 110G or equivalent or consent of instructor. Intensive study of the theory and practice of 
financial accounting. Asset and liability measurement, income determination, financial statement analysis. Mr. Epstein (Sp)

220A. Financial Accounting. (4) Three hours of lecture and one and one-half hours of discussion per week. Prerequisite: course 120G or consent of instructor. A study of the field of financial accounting, its purpose and limitation, and its role in business decision-making. Mr. Freeman (F, W, Sp)

220B. Financial Accounting Theory. (4) Formerly 221. Three hours of lecture and one and one-half hours of discussion per week. Prerequisite: courses 121G and 209 or equivalent. Financial accounting concepts and principles are studied in order to provide a basis for discussions and test of current accounting practice. Mr. Stewart (F, W, Sp)

221. Current Topics in Financial Accounting. (4) Three hours of lecture per week. Prerequisite: course 220A or equivalent. This course focuses on issues involving the use of financial accounting information by decision makers external to the firm. It exposes the student to recent and current research in financial accounting, including a basis for discussions and tests of current accounting practice. Mr. Hakanesson (W)

222. Seminar in Accounting Theory. (4) Three hours of lecture per week. Prerequisite: course 221. The evolution of accounting thought; recent developments. Mr. Hakanesson (W)

223A–223B–223C. Doctoral Seminar in Accounting. (4) Three hours of lecture per week. Prerequisites: course 292C or IDS 209A or other introduction to decision theory, and Economics 201A–201B–201C. A seminar examining the recent literature on the applied content of financial accounting, with emphasis on seminal contributions; topics covered include research methodology in the field and the implications of social science for individual research projects. Mr. Pennman, Mr. Crichfield, Mr. Oltson (F)

224. Advanced Managerial Accounting. (4) Three hours of lecture per week. Prerequisite: course 121G or equivalent. Public accountants as well as management accountants must understand thoroughly the management process and information requirements and analysis for managerial decision making. This course includes the theory of management accounting, its application in modern organizational settings, and related problems areas involved in current CMA and CPA examinations. Mr. Wheeler, Mr. Chang (W, Sp)

225. Selected Topics in Managerial Accounting. (4) Three hours of lecture per week. Prerequisite: course 224 and or equivalent. Through judicious use of quantitative methods including mathematical programming and statistical decision theory, this course provides a conceptual analysis of several prominent managerial accounting topics. Mr. Scherer (Sp)

226. Advanced Topics in Inflation Accounting. (4) Two 2-hour sessions per week. Prerequisite: course 225 or equivalent. Historical background of the auditing function; development of auditing standards; application of statistical sampling theory to auditing. Mr. Crichfield (F)

227. Control Aspects of Information Systems. (4) Three hours of lecture per week. Prerequisite: courses 126 and 127. Seminar in current professional problems concerning the design and implementation of systems including auditing and other control aspects of these systems. Mr. Boulti (Sp)

228. Advanced Topics in Incomes Taxation. (4) Two 2-hour sessions per week. Prerequisite: course 128. Professional study of tax accounting practice, corporation tax problems, estate and gift taxation, tax research, tax planning and administration procedures. Mr. M. Smith (W)

229. Management Planning and Control Systems. (4) Three hours of lecture per week. Prerequisite: completion of courses 126 and 209. Financial, strategic planning, management control systems, internal pricing and related topics concerned with planning and control of corporation operations including multi-national firms and not-for-profit organizations. Course designed for students interested in management consulting. Mr. Koenigsberg (Sp)

230. Theory of Finance. (4) Three hours of lecture and one and one-half hours of discussion per week. Prerequisite: courses 130G and 209 or equivalent. Financial decision problems, their structure, solution and implications including decision diagrams and dynamic decision models, the representation of preferences, asset composition models and the structure of asset prices. Mr. Rosenberg, Mr. Schwartz, Mr. Garman (F, W, Sp)

231. Corporate Financial Management. (4) Three hours of lecture per week. Prerequisites: courses 230 and 290 or equivalent. Financial policies of firms including asset acquisition and replacement, capital structure, dividends, working capital and mergers. Mr. Breuer, Mr. Brenner, Mr. Leland (F, W, Sp)

231M. Corporate Financial Management. (4) Three hours per week. Prerequisite: courses 130G and 209. Valuation of financial policies of firms including asset acquisition and replacement, capital structure, dividends, working capital and mergers. Mr. Garman (F, W, Sp)

232. Money Markets and Financial Institutions. (4) Three hours of lecture per week. Prerequisite: courses 102G. Structure and operations of the Federal Reserve System commercial bank and nonbank financial institutions. Intermediation and money market regula-


234. Advanced Topics in Business Finance. (4) Three hours of lecture per week. Prerequisite: course 233. Normal and abnormal decision making by business firms, financial regulations and the business firm, and empirical studies in business finance. Mr. Garman (Sp)

235. Advanced Topics in Financial Institutions and Financial Markets. (4) Three hours of lecture per week. Prerequisite: consent of instructor. The theory of regulation of financial institutions, the analysis of money and capital markets and empirical studies on financial institutions and financial markets. Topics to be covered will vary. Mr. Kaufman (Sp)

236. Advanced Topics in Securities Markets and Investments. (4) Three hours of lecture per week. Prerequisite: consent of instructor. The theory of intertemporal choice under uncertainty, portfolio selection, equilibrium security prices, implications for firms, empirical verification of financial theory. Mr. Leland (W)

239 Seminar in Insurance. (4) Three hours of meetings per week. Mr. Goshay (Sp)

241. Production Programming. (Formerly 242) Four hours of lecture per week. Prerequisite: course 209. Programming methods and their application to production management areas of process selection, output determination, facilities location and design, and linear programming. While emphasis is placed upon analysis of deterministic linear systems approaches for less restricted cases. Mr. Rogers (W)

242. Facilities Planning and Production Control. (Formerly 243) Four hours of lecture per week. Prerequisite: course 242A or 242B or equivalent. Seminar in current professional problems in facilities planning and production control. Operation of production systems scheduling of materials, manpower and machines into through, and out of the production process. Mr. Koenigsberg (Sp)

243. Analysis for Production Management. (4) Two 2-hour sessions per week. Prerequisite: consent of instructor. Students are expected to have some knowledge of the use of elementary statistical methods in quantitative analysis. Examination of the nature and content of methods of quantitative analysis applied in production management decision making. Probabilistic models and statistical methods are developed for designing inventory systems, evaluating "quality control plans, choosing among alternative methods, analyzing service, maintenance operations, etc.

244. Problem Analysis Seminar. (4) Three hours of lecture per week. Prerequisite: consent of instructor. Study of a group of problems related to the student's career field, problems being considered and will also include student presentations.

246A. Quantitative Planning Models. (4) Three hours of lecture per week. Prerequisite: course 246A or equivalent. Financial plans and their application to business problems. Mr. Grinold (F)

246B. Applied Probability Models in Management Science. (4) Three hours of lecture per week. Prerequisite: course 246A. Models for decision making in an uncertain environment. Introduction to the theory of intertemporal choice under uncertainty, and decision making. Applications to cash management, capacity expansion, replacement and maintenance, marketing, etc. Mr. Grinold (W)

248. Seminar in Production Management. (4) Four hours of lecture per week. Prerequisite: courses 106G and 146A or equivalent. A seminar examining the recent literature on financial institutions and financial markets. Mr. Kaufman (Sp)

250. Philosophy of Systems Science. (4) Three hours of lecture per week. Prerequisite: consent of instructor. An introduction to the basic concepts of systems science. Mr. Kaufman (Sp)

NOTE: For key to symbols, see page 36.
253. Labor-Management Relations in the Public and Non-Profit Sectors. (4) Three hours of lecture per week. Prerequisite: consent of instructor. Students study collective bargaining practices and policies of the labor force, manpower policies, employment discrimination, and unemployment. Analyses of wage and salary policies of various types of public agencies, occupational groups; production and clerical workers, managerial and professional workers. Problems of wage and income policies of the federal, state, local and national government.

Mr. Garbarino (F)

254. Marketing Management. (4) Three hours of lecture per week. Prerequisite: course 160G or equivalent. Analyzes concepts and theories from behavioral science and marketing decision-making processes: the nature and scope of marketing; marketing organization; marketing strategies and policies; resource allocation; the legal and environmental aspects of marketing; marketing integration; marketing research and analysis.

Mr. Myers (Sp)

255. Industrial Marketing Behavior. (4) Three hours of lecture per week. Prerequisite: course 160G or equivalent; course 260 is recommended. The environment of an industrial firm and its interdependence with the firm's marketing decisions. Models of organizational decision processes: examination of structural/behavioral characteristics of industrial procurement and selling processes. Applications to marketing functions (economic/social) and their research methods.

Mr. Matthson (W)

256. Marketing Organization. (4) Three hours of lecture per week. Prerequisite: course 160G or equivalent. Means and evolutionary aspects of professional marketing organization; marketing organization at the wholesale and retail levels; spatial aspects of general marketing administration; marketing at the channel; decision variables; management of the marketing channel; strategies and policies of "orderly" marketing.

Mr. Kacker, Mr. Carman (F, W)

257. Marketing Research. (4) Three hours of lecture per week. Prerequisite: course 160G or equivalent. Topics range over all parts of the marketing research field. Problems in the management of consumer behavior; understanding and demand analysis. Emphasis on applied problems, marketing research methods, and consumer behavior.

Mr. Carman (F, W, Sp)

258. Economic Analysis I. (4) Three hours of lecture per week. Prerequisite: course 160G or equivalent. Analyzes topics of monetary theory, money and banking, fiscal policy, international trade, income and employment determination, and inflation and deflation. Emphasis on applications to marketing problems.

Mr. Myers (Sp)

260. Consumer Behavior. (4) Three hours of lecture per week. Prerequisite: course 160G or equivalent. Analyzes consumer behavior and consumer behavior processes useful for the understanding and prediction of market place behavior and demand analysis. Emphasis applies to marketing policy formulation and strategy and to various decision areas within marketing.

Mr. Coverdale (F)

264. Marketing Management. (4) Three hours of lecture per week. Prerequisite: course 160G or equivalent. Focus is on the study of marketing cases of public or private firms and organizations in an assessment of their marketing strategies and practices. Case perspectives range over all parts of the marketing mix including sales management and personal selling, advertising, promotions, and public relations. Emphasis is on planning and integration of components of the total marketing program.

Mr. Carman, Mr. Bagozzi (F, W)

265. Marketing Management. (4) Three hours of lecture per week. Prerequisite: course 160G or equivalent. Focus is on the study of marketing cases of public or private firms and organizations in an assessment of their marketing strategies and practices. Case perspectives range over all parts of the marketing mix including sales management and personal selling, advertising, promotions, and public relations. Emphasis is on planning and integration of components of the total marketing program.

Mr. Carman, Mr. Bagozzi (F, W)

266. Marketing Management. (4) Three hours of lecture per week. Prerequisite: course 160G or equivalent. Focus is on the study of marketing cases of public or private firms and organizations in an assessment of their marketing strategies and practices. Case perspectives range over all parts of the marketing mix including sales management and personal selling, advertising, promotions, and public relations. Emphasis is on planning and integration of components of the total marketing program.

Mr. Carman, Mr. Bagozzi (F, W)

267. Marketing Management. (4) Three hours of lecture per week. Prerequisite: course 160G or equivalent. Focus is on the study of marketing cases of public or private firms and organizations in an assessment of their marketing strategies and practices. Case perspectives range over all parts of the marketing mix including sales management and personal selling, advertising, promotions, and public relations. Emphasis is on planning and integration of components of the total marketing program.

Mr. Carman, Mr. Bagozzi (F, W)

268. International Marketing. (4) Three hours of lecture per week. Prerequisite: course 160G or equivalent. Emphasis is on the international aspects of marketing, supplemented with cases. Mr. Mattson, Mr. Holton (W, Sp)

269. Financial Management. (4) Three hours of lecture per week. Prerequisite: courses 130G and 285 or their equivalents. The financial problems facing an internationally-oriented corporation. Topics include the international market, foreign exchange markets, international sources of funds, foreign stock markets, direct foreign investment, capital in the international economy; accounting for multinational business, international taxation, and foreign equity ownership. Mr. Enzinger (W, Sp)

273. Seminar in International Business. (4) Three hours of lecture per week. Prerequisite: courses 269 and 285 or their equivalents. The seminar will cover topics on the international economy. The seminar will cover the following topics: the international market, foreign exchange markets, international sources of funds, foreign stock markets, direct foreign investment, capital in the international economy; accounting for multinational business, international taxation, and foreign equity ownership. Mr. Enzinger (W, Sp)

275. Consumer Behavior. (4) Three hours of lecture per week. Prerequisite: course 160G or equivalent. Emphasis is on the study of consumer behavior and consumer behavior processes useful for the understanding and prediction of market place behavior and demand analysis. Emphasis applies to marketing policy formulation and strategy and to various decision areas within marketing.

Mr. Coverdale (F)

276. Consumer Behavior. (4) Three hours of lecture per week. Prerequisite: course 160G or equivalent. Emphasis is on the study of consumer behavior and consumer behavior processes useful for the understanding and prediction of market place behavior and demand analysis. Emphasis applies to marketing policy formulation and strategy and to various decision areas within marketing.

Mr. Coverdale (F)

277. Consumer Behavior. (4) Three hours of lecture per week. Prerequisite: course 160G or equivalent. Emphasis is on the study of consumer behavior and consumer behavior processes useful for the understanding and prediction of market place behavior and demand analysis. Emphasis applies to marketing policy formulation and strategy and to various decision areas within marketing.

Mr. Coverdale (F)

278. Consumer Behavior. (4) Three hours of lecture per week. Prerequisite: course 160G or equivalent. Emphasis is on the study of consumer behavior and consumer behavior processes useful for the understanding and prediction of market place behavior and demand analysis. Emphasis applies to marketing policy formulation and strategy and to various decision areas within marketing.

Mr. Coverdale (F)

279. Consumer Behavior. (4) Three hours of lecture per week. Prerequisite: course 160G or equivalent. Emphasis is on the study of consumer behavior and consumer behavior processes useful for the understanding and prediction of market place behavior and demand analysis. Emphasis applies to marketing policy formulation and strategy and to various decision areas within marketing.

Mr. Coverdale (F)
Recommended high school preparation for Chemistry or Chemical Engineering should include: chemistry (1 year); physics (2 years); mathematics (4 years) including trigonometry, intermediate algebra, analytic geometry. Where the choice is available, the preferred foreign language is German.

For more specific description of the programs for the various degrees, as well as options of specialization, see the Announcement of the College of Chemistry.
**146. Principles of Electrochemical Processes.** (3) Three lectures per week. Prerequisite: courses 141A and either 150 or 156, or senior standing in physical science or engineering. Principles and applications of electrochemical equilibria, kinetics, and transport processes in aqueous, electrolytic, and non-electrolytic solutions. Mr. Lynn (Sp)

150. \[\text{Fluid Flow and Heat Transfer Processes.} (4) Four 1-hour class meetings per week. Prerequisite: Mathematics 102, beginning vector calculus. Fluid mechanics, heat transfer, and refrigeration. Emphasis on gas and liquid flow, heat transfer, and refrigeration. Mr. Bell (W); Mr. Foss (Sp; W).

151A-151B. \[\text{Chemical Engineering Laboratory.} (4-4) Two 2-hour laboratories per week. Sequence beginning each quarter.]

151A. \[Prerequisite: course 150 with a grade of B— or higher; students in physical science or engineering. Principles of mass transfer. Design and control of transfer processes. Introduction to the principles of separation operations.}

151B. \[Prerequisite: course 150 with a grade of B— or higher; course 152 (which may be taken concurrently). Principles of mass transfer. Design and control of transfer processes. Introduction to the principles of separation operations.]

152. \[Separation Processes. (3) Three 1-hour class meetings per week. Prerequisite: course 141A (which may be taken concurrently) and senior standing. Design and control of transfer processes. Introduction to the principles of separation operations.]

153. \[Design of Separation Processes. (4) Four 1-hour class meetings per week. Prerequisite: course 150 with a grade of B— or higher; course 152 (which may be taken concurrently). Principles of mass transfer. Design and control of transfer processes. Introduction to the principles of separation operations.]

154. \[Principles of Mass Transfer. (3) Three 1-hour lectures per week. Prerequisite: course 150 or knowledge of elementary fluid mechanics. Production and separation of particulate systems in force and flow fields. Dust and mist collection and filtration, crystallization, distillation, and adsorption processes. Mr. Goren (F).

155. \[Transport Phenomena. (3) Three 1-hour lectures per week. Prerequisite: course 150 or senior standing in physical science or engineering. The differential equations of momentum, energy, and mass transfer applied to laminar and turbulent flow and to interphase transfer.

156. \[Optical Science and Technology. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisite: course 150 or senior standing in physical science or engineering. Principles of modern optical science and technology. Introduction to the physical and chemical behavior of light and matter. Optical properties of solutions, melts, glasses, and solids. Engineered optical materials, optical coatings, emphasizing processing technology. Experiments in ultraviolet, visible, and near-infrared regions.

157. \[Process Technology of Solid-State Materials and Devices. (3) Three 1-hour class meetings per week. Prerequisite: Materials Science and Engineering 150 or senior standing in physical science or engineering. The manufacture of semiconductors and solid-state devices. Mr. Hess (W).

160. \[Chemical Process Design. (4) Four 1-hour class meetings per week. Prerequisite: course 153. Design principles and equipment for chemical processing equipment. Applications of transport phenomena in chemical systems. Design of integrated systems for efficient performance under economic considerations. Mr. Lynn (F); Mr. Blue (W); Mr. Charlesworth (Sp).

162. \[Dynamics and Control of Chemical Processes. (4) Three 1-hour lectures and one 3-laboratory per week. Prerequisite: senior standing in engineering or physical science or engineering. The unsteady behavior of industrial chemical processes and the methods available for the control of their control. Laboratory testing of process control systems and measurement of process control performance. Mr. Foss (F).

165. \[Selection and Evaluation of Chemical Processes. (3) Two 1-1/2-hour lectures per week. Prerequisite: course 156. Development and discussion of a series of realistic cases involving the engineering of chemical processes. Selection and synthesis of a process and process elements. Identification and evaluation of process modifications and alternatives. Mr. Lynn (Sp).

170. \[Introduction to Biochemical Engineering. (3) Two 1-hour lectures and one 3-laboratory per week. Prerequisite: course 153, which may be taken concurrently. Applications of methods and theory useful in the design and operation of processes in the biochemical industries with particular emphasis on fermentation systems. Laboratory techniques for batch and continuous cultures. Mr. Lynn (Sp).

192. \[Individual Study for Advanced Undergraduates. (2–5) Prerequisite: consent of instructor. An independent study project on a subject newly approved by the department, dependent upon availability of instructor, equipment, and facilities. Prerequisite: course 153. Experiments in mass transfer and chemical phenomena. Analysis of the distinctive features of industrial catalytic systems, and special emphasis on chemical engineering applications. Mr. Williams (Sp)

193. \[Separator Systems. (2–5) Prerequisite: a written proposal like that required for course 156. Advanced study in the design and operation of processes in the biochemical industries with particular emphasis on separation and mass transfer. Mr. Lynn (Sp).

200. \[Graduate Courses. (3–5) Prerequisite: senior standing and a written proposal like that required for course 156. Special laboratory work for advanced students. Mr. King (F).

230. \[Theoretical Methods in Chemical Engineering. (3) Three hours of lecture per week. Prerequisite: Mathematics 51C or equivalent. Principles of statistical thermodynamics. Introduction to modern methods and techniques of research in chemical engineering applications. Mr. Radke (Sp).

232. \[Computational Methods in Chemical Engineering. (3) Three 1-hour lectures per week. Prerequisite: Mathematics 51C or equivalent, or course 230. Open to senior honor students. Introduction to modern computational techniques for treatment of problems not amenable to analytic solutions. Application of numerical techniques to chemical engineering calculations with emphasis on computer methods. Mr. Radke (Sp).

240. \[Phase Equilibria. (3) Three 1-hour lectures per week. Prerequisite: course 230. Open to upper-division students. Equilibrium and thermodynamics of real systems. Phase transitions and applications to separation operations. Equilibria properties of pure and mixed fluids. Mr. Radke (Sp).

241. \[Applications of Statistical Mechanics. (2) Two 1-hour lectures per week. Prerequisite: course 240 and consent of instructor. Principles of statistical mechanics. Analysis of configurational properties of fluids. Introduction to statistical thermodynamics of gases, liquids, polymers and surfaces with applications to separation operations. Mr. Goren (Sp).

243. \[Cryogenic Engineering. (3) Three 1-hour lectures per week. Prerequisite: course 141A and 150 or equivalent. Low-temperature refrigeration systems. Principles and applications. High-temperature refrigeration systems. Principles and applications. Mr. Radke (Sp).

250. \[Mass Transfer. (3) Three 1-hour lectures per week. Prerequisite: consent of instructor. Diffusion in gases and liquids. Mechanism and models of mass transfer in laminar and turbulent flows. Fluidization of beds and fluidized bed reactors. Mr. Bell (Sp).

251. \[Separation Processes. (3) Three 1-hour lectures per week. Prerequisite: graduate standing or consent of instructor. Concepts of multistage and counter-current separation operations. Principles and laboratory analysis of binary and multicomponent systems. Continuous, semicontinuous, and batch operation.

252. \[Adsorption Separations in Particulate Beds. (3) Three 1-hour lectures per week. Prerequisite: course 230 (may be taken concurrently), or 153 with honors standing. Introduction to ion exchange, adsorption, partition adsorption and extraction, and regenerative heat exchangers. Fixed-bed and fluidized-bed, theory of chromatography. Moving beds, semicontinuous, agitated systems, membrane processes, fluidized and packed beds. Mr. King (F).

256. \[Advanced Transport Phenomena. (3) Three 1-hour lectures per week. Prerequisite: course 230. Formulation and rigorous analysis of the laws governing transport properties, with special emphasis on chemical engineering applications. Detailed investigation of laminar flows. Mr. Newman (F).

258. \[Chemical Technology of Polymers. (3) Three 1-hour lectures per week. Prerequisite: course 158 or consent of instructor. Analysis of all steps in the sequence of production of monomers and polymers, processing rheology, optimal selection and recycling of polymeric materials. Chemical principles in the technology of adhesives, rubbers, plastics, fibers and composites. Mr. Williams (Sp).

260. \[Optimization in Chemical Process Design. (3) Three hours of lecture per week. Prerequisite: course 230 or consent of instructor. Modern mathematical programming to problems of optimum design and operation of chemical processes. Mr. Foss (Sp).

261. \[Process Simulation. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisite: course 250 or equivalent. Introduction to modern simulation techniques for the design and analysis of complex chemical processes. Mr. King (F).

262. \[Chemical Process Dynamics. (3) Three 1-hour lectures per week. Prerequisite: course 230 or consent of instructor. Principles of chemical kinetic processes and physical rate processes and their interaction to govern the apparent behavior of chemically reactive systems. Particular emphasis on catalytic reactions and the analysis and design of fixed and fluidized bed reactors. Mr. King (F).

249. \[Biomedical Engineering. (3) Three 1-hour lectures per week. Prerequisite: Biochemistry 102; Chemistry 110B, 112E; course 230 or consent of instructor. Application of chemical engineering principles to the design and optimization of biological and biochemical materials. Design of systems for immunochemical processes and for the separation and purification of biologically active materials. Mr. King (F).

265. \[Advanced Transport Phenomena. (3) Three 1-hour lectures per week. Prerequisite: course 230. Formulation and rigorous analysis of the laws governing transport properties, with special emphasis on chemical engineering applications. Detailed investigation of laminar flows. Mr. Newman (F).

268. \[Chemical Technology of Polymers. (3) Three 1-hour lectures per week. Prerequisite: course 158 or consent of instructor. Analysis of all steps in the sequence of production of monomers and polymers, processing rheology, optimal selection and recycling of polymeric materials. Chemical principles in the technology of adhesives, rubbers, plastics, fibers and composites. Mr. Williams (Sp).

260. \[Optimization in Chemical Process Design. (3) Three hours of lecture per week. Prerequisite: course 230 or consent of instructor. Modern mathematical programming to problems of optimum design and operation of chemical processes. Mr. Foss (Sp).

261. \[Process Simulation. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisite: course 250 or equivalent. Introduction to modern simulation techniques for the design and analysis of complex chemical processes. Mr. King (F).

262. \[Chemical Process Dynamics. (3) Three 1-hour lectures per week. Prerequisite: course 230 or equivalent. Principles of chemical kinetic processes and physical rate processes and their interaction to govern the apparent behavior of chemically reactive systems. Particular emphasis on catalytic reactions and the analysis and design of fixed and fluidized bed reactors. Mr. King (F).
Chemistry

Department Office, 419 Latimer Hall

Professors:
- Neil Bartlett, Ph.D., D.Sc.
- Robert G. Bergman, Ph.D.
- Leo Breese, Ph.D.
- Melvin Calvin, Ph.D., Sc.D., LL.D. (University Professor)
- James Casey, Ph.D.
- Joseph Cerny, Ph.D.
- Robert E. Connick, Ph.D.
- William G. Dauben, Ph.D.
- William D. Gwinn, Ph.D.
- Charles B. Harris, Ph.D.
- John E. Hearst, Ph.D.
- Henry E. Holden, Ph.D.
- Robert H. Hudson, Ph.D.
- Frederick R. Jensen, Ph.D.
- Harold S. Johnston, Ph.D., Sc.D.
- William L. Jolly, Ph.D.
- George Jura, Ph.D.
- Sung-Hui Kim, Ph.D.
- Yuan T. Lee, Ph.D.
- Bruce H. Mahan, Ph.D.
- Samuel S. Markowitz, Ph.D.
- William H. Miller, Ph.D.
- Bradley Moyer, Ph.D.
- Luciano G. Morell, Ph.D.
- Earl L. Muetterties, Ph.D.
- Rolle J. Myers, Ph.D.

Associate Professors:
- Wayne L. Hubbell, Ph.D.
- Judith P. Kjeldahl, Ph.D.
- Alexander Pines, Ph.D.

Assistant Professors:
- Richard A. Andersen, Ph.D.
- Paul A. Bartlett, Ph.D.
- Craig L. Hill, Ph.D.
- Richard A. Mathies, Ph.D.
- William L. Wasbush, Ph.D.
- John S. Winn, Ph.D.

Graduate Study in Chemistry

Students interested in graduate study are invited to write to the Chairman of the Department of Chemistry, 419 Latimer Hall, for information.

LOWER DIVISION COURSES

1A–1B–1C. General Chemistry. (4–4–4) Two 1-hour lectures, one 1-hour discussion and one 4-hour laboratory per week. Prerequisite: high school chemistry or equivalent (or consent of instructor). Methods used by the chemical and petroleum industry to evaluate the commercial worth of processes using chemical, economic, marketing, and material factors. Practice is offered through the medium of unstructured and open-ended projects involving group participation and individual efforts.

Department of Chemistry

The Staff (Mr. Shen in charge) (F, W, Sp)

Robert G. Bergman, Ph.D.
James Cason, Jr., Ph.D.
Joseph Cerny, Ph.D.
Robert E. Connick, Ph.D.
William G. Dauben, Ph.D.
William D. Gwinn, Ph.D.
Charles B. Harris, Ph.D.
John E. Hearst, Ph.D.
Henry E. Holden, Ph.D.
Robert H. Hudson, Ph.D.
Frederick R. Jensen, Ph.D.
Harold S. Johnston, Ph.D., Sc.D.
William L. Jolly, Ph.D.
George Jura, Ph.D.
Sung-Hui Kim, Ph.D.
Yuan T. Lee, Ph.D.
Bruce H. Mahan, Ph.D.
Samuel S. Markowitz, Ph.D.
Charles B. Hudson, Ph.D.
Bradley Moyer, Ph.D.
Luciano G. Morell, Ph.D.
Earl L. Muetterties, Ph.D.
Rolle J. Myers, Ph.D.
Wayne L. Hubbell, Ph.D.
Judith P. Kjeldahl, Ph.D.
Alexander Pines, Ph.D.
Richard A. Andersen, Ph.D.
Paul A. Bartlett, Ph.D.
Craig L. Hill, Ph.D.
Richard A. Mathies, Ph.D.
William L. Wasbush, Ph.D.
John S. Winn, Ph.D.

NOTE: For key to symbols, see page 36.

CHOICE OF COLLEGE

A student can complete a major in chemistry in either the College of Chemistry (B.S. degree) or the College of Letters and Science (A.B. degree). Both curricula are approved by the American Chemical Society if the student includes certain courses in the total program, and either is a satisfactory foundation for a career in chemical industry, for the teaching of chemistry, or if completed with high academic standing, for graduate work in chemistry.

Chemistry Major in the College of Chemistry

The requirements of a B.S. degree in the College of Chemistry, with a chemistry major are: a total of 120 units, including a minimum of 27 units in the humanities and social sciences, chosen from a list provided by the College of Chemistry.

Satisfaction of the American History and Institutions requirement. A reading knowledge of scientific German equivalent to that provided by course 1B–1C, and cours 105, for example). With the approval of the adviser or department includes certain courses in the total program, and either is a satisfactory foundation for a career in chemical industry, for the teaching of chemistry, or if completed with high academic standing, for graduate work in chemistry.

Chemical Thermodynamics. (4) Three 1-hour lectures and one 1-hour discussion per week. Prerequisites: course 1C–1D, 2A, 2B, and 4B. Introduction to chemical thermodynamics: colligative properties, fundamentals and chemical equilibria. Students with credit in course 8A and 8B may not receive duplicate credit in the corresponding quarters of course 12B and 12A.

NOTE: For key to symbols, see page 36.

UPPER DIVISION COURSES

104A–104B. Advanced Inorganic Chemistry. (3–3) Three 1-hour lectures per week. Prerequisites: course 1A–1B, and 104A. A more advanced treatment of the periodic table, electronic structures, valence electron configurations, chemical bonding, molecular structure, chemical reaction rates, and acid-base equilibria. A study of coordination compounds, oxidation-reduction reactions, and equilibria. The central problem is how to account for the diversity of the chemical world and its continuing evolution. Only students who have taken advanced chemistry courses during the semester are eligible to register for this course.

NOTE: For key to symbols, see page 36.
112E. Organic Chemistry Lecture Only. (3) Two 1
1/2-hour lectures per week. Prerequisite: course 128
with grade of C— or higher. The lecture part of course
112E. It is intended for students in chemical engineering who
with an additional course in organic chemistry, but
open to others with consent of the instructor. (F, Sp)

H114. Advanced Chemical Thermodynamics. (3)
Three 1-hour lectures per week. Prerequisite: course
110B and honors standing. A rigorous presentation of
classical thermodynamics. Equilibria involving real
gases and real solutions. Application of tabulated ther-
modamic data. Systems involving intensive variables
besides pressure and temperature. Mr. Pitzer, (Sp)

212. Molecular Structure and Molecular Spec-
troscopy. (3) Three 1-hour lectures per week. Prereq-
ussee. Spectral analysis of polyatomic molecules. The effect of molecular symme-
try on infrared and Raman spectra. Radiofrequency
spectroscopy: molecular nuclear, quadrupole, elec-
tron spin, and microwave spectroscopy.

Mr. Gwinn (Sp)

213. Nuclear Chemistry. (3). Two 1 1/2 hour lec-
tures per week. Prerequisite: course 110A or equiva-
lar orbital and resonance concepts to bonding, elec-
tronic structure, and reaction of organic compounds.
Topics discussed include orbital symmetry reaction
rules. A reading knowledge of German is recommend-
Mr. Streitwieser (F).

212B. Organic Chemistry—Synthetic Methods. (3)
One lecture and four 3-hour laboratories per week.
Prerequisite: course 110A, 110B, or consent of instruc-
tor. Application of molecular orbital concepts to bonding, elec-
tronic structure, and reaction of organic compounds.
Topics discussed include orbital symmetry reaction
rules. A reading knowledge of German is recommend-
Mr. Heathcock (W).

Mr. Jensen (Sp)

212C. Organic Chemistry—Synthetic Methods. (4)
One lecture and four 3-hour laboratories per week.
Prerequisite: course 110A, a reading knowledge of Ger-
man, or consent of instructor; course 128 recom-
manded. Advanced synthetic reactions and tech-
niques, designed as a preparation for experimental
work.

Mr. Rapoport (F)

194. Research for Advanced Undergraduates.
(2–3) Prerequisite: honors standing, course 110B, and
consent of the instructor. Students who have com-
peted with high credit a satisfactory number of ad-
vanced courses may prosecute original research under
the direction of one of the members of the staff.

The Staff (Mr. Noyce in charge) (F, W, Sp)

195. Special Topics. (3) Three 1-hour lectures per
week. Prerequisite: consent of instructor. Special
topics will be offered from time to time. Examples are:
photochemical air pollution, computers in chemistry.

The Staff (Mr. Noyce in charge) (F, W, Sp)

196. Special Laboratory Study. (2–5) Prerequisite:
course 111B and at least one of courses 105, 106,
107, or 125; consent of the instructor and consent of
the adviser. Special laboratory work for advanced un-
dergraduates.

The Staff (Mr. Noyce in charge) (F, W, Sp)

199. Supervised Independent Study and Re-
search. (1–6) Enrollment is restricted to freshmen.
Regulations listed on page 36. Additional limitation:
non-laboratory study only. Must be taken on a passed/not
passed basis.

The Staff (Mr. Noyce in charge) (F, W, Sp)

GRADUATE COURSES

204A–204B–204C. Advanced Topics in Inorganic
Chemistry. (3–3–3) Three hours of lecture per week.
Prerequisite: course 104A and B, Chemistry 111A and
B, or the equivalents of these courses. Current techniques and theory in inor-
organic chemistry including discussion of the structure,
bonding and reactions of inorganic compounds.

Three quarter sequence beginning (F).

Mr. Hechtcock, Mr. Washburn, Mr. Dauben

207. Organic Chemistry. (3) Two 1 1/2 hour lec-
tures per week. Prerequisite: course 110A, chem-
istry of heterocyclic compounds, with emphasis on those
of natural origin. Must be taken on a satisfacto-
ry/unsatisfactory basis.

208. Organic Chemistry. (3) Two 1 1/2 hour lec-
tures per week. Prerequisite: course 206C. Kinetics and mech-
ism of organic reactions, mechanisms of rear-
grangements. Must be taken on a satisfacto-
ry/unsatisfactory basis.

Mr. Jensen (W)

209. Organic Chemistry. (3) Three 1-hour lectures
per week. Prerequisite: course 206C. The chemistry of poly-
cyclic compounds of biological interest, with em-
phasis on terpenoids, steroids and related substances.
Mr. Dauben (F)

210. Contemporary Organic Chemistry. (1) One
hour of lecture per week. Prerequisite: graduate stand-
ing in Chemistry. Recent significant developments in the theory and practice of organic chemistry. Must be taken on a satisfacto-
ry/unsatisfactory basis.

Mr. Bergman, Mr. Washburn (F, W, Sp)

216A–216B. Statistical Mechanics. (3–3) Three
1-hour lectures per week. Prerequisite: course H114, and
an introduction to quantum mechanics (which may be
taken concurrently). Open to senior honor students with consent of instruc-
Two-quarter sequence beginning (W).

216D. Principles and applications of statistical me-
chanics: ensemble theory, statistical thermodynamics of
dead and real gases, solids, and chemical equili-
rium.

216B. Topics chosen from among the following: liq-
uids, solutions, light-scattering, polymeric systems,
spectral line shapes, Quantum statistics, transport prop-
erties. Mr. Pitzer (W), Mr. Harris (Sp)

217A–217B–217C. Advanced Quantum Mechan-
isms. (3–3–3) Three 1-hour lectures per week. Prereq-
ussee. course 110B and 111C or equivalent.

TEACHER TRAINING COURSE

301. Undergraduate Chemistry Instruction. (2)
One hour and 5 hours of laboratory per week.
Prerequisite: course 110A, 110B, and 110C lecture,
strong and standing, completion of Chemistry 1A–B–C with a grade of B- or better.
Tutoring of students in Chemistry 1A–B–C. Students will attend a weekly meeting on tutoring methods at the Student Learning Center and will attend Chemistry 1A–B–C lectures. May be repeated once for credit.
Given on a passed/not passed basis only.
School of Education

School of Education Office, 1510 Tolman Hall

Professors:

Mille Almy, Ph.D.
Charles S. Beane, Ph.D.
Guy Benveniste,* Ph.D.
Diana L. Bower, Ed.D.
El M. Bower, Ed.D.
Elwood D. Cates, Ph.D., J.D., H.D.L. (hon.)
Gerardon Jocelyn Clifford, Ed.D.
Lyman A. Glenn, Ph.D.
James C. Jacob, Ph.D.
Curtis D. Hardy,* Ph.D.
Paul A. Harst, Ph.D.
John G. Hurst, Ph.D.
Rebecca L. Jarrett, Ph.D. (*Acting Chairman)
Arthur R. Jensen, Ph.D.
Reginald L. Jones,* Ph.D.
Henry Kaiser, Ph.D.

Mary C. Jones, Ph.D. (Emeritus)
Frederic Lige, Ph.D. (Emeritus)
S. E. Trotman Lund, Ph.D. (Emeritus)
Thomas R. McConnell, Ph.D., L.L.D., D.H.L.
Leland L. Medsker, Ed.D. (Emeritus)

Associate Professors:

Paul R. Ammon, Ph.D.
Donald A. Hansen, A. Donald A. Hansen, Ph.D.
Lawrence D. Lowrey,* Ed.D.
John David Miller, Ph.D.
Richard D. Mosier, Ph.D.

Assisitant Professors:

Lyle Wong Fillmore, Ph.D.
David J. Lein, Ph.D.

Professors:

William M. Banks, III, Ph.D.
Shirley S. Chater, Ph.D.

Senior Lecturer:

Robert W. Blackburn, M.A.

Lecturers:

Randy J. Reed, Ph.D.
Herbert D. Simons, Ed.D.
Pamela L. Smith, Ed.D.
M. I. Charles E. Woodson, Ph.D.

Supervisors:

Marlyn Hart Buckley, Ph.D. (Reading Specialist Credential)
M. Kathleen Fairbanks, Ph.D. (Administrative Services Credential)
Lance Flanagan, Ed.D. (Physical Education Men)
James R. Gray, M.A. (English)
Margaret C. Jackson, M.A. (Social Sciences)
Keith L. Lane, B.A. (English)
Constance C. L'Avare, M.A. (Social Sciences)
Richard W. Luborga, M.A. (Elementary)
Grace M. Maierina, M.A. (English)

Coordinators:

Eaine M. Boyce (Field Service Center)
Wilma H. Bollinger, Ed.D. (Admissions Office and Summer Programs)

The School of Education offers three principal areas of study: a teaching credential program for those preparing for teaching positions in public schools; programs leading toward credentials for administrative, and pupil personnel services in the public schools, and degree programs, both academic (M.A. and Ph.D.) and professional (M.A.T. and Ed.D.). The M.A.T. (Master of Arts in Teaching) program is available in Comparative Literature, English, French, or German. This program combines study in the academic field with professional training in education.

Applicants to programs in the School of Education must file an application with the Graduate Division. For M.A.T. and teacher education programs, contact the Student Personnel Office, 1615 Tolman Hall, for specific instructions on applying.

The State teaching credentials authorize service in the public schools of California. To qualify for a teaching credential, a bachelor's degree is required with a major in a field other than education. Other requirements include a teaching authorization and a professional preparation program in an area of specialization. Although most of the students in teaching credential programs are graduates, it is possible to complete these programs as undergraduates.

For details concerning the requirements and areas of specialization for all credential and degree programs in education, consult the Announcement of the School of Education.

UPPER DIVISION COURSES

111. The Alternative Education Movement. (4)
Formerly 119A. Four hours of lecture per week. Prerequisite: consent of instructor. Using an issue centered approach, the development and current status of the "Alternative Education Movement" will be examined. The focus will be on those alternatives that have emerged from the grass roots and are autonomous, democratic, and full time. Must be taken on a pass/no pass basis.

Mr. Hurst (Sp)

115. The Exceptional Child. (2-3) One 2-hour lecture per week. Introduction to social, psychological, and educational problems and programs for exceptional children. Must be taken concurrently with course 115L.

115A. Mental and Emotional Handicaps. Topics: mentally retarded, emotionally disturbed, learning disabilities, multihandicaps, gifted, and preschool programs for the young handicapped.

Mr. Bower (F)

115B. Sensory and Motor Handicaps. Topics: blind, partially seeing, deaf, hard of hearing, deaf/blind, and physically handicapped.

Mr. Bower (W)

115L. The Exceptional Child Laboratory. (1-5) Three to fifteen hours of field work per week. Conferences, observations, and meetings with experienced professionals with a variety of exceptional children. May be repeated twice.

Mr. Bower (F, W)

117. Introduction to Inquiry and Educational Research. (3) Formerly course 118A. One 3-hour lecture per week. Introduction to the logic and skills of social-psychological and educational research. The major topics of inquiry, the methods of inquiry, and the interpretation of results will be illustrated.

Mr. Hurst (Sp)

118. Special Research Concerns and Methods. Prerequisite: course 117 or equivalent. The several courses are focused on topics, concerns, and methods for which students frequently need special preparation and/or advanced study.

Mr. Bower (Sp)

118A. Experimental and Quasi-experimental Designs. (3) Three hours of lecture per week.

Mr. Wilson (Sp)

118B. Personal and Group Assessment. (3) Three hours of lecture per week. Presentation of selected theories relevant to the structure of personal characteristics and human development. Examination of the content, form, and interpretation of inventories, appropriate uses, with emphasis given to the assessment of change.

Mr. Wilson (Sp)

118C. Questionnaire Construction and Survey Research. (3) Three hours of lecture per week.

Mr. Wilson (Sp)

118D. Field Research Methods in Education (3) Three hours of lecture per week. Theory and practice of various qualitative research techniques drawn from the disciplines of anthropology and sociology.

Mr. Walker (F)

118E. Applied Research Methods. (4) Three hours of lecture per week. Practical application of qualitative research methods with emphasis on the validity of their use in educational settings. Focuses on participant observation and other qualitative techniques applied to educational research.

Mr. Wilson (Sp)

119A–119B. Introduction to Data Analysis for Educational Research and Program Evaluation. (4) Two hours of lecture, one hour of discussion, and one hour of seminar. Preparation of data analysis and decision making in educational research is examined. Examples of estimation, graphic methods, hypothesis testing, and exploratory procedures are discussed.

Mr. Kaiser (W)

119L–119M. Educational Data Analysis Laboratory. (1-5) Three hours of laboratory per week. Must be taken concurrently with course 119B.

Mr. Kaiser (W)

120. Social Simulations in Teaching and Research. (3) One 2-hour lecture and one 4-hour laboratory per week. An introduction to social simulations and their uses for teaching and research in the social and behavioral sciences. Theories of learning and human development will influence the design and development of simulation and decision making in educational research is examined. Examples of estimation, graphic methods, hypothesis testing, and exploratory procedures are discussed.

Mr. Kaiser (W)

121. Stratification in Schools and Workplaces. (5) Four hours of lecture per week. Social stratification, the ladder of achievement, and the ladder of failure as part of a screening process which continues in workplaces. Correspondence between tracking in schools and segmentation in workplace. Evidence of causal relationships between success and ability.

Mr. Lein (Sp)

132A–132B. Foundations for Teaching in Elementary Schools. (4) Four hours of lecture (F) and four hours of seminar (W). Prerequisite: acceptance by the "Alternative Education Movement" will be examined. The focus will be on those alternatives that have emerged from the grass roots and are autonomous, democratic, and full time. Must be taken on a pass/no pass basis.

Mr. Hurst (Sp)

Mr. Bower (F)

NOTE: For key to symbols, see page 38.
ance in Plan I Multiple Subject Teaching Credential Program. Seminars, lectures, workshops to meet requirements of the single subject credential. Subject areas include: psychological foundations, sociological foundations, curriculum, instructional theory and methods in a subject area corresponding with approved list of teaching fields. Credit and grade assigned upon completion of full sequence. The sequence in supervised teaching may begin before the opening day of each of the quarters, in order to fit the calendar of the public schools.

The Staff (F, W)

133A–133B. Foundations for Teaching in Secondary Schools. (7–6) Seven hours of lecture (F), six hours of lecture (W) per week. Prerequisite: Admission to Single Subject Multiple Subject Program. Seminars, lectures, workshops to meet requirements for the single subject credential. Subject areas include: psychological foundations, sociological foundations, curriculum, instructional theory and methods in a subject area corresponding with approved list of teaching fields. Credit and grade assigned upon completion of full sequence. The sequence in supervised teaching may begin before the opening day of each of the quarters, in order to fit the calendar of the public schools.

The Staff (W, Sp)

133C–133D–133E. Foundations for Teaching in Secondary Schools. (5–4–5) Five hours of lecture (F), four hours of lecture (W, Sp) per week. Prerequisite: admission to Single Subject Credential Program Model II. Seminars, lectures, workshops to meet requirements for the single subject credential. Subject areas include: psychological foundations, sociological foundations, curriculum, instructional theory and methods in a subject area corresponding with approved list of teaching fields. Credit and grade assigned upon completion of full sequence. The sequence in supervised teaching may begin before the opening day of each of the quarters, in order to fit the calendar of the public schools.

The Staff (W, Sp)

135F–133G–133H. Foundations for Teaching in Elementary Schools. (3–4–3) Three or four hours of lecture per week. Prerequisite: Admission to English Subject Credential Program. Seminars, lectures, workshops to meet requirements for the single subject credential. Subject areas include: educational psychology, language arts, art, social science, music, mathematics, and science. Credit and grade assigned upon completion of full sequence. The sequence in supervised teaching may begin before the opening day of each of the quarters, in order to fit the calendar of the public schools.

The Staff (F, W, Sp)

133J–133K–133L. Foundations for Teaching in Elementary Schools. (3–4–3) Three hours of lecture per week (F, Sp); four hours of lecture per week (W). Prerequisite: admission to Single Subject Multiple Subject Program. Seminars, lectures, workshops to meet requirements for the single subject credential. Subject areas include: educational psychology, instructional theory, and methods in social sciences, sociological and psychological foundations of teaching. Credit and grade assigned upon completion of full sequence. The sequence in supervised teaching may begin before the opening day of each of the quarters, in order to fit the calendar of the public schools.

The Staff (W, Sp)

134A–134B. Foundations in Reading in Grades K–12. (2–3) Two hours of lecture (F); three hours of lecture (W) per week; plus field work assignments in the public schools. Prerequisite: admission to a teaching credential program; entry prior to admission for credential or not admitted for six hours of grade assigned upon completion of full sequence. The sequence in supervised teaching may begin before the opening day of each of the quarters, in order to fit the calendar of the public schools.

The Staff (W)

135A–135B. Foundations in Reading for Secondary Schools. (2–3) 135A: Two hours of lecture per week (F); 135B: Three hours of lecture per week (W); plus field work assignments in the public schools. Prerequisite: admission to a teaching credential program; entry prior to admission for credential on a limited basis. There are no prerequisites and field credits and grade assigned upon completion of full sequence. The sequence in supervised teaching may begin before the opening day of each of the quarters, in order to fit the calendar of the public schools.

The Staff (W)

135C–135D–135E. Foundations in Reading for Secondary Schools. (2–2–1) Two hours of lecture per week (F); plus field work assignments in the public secondary schools. Prerequisites: admission to a teaching credential program; entry prior to admission for credential on a limited basis. Theory, methods, and materials for teaching secondary reading including: word analysis, vocabulary, reading for comprehension, study skills in content areas, reading diagnosis and assessment, and associated field work. Credit and grade assigned upon completion of full sequence. The sequence in supervised teaching may begin before the opening day of each of the quarters, in order to fit the calendar of the public schools.

The Staff (W)

136. Teaching the Language Arts to Speakers of Nonstandard Dialects. (3) 3 one-hour lecture and field work per week. An examination of instructional principles and problems for children who speak nonstandard dialects. The course focuses on the structure of nonstandard dialects, interference of these dialects with the learning of the language arts, and teaching strategies to correct interference.

The Staff (W)

137A–137B–137C. Integrated Instruction in the Elementary School. (4–3–6) Three hours of lecture (F), three hours (W) in six hours of lecture (Sp) per week. Prerequisite: acceptance in the E.R.A. program (Educational Research and Its Applications.) Seminars, lectures, workshops, to meet the single subject credential. Subject areas include: educational psychology and sociology, instructional strategies, learning processes, by subject areas. Credit and grade assigned upon completion of full sequence. Must be taken on a passed/not passed basis (undergraduates) or a satisfactory/unsatisfactory basis (graduates). The sequence in supervised teaching may begin before the opening day of each of the quarters, in order to fit the calendar of the public schools.

The Staff (W)

137D–137E–137F. Integrated Instruction in the Secondary School. (3–4–6) Three hours of lecture (F), four hours (W), and six hours (Sp) per week. Prerequisite: acceptance in the E.R.A. program (Educational Research and Its Applications.) Seminars, lectures, workshops, to meet requirements for the single subject credential. Subject areas include: educational psychology and sociology, instructional strategies, learning processes, by subject areas. Credit and grade assigned upon completion of full sequence. Must be taken on a passed/not passed basis (undergraduates) or a satisfactory/unsatisfactory basis (graduates). The sequence in supervised teaching may begin before the opening day of each of the quarters, in order to fit the calendar of the public schools.

The Staff (W)

145. Beginning Counseling. (3) Two hours of lecture and 3 hours of laboratory per week. Prerequisite: consent of instructor. Introduction to counseling theory, research and skills. Emphasis on counseling skills that are recent research has demonstrated to be most effective in implementing client behavior change.

Mr. Roffers (F, W, Sp)

146. Supervised Independent Study and Research. (1-3) Enrollment is restricted to students teaching in the Lawrence Hall of Science or related institutions. Individual and/or group meetings with faculty sponsor and written report required. Maximum credit is 10 units and must be taken on a passed/not passed basis. The Staff (W, Sp)

190. Supervised Independent Study and Research for Undergraduates. (1–6) Enrollment is restricted to students teaching in the Lawrence Hall of Science or related institutions. Individual and/or group meetings with faculty sponsor and written report required. Maximum credit is 10 units and must be taken on a passed/not passed basis. The Staff (W, Sp)

200. Proseminar in Educational Psychology. (3) Three hours of lecture per week. Prerequisite: admission to graduate work in Division of Educational Psychology. Required of all first-year students. Lectures and discussions on current research by members of the faculty. Background reading and written reports required. Student papers will be examined on the basis of the understanding and critical acumen of the student. Must be taken on a satisfactory/unsatisfactory basis. Mr. Ammon in charge (F)


210A. General Psychology of Learning. Mr. Windmiller (F)

210B. Major theories of child development. Ms. Wilcox (Sp)

210C. Psychology of instruction and survey of current trends in teaching, reading, mathematics, and social studies. Ms. Windmiller (W)


210G. Controversial issues regarding the field. Mr. Leon (W)

210H. Classroom management problems and exploration and parameters of appropriate consultation with community-based consultation. Ms. Lambert (W)

210L. Laboratory for School Psychology. (1) One hour of discussion and seminars on current trends in the field of School Psychology. Laboratory section to evaluate field work records. Must be taken concurrently with 210A–210B–210C, and 210D–210E–210F. Ms. Lambert in charge (F, W, Sp)

211A. Introduction to Theory and Research in Attitude Change. (3) Formerly 211. One 3-hour lecture per week. Lectures and class discussion covering theory and research.

211B. Advanced Studies in Theory and Research Regarding Measurement and Change of Attitudes and Opinions. (3) Formerly 215B. One 3-hour seminar per week. The Staff (F)

212. The Psychology of Reading Acquisition. (3) One 3-hour seminar per week. An examination of re-
search concerned with the psychological processes of reading. Particular emphasis will be placed on the prerequisites to reading acquisition, decoding reading acquisition. Particular emphasis will be placed on the prerequisites to reading acquisition, decoding processes. Mr. Lambert (F, W)

213A-213B. Standard Tests in Education (1 1/2-1 1/2 hours of lecture per week. Prerequisite: consent of instructor. Credit and grade assigned upon completion of full sequence. Mrs. Lambert (F, W)

213C. Individual Appraisal. (4) One 3-hour lecture and one 3-hour laboratory per week. Prerequisite: consent of instructor. Theories of intelligence and the history and techniques of individual appraisal. Supervised practice in administration and scoring of contemporary tests of intelligence. Ms. Lambert (F)

*1213D. Individual Appraisal. (4) Three hours of lecture and five hours of laboratory per week. Prerequisite: consent of instructor. Theories of intelligence and the history and techniques of individual appraisal. Supervised practice in administration and scoring of contemporary tests of intelligence. Ms. Lambert (F)

214. Human Development and Education. 214A. Play and Games in Human Learning. (3) Formerly 214D. One 2-hour lecture and one 2-hour laboratory per week. Prerequisite: consent of instructor. Theories of play and play as it will serve as consultants. Students will be required to spend a minimum of two hours a week observing children. Mr. Tower (W)

*1214B. Social and Emotional Development. (3) Three hours of lecture per week. Prerequisite: courses 193, 119A, 119B or equivalents. *1214C. Mental Health—Individual and Group Processes. (6) Twelve weeks of seminar per week. Prerequisite: consent of instructor. Mr. Woodson (F)

215. Advanced Topics on Exceptional Children. (3) One 2-hour lecture and one hour of field work per week. Prerequisite: consent of instructor. Topics will include problems in mainstreaming mildly handicapped children and social psychological perspectives on the education of exceptional children. Mr. Woodson (F)

216. Educational Measurement. Prerequisite: courses 119A-119B or equivalent. The theory and principles of educational measurement and packaged computer programs for doing test analysis are examined. 216A. Principles of Measurement in Education. (3) One 3-hour lecture per week. An overview of the methodology of educational measurement with emphasis upon achievement test construction and use. Mr. Woodson (F)

216B. Theories of Educational Measurement. (3) Three hours of lecture per week. Examination of research in the theory and problems of measurement in education and psychology. Offered in alternate years. Mr. Jensen, Mr. Woodson (Sp)

*216C. Factor Analysis. (3) Three hours of lecture per week. Three models of factor analysis: Hotelling's component analysis, Thurstone's common factor analysis, and Guttman's image analysis. The transformation problem in detail. Factor scores and the determinacy of factor analysis. Offered in alternate years. Mr. Kaiser (Sp)

*216D. Scaling. (3) Three hours of lecture per week. Paired comparisons; the law of comparative judgment; equating and successive differences; summed ratings; scalogram analysis; the scale-discrimination technique; cumulative scales. Offered in alternate years. Mr. Kaiser (Sp)

*216S. Prosemear in Educational Measurement. (1) One hour of seminar per week. Current research and publications on educational measurement by faculty, students, and others are examined. Mr. Marascuilo (F); Mr. Woodson (F, W, Sp)

217. Intellectual Development and Education. Prerequisite: course 193 or equivalent. 217A. Theory and Practice. (3) Formerly 217A. One 3-hour session per week. A consideration of psycho-metric approaches to the study of individual differences in human mental abilities, with emphasis on intelligence, including theories and empirical research on the measurement, nature and structure of abilities, from the perspective of behavioral and social psychology. Mr. Marascuilo (F); Mr. Woodson (F, W, Sp)

217B. Cognitive Development. (3) One 3-hour session per week. A graduate-level introduction to the development of thinking from early childhood through adolescence, with primary emphasis on Piagetian theory and research. Mr. Ammon (W)

*217C. The Neuropsychology of Reading. (3) Three hours of session per week. Prerequisite: graduate status. A critical analysis of recent and current neuropsychological research relevant to reading, dyslexia, and learning deficits. Emphasis is placed on critical evaluation of current theoretical perspectives and practice. Mr. Rohwer (F); Mr. Jensen (W)

218. Seminars in Intellectual Development and Education. Prerequisite: course 119B and consent of instructor. 218A. The Critical Analysis of Research on Cognitive Processes. (4) Three 3-hour seminar per week. Prerequisite: course 119B and consent of instructor. Theories of cognitive processes. Current published journal reports of research on cognition in children and adults will be critically reviewed and evaluated. Mr. Rohwer (Sp)

218B. Language. (3) One 3-hour seminar per week. Seminar devoted to selected topics in such areas as language development, language acquisition, and subcultural variation in language, as these relate to education. Mr. Ammon (Sp)

218C. Learning. (3) One 3-hour seminar per week. An intensive examination of specific topics (e.g., the development of imagery processes; social-class comparisons) in the area of the development of learning processes. Mr. Rohwer (W)

218D. Second Language Acquisition and Education. (4) Formerly 291L. Four hours of lecture per week. Prerequisite: consent of instructor. An in-depth course in developmental and psycholinguistic approaches as psychology 143. Background in linguistics or psychology helpful. Theory and research on untaught acquisition of second languages by children and adolescents. Focus on cognitive and social variables of the learning process and on the social context of language learning. Examination of educational problems encountered by second language learners. Ms. Fillmore (Sp)

218E. Individual Differences. (3) One 3-hour seminar per week. Consideration of the role of individual differences in educationally relevant abilities; cognitive style intelligence, learning, memory, aptitude training interaction, and related non-cognitive factors, with emphasis on experimental, factor analytic, and behavior-genetic analysis of human abilities. Mr. Jensen (Sp)

218F. Conceptual Problems in Psychological Inquiry. (3) Three hours of seminar per week. Prerequisite: consent of instructor. An examination of common methodological problems in research on human behavior, with special reference to problems encountered in psychological and educational research. Mr. Hardvak (F)

*219A. Data Analysis for Educational Research and Practice. (3) Formerly 419A. Three 3-hour lectures and 1-hour discussion per week. The course is an intensive introduction to the procedures of data analysis and programming used in educational research and the most widely used in educational research. Mr. Jensen (Sp)

*219A. Categorical Data Analysis for Educational Studies. (4) Four hours of lecture per week. The data analysis techniques most widely used in educational research where the measures are categorical are examined. Offered in alternate years. Mr. Jensen (Sp)

*219B. Data Analysis for Non-Experimental Studies in Education. (4) Four hours of lecture per week. The data analysis techniques most widely used in educational research where the measures are categorical are examined. Offered in alternate years. Mr. Jensen (Sp)

*219C. Data Analysis for Experimental Studies in Education. (4) Four hours of lecture per week. The data analysis techniques most widely used in educational experiments where the measures are categorical are examined. Offered in alternate years. Mr. Jensen (Sp)

*219L. Educational Data Analysis Laboratory. (1) Three hours of laboratory per week. Must be taken concurrently with course 219A, 219B, or 519C. Mr. Marascuilo (F)

*219S. Prosemear in Educational Data Analysis. (1) One hour of seminar per week. Current research and publications on educational data analysis by faculty, students, and others are examined. Mr. Marascuilo (F); Mr. Woodson (F, W, Sp)

220. Introduction to Philosophy of Education. (4) One 3-hour lecture per week. Philosophical analysis applied to current educational problems and key concepts. Mr. Ammon (W)

*221A. History of Educational Thought. (4) Formerly 221A-221B. One 3-hour lecture per week. The evolution of systematic theories and schools of thought, in educational philosophy and practice, in education of normal and exceptional children. Mr. Woodson (F)

221B. History of American Education. (5) Formerly 221C. Four hours of lecture per week. Social and intellectual history of American education from the colonial period to the Civil War with emphasis upon adaptations of European school practices and their causes, apprenticeship education, and the family as educational unit. Ms. Clifford (W)

221C. History of American Education. (5) Formerly 221D. Four hours of lecture per week. Social and intellectual history of American education since 1855, with emphasis upon reform movements and the evolution of the American University. Ms. Clifford (W)

*222. Anthropology of Education. (3) Three hours of lecture per week. An examination of the ways in which educational systems, events and issues in both western and non-western societies have been viewed from the perspective of cultural anthropology.

223A. Sociology of Education. (4) Two 1 1/2-hour lectures and 1-hour discussion per week. The organizational structure of educational institutions, the processes of control and socialization within schools, and the functions of schools in society. Mr. Wilson (W)

223B. Sociological Theory and the Study of Education. (4) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: Sociology 157 or equivalent. The interplay between theoretical perspectives and the conduct and interpretation of educational research. Distinctions between and contributions of functionalism, exchange theory, conflict theory, symbolic interactionism and ethnomethodology as perspectives informing inquiry in education. Mr. Wilson (W)

224. Theories of the Self. (3) One 3-hour session per week. Philosophical and psychological theories of the nature of human nature, the psyche, the person, the self, and the relation between education and the self. Topics vary from quarter to quarter. (W) Existential and phenomenological theories, with emphasis upon Kierkegaard, Heidegger, Scheler, Merleau-Ponty, Ricoeur (Sp). C. G. Jung, but with some attention to Tantric Buddhism. Mr. Jarrett (W, Sp)

225. Values and Education. 225A. Theory of Values and Moral Development. (4) One 3-hour lecture per week. The development of theory of value and the placement of moral values in a typology of values. Recent theories of moral education. Values implicit or explicit in textbooks and textbooks. Mr. Jarrett (F)

225B. Humanistic and Aesthetic Education. (4) One 3-hour lecture per week. The centrality of values in the fine arts and in literature. The fine arts will be emphasized. Mr. Jarrett (Sp)

226. Seminar in the History of Education—Selected Topics. (5) Three to four hours of seminar per week. In-depth study of one or more topics in the history of education, with emphasis upon original research by the student in independent study and shared discussions and critiques in the seminar sessions. Topic (Sp) varies by seminar. Mr. Woodson (F, W)

227A. Education In Non-literate Societies. (3) Formerly 227A. Three 1-hour lectures and one 1-hour discussion per week. An examination of educational systems of several non-literate societies in different parts of the world and emphasis on the ways in which educational systems in different parts of the world are influenced by social interactions between education, culture, and social structure. Mr. Walker (F)

227B. Education In Developing Countries. (3) Formerly 227B. Three 1-hour lectures and one 1-hour discussion per week. The educational systems of several countries in Africa, Asia, and Latin America will be examined with the intention of understanding the problems and solutions involved in creating forms of education appropriate to the needs and aspirations of these developing nations.

228. Seminar in Sociology of Education—Selected Topics. (5) Three 1-hour discussions per week. Prerequisite: course 192, 222A, or consent of instructor.
Perspectives of contemporary sociology applied to selected topics in education. Topics will include: (F) Class and race in schools; (W) Education and control: toward a critical sociology of education. Mr. Leon (F); Mr. Takagi (W)

229A. Proseminar in the Sociology and Anthropology of Education: Substantive Issues. (3) Three hours of lecture per week. Prerequisite: enrollment in the Sociology and Anthropology of Education Program. Students in other areas may petition for admission. A proseminar focusing on the academic and professional development of students. A major paper, readings and class presentation, in a substantive area selected by the faculty in charge, will be required of all students. Mr. Hansen (F)

229B. Proseminar in the Sociology and Anthropology of Education: Research Development. (3) Three hours of lecture per week. Prerequisite: enrollment in the Sociology and Anthropology of Education Program; students in other areas may petition for admission. A proseminar focusing on the academic and professional development of the participants. Written and classroom exercises of individual research are required of all students. Mr. Takagi (Sp)


230A. Reading. (3) Prerequisite: consent of instructor. Mr. Rudder (W); Mr. Simons (Sp)

230B. Speaking, Listening, and Writing. (3) Prerequisite: consent of instructor. Mr. Loban (Sp)

230C. Literature. (3) Prerequisite: consent of instructor. Mr. Loban (W)

230D. Mathematics. (3) Prerequisite: consent of instructor.

230E. Social Sciences. (3) Prerequisite: consent of instructor. Topics will vary from quarter to quarter. Trends in social sciences. Mr. Michaels (F,Sp)

230F. Science. (3) Prerequisite: Teaching credential and test scores; or consent of instructor. Mr. Lowery (F)

230J. Diagnosis and Treatment of Reading Deficiencies. (3) Prerequisite: course 230A and consent of instructor. Diagnosis and correction of reading and study skills difficulties of intellectually capable students. Suggested topics: reading and spelling disabilities, diagnostic techniques and materials for remediation; problems of upper-level educationally handicapped students who require college. Mr. Maxwell (Sp)

231. Research in Curriculum and Instruction. One 3-hour session per week. Critical analyses of research in the subject areas.

231A. Reading. (3) Prerequisite: course 230A. Mr. Rudder (W); Mr. Simons (Sp)

231B. Speaking, Listening, and Writing. (3) Prerequisite: consent of instructor. Mr. Rudder (W); Mr. Simons (Sp)

231C. Literature. (3) Prerequisite: consent of instructor. Mr. Loban (Sp)

231D. Mathematics. (3) Prerequisite: consent of instructor.

231E. Social Sciences. (3) Prerequisite: consent of instructor. Mr. Michaels (F)

231F. Science. (3) Prerequisite: courses 119A and 119B or equivalent; course 230F recommended; and consent of instructor. Mr. Miller (W)

231J. Psycholinguistics and Reading-Language Instruction. (3) Prerequisite: course 231A and consent of instructor.

231K. Reading and Language Measurement Instruments. (3) Formerly 231J. Prerequisite: course 231A or consent of instructor. A survey and analysis of reading and language measurement instruments. Standards for readiness, decoding and word recognition, comprehension, vocabulary, diagnostic tests and criterion referenced tests will be covered. Mrs. Fillmore, Mr. Simons (W)

231M. Issues and Topics in Bilingual Education. (3) A consideration of the arguments for bilingual education from historical, sociological, educational, and legal perspectives. Emphasis not only on the practical problems of program implementation—particularly in the areas of curriculum, instructional strategy, and language use and community acceptance—but also on research questions related to bilingual education.

232. Early Childhood Programs. One 3-hour session per week. Prerequisite: consent of instructor. Traditional and innovative programs for the education and care of young children.

232A. Infant and Pre-school Programs. (3) Ms. Almy (F)

232B. Kindergarten and Early Primary Programs. (3) Ms. Almy (W)

232C. Selected Issues in Early Childhood Education. (3) Prerequisite: course 232A. Mr. Simons (W)

233. Production of Mediated Programs. (3) Three hours of lecture and six hours of laboratory/discussion per week. An introduction to the production of mediated programs. Course focuses on audio, video, programmed and computer-assisted instruction, multi-media, simulations/games, clinical practice. Mr. Simons (W)

234. Programmed and Automated Instruction. (4) Three hours of lecture and two hours of laboratory per week. Prerequisite: consent of instructor. Lectures, discussions, and readings will cover principles and applications of automated techniques in instruction. Emphasis will be upon instructional strategies. Students will prepare simple instructional packages and use a computer to evaluate their effectiveness. Mr. Woodson (W)

235A. Curriculum Planning: Bases for Curricular Decisions. (3) One 3-hour session per week. Theories of learning and cognitive development; socio-cultural factors; taxonomies in the cognitive and affective domains; current structure of the school curriculum; and approaches to curriculum development; problems associated with curriculum evaluation. A curriculum development project designed to integrate the various aspects of the course is required. Mr. Webster (F,Sp)

235B. Curriculum Planning: Theories, Principles, and Practices of Instruction. (3) Three 1-hour sessions per week. The course treats the following factors: theories of instruction; planning; teaching, research paradigms, studies, and findings relating to teaching effectiveness. Students are required to observe and analyze the teaching act and to conduct micro-teaching exercises.

236. Advanced Studies in Elementary and Secondary Education.

236A. Current Trends and Issues. (3) Formerly 236D. Three 1-hour lecture sessions per week. Prerequisite: consent of instructor. Critical consideration of current issues and trends in the public schools.

236B. Inter-Ethnic and Interpersonal Relations in Education. (4) Formerly 236D. One 3-hour lecture and one 2-hour of field work per week. Study of the educational implications of the sub-cultures of non-Anglo minorities. Study of reading research regarding the factors; prejudice and educational strategies for its elimination. Exercising in interpersonal and intercultural relationships and field work are involved.

240. Foundations of Student Personnel and Counseling.

240A. Principles and Theories of Guidance. (3) One 3-hour lecture session per week. Prerequisite: consent of instructor. Critical consideration of current issues and trends in the public schools.

240B. Personality Theory and Human Development. (3) One 3-hour lecture and reading review per week. Study of the educational implications of the sub-cultures of non-Anglo minorities. Study of reading research regarding the factors; prejudice and educational strategies for its elimination. Exercising in interpersonal and intercultural relationships and field work are involved. Mr. Heist (W)

240C. Career Guidance. (3) One 3-hour session per week. Prerequisite: consent of instructor. Analysis of theories of and research on career development. Sources and interpretation of vocational data. Program applications.

240D. Appraisal in Counseling and Guidance (3) Formerly 240E. One 2-hour lecture and one 2-hour laboratory per week. Prerequisite: consent of instructor. Theory and practice of psychological appraisal of counselees. Emphasis upon integration of assessment and planning. Data Sec. 1: Cultural, educational, and practical. Data Sec. 2: Personality assessments. Sec. 1, Mr. Stewart (W); Sec. 2, The Staff (Sp)

240E. Social and Cultural Factors in Counseling. (3) One 2-hour session per week. Course focuses on theory and research pertaining to the effect of social and cultural factors in counseling and psychotherapy. Emphasis is placed on the role of gender, age and social class as they affect the counseling process. Particular attention is given to the design of research that explores the complex interface of culture/social context with individual characteristics of client and counselor.

240F. Counseling and Mental Health. (4) Formerly 240D. One 3-hour lecture per week. Prerequisite: consent of instructor. Analysis of research in counseling. Advanced practice in those areas of counseling that have an impact on educational and community settings. Mr. Roffers (Sp)

245A. Counseling Research and Practice. (4) One 2-hour lecture and one 1-hour laboratory per week. Prerequisite: course 145 or consent of instructor. Analysis of the research in counseling. Advanced practice in those areas of counseling that have an impact on educational and community settings based on the research literature. Mr. Roffers (Sp)

245B. Counseling Research and Theory. (4) One 3-hour laboratory per week. Prerequisite: course 244A or 245A, or consent of instructor. Emphasis on a variety of counseling theories through lectures, readings, demonstrations and case analyses. Mr. Roffers (Sp)

246. Organization and Administration of Student Personnel Programs. (3) One 2-hour session per week and reading review. An introduction to various counseling and personnel programs and organizations. A comparison of selected organizational models and related administrative styles.

249B. Family Processes. (4) One 4-hour discussion per week. A seminar focused on interaction and change in inter-generational family units, in cultural and historical perspective. Emphasis will be on understanding family processes, through large-scale research, small group studies and case analyses. A major paper is required.

250. Special Problems in Counseling theory and Research. (3) One 2-hour seminar and one 1-hour discussion per week. Prerequisite: consent of instructor. Designed to develop interdisciplinary research and theory which bear on current problems of significance to counseling and student personnel. Topics vary from term to term. Mr. Stewart, Mr. Guthrie in charge (W)

250A. Introduction to Educational Policy Issues. (4) One 3-hour lecture per week. An overview of the policy issues facing contemporary education. A comparison of selected educational, professional and public policy sources of useful policy information, and writing policy-relevant papers. Mr. Reed, Ms. Almy (W)

250B. Introduction to Policy Analysis. (4) One 3-hour lecture per week. Emphasizes the procedures involved in interpreting policy proposals, analysing their consequences, and proposing alternatives. Attention given to understanding legislative language, the legislative process, and sources of useful policy information, and writing policy-relevant papers. Mr. Reed, Ms. Almy (W)

251A. School Supervision: Theory and Practice. (3) Formerly 259B. One 3-hour lecture per week. Concepts and methodologies of educational planning and their relationship to planning and administration; impact on political process. Planning at international, national, and regional levels.

251B. Administration of the Individual School (3) For senior students. An overview of principles of practices in the organization and administration of elementary and secondary schools.

251C. Special Topics in Urban School Administration. (3) Formerly 259A. One 3-hour lecture per week. Various topics affecting urban school administration will be considered. Topics for Spring quarter to be announced. Mr. Reed (Sp)

252. Administration of Educational Personnel Services. (3) Formerly 259D. One 3-hour lecture per week.
week. Theories, policies and practices relative to the administration of educational personnel services.

253. Education and the Law. This series is intended to provide students with an understanding of the law and legal procedures pertinent to education. It is primarily concerned with policy analysis, administration, and evaluation, and those in training for roles where there is a professional-client relationship.

253A. Education and Administrative Law. (4) One 3-hour lecture per week. Course emphasizes (1) the historical development of America’s legal system, (2) contemporary legal principles and procedures and the impact of federal, state, and local governmental arrangements for education. Attention given to policy development and implementation. Review of appropriate studies of legal and ethical norms. Mr. Guthrie (F).

257B. The Federal Government and Education. (4) One 3-hour lecture per week. Course covers (1) historical perspective of educational policy, (2) education policy making and implementation, (3) federally-supported education programs, and (4) additional topics such as curriculum and educational reform. Mr. Guthrie (W).

257C. Special Topics in Education and Government. (4) One 3-hour lecture per week. Directed research on special topics related to the structure and formation of government and education. Mr. Duffy (F).

258. Organizational Theory and Education. (4) One 3-hour lecture and one 1-hour discussion per week. Sociological approaches to the study of organizations with particular reference to education. Power and authority, control analysis, role analysis. Professional and bureaucratic conflicts. Incentive systems and organizational equilibrium. Mr. Benveniste (F).

258A. Organizational Theory and Education. (4) One 3-hour lecture and one 1-hour discussion per week. Sociological approaches to organizational change and innovation. Control and decision making. Participation, planning, organizational development (OD) in education. Mr. Benveniste (W).

258B. Seminar on Organizational Design and Future. (4) One 3-hour lecture and one 1-hour discussion per week. Organizational theory and futurism, utopian models. Field methods in analysis and design in educational organizations. Mr. Benveniste (W).

260. The Community College. (4) One 3-hour session per week. Nature and role of the community college in American society; a consideration of purposes, curriculum, student characteristics, and implications for instruction and student personnel. Mr. Tillery (F).

261A. Higher Education: Historical and Philosoph. Bases. (4) Three hours of lecture per week. Historical analysis of the roots and development of American higher education, an examination of the changing philosophical bases, and a review of the origins of major issues and innovations. Mr. Glenny (F).


268A. The Student in Higher Education. (4) One 3-hour session per week. Consideration of the college student as a developing human being, social creature, learner, and participant in institutional governance. Analytical review of college teaching and the role of students in evaluation.

268B. Advanced Study in Higher Education. Pre-requisite: consent of instructor. (4) One 3-hour session per week. Consideration of the college student as a developing human being, social creature, learner, and participant in institutional governance. Analytical review of college teaching and the role of students in evaluation.

268D. College Teaching. (4) One 3-hour session per week. Consideration of typologies of college teaching styles, issues and problems of adult learning. An analytical review of college teaching and the role of students in evaluation.

268E. Seminar in Adult Education—Selected Top. (4) One 3-hour session per week. In-depth and critical study of a topic in adult education. Research and critical evaluation of existing research by students will be discussed and evaluated.

270. Adult Education and Aging. (4) One 3-hour lecture per week. A critical examination of the problems and issues of aging and their potential influence for formal and adult education upon the aged.

275. Seminar in Adult Education—Selected Top. (4) One 3-hour session per week. In-depth and critical study of a topic in adult education. Research and critical evaluation of existing research by students will be discussed and evaluated.

282A—283B. Concepts and Theory of Leadership in Educational Administration. (2—4; 4—4; 4—4) One 3-hour lecture per week. This research seminar is open to members of special doctoral program for preparation of educational leaders. Basic concepts, issues, applications and identification and articulation of preparation in the field will be given interaction between theory and practice.

283A—283B. Seminar on Organizational Design and Futur. (4) One 3-hour lecture and one 1-hour discussion per week. Organizational theory and futurism, utopian models. Field methods in analysis and design in educational organizations.

284. Economic Analysis of Educational Systems, Part I. (4) Formerly 254A. Two 3-hour lecture and one 1-hour discussion per week. Use of causal assumptions and techniques for analyzing behavior of educational systems over time. Students receive extensive opportunity to practice with actual data, using packaged computer software. No programming is required. Mr. Stern (Sp).

254B. Quantitative Analysis of Educational Systems, Part II. (4) Formerly 2550D. Four hours of lecture per week. Prerequisite: Education 254A or consent of instructor. Continuation of Education 254A. Use of empirical models in assessing efficiency of educational and other service systems. Lectures cover individual and collective rationality, centralized planning and decentralized markets, third-party payment and commodification of behavior. Extension of regression analysis to categorical dependent variables. Mr. Stern (Sp).

265A. Economics of Education. (4) One 3-hour lecture and four 1-hour laboratory periods per week. Topics to be considered include the following: alternative methods of assessing the contribution of education to economic growth; the economics of human services; education production functions; efficiency criteria; cost analysis and sectoral planning; economic aspects of innovation.

265B. Finance of Education. (4) One 3-hour lecture and one 1-hour discussion per week. Sources of revenue for elementary and secondary schools; methods of distributing state and federal contributions; analysis of the functional distribution of school expenditures; cost-effectiveness analysis; economic aspects of proposals to increase the operation of public schools in local private sector.

266. Economics of Education. (4) One 3-hour lecture and one 1-hour discussion per week. Cost benefit analysis of returns of high education. Resources allocation and economic policy of state, federal and local government. Economics of student loans and grants. Consequences and viability of various investment policies and financial incentives for institutional programming. International comparisons.

270. Adult Education and Aging. (4) One 3-hour lecture per week. Course will cover facets of school fiscal management such as enrollment, revenue, and expenditure. Topics include real estate, income determination, and administration; school accounting practices; and principles of investing and borrowing for public institutions.

257. Education and Government. This series provides an understanding of governmental structures and political processes affecting education. The courses are intended primarily, though not exclusively, for students in policy analysis, administration, school finance and economics, and evaluation.
of post-secondary education with emphasis on teaching methodology, effective communication, team teaching, and technology in the classroom. Laboratory and field experience provided. Prerequisites: completion of 291A and 291B. Mrs. Heist (W, Sp) and Mr. Tillery (W, Sp).

293A—293B—293C. Advanced Study and Research in the Methodology of Teaching. (4—4—4) Four hours of seminar and four hours of field work per week.

Prerequisite: Successful completion of 293B and 293C. The Staff (F, W, Sp).

294. Thesis Seminar. (1—8) Prerequisite: consent of instructor. May be taken on a satisfactory/unsatisfactory basis for a master's degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp).

602. Individual Study for Doctoral Students. (1—8) Individual study in content and level required by the student to meet any of the requirements of the Ph.D. degree in educational administration and organization, with emphasis on the problems and practices of a major city school district. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp).
Effective Fall Quarter 1977, a student who has attempted more than 15 quarter units of college work will not be allowed to register in the College of Engineering without permission of the Dean of the College. Institution in the College should occasion no hardship or difficulty for continuing undergraduates, regardless of unit attempts provided they pursue engineering-relevant programs of study.

Graduate programs are offered leading to the Master of Science and Doctor of Philosophy degrees for study emphasizing applied sciences, and Master of Engineering and Doctor of Engineering degrees for advanced professional studies of design and development. Fields of study include civil engineering, electrical engineering and computer sciences, industrial engineering and operations research, mechanical engineering, nuclear engineering, ceramic engineering and metallurgy, materials science and mineral engineering, engineering geoscience, fluid mechanics, applied mechanics, and naval architecture. Also, interdisciplinary graduate programs are available in air pollution engineering, bioengineering, energy, earthquake engineering, energy and energy resource engineering, environmental engineering, mining and mineral resources, ocean engineering, and urban and public systems. Specific graduate programs may be found in the Announcement of the College of Engineering.

## Civil Engineering

### Department Office, 760 Davis Hall

**Chairman:** Carl L. Morris, M.S.

### Hydraulic and Sanitary Engineering

**Division Office, 633 Davis Hall**

**Professors:**
- Hugo B. Fletcher, Ph.D.
- James A. Harder, Ph.D.
- David A. Hodges, Ph.D.
- Walter B. Lawrence, M.S.
- William J. Ousley, Ph.D.
- Erman A. Pearson, Sc.D.
- Robert E. Setlack, Ph.D.
- James A. Thompson, Ph.D.

**Associate Professors:**
- Alexander J. Horne, Ph.D.
- Joseph L. Hammack, Jr., Ph.D.

**Lecturers:**
- Clarence C. Golleke, Ph.D.
- Frank H. Pearson, Ph.D.

David K. Todd, Ph.D.
Robert L. Wiegel, M.S.
Joseph W. Johnson, Ph.D.
(Emertius)
William F. Langeler, M.S.,
D.Eng. (Hon.) (Emertius)

Civil engineering is concerned with the planning, design, and construction of public and private works such as buildings, bridges, dams, transportation systems and water supply systems. The civil engineer must have a full understanding of the physical and economic aspects of structures and systems. The four-year undergraduate curriculum leading to the B.S. degree is designed to provide a basic and fairly comprehensive background in civil engineering and related fields. This curriculum may provide a student with a direct entry to professional experience upon graduation or with preparation for graduate study. Students may arrange their programs to integrate graduate and undergraduate professional experience upon graduation or with preparation for graduate study into a five-year program, leading to the bachelor's degree by the end of the fourth year and the master's degree by the end of the fifth year.

### Curriculum for the Bachelor's Degree

A total of 180 units is required. The program of study is described in detail in the Announcement of the College of Engineering (available without charge from the College of Engineering, University of California, Berkeley, California 94720). All students must complete a total of 27 units of humanities and social studies of which, 9 units must be upper division, and a minimum of three courses, at least one of which is in upper division, must be taken from a single department. Other courses include:

#### Lower Division

**Required:** Mathematics 1A–1B–1C–1D, 5A–5B–5C–5D. (Courses in physical or biological science or statistics may replace Physics 50 and/or Physics 5E. Substitutions may be made from an approved list of courses.)

Engineering 28, 36, and 45. Civil Engineering 10. Computer Science 1 and Statistics 25. Electives: 22 units including at least 15 units in humanities or social sciences.

#### Upper Division

**Required:** Mechanical Engineering 104A. Civil Engineering 110, 118, 121, 190A, 131, 133 or 134, 140, 141, 145A–145B, 170, 192 and 194. Electives: 12 units in upper division civil engineering courses. 26 units of electives including 12 units in humanities and social sciences (of which 9 must be upper division), and 14 units of free electives.

### Structural Engineering and Structural Mechanics

**Division Office, 721 Davis Hall**

**Professors:**
- Frank Baron, Ph.D.
- Vilermo Bertero, Sc.D.
- Jack G. Bokhampa, C.I.
- Boris Brasier, M.S.
- Anil K. Chopra, Ph.D.
- Hay W. Cough, Jr., Sc.D.
- William G. Godden, Ph.D.
- James M. Kraly, Ph.D., Vice Chairman
- Jacob Lubin, Ph.D.
- Hugh D. McDevitt, Ph.D.
- Poivinder K. Mehta, Sc.D.
- Richard E. Pearson, Ph.D.
- David Pitz, M.S.
- Karl Peter, Ph.D.
- Milos Polvicka, M.S.
- (Chairman)

**Associate Professor:**
- R. Brady Williamson, Ph.D.

Egor P. Popov, Ph.D.
Graham H. Powell, Ph.D.
Jerome A. Rabinowitz, Ph.D.
Joseph W. Johnson, Ph.D.
(Emertius)
William C. Rockman, Ph.D.
(Chairman)

### Electric Engineering and Computer Sciences

**Department Office, 231 Cory Hall**

**Computer Science Division Office, 753 Evans Hall**

**Professors:**
- Diogenes J. Angelakos, Ph.D.
- Jordan F. Newell, Ph.D.
- Gordon F. Newell, Ph.D.
- Carl L. Morris, M.S.
- Walter B. Lawrence, M.S.
- William J. Ousley, Ph.D.
- Erman A. Pearson, Sc.D.
- Robert E. Setlack, Ph.D.
- James A. Thompson, Ph.D.

**Associate Professors:**
- Alexander J. Horne, Ph.D.
- Joseph L. Hammack, Jr., Ph.D.

**Lecturers:**
- Clarence C. Golleke, Ph.D.
- Frank H. Pearson, Ph.D.

David K. Todd, Ph.D.
Robert L. Wiegel, M.S.
Joseph W. Johnson, Ph.D.
(Emertius)
William F. Langeler, M.S.,
D.Eng. (Hon.) (Emertius)

NOTE: For key to symbols, see page 38.

Graduate Study

Graduate programs of study leading to the master's and doctoral degrees are available in the major civil engineering fields: air pollution, construction, geodesy and photogrammetry, hydraulic, sanitary, geotechnical engineering, structural engineering and mechanical engineering, and water resources. For details, please consult the Announcement of the College of Engineering.

## Electrical Engineering and Computer Sciences

**Department Office, 231 Cory Hall**

**Computer Science Division Office, 753 Evans Hall**

**Professors:**
- Diogenes J. Angelakos, Ph.D.
- Jordan F. Newell, Ph.D.
- Gordon F. Newell, Ph.D.
- Carl L. Morris, M.S.
- Walter B. Lawrence, M.S.
- William J. Ousley, Ph.D.
- Erman A. Pearson, Sc.D.
- Robert E. Setlack, Ph.D.
- James A. Thompson, Ph.D.

**Associate Professors:**
- Alexander J. Horne, Ph.D.
- Joseph L. Hammack, Jr., Ph.D.

**Lecturers:**
- Clarence C. Golleke, Ph.D.
- Frank H. Pearson, Ph.D.

David K. Todd, Ph.D.
Robert L. Wiegel, M.S.
Joseph W. Johnson, Ph.D.
(Emertius)
William F. Langeler, M.S.,
D.Eng. (Hon.) (Emertius)

NOTE: For key to symbols, see page 38.

Graduate Study

Graduate programs of study leading to the master's and doctoral degrees are available in the major civil engineering fields: air pollution, construction, geodesy and photogrammetry, hydraulic, sanitary, geotechnical engineering, structural engineering and mechanical engineering, and water resources. For details, please consult the Announcement of the College of Engineering.

With the rapid growth in technology, electrical engineering now encompasses solid-state devices, integrated circuits, microwave electronics, quantum and optical electronics, bioelectronics, radiation and propulsion, plasmas, power systems, control systems, and...
communication systems, circuit theory, large-scale net-
works and systems, ecological systems and pattern recog-
nition.

Computer sciences encompasses theory, software,
and hardware. These include: algorithmic complexity
and theory of computation, analysis of numerical and
combinatorial algorithms, computer architecture and
machine organization, computer graphics, data base
management systems, formal languages and automata
theory, information theory, parallel and pipeline com-
puters, performance analysis, programming languages
and compilers, operating systems, and symbolic alge-
bric manipulation.

Computer Science Division

Programs in computer science are offered by the De-
partment through its Computer Science Division.

Curriculum for the Bachelor's Degree

A total of 180 units is required for the bachelor’s degree
with the following minimum requirements:

I. A total of 24 units of physical or life science including
Physics 5A, 5B, 5C and 5D.
II. A total of 24 units of mathematics or statistics including
Mathematics 1A, 1B or 1C or equivalent mathe-
tical material covered by 12 units of Mathematics 15.
III. A total of 24 units of mathematics or statistics in
cluding Mathematics 1A, 1B or 1C or equivalent ma-
terial covered by 12 units of Mathematics 15.
IV. Seventy-two units of electives, including at least 27
units of Humanities and Social Studies and 24 units of
Computer Sciences; electronics, computer
sciences, and bioelectronics. Or they may plan an
individual program to suit their special needs or
background.

General Electrical Engineering and
Computer Sciences Program

The lower division pro-
cram includes Mathematics 5A through 5E, Mathematics 1A
through 1C or equivalent material covered by 12 units of
Mathematics 15; Computer Science 1 or 1S, Engi-
neering 17 and 45, about 15 units of humanities and
social science, and about 40 units of electives.

Biology 1A–1B, Geology 5, Computer
Science 41, Physiology 1. If a sequence is not sub-
stituted, the sequence must be completed to satisfy the Engineering 45

Computer Science Division

Programs in computer science are offered by the De-
artment through its Computer Science Division.

Curriculum for the Bachelor's Degree

A total of 180 units is required for the bachelor’s degree
with the following minimum requirements:

I. (a) Sixty units in the College of Engineering with 45
units in the upper division. (b) Engineering 17, 45, and
Computer Science 1 or 4 units of Computer Science 15.
(c) Four upper division laboratory courses in Electrical
Engineering and Computer Sciences.
(d) Thirty upper division units in Electrical Engineering
and Computer Sciences.

II. A total of 24 units of physical or life science including
Physics 5A–5B–5C.

III. A total of 24 units of mathematics or statistics in-
cluding Mathematics 1A, 1B, and 1C or equivalent ma-
terial covered by 12 units of Mathematics 15.

IV. Seventy-two units of electives, including at least 27
units of Humanities and Social Studies and 24 units of
Computer Sciences; electronics, computer
sciences, and bioelectronics. Or they may plan an
individual program to suit their special needs or
background.

General Electrical Engineering and
Computer Sciences Program

The lower division pro-
cram includes Physics 5A through 5E, Mathematics 1A
through 1C or equivalent material covered by 12 units of
Mathematics 15; Computer Science 1 or 1S, Engi-
neering 17 and 45, about 15 units of humanities and
social science, and about 40 units of electives.

Biology 1A–1B, Geology 5, Computer
Science 41, Physiology 1. If a sequence is not sub-
stituted, the sequence must be completed to satisfy the Engineering 45

Electronics. For students whose interests fall into
areas such as solid state electronics, integrated
circuits, plasma, electronics, microwave elec-
tronics, quantum electronics, optical electronics, su-
perconductivity, and energy conversion.

Systems. For students whose interests fall into areas
such as networks, control theory, information theory,
communication theory, finite-state systems, mathematical
programming, system theory, and large-scale sys-
tems.

Bioelectronics. For students interested in animal
control systems, physical modeling of neural systems,
application of circuit and system techniques to living
systems, and ecological systems.

Computer Science. For students interested in ma-
chine organization and logical design, programming
systems and languages, digital devices and circuits,
heuristic programming and artificial intelligence,
switching and automatic theory, algebraic theory of ma-
chines, mathematical theory of languages, coding
theory, pattern classification, and learning systems.

This program is offered by the Department through its
Computer Science Division.

Undergraduates who wish to major in computer
science may do so either through the College of Letters
and Science or through the College of Engineering.

Upper Division. All Engineering Science programs
must include 24 units of upper division technical
upper division courses approved by the advisor.

Graduate Program

To prepare the graduate student for work in the rapidly
developing fields of electrical engineering and com-
puter sciences, the Department offers a wide selection of
courses, seminars and a reasonable amount of free-
time for meeting degree requirements. Since no single
sequence of courses is required, students are free to
donald design programs to suit their particular needs and inter-
ests, in consultation with a faculty advisor in their field.

Graduate degree programs are available as prepara-
tion for research and teaching (Master of Science and
Doctor of Philosophy), and for careers in design, devel-
opment, and management (Master of Engineering and
Doctor of Engineering). The Master of Science program
requires about one year of study. About three addition-
ally, 12 units are usually required for the Doctor of Philo-
osophy. The Master of Engineering program requires five
quarters of study and includes a minor in a technical sub-
class outside the major and a second minor in a
non-technical subject such as law, business administra-
tion, etc. The Doctor of Engineering program, of about
two years duration, builds on the course work for the
Master of Engineering and requires a one-year intern-
ship in a design and development organization. Stu-
dents may plan either a B.S. or M.S. program to suit the
D.Eng. should apply first for the M.Eng. pro-
gram.

Details of the available fields of graduate study in elec-
trical engineering and computer sciences are de-
scribed in the Announcement of the College of Engi-
neering. For further information on graduate programs
and procedures, see the Electrical Engineering and
Computer Sciences Graduate Orientation Notes, avail-
able from 197 Cory Hall.

Engineering Science

The student in engineering science studies in one of
several areas where engineering science interacts with
the natural sciences, mathematics, statistics, or medi-
cine. Students in this program may choose to prepare
for graduate study in the engineering fields, the natural
sciences, or medicine. Graduate programs in engineer-
ing science are offered by the individual engineering
departments.

Programs for the Bachelor's Degree

The undergraduate Engineering Science curriculum is
multidisciplinary and is administered by the Engineer-
ing Science Committee. Acceptance and continuation
in the engineering science curriculum requires a mini-
um grade-point average of 3.00. All engineering
science programs must include a total of 27 units of
humanities and social studies of which 9 units must be
upper division; a minimum of three courses, at least
one of which is in upper division, must be taken from
a single department.

Lower Division. Required: (for all upper division programs in engineering science) Mathematics 1A–1B, 1A–1B, 1A–1B–5C; Chemistry 1A–1B–1C (except Engineering Mathematics—Mathematics Engi-
neering Physics requires Chemistry 1A–1B); Com-
puter Science 1; Physics 5A–5B–5C–5D–5E (Engineer-
ing Mathematics—Mathematical Statistics requires
Physics 5A–5C–6B); English 1A or Rhetoric 1A or
Comparative Literature 1A; technical electives, 8 units
which must include Biology 1A–1B for those in bio-
engineering, Geology 5 for those in engineering ge-
oscience. (Transfer students admitted to Engineering
Mathematics—Mathematical Statistics, Engineering
Physics or the Individual Program in Engineering
Science may substitute 8 units of upper division tech-
cal electives approved by the advisor.)

Upper Division. All Engineering Science programs
must include 24 units of upper division engineering
courses (required upper division engineering courses
may be included).

Particular requirements of the various options in the
engineering science program are described below. The
Announcement of the College of Engineering should
be consulted for full details.

Bioengineering. Required: Chemistry 8A–8B, 14 or
109A; Biochemistry 102; Medical Physics 120–122.
Electives must include: 8 units of upper division mathe-
ematics; an upper division course in mechanics; an up-
per division course in fluid mechanics. Note for pre-
med students: Zoology 105 is recommended; for
foreign language requirements of medical schools should
be taken into account.

Engineering Geoscience. Required: Physics 105A
or Mechanical Engineering 103, Physics 110A–110B
or Electrical Engineering and Computer Science 117A–
117B, Mathematics 120A–120B–120C, or 121A–
121B and Engineering 115, or Mathematics 105A,
105B and Biological Science 150; Geophysics 122A–
122B; Civil Engineering 139 or Mechanical Engineering
185; electives which must include: (a) 4 units of upper divi-
sion courses in geology or geophysics; (b) an upper
division course in statistics; (c) for those who did not
take in the lower division a course in materials such as
Engineering 45, an upper division course dealing with
materials; (d) a course in thermodynamics; (e) a course
in fluid mechanics.

Engineering Mathematics or Mathematical Sta-
tistics. Required: Mathematics 112, 120A–
120B–120C or three courses from Mathematics 104A–
104B, 105, 185; Statistics 130A–134B; electives,
which must include: at least four upper division courses
in mathematics or statistics; sufficient units of physical
or life sciences so that total is 24 units including Phys-
ics 5A–5B–5C.

Engineering Physics. Required: Mathematics 120A–
120B–120C, or 104A–104B and 185; Physics 110A–
110B–110C or Electrical Engineering and Computer Science 104A and 117A–117B, Physics 137A–137B; Mechanical Engineering 103 or Physics 105A; Mechanical Engineering 175 or Physics 105B; Nuclear Engineering 102 or Electrical Engineering and Computer Sciences 171 or Physics 111A; Mechanical Engineering 111 or Physics 111 or Materials Science and Engineering 102 or Mechanical Engineering 105A; Physics 141A or Electrical Engineering and Computer Science 130 or Materials Science and Engineering 108; Mechanical Engineering 185 or Civil Engineering 139 or Mechanical Engineering 106A or Civil Engineering 165A; 20 units of upper division courses in the Department of Physics.

Individual Program in Engineering Science. Required: 90 units of upper division electives of which 20 units must be in approved upper division courses in Natural Science or Mathematics.

Programs for Graduate Degrees

Students with a B.S. degree in fields other than engineering, as well as those with a B.S. degree in engineering, may be eligible for the M.S. and Ph.D. degrees in engineering science. Programs of study and research leading to a graduate degree in engineering science are offered by all of the engineering departments. These programs emphasize the theoretical principles of mathematics, chemistry, physics, geology, and biology on which developments in engineering and the applied sciences are based.

Industrial Engineering and Operations Research

Department Office, 4135 Etcheverry Hall

Professors:
Richard E. Barlow, Ph.D.
Edward R. F. W. Crossman, Ph.D.
Stuart E. Dreyfus, Ph.D.
David Gale, Ph.D.
C. Roger Glassow, Ph.D.
Raymond C. Grassi, M.S.
William E. Lockett, Ph.D.
(Chairman)

Associate Professors:
Ian Adler, Ph.D.
James T. Lapin, Jr., M.S.

Lecturer:
Stephen Lerner, Ph.D.

Industrial engineering and operations research in a modern field of systems design, analysis, and control which is concerned with integrated systems of men, machines, and material and their interaction with their environment. Increased emphasis is placed on applications in socio-engineering, such as water resources management, transportation systems, pollution and waste disposal systems, and highway accident prevention, as well as the classical studies of production, automation, inventory control, scheduling, systems reliability, engineering economics, incentives, organization, and man-machine systems.

Undergraduates in Industrial Engineering and Operations Research receive broad training in engineering fundamentals, principles of economics and advanced mathematics and statistics in order to prepare them for elective sequences which stress the construction of systems models, the role of the human being in these systems, and the related mathematical methods of optimization and control. A unified core program is offered both for students who wish to pursue the professional aspects of the field, and for those who, after further 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 180 units is required, including:

Lower Division. Required: Mathematics 1A–1B–1C, 51A–51B–51C; Chemistry 1A–1B; Physics 5A–5B–5C–5D; Engineering 17, 45; Computer Science 1, 2; 7 to 8 units of technical electives: to be selected from Engineering 28, 36, Computer Science 41, or Physical, or Biological Science courses approved by the adviser; 21 to 22 units of electives. 3

Upper Division. Required: Industrial Engineering and Operations Research, 130, 160, 161, 162, 170, 171, or 172, 150, 153, or 154, 180; Engineering 120; Statistics 134A, 147, 44 units of electives. 3

3 Electives: (1) Must include a total of 27 units of humanities and social studies of which, 9 units must be upper division, and a minimum of three courses, at least one of which is in upper division, must be taken from a single department. (2) Must include at least 18 units of upper division courses in engineering, science, mathematics, or statistics, of which at least 7 units must be in courses given by the Department of Industrial Engineering and Operations Research.

Graduate Programs

Graduate programs leading to the M.S., M.Eng., Ph.D., and D.Eng. are offered in two interrelated areas of study.

Industrial Engineering. This program has been developed to meet the needs and interests of engineers and scientists wishing to enhance their competence in industrial, service and public systems design, analysis and operation, thus preparing students for administrative positions.

Operations Research. This program prepares the student for advanced work in the theory of systems science. The development of quantitative model structures and necessary methods of analysis and optimization are emphasized.

Undergraduates from scientific disciplines other than engineering may be accepted into these programs. A master's degree may be earned by thesis or by comprehensive examination. Doctoral degrees require oral examination in the major and two minor fields followed by submission of a thesis demonstrating ability to conduct independent advanced research. Graduate research facilities are available in the Human Engineering and Organizational Sciences Laboratory, and in the Operations Research Center.

The department requires all graduate applicants to submit Verbal and Quantitative Aptitude scores of the Graduate Record Examination. Further information on graduate programs may be obtained from the Industrial Engineering and Operations Research Office, 4135 Etcheverry Hall and in the Announcement of the College of Engineering.

Manufacturing Engineering

Manufacturing Engineering is an interdisciplinary program offered jointly by the Department of Industrial Engineering and Operations Research and the Department of Mechanical Engineering. The program will train engineers in an integrated view of properties of materials, manufacturing process fundamentals, productive system analysis, and systems design and synthesis.

NOTE: For key to symbols, see page 36.
Materials Science and Mineral Engineering

Department Office, 210 Hearst Mining Building

Professors: Robert H. Bragg, Ph.D. (Chairman), Kenneth K. Kelley, Ph.D., Bimal K. Bhattacharyya, Professors: Michael Hood, Ph.D., J. W. Evans,® Ph.D., Associate Professors: H. Frank Morrison, Ph.D., Robert H. Bragg, Ph.D. (Adjunct), Materials Science and Engineering, is a broad field within which primary emphasis can be directed toward fundamental physics, chemistry, or engineering. Because of the ever-increasing demand for improved or better characterized materials, fundamental and applied research in the field is extremely active, providing a wide choice of rewarding career opportunities.

Curriculum for the Degree and its Programs

Students in all programs in materials science and engineering must complete a total of 180 units.

Lower Division. Required: Mathematics 1A–1B–1C; 51A–51B–51C; Chemistry 1A–1B; Physics 5A–5B–5C–5D; Computer Science 1, 2; Engineering 17, 28, 36, 45; 22 units of electives.

Upper Division. Engineering 102, 120; Civil Engineering 130A; Mechanical Engineering 101, 102A, 102B or Engineering and Operations Research 180, 104A, 105A or 111, 134 or Industrial Engineering and Operations Research 130; Industrial Engineering and Operations Research 150, 153, 165; Statistics 134A, 147; 34 to 35 units of electives. Effective must include: (a) a total of 27 units of humanities and social studies of which 9 units must be upper division; a minimum of three courses, at least one of which is upper division, must be taken from a single department. (b) Two courses from each of the following two groups: Group I: Mechanical Engineering 121, 123, 127, 131, 132. Group II: Industrial Engineering and Operations Research 170, 172, 154, 162, 166.

Curriculum for the Bachelor's Degree

A total of 180 units is required, including:

Lower Division. Mathematics 1A–1B–1C, 51A–51B–51C; Chemistry 1A–1B; Physics 5A–5B–5C–5D; Computer Science 1, 2; Engineering 17, 28, 36, 45; 22 units of electives.

Upper Division. Engineering 102, 120; Civil Engineering 130A; Mechanical Engineering 101, 102A, 102B or Engineering and Operations Research 180, 104A, 105A or 111, 134 or Industrial Engineering and Operations Research 130; Industrial Engineering and Operations Research 150, 153, 165; Statistics 134A, 147; 34 to 35 units of electives. Effective must include: (a) a total of 27 units of humanities and social studies of which 9 units must be upper division; a minimum of three courses, at least one of which is upper division, must be taken from a single department. (b) Two courses from each of the following two groups: Group I: Mechanical Engineering 121, 123, 127, 131, 132. Group II: Industrial Engineering and Operations Research 170, 172, 154, 162, 166.

Materials Science and Engineering

Department Office, 210 Hearst Mining Building

Professors: Robert H. Bragg, Ph.D. (Chairman), Kenneth K. Kelley, Ph.D., Bimal K. Bhattacharyya, Professors: Michael Hood, Ph.D., J. W. Evans,® Ph.D., Associate Professors: H. Frank Morrison, Ph.D., Robert H. Bragg, Ph.D. (Adjunct), Materials Science and Engineering, is a broad field within which primary emphasis can be directed toward fundamental physics, chemistry, or engineering. Because of the ever-increasing demand for improved or better characterized materials, fundamental and applied research in the field is extremely active, providing a wide choice of rewarding career opportunities.

Curriculum for the Degree and its Programs

Students in all programs in materials science and engineering must complete a total of 180 units.

Lower Division. Required: Mathematics 1A–1B–1C; 51A–51B–51C; Chemistry 1A–1B; Physics 5A–5B–5C–5D; Computer Science 1, 2; Engineering 17, 28, 36, 45; 22 units of electives. *Note: Physics 5E and 8 units of mathematics, if not taken in the lower division, may be taken in the junior year without any delay in progress toward the degree provided a total of 90 units has been completed in the first two years.


Options. Students interested in either the metallurgy or ceramic engineering options should state their preference so that an appropriate faculty adviser can be assigned. A variety of elective course programs are available in either option.

Graduate Study in Materials Science

Qualified holders of the bachelor's degree in fields such as ceramic, chemical, metallurgy, physics, chemistry and various fields of engineering can all successfully undertake graduate study in materials science.

The graduate program emphasizes research. Techniques such as transmission electron microscopy, field ion microscopy, x-ray diffraction topography, mass spectrometry, precision electrical conductivity mesurements, micro-probe X-ray emission spectroscopy, differential thermal analysis, precision calorimetry and cryogenic high temperature mechanical testing are used for fundamental characterization of materials. Research topics include study of the mechanical, chemical, surface, thermodynamic, electrical, and magnetic properties of materials, and study of the kinetics, thermodynamics, and simulation of the processes by which materials are produced.

Graduate Study in Engineering Geoscience

This program is directed toward graduate education and research applied in geophysical sciences. The course of study leads to the M.S., Ph.D., and D.Eng. degrees and is designed for students with undergraduate degrees in geophysics, engineering geology, physics, or mathematics. An M.S. program is available for persons currently in industry or government who wish to undertake graduate work in the geosciences. The program currently stresses study in mineral and oil exploration, engineering geology, and geophysics.

Through the cooperation of the Department of Geology and Geophysics, students are encouraged to take courses in that department to complete requirements for the major in Engineering Geoscience. Courses in the Department of Geology and Geophysics that may constitute part of the major in Engineering Geoscience are: Geophysics 121A–121B, 122A–122B, 204A–2045, 208, Geology 106, and 150.

Mechanical Engineering

Department Office, 6193 Etcheverry Hall

Professors: Robert E. Sawyer,° Ph.D.; Samuel A. Schwalb, Ph.D.; Ralph A. Masi, Ph.D. (Emeritus); Michael M. Carroll, Ph.D.; Giles M. Corcoran, Ph.D.; Israel M. Cornet, Ph.D.; Don M. Cunningham, M.S.; John F. Demars, Ph.D.; Joseph Fricek, M.S.; Werner Goldsmith, Ph.D.; Ralph Greif, Ph.D.; Robert F. Keeler, Ph.D.; Maurice P. Kos, Ph.D.; Chien-Shi Hsu, Ph.D.; Franklin C. Paul Dubois, Ph.D.; Shiro Kobayashi, Ph.D.; Alan D. K. Krikel, Ph.D.; Edmond V. Lallone, Ph.D.; George J. Masi, Ph.D.; Robert L. Blecher, Ph.D.; George J. Meetz, Ph.D.; B.S.; Provost; Clayton D. Mete, Jr., Ph.D.; Vice Chairman; Paul M. Nathgi, Ph.D.; Antoine K. Copenham, Ph.D.; Charles W. Redcliffe,° M.S.; M.E.; Reinhard M. Rosenblatt, M.S., Ph.D. (Hon.)

Associate Professors: David M. Austerland, Sc.D.; Patrick J. Pagni, Ph.D.

Assistant Professors: John W. Delli, Ph.D.; David A. Dormine, Ph.D.; Dall E. Kendall, Sc.D.; Lawrence Starr, M.D.

Professors: Henry P. Pickus, Ph.D. (In-Residence); Kurt S. Splegler, Ph.D. (In-Residence)

Mechanical engineering includes the science and art of the formulation, design, development, and control of systems and components involving thermodynamics, mechanics, fluid mechanics, and the conservation of energy into useful work. The mechanical engineer requires a thorough preparation in mathematics, physics, chemistry, manufacturing processes, properties of materials, mechanics, fluid mechanics, thermodynamics, as well as intensive design and labo-
ory experience. The program of study includes basic subjects common to all engineering fields, fundamental subjects important to all mechanical engineers and specialization in one or more phases of mechanical engineering. Undergraduate specialization is provided in the choice of technical electives which may be selected from the subject areas of applied mechanics, automatic controls, electro-mechanical systems, analytical geometry, energy conversion, fluid mechanics, heat and mass transfer, materials processing, mechanical design, naval architecture, nuclear engineering, cryogenics, thermodynamics, and biomedical, environmental and petroleum engineering. The curriculum has recently been revised to make it one of the most flexible in the nation.

Because of the widening range of technical problems and the limited amount of specialization available in the undergraduate curriculum, qualified students should consider graduate study to enlarge their scientific and technical capability. Further details on undergraduate and graduate fields of emphasis in mechanical engineering are available in the Announcement of the College of Engineering.

Curriculum for the Bachelor's Degree

A total of 180 units is required, including:

**Lower Division.** Mathematics 1A–1B–1C, 41, 51C. Chemistry 1A–1B; Physics 5A–5B–5C–5D–5E; Computer Science 1; Engineering 28, 36, 45; 36 units of electives.


**Mechanical Engineering Options.** The following groups of technical electives are suggested to aid undergraduates in the choices of specific professional fields. Each group contains more courses than can be taken within the standard allowance of technical electives, and there is no requirement that all electives selected be from any single group.

- Applied Mechanics: Engineering 115, 116, 117; Mechanical Engineering 129, 133, 134, 162, 173, 174, 175, 185, 282A; Mathematics 104A.
- Automatic Controls: Engineering 116, 118; Mechanical Engineering 133, 134, 172, 175; Electrical Engineering and Computer Sciences 119, 128A–128B.
- Energy Conversion: Engineering 117, 160, 161; Mechanical Engineering 110, 146, 147; Physics 132.
- Environmental Engineering: Engineering 117, 150, 151, 152, 161; Mechanical Engineering 110, 142, 145, 147, 151, 155, 159, 160, 175, 174; Civil Engineering 140; Nuclear Engineering 153; Geography 146; Architecture 110.
- Fluid Mechanics and Aeronautics: Engineering 116, 117; Mechanical Engineering 133, 147, 151, 159, 162, 164, 175; Civil Engineering 138, 166A; Physics 132; Astronomy 101.
- General Mechanical Engineering: Engineering 117; Mechanical Engineering 133, 134, 147, 151, 159, 185.

**NOTE:** For key to symbols, see page 36.

**Naval Architecture**

Department Office, 202 Naval Architecture Building

**Professors:**

- J. Randolph Pauling, Jr., D.Eng.
- Henry A. Schade, D.Eng.
- William C. Webster, Ph.D.
- John V. Wehausen, Ph.D. (Chairman)

**Lecturers:**

- Alan M. Mansour, Ph.D.
- Oswald J. Sibul, M.S.

**Naval Architectural Studies**

- Students may prepare for a bachelor's degree in the fields of naval architecture and marine engineering. With graduate study, they may earn advanced degrees in one of these fields. The student's background and objectives should be considered in the choice of technical electives. The Naval Architecture major offers courses in the fundamentals of marine vehicle design and the theories of ship structures and ship hydrodynamics. There is no undergraduate major, but undergraduate courses are offered, and students interested in naval architecture may elect courses in this department as an option within the mechanical engineering major. Graduate study is offered in the areas of ship structures and ship hydrodynamics, leading to the master's and doctor's degrees. The graduate student normally must take Naval Architecture 240A–240C, 240D–240E, and 241A–241B–241C. 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 three quarters of study. Further details on graduate programs (including the graduate double major program) are available from the department upon request.

**Nuclear Engineering**

Department Office, 4103 Etcheverry Hall

**Professors:**

- Paul L. Chambre, Ph.D.
- Lawrence M. Grossman, Ph.D.
- Selwyn R. Kaplan, Ph.D.
- Donald R. Olander, Sc.D.

**Associate Professors:**

- George Yadigaroglu, Sc.D.

**Senior Lecturer:**

- Robert V. Fite, Ph.D.

**Lecturers:**

- Roger W. Wallace, Ph.D.

**Nuclear Engineering**

Nuclear engineering is concerned with the applications of nuclear reactions, including the design, analysis, and operation of nuclear reactors and their nuclear fuel cycles. The principles of nuclear engineering are applied to both nuclear fission reactors and the development of nuclear fusion as an energy source. The nuclear engineering courses deal with the physical principles of nuclear reactions, the interaction of nuclear radiation with matter, the behavior of neutrons in reactor media, the thermal and hydrodynamic principles of heat extraction, the properties of nuclear materials, and the analysis of nuclear fuel cycles. The courses are taught in the undergraduate and graduate levels. Other courses include radiation protection and biological effects, environmental effects, nuclear safety, and thermonuclear fusion.

Undergraduate majors in nuclear engineering and in other fields of engineering through the undergraduate double major programs (see below) 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.

For details on degree requirements please consult the Announcement of the College of Engineering.

**Engineering: Special Programs**

**Double Major Programs of Study.** The Double Major Program is designed for students who wish to undertake study in two major areas of engineering in order to qualify for employment in either field or for positions in which competence in two fields is required. Students may prepare for either bachelor's degree combining study in any of the following areas:

- Civil Engineering/Materials Science and Engineering Electrical Engineering and Computer Sciences/
  - Materials Science and Engineering Mechanical Engineering/Materials Science and Engineering
  - Materials Science and Engineering Nuclear Engineering

**Electrical Engineering and Computer Sciences/Nuclear Engineering**

**Industrial Engineering and Operations Research/Nuclear Engineering**

**Mechanical Engineering/Nuclear Engineering**

These curricula include the core courses in each of the major fields. They involve normal course loads and can be completed in four years. Both majors are offered on the student's transcript of record. For complete information about programs of study under the Double Major see the Announcement of the College of Engineering.

In addition to the double major programs within the College of Engineering described above, two double major curricula involving the College of Engineering and the College of Chemistry are offered. These are:

1. Materials Science and Engineering Chemical Engineering
2. Nuclear Engineering/Chemical Engineering

These curricula include the core courses in both departments and require the same number of units and length of time to complete as the single major pro...
Interdisciplinary Graduate Programs

Many areas of graduate study encompass the work of faculty in more than one engineering department and include faculty and students from outside the College of Engineering. Such interdisciplinary programs are continually developing within the College of Engineering. Following is a list of those programs that have been formally approved at press time. Each program is supervised by a College-wide interdepartmental committee which provides a unifying thread to the program. Study in these programs leads to degrees in Master of Science, Master of Engineering, Doctor of Engineering, and Doctor of Philosophy in Engineering or Engineering Science in certain of the departments within the College.

Further information on any of these programs can be obtained by writing to the Dean of Interdisciplinary Studies, College of Engineering, University of California, Berkeley, CA 94720.

Air Pollution Engineering. This is an interdisciplinary program which includes Civil Engineering, Mechanical Engineering, Chemical Engineering and School of Public Health. The core program is taken by all students who then specialize in the respective departments.

Bioengineering. The purpose of the bioengineering program is to equip a student with a strong background in engineering while at the same time providing either a broad interdisciplinary exposure to biological, physiological, medical, and other health or life science related areas, or a more intense, thorough professional training in some specialty within these areas. The intention of this type of hybrid education is to allow the student to become professionally involved in practical or theoretical problems related to biological or medical systems. With this type of educational background the bioengineer can expect to bring new concepts, approaches, and techniques to bear on these problems.

Students engaged in the study of bioengineering can construct an interdisciplinary major from courses in each of the following areas with courses in each of these areas included in the core program. Additional courses may also be included in the core program to meet the needs and objectives of the individual student. Emphasis is placed on the integration of core courses in bioengineering with courses in other departments which relate to the student's interests and objectives. The curriculum is designed to allow for maximum flexibility and adaptability to the needs of the student.

Students enrolled in the Department of Mechanical Engineering (College of Engineering) are encouraged to form interdisciplinary major fields. Within the area of environmental engineering, students are encouraged to form a program of study in environmental engineering and to become involved in research and development projects in the area.

Energy and Energy Resource Engineering. It is generally recognized that the provision of an adequate supply of energy in economic and environmentally acceptable forms are among the most important tasks facing the engineering profession in the decades ahead. The complexity of the problems in the energy field requires an interdisciplinary approach in which engineering and environmental analysis are used in a network of socio-economic and public policy concerns.

The physical and environmental limits to the use of energy and the fuel supply, as well as a wide range of options in the conversion, utilization, and distribution of energy, present fundamental and challenging technical problems for both research and professionally oriented engineering students.

The College of Engineering offers a variety of graduate programs, including, in particular, a two year course of study for a Master of Engineering degree involving interdisciplinary work in energy and energy resource engineering across departmental boundaries and including social and policy studies. The programs involve specialization in an energy technology within a student's "home" department, technical breadth courses in other engineering departments and in general energy studies, and a selection of courses in socio-economic and policy areas. Individual student involving synthesis and project design is an important part of the total program. Energy and energy resource discipline areas involved in the engineering departments with associated fields of specialization are as follows:

Civil Engineering: structures; resources; environmental engineering; transportation.

Electrical Engineering & Computer Sciences: electric power, systems and optimization, solid state, plasmas and controlled thermonuclear fusion.

Industrial Engineering & Operations Research: optimization, large system studies, applied stochastic processes.

Materials Science & Engineering: materials for energy conversion; materials process engineering, particulate materials.

Mechanical Engineering: thermal power, combustion, heat transfer, resources, systems and modeling, environmental engineering.

Nuclear Engineering: reactor engineering; safety and environment; fuels and materials; fusion.

Environmental Engineering. Within its department and organized research units the College of Engineering offers many avenues for academic study and research in environmental engineering. Attention in some areas is focused on fundamental understanding of sources of environmental problems, the development of methods of monitoring and treatment for the maintenance of environmental quality. In other areas the principal interest lies in applications of engineering technology to the recovery or utilization of resources, or guiding against environmental deterioration. In each of these fields the excellence of faculty and the distinction of graduates is well known.

At Berkeley the development and preparation of engineers qualified for professional practice builds upon sound training in disciplines of a parent field. This background is deepened and ranges of skills are broadened by additional studies appropriate to professional goals.

Departments offering degree programs in environmental engineering areas are indicated in the summary below. Students desiring preparation in an environmental engineering field should enroll in a department of the College most nearly containing the core curriculum of interest. Their program will be planned through conferences with the advisor in both core and breadth elements according to interests and the special degree requirements of the department. For instance, students electing an M.S. degree program in Air Pollution Engineering may be enrolled in the Departments of Civil Engineering, Chemical Engineering (College of Chemistry), or Mechanical Engineering.

Students enrolled in the Department of Mechanical Engineering may select environmental engineering as an interdisciplinary major field. Within this area the student may arrange degree programs at all levels in fields of air pollution engineering, desalination, geothermal energy, mountain management, waste heat management, and others. (See Berkeley Interdisciplinary Program in Mechanical Engineering.) Members of the Mechanical Engineering faculty are actively engaged in a rich variety of research and development projects in each of these areas.

The Division of Hydraulic and Sanitary Engineering, Department of Civil Engineering, has long maintained a leading position in the areas of water quality and hydraulic engineering. Programs for students enrolled in this division may be arranged in coastal engineering, water resources engineering, and sanitary engineering. The faculty of the division engages in vigorous and diversified programs of research in the Hydraulic Engineering Laboratory and the Sanitary Engineering Research Laboratory.

Nuclear Engineering offers programs in radiation protection, reactor safety, management of radioactive wastes, and environmental energy.
wastes, and environmental monitoring of radioactive releases.

The various environmental engineering activities of the departments and laboratories within the College permit a close working cooperation with the College of Chemical Engineering and Public Health.

Mining and Mineral Resources. The mining, mineral, and fuel industries are presently confronted with an unprecedented demand to increase mineral and energy discovery and production. Both current and future needs must be satisfied in the face of dwindling supplies of known, accessible deposits mined in the past with due consideration to environmental, energy conservation and safety factors. This task requires using all available resources—mineral, technical, conceptual, and professional, as well as advancing the science and practice of exploration, mining and mineral processing, and mineral resource utilization and management.

A graduate program which will equip students to handle these issues clearly involves interdisciplinary study which cuts across conventional distinctions within the College and University. The Mining and Mineral Resources program allows students to pursue graduate study leading to degrees in both the master’s and doctoral levels. The principal departments involved are Chemical Engineering, Civil Engineering, Materials Science and Mineral Engineering, and Mechanical Engineering, as well as Business Administration, Economics, Political Science and Computer Sciences. Regular departmental course offerings are supplemented by special courses in Mining and Mineral Resources taught by visiting faculty from industry and universities.

Berkeley’s strong research programs and excellent laboratory facilities offer a broad range of educational opportunities. Faculty are involved in such areas as resource inventory, ore genesis, applications of geology and geophysics to mining and mineral exploration, mining systems, rock mechanics, fluid flow in rocks, geothermal resources, petroleum and natural gas engineering, enhanced oil recovery, mineral processing and the utilization of coal. The University also has a number of funding sources to support graduate students in the program.

At Berkeley, there are strong programs and excellent laboratory facilities related to finding, extracting and processing mineral resources. Faculty are involved with the importance of mineral resources, mining geology, mineral deposition, application of geophysics to mineral exploration, mining systems, rock mechanics, tunneling, fluid flow in rocks, geothermal resources, petroleum and natural gas engineering, enhanced oil recovery, mineral processing, coal processing, mineral resources of the sea, extractive and process metallurgy, and recycling of metals and waste materials.

Ocean Engineering. Ocean Engineering is the application of engineering techniques and technology to the marine environment. Some of the present areas of concern faced by the ocean engineer are demands for increased utilization of non-living marine resources such as petroleum, aggregates, and metallic minerals; the impact of large coastal populations creating potential marine pollution problems; increased trade with other nations, particularly in bulk cargos, requiring not only new surface ship design but also modern port facilities and advanced cargo handling techniques; in essence, all those human activities which utilize the ocean.

As Ocean Engineering incorporates a wide range of engineering disciplines, four departments participate in Berkeley’s Ocean Engineering Program: Civil Engineering, Mechanical Engineering, Chemical Engineering, and Naval Architecture.

Programs of interest to potential graduate ocean engineering students at Berkeley include air-sea interactions, coastal engineering, corrosion in sea water, desalination, marine and offshore construction, harbor design, marine geophysics, waste disposal, naval architecture, engineering properties of marine sediments, ocean mining and prospecting, oceanographic data analyses, marine sediment transport, ocean energy, oceanographic instrumentation, offshore platforms, marine and estuarine pollution control, oceanographic vehicles, and properties of engineering materials in sea water.

Research is conducted chiefly in the various laboratories on the Berkeley campus and at the Richmond Field Station as well as at satellite laboratories such as the Bodega Marine Laboratory. Oceanographic research vessels and ship time are available locally through working arrangements with the California Maritime Academy and in San Diego for world-wide operations through the University’s marine facilities at the Scripps Institution of Oceanography.

Student support is administered directly by the four participating departments. A variable and limited number of graduate traineeships are available through the University’s Sea Grant Program. Urban and Public Systems. The program in Urban and Public Systems in the College of Engineering is intended to prepare engineers to assume a more effective role in improving our urban society.

The nature, arrangement and functioning of an urban complex derive from technological opportunities, together with social, economic and political forces, both public and private. The interactions among the many factors involved in the urban complex; housing, land use patterns, transportation, communication, municipal services, social programs, taxation practices, the legal system and government structure, need to be better understood. Urban facilities and services must be planned and provided so that they contribute positively to the overall welfare; and “specialists” must become not only increasingly more competent in their own fields but also more aware of the interactions their areas of expertise have with others.

Berkeley’s program in Urban and Public Systems offers a broadly based educational preparation for students who intend to follow professional careers involving the planning and design of public systems in the urban setting.

The program comprises in-depth quantitative study in a technological area of a student’s interest, together with a flexibly arranged set of studies relating to the physical, economic, social and institutional environments within which an urban system must function. A two-year, professional Master of Engineering degree program requires a minimum of 66 units.

Emphasis is placed on the processes of problem-solving and decision-making where interacting subsystems of the urban region are involved. To this end, the program includes coursework in other disciplines and a multidisciplinary, student-group, project-design course.

Electrical Engineering

LOWER DIVISION COURSES

1. Applications of Nuclear Energy. (4) Three hours of lecture and 1 hour of discussion per week. Prerequisite: none. Not open to students majoring in engineering. Radioactivity and nuclear reactions; applications of radioisotopes in medicine and industry; radiations and dosimetry; reactor principles; licensing and effluent release in power reactors; non-military applications of nuclear explosives; controlled fusion research; particle accelerators; nuclear energy in the future. (Sp)

17. Introduction to Electronics. (4) Three hours of lecture and two hours of recitation per week. Prerequisite: one year of high school physics. Elementary electronic blocks used in analog and digital systems. Applications of analog and digital electronic circuits.

17-I. Introduction to Electronics (Self-paced). (4) Formerly 17.5. Two hours of lecture per week. Prerequisite: Physics 5C. An introductory course in the principles of electronic circuits and systems. Circuit fundamentals, passive and active devices, electronic devices, active circuits and system building blocks. Analysis of the important internal and external characteristics of electronic blocks used in analog and digital systems.

15. Engineering Graphics. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: Mathematics 1A—may be taken concurrently. Importance of graphical presentation in engineering. Free-hand sketching in preliminary design. Fundamentals of orthographic projection with applications to three-dimensional design and presentation of data and the results of engineering calculations. Graphical mathematics and empirical equations. Mr. Stiedel, Mr. Cunningham, Mr. Radcliff, Mr. Laitone (F, Sp)

36. Engineering Mechanics I. (3) Three hours of lecture per week. Prerequisite: Physics 5A, Mathematics 1C. A vectorial treatment of the principles of statics of forces, and rigid bodies in equilibrium. Stress and strain, stress and strain relations, problem of equilibrium of two-dimensional and three-dimensional systems. Work and potential energy, the principle of virtual work, stability of equilibrium. Mr. Corsos, Mr. Frisch, Mr. Schauf, Mr. Rosenberg, Mr. Domfield (F, W, Sp)

44. Mineral Resources Engineering. (3) Three hours of lecture per week. Prerequisite: Physics 5A, Chemistry 1A, Mathematics 1A, or equivalent. The mineral resources available in the United States and world-wide for the production of engineering materials (metals, ceramics, etc.) and energy. Exploration for such resources. Existing and proposed industrial processes for conversion of such resources to engineering materials and energy. Mr. Evans, Mr. Morrison, Mr. Holdren (Sp)

55. Properties of Materials. (4) Three hours of lecture and three hours of discussion per week. Prerequisite: Physics 5A. Applications of basic principles of physics and chemistry to the selection and use of engineering materials. Stress and strain analysis, emphasis on mechanical behavior of metals, concrete, and ceramics and upon the electrical properties of semiconducting materials. Mr. Pirtz, Mr. Williamson, Mr. Mehta (F, W, Sp)

47. Supplementary Work in Lower Division Engineering. (1—3) Prerequisite: limited to students who have not completed a lower division course. May be taken only with permission of the Dean of the College of Engineering. Students with partial credit in a lower division engineering course may complete the work under this heading. May be repeated for credit. Mr. Pritz (F, W, Sp)

UPPER DIVISION COURSES

100. Materials and Methods Used in Manufacturing. (3) Three 1-hour lectures per week. Prerequisite: open to students in Engineering. Introductory study of the materials and processes of importance in contemporary technology, with demonstration of basic processes such as machining, forming, casting, welding, etc. Mr. Pickus (F)

105. Introduction to Operations Research. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: Math 1C. Not open to students majoring in Industrial Engineering Research. General introduction to the models and techniques of operations research as they pertain to engineering system problems. Examples will be drawn from the various engineering disciplines to illustrate techniques, models, and optimization of engineering systems. Mr. Telford (F, W, Sp)

115. Methods of Linear Algebra. (3) Three hours of lecture per week. Prerequisite: Mathematics 41 or 51A. Review of matrix algebra. Formulation of problems in engineering and mathematical sciences. Cartan- minors and their applications to physical problems. (W)

116. Application of Complex Variables. (3) Three hours of lecture per week. Prerequisite: Mathematics 51C. Methods of theoretical engineering analysis; application of complex variable theory to the design and analysis of engineering systems. (F) Mr. Laitone

117. Methods of Engineering Analysis. (3) Three hours of lecture and two hours of recitation per week. Prerequisite: Mathematics 51C. Methods of theoretical engineering analysis; techniques for analyzing partial differential equations and the solution of special functional equations in engineering systems. Mr. Holt, Mr. Schauf (F, Sp)

118. Application of Numerical Methods to Engineering Problems. (3) Three hours of lecture per week. Prerequisite: Mathematics 51C. Application of digital computers to solution of engineering problems. Solution, by compiler languages, of linear systems. Mr. Tanaka (F, W, Sp)

NOTE: For key to symbols, see page 36.
algebraic equations, roots of polynomials, interpolating polynomials, ordinary differential equations, error analysis. Digital computer time available for course work.


147. Supplementary Work in Upper Division Engineering. (1-3) Prerequisites: limited to students who must meet the requirements in an upper division engineering course. May be taken only with permission of the Dean of the College of Engineering. Students with partial credit in an upper division engineering course may complete the work under this heading. (May be repeated for credit.) Mr. Pritz, Mr. W. Sp

150. Environmental Engineering: Air Pollution. (3) Three 1-hour lectures per week. Prerequisite: course 15, Chemistry 1B, Physics 5, Math 5 and 1C. An introduction to the technology of air pollution dealing with air pollutants, effects, sources, abatement processes, physical, chemical, and biological processes. Mr. Oppenheim, Mr. Thomas (F, Sp)

151. Environmental Engineering: Water Pollution Control. (3) Three 1-hour lectures per week. Prerequisite: course 15, Chemistry 1B, Mathematics 5, Physics 5, and 1C. An overview of the environmental problems and technical solutions as they relate to the surface, ground, and marine waters. Consideration is given to water conditioning and to the nature, treatment, and environmental efforts of pollution and industrial wastewater. Mr. Pearson, Mr. Scherer (F, W)

152. Environmental Engineering: Solid Waste Management. (3) Three hours of lecture per week. Prerequisite: completion of course 10. Introduction to the practice and issues of solid waste management. Technology of collection, treatment, disposal, and application. Aplication of systems analysis to the design of institutional, legal, social, and environmental aspects. Case studies. Mr. Hurbut (Sp)

160. Energy and Power. (4) Four hours of lecture per week. Prerequisite: Physics 52, Math 5 and 5C or equivalent. Sources, conversions, transmission, and requirements for energy in human society, concentrating on electric power. Principles of nuclear fission and fusion, and hydroelectric power generation. Geothermal, tidal, and solar power. Direct energy conversion, geological and social problems. Mr. White, Mr. Oppenheim, Mr. Schrock (W)


GRADUATE COURSES

200. Applied Geophysics. (4) Three hours of lecture per week and four afternoon field trips. Prerequisite: graduate or upper division standing in a technical field. Geophysical methods applied to mineral exploration, geological engineering, geological mapping and ground water hydrology. Seismic reflection and refraction, resistivity, magnetic, gravity, and electromagnetic surveying. Approximately two weeks and one field exercise will be devoted to each method. Mr. Morrison (F)

201. Ocean Engineering Seminar. (2) One and one-half hours of lecture per week. Prerequisite: enrollment in Ocean Engineering M. Eng. program and permission of instructor. May be repeated for credit. An integrated series of lectures on selected subjects in Ocean Engineering by faculty members and invited guest lecturers designed to present the newest developments in their respective specialty field of Ocean Engineering, followed by discussion in depth. Students will be required to develop a 20-page term paper based either on one of the aspects covered in existing courses, or on the integration of all the aspects concerning a specific problem. Mr. Weitzel, Mr. Wiegell (W, Sp)

230A–230B. Engineering Analysis. (4–6) Three hours of lecture and one hour of discussion per week. Prerequisite: Mathematics 51C. Methods of theoretical analysis of typical engineering phenomena. Development of complex variable theory, orthogonal expansions and special functions to solve partial differential equations arising in engineering. Mr. Geiringer, Mr. Pauling; 230B: Mr. Schaal, Mr. Berger (F), Mr. McNiven (Sp); 230B: Mr. Schaal (W)

230C. Engineering Analysis. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 230A. Theoretical analysis of typical engineering systems by means of linear operators, linear integral equations, finite difference methods, perturbation methods, and asymptotic expansions. Mr. Berger (Sp)

230E. Engineering Analysis. (3) Three 1-hour lectures per week. Prerequisite: course 230A or Mathematics 165 or Electrical Engineering and Computer Sciences 119 or Mechanical Engineering 117 or equivalent. The principal purpose of the course is to acquaint students with the use of the Fourier transform. Emphasis is placed on two-dimensional transforms applied to problems of sampling, radiation, arrays and optics. Mr. Hankel. Fourier techniques are also developed and applied to linear systems under discussions. The Staff (F)

272. Application of Digital Computing Methods to Engineering Problems. (3) Three hours of lecture per week. Prerequisite: knowledge of Fortran (or Algol) and an introductory course in basic numerical methods (e.g., Engineering 118). Application of numerically exact techniques to the numerical solutions of partial differential equations with special emphasis on equations related to engineering systems, e.g., vibration studies, trajectories, aerodynamics, heat flow, elasticity; error analysis; stability of numerical methods. Mr. Willis (Sp)

298. Group Studies or Seminars. (1-8) Advanced group studies or seminars in subjects which are interdisciplinary in the various fields of engineering or other sciences. Associate in Engineering, undergraduates. Prerequisites and Top forms which the basis of seminars will be announced at the beginning of each semester. Mr. Pask (F, W, Sp)

299. Individual Research. (1-12) Prerequisite: graduate standing. Research or investigation in selected advanced subjects. Mr. Godden (F, W, Sp)

IDS 1. Technology and Society. (4) See Interdepartmental Studies for the complete description of this course.

IDS 111. Introduction to Neurobiology. (3) See Interdepartmental Studies for the complete description of this course.

IDS 180. Economic and Biological Feedback Systems. (3) See Interdepartmental Studies for the complete description of this course.

Civil Engineering

LOWER DIVISION COURSES

10. Engineering Survey Measurements. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: course 10; 118 or an introductory course in surveying (may be taken concurrently). Standards, units, calibration; measurement of distance, elevation, angles; systematic and random errors; determination and adjustment of measurements; weighting, principles of least squares, directions; traverse computations; horizontal and vertical control. Mr. Whipple, Mr. W. Sp

21. Plane Surveying. (4) Two 1 1/2-hour lectures and one 3-hour laboratory per week. Prerequisite: Trigonometry. Not open to students in engineering. Prerequisites: courses 1A, 1B, 1C, 1D, 1E, 1F, 1G. Analysis of problems of traverse, level, and problems in traverse; computer assembly, error analysis, preliminary and location surveys; computation of earthwork and related quantities; field work. Mr. Holt (F, W, Sp)

101. Elementary Photogrammetry. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: course 10. Simple, compound, reverse, and transition horizontal surveys; vertical contours; reconnaissance, preliminary, and location surveys; computations of earthwork and related quantities; field work. Mr. Arons, Mr. Moffitt (W)

102. Route Surveying. (4) Two 1 1/2-hour lectures and one 3-hour laboratory per week. Prerequisite: course 10. Simple, compound, reverse, and transition horizontal surveys; vertical contours; reconnaissance, preliminary, and location surveys; computations of earthwork and related quantities; field work. Mr. Arons, Mr. Moffitt (W)

105. Higher Surveying and Geodesy. (3) Three hours of lecture per week. Prerequisite: course 100. Methods of geodetic surveying; geodetic triangulation; triangulation, geometry of spheroid; computation of geodetic position; figure of the earth; gravity observations; geodetic leveling. Mr. Moffitt (W)

107. Airphoto Analysis and Interpretation. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: senior standing in engineering or geology. Principles of photo reading, analysis, and interpretation of aerial photographs of natural and man-made systems and structures, selection of materials for engineering construction. Mr. Anderson (W)

110. Properties of Structural Materials. (3) Two 1-hour lectures and one 2-hour laboratory per week. Prerequisite: Engineering 45 and an introductory course in chemistry may be taken concurrently. Properties of structural materials, such as cements, concrete, wood, plastics and structural steel. Experiments for determining behavior under simple conditions. Mr. Pritz, Mr. Mehta, Mr. Williamson (F, W, Sp)

111. Character of Structural Materials. (3) Three hours of lecture and three hours of laboratory per week. Prerequisite: 110 or equivalent. Principles relating internal structure to physical, chemical, and mechanical properties. Properties of associated structural materials such as hydraulic cements, concrete aggregates, soils, structural steel and aluminum alloys, wood and polymers. Mr. Butts, Mr. Williamson (Sp)

112. Aggregates for Civil Engineering Construction. (3) Two hours of lecture and three hours of laboratory per week. Prerequisite: course 110 or an introductory course in geology. Examination of rocks for both natural and synthetic aggregates needed for civil engineering construction. Properties of aggregates in Portland cement concrete, and desirable properties of properly proportioned Portland cement concrete. Special emphasis on siliceous aggregate, limestone, dolomite, and expanded shales. Mr. Matthews (F, W, Sp)

113. Concrete and Concrete Materials. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisite: course 110 (may be taken concurrently). Composition and properties of Portland cement concrete and concrete materials. Proportioning of concrete mixes. Laboratory experiments on properties of cements, aggregates and concretes, and evaluation of strength, durability and shrinkage characteristics. Mr. Polivka (W)

114. Soil Properties and Their Engineering Application. (2) One 1-hour lecture and a 4-hour laboratory per week. Prerequisite: course 121. Selected lectures and experiments on physical and mechanical properties of soils and their problems. Preparation of engineering reports on the results. Mr. Houston, Mr. Lymar (F, W)

115. Asphalt and Asphalt Mixtures. (2) One 1-hour lecture and one 2-hour laboratory per week. Prerequisite: senior standing in civil engineering. Properties of asphalt, aggregates and their combinations; principles and practices of paving construction, and control of asphalt mixtures; laboratory tests for asphaltic aggregates and mixture design including specifications for preparation and stability of asphalt roads; evaluation. Mr. Monismith (F)

118. Engineering Geology. (3) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: courses 1 and 101. Laboratory study and rock types; principles of physical and structural behavior; influence of geological features on engineering works. Field trip. Mr. Brekke (F, Sp)

119. Introduction to Geotechnical Engineering. (3)
Two hours of lecture and one 3-hour laboratory per week. Prerequisite: course 118 or an introductory course in geology. Geological and anthropological exploration of rock masses for civil engineering structures; application of geological data in engineering of underground openings, and dams, and resistance of rock masses to earthfractures. Mr. Brekke (W).

120. Introduction to Rock Mechanics. (3) Three hours of lecture per week and several demonstrations. Prerequisite: CE 118, 121. The properties and behavior of rock masses, including rock strength, jointing, deformation, and stress, and deformation of intact and jointed rock masses. Analytical methods used in support of design and construction of underground and surface excavations in rock. Mr. Goodman (W).

121. Soil and Foundation Engineering. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: CE 100, 133, 166A (may be taken concurrently). Soil identification and classification. Physical and mechanical properties of soils. Bearing capacity of soils and lateral earth pressures on structures. Site investigations, design of substructures, construction problems in foundation engineering. Mr. Mahin, Mr. Raphael (F, W, Sp).

122. Soil Mechanics and Foundation Design. (3) Three 1-hour lectures per week. Prerequisite: course 121. Principles of foundation design; ultimate bearing capacity and settlement of footings, design of piles, and their applications in predicting the settlement of structures; allowable Bearing pressures; methods of minimizing settlement of foundation structures; load distribution on subsoils and pressures on walls. Mr. Lysem, Mr. Seed (F, Sp).

126. Structural Design in Timber. (3) Three hours of lecture per week. Prerequisite: course 131 or equivalent. Characteristics and properties of wood as a structural material; design and construction of structural systems and components of entire structures of wood. Topics include working designs, stress and detail of plain and glulam beams, columns, connections and framing systems. Mr. Mahin, Mr. Raphael (Sp).

128A. Structural Systems I. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: Architecture 120. Shear and moment diagrams, stress distributions in beams; stress and buckling behavior of columns. Design of beams and columns in timber and concrete. The Staff (F, W).

128B. Structural Systems II. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: course 128A. Analysis and design of multistory frame buildings. Application of methods for proportioning building systems. Building response to horizontal and vertical loading. Special problems in design of high-rise buildings. Mr. Heister (W).

128C. Structural Systems III. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: course 128B. Analysis and design of long-span systems. Emphasis on design methods for specific elements of frame, arch, cable, and shell systems. The Staff (F, W).

129. Introduction to Industrialized Building Systems. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: course 133. Selection, design, production, and construction of industrialized building systems. The Staff (Mr. Chopra, Mr. Scordelis (F, W, Sp).)

130A. Mechanics of Materials I. (4) Four and 1/2 hours of lecture per week. Prerequisite: Engineering 36. Elastic and ultimate resistance of materials; stress analysis for beams, slabs, arches, columns; analyses for bars; stresses; combined stresses; columns; elements of design for wood and metal members. Mr. Pister (F, W, Sp).

130B. Mechanics of Material II. (4) Four and 1/2 hours of lecture per week. Prerequisite: CE 130A. Mechanics of thin-walled structures for box girder, aircraft and ship structures. Stress deformation and stability analyses, torsion and bending, buckling and post buckling strengths of columns, plates, and shells; analysis of sandwich components; thermal stresses, thermal buckling. Mr. Kelly, Mr. Sackman, Mr. Taylor (W, Sp).

131. Introduction to Structural Analysis. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisite: course 130A. Analysis of statically determinate and indeterminate structures using matrices. Kinematics, virtual work, strain energy, force and displacement methods and moment distribution. Mr. Penzen, Mr. Scortelles (F, W, Sp).

132. Introduction to Dynamics of Structures and Earthquake Engineering (3) Two 1/2-hour lectures per week. Prerequisite: courses 131 and Mechanical Engineering 104A. Analysis of response of structures to seismic excitation; foundation motion due to earthquakes. Mr. Chopra, Mr. Penzen (Sp).

133. Theory of Reinforced Concrete Design. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: course 131 and 110 (both may be taken concurrently). Analysis of working stress design and ultimate strength design. Analysis and design of reinforced concrete elements including beams, columns, slabs, and footings. Mr. Raphael (F, W, Sp).

134. Elements of Metal Structures. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: course 131. Introduction to design of metal structural members and connections. Mr. Raphael, Mr. Bresler (Sp).

135. Reinforced Concrete and Prestressed Concrete Design. (4) Three 2-hour lectures and one 3-hour laboratory per week. Prerequisite: CE 131, 133. Advanced topics in the design of structural systems in reinforced concrete and prestressed concrete. The design of typical floor systems in reinforced concrete and prestressed concrete. Mr. Raphael (W).

136. Advanced Structural Analysis. (3) Three hours of lecture per week. Prerequisite: course 131. Digital computer analysis of linear structural systems. Discussion of theoretical bases for computer programs. Application of several standard programs to a variety of structures including three-dimensional buildings. Verification of results. Mr. Wilson (F).

137. Synthesis and Design of Structural Systems. (4) Two 1/2-hour lectures and one 3-hour laboratory per week. Prerequisite: courses 133, 134. Planning and design aspects of structural systems; sources of stress and strain; design criteria; layouts of structural systems; optimization, formal and informal methods of analysis. Mr. Baron (W).

139. Introduction to Mechanics of Solids. (4) Three 1/2-hour lectures per week. Prerequisite: course 130 or Physics 105A. Stress-strain relations for elastic and inelastic materials; linear elastic fracture mechanics; thermal effects; solution of problems in elasticity and inelasticity. Mr. Sackman (Sp).

140. Water Resources Engineering. (4) Three hours of lecture and one hour of recitation per week. Prerequisite: course 131. Principles of hydrology; hydrologic systems; rivers and ground water; snowmelt, glaciers, and green water. The Staff (F).

141. Water Quality Management. (3) Three 1-hour lectures per week. Prerequisite: course 130. Chemical, physical, and biological aspects of water and wastewater treatment. Theory and design of water and wastewater treatment plants. Special water conditioning problems including taste and odor removal, desalination, and corrosion control. Water pollution control and its relation to process design. Mr. Lawrence and Staff (F, W).

142. Design of Water Quality Management Systems. (3) Three hours of lecture per week. Prerequisite: course 141 (may be taken concurrently). Lectures and discussions of the nature of engineering organization with emphasis on practice and concepts of systems, process, and functional design. Field trips and laboratory experiments relating to the application of design principles to typical units of water and waste water treatment systems. Mr. Lawrence (W).

143. Applied Ecology. (3) Two 1/2-hour lectures per week. An introduction to some aspects of ecology for those with little or no biological training. Effects of pollution on terrestrial and aquatic ecosystems. Mr. Home (F).

144. Environmental and Sanitary Engineering. (3) Three 1-hour lectures per week. Prerequisite: for engineering, science, and public health majors. Not open to civil engineering students. The biochemical cycles of carbon, nitrogen, sulfur, and phosphorus; sewage treatment. Mr. Hopkins (F).

145. Chemical Engineering of Water and Waste Water. (3) Three 1-hour lectures per week. Prerequisite: Chemistry 1B. A consideration of the chemical components of water as a factor determining the quality of waste waters. Nomenclature and reactions of pertinent organic and inorganic compounds; special topics such as biochemical degradations and cycles, pesticide pollution, detergent pollution, and air pollution. Mr. Thomas (W).

146A. Elementary Fluid Mechanics. (3) Three 1-hour lectures per week. Prerequisite: Mechanical Engineering 104A (may be taken concurrently). Principles of mechanics applied to the statics and dynamics of incompressible fluids. Mr. Polivka (F).

146B. Elementary Fluid Mechanics for Civil Engineers. (3) Two 1-hour lectures and one 1-hour laboratory per week. Prerequisite: course 165B. Principles of fluid mechanics applied to open channel flows, fluid measurements, unsteady flow, and forces on submerged objects. Principles are illustrated by laboratory experiments conducted by the student. Mr. Selleck (W).

146C. Open Channel Hydraulics. (3) Three 1-hour lectures per week. Prerequisite: course 165B. Steady flow of friction formulas, nonuniform flow, model laws for distorted models, elements of sediment transport, surges in open channels. Mr. Harder (F).

146D. Hydrology. (3) Three 1-hour lectures per week. Prerequisite: course 165B. Principles of hydraulics, distribution of water, and application of hydraulics to engineering problems in waterways, irrigation, and drainage systems. Mr. Todd (W).

146E. Design of Hydraulic Structures. (3) Three hours of lecture and three hours of laboratory per week. Prerequisite: course 166. Design of small hydraulic structures; friction elements, control and transition structures. Use of hydraulic models as an aid in design. Mr. Fischer (Sp).

170. Introduction to Transportation Engineering. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: course 10 or equivalent. Objectives, characteristics, policy, economics, location, design, and operation of transportation systems. The Staff (F, W, Sp).

171. Introduction to Traffic Engineering. (4) Three hours of lecture and three 1-hour laboratory per week. Prerequisite: course 170. Street and highway traffic problems; principles of design of thoroughfares on the basis of operational characteristics; traffic regulation and control. Mr. Homburger (Sp).

173. Highway Design and Construction. (4) Three hours of lecture and three 1-hour laboratory per week. Prerequisite: course 171. Design, drainage, and construction of highways and streets including intersections, interchange, and pavement design. Mr. Monismith (Sp).

180. Concrete Construction. (3) Two and 1/2-hour lectures per week. Prerequisite: CE 110 (or equivalent). Consideration of use of concrete in construction; technical requirements; selection of materials; control of quality; types of concrete, concretes used for construction of buildings, highways, airports, bridges, dams and hydraulic structures. Mr. Polivka (F).

NOTE: For key to symbols, see page 38.
181. Engineering Construction. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisite: course 146 or equivalent. Emphasis is on the design and construction of modern building and highway facilities. Students will be evaluated on their ability to work in teams and solve problems related to the construction industry. Prerequisite: consent of instructor. Projects, distribution, min- 
182. Polymers in Construction. (3) Three 1-hour lectures and two 1-hour laboratory sessions per week. Prerequisite: course 145 or equivalent. Introduction to the properties and applications of polymers in construction, including adhesives, sealants, and coatings. Students will be evaluated on their ability to understand the chemical and physical principles underlying the performance of polymers in construction. Prerequisite: consent of instructor. Theory and application of water chemistry, spectrometric methods, and problem solving in water treatment. Experiments on redox potential measurements, corrosion control, and methods of analysis for water quality. Mr. Pearson, Mr. Thomas (F).

183. Aquatic Chemistry. (3) Three hours of lecture per week. Six to eight hours of laboratory per quarter. Prerequisite: course 145, 146B or consent of instructor. The application of chemical and physical methods to the study of aquatic environments. Prerequisite: consent of instructor. The role of water in biological processes, including nutrient availability, photosynthesis, and oxygen transport. Mr. Pearson, Mr. Thomas (F).

184. Chemical Oceanology. (3) Three hours of lecture per week. Prerequisite: course 145 or equivalent. Consent of Instructor. Theory and application of water chemistry, spectrometric methods, and problem solving in water treatment. Experiments on redox potential measurements, corrosion control, and methods of analysis for water quality. Mr. Pearson, Mr. Thomas (F).

185. Advanced Sanitary Engineering Laboratory. (2) One 1-hour lecture and two 1-hour laboratory sessions per week. Prerequisite: course 145 or equivalent. Laboratory experiments on fluid flow, solid waste management, and water treatment processes. Prerequisite: consent of instructor. Theory and design of treatment processes for terminal waste treatment to reduce pollutant emissions to environment. Mr. Pearsall, Mr. Lawson (Sp).

186. Reaction Kinetics in Water Processing. (2) Two 1-hour lectures per week. Prerequisite: course 145 or equivalent. Theory and design of treatment processes for terminal waste treatment to reduce pollutant emissions to environment. Mr. Pearsall, Mr. Lawson (Sp).

187. Reaction Kinetics in Water Processing. (2) Two 1-hour lectures per week. Prerequisite: course 145 or equivalent. Theory and design of treatment processes for terminal waste treatment to reduce pollutant emissions to environment. Mr. Pearsall, Mr. Lawson (Sp).

188. Solid Waste Management. (2) Two 1-hour lectures per week. Prerequisite: course 145 or equivalent. Theory and design of treatment processes for terminal waste treatment to reduce pollutant emissions to environment. Mr. Pearsall, Mr. Lawson (Sp).

189. Chemical Oceanology. (3) Three hours of lecture per week. Prerequisite: course 145 or equivalent. Consent of Instructor. Theory and application of water chemistry, spectrometric methods, and problem solving in water treatment. Experiments on redox potential measurements, corrosion control, and methods of analysis for water quality. Mr. Pearson, Mr. Thomas (F).

190. Advanced Hydrodynamic Structures Laboratory. (2) Three 1-hour lectures and two 1-hour laboratory sessions per week. Prerequisite: course 145 or equivalent. Laboratory experiments on fluid flow, solid waste management, and water treatment processes. Prerequisite: consent of instructor. Theory and design of treatment processes for terminal waste treatment to reduce pollutant emissions to environment. Mr. Pearsall, Mr. Lawson (Sp).

191. Advanced Hydrodynamic Structures Laboratory. (2) Three 1-hour lectures and two 1-hour laboratory sessions per week. Prerequisite: course 145 or equivalent. Laboratory experiments on fluid flow, solid waste management, and water treatment processes. Prerequisite: consent of instructor. Theory and design of treatment processes for terminal waste treatment to reduce pollutant emissions to environment. Mr. Pearsall, Mr. Lawson (Sp).

192. Physical Oceanology. (3) Three hours of lecture per week. Prerequisite: course 145 or equivalent. Consent of Instructor. Theory and application of water chemistry, spectrometric methods, and problem solving in water treatment. Experiments on redox potential measurements, corrosion control, and methods of analysis for water quality. Mr. Scherer (F).
221. Advanced Structural Theory. (4) Three 1 1/2-hour lectures per week. Prerequisite: course 131. The application of continuous mathematics and mechanics to common structural design problems. The use of analog computers for the solution of nonlinear structural problems. Mr. Clough (W).

222. Model Analysis and Structural Behavior Laboratory. (3) Two hours of lecture and one three-hour laboratory per week. Prerequisite: graduate standing in engineering. Dimensional analysis and the theory of models. Prediction of static, dynamic, ultimate and thermal response of structures by true-scale and distorted models. The use of models in structural design. Laboratory and field studies of structural behavior: harmonic, seismic and ambient excitation, stress measurement. Mr. Godden (W) and Mr. Mihalczo (Sp).

224. Finite Element Analysis of Structural Systems. (3) Three hours of lecture per week. Prerequisite: course 290G and course 230A. Application of finite element methods to Civil Engineering problems; including stress analysis of two- and three-dimensional solids, plate bending, shells and deformation. Mr. Wilson, Mr. Taylor (Sp) and Mr. Bertolo (Sp).

225A. Dynamics of Structures. (3) Two 1 1/2-hour lectures per week. Analysis of stresses and deflections in structures due to the application of dynamic loads. Approximate and "exact" methods for determining the response of buildings, bridges, frames, to earthquake accelerations, wind gusts, moving loads, bomb blast, and other dynamic effects. Mr. Clough (G), Mr. T. Hunt (W), Mr. Bertolo (Sp), Mr. Pister, Mr. Kelly (F, Sp).

225B. Dynamics of Structures. (3) Two 1 1/2-hour lectures per week. Prerequisite: course 225A. Development of techniques for the analysis of continuous structures to dynamic loading. Mr. Penzenz (Sp).

226. Random Vibrations of Structural Systems. (4) Four and one-half hours of lecture per week. Prerequisite: course 225A or equivalent. Probability, density functions, one and several variables, Gaussian distributions, random walk concepts; random processes, correlation functions; development of statistical procedures for the analysis and design of structural systems; response of selection of structural materials and systems; reliability analysis and design. Mr. Penzenz, Mr. Chopra (F).

227. Structural Design for Dynamic Loads. (3) Two 1 1/2-hour lectures per week. Prerequisite: course 221A and course 225A. Design of structures subjected to wind, traffic, and machinery vibrations. Seismic resistant design; failure criteria and establishment of design earthquake spectra; selection of structural materials and systems; preliminary design of small and multistory buildings; reliability analysis and final design. Mr. Bertolo, Mr. Pister, Mr. Kelly (Sp).

228. Advanced Study of Cementitious Materials. (3) Three 1 1/2-hour lectures per week. Prerequisite: course 221A. Analysis of pozzolanic and hydraulic cement. The microstructure of hydrated cement paste and its influence on strength, shrinkage, and durability. Expansion controls, aluminous cements and special cements. Mr. Mehta (F).

230A. Advanced Mechanics of Materials. (4) Three 1 1/2-hour lectures per week. Prerequisite: course 130A. Constitutive equations for elastic and viscoelastic materials; uniqueness theorems for linear solids, correspondence principle; kinematics and thermodynamics of continua; plasticity and hardening plastic materials. Mr. McNiven, Mr. Sackman, Mr. Kelly (Sp).

230B. Advanced Mechanics of Materials. (4) Four and one-half hours of lecture per week. Prerequisite: course 230A. Two-dimensional problems including stress and strength of thick plates. Vibration and buckling of plates. Structural stability (equilibrium, energy, and dynamic methods, non-conservative problems). Mr. Kelly, Mr. Popov, Mr. Sackman (W).

230C. Advanced Mechanics of Materials. (4) Four and one-half hours of lecture per week. Prerequisite: course 230B. Elements of tensor analysis. Deformations and strains; stress-strain relations; constitutive theory for elastic and viscoelastic materials; uniqueness theorems for linear solids, correspondence principle; kinematics and thermodynamics of continua; plasticity and hardening plastic materials. Mr. McNiven, Mr. Sackman, Mr. Kelly (Sp).

**234. Analysis of Flight Structures. (3) Three 1-hour lectures per week.** Prerequisite: course 232B or ME 185. Study of the displacement equations of motion and the Helmholtz displacement potentials. Dilatational and rotational modes; wave propagation in solids; interaction of waves; reflection and dispersion due to boundaries. Rayleigh and Love Waves. Waves in granular and viscoelastic media. Mr. Wasowin (F).

**239. Mechanics of Nonlinear Solids. (4) Three 1 1/2-hour lectures per week.** Prerequisite: course 231 and Engineering 230A. Constitutive equation of plastic, viscoplastic, and nonlinear viscoelastic solids; relation to experiments. Perfectly plastic solids; behavior of beams, plates, shells; torsion; plane problems; limit analysis. Behavior of physically nonlinear solids. Dynamic problems; impulsive loading, wave propagation. Mr. Lubliner (W).

**240A–240B–240C. Mechanics of Solids (3–3–3).** Three hours of lecture per week. Prerequisite: any of courses 235, 236, 237, 238, 239 or ME 231–238. Elements of tensor analysis; deformation and stress balance equations; mechanical constitutive equations for solids; theoretical principles of propagation of discontinuity surfaces; solution of quasi-static and dynamic problems for structural materials and mechanisms. Mr. Popov, Mr. Pister, Mr. Lubliner, and Mr. Sackman. Three-quarter sequence beginning (F).


242. Analysis and Design of Structural Systems. (3) Three 1-hour lectures per week. Prerequisite: course 221. Structural analysis related to structural behavior and design. The interpretation of structural action for purposes of design. Sources of stress and participation strains and their relation to their relative importance; limits of kinds of loads, environmental conditions, and structural systems are considered. Mr. Popov, Mr. Pister, Mr. Kelly (Sp).

243A. Advanced Reinforced Concrete. (4) Three 1 1/2-hour lectures per week. Prerequisite: course 133 or equivalent. Behavior and design of reinforced concrete elements. Mechanical properties, hardening and cracking in reinforced concrete. Strength and deformation characteristics of reinforced concrete elements. Limit states, torsion, shear, moment and combined loadings. Failure criteria. Influence of load and environment history. Mr. Bresler, Mr. Popov, Mr. Main (F).

243B. Advanced Reinforced Concrete. (4) Three 1 1/2-hour lectures per week. Prerequisite: course 243A or equivalent. Limit state design of reinforced and prestressed concrete elements. Design for strength and ductility of ductile moment-resisting frames and frame-wall systems: first and second order theories. Design of slabs: recent advances in applications of actual line theory and strip method. Mr. Bertero (Sp).

244. Advanced Prestressed Concrete. (4) Three 1 1/2-hour lectures per week. Prerequisite: course 135 or equivalent. Behavior and design of prestressed concrete elements. Design of prestressed concrete elements and systems—continuous beams, frames, slabs, bridges, buildings, partial prestressed systems. Mr. Lin (W).

245. Design of Concrete Shells. (3) Three 1 1/2-hour lectures per week. Prerequisite: course 134. Topics in advanced steel design with emphasis on connections, considering strength, stiffness and fatigue; long-span bridge designs; analysis of orthotropic bridge decks; stability, particularly plate girders; offshore structures; design, fabrication, analysis of welded tubular connections, considering fatigue, crack developments, fracture mechanics. Mr. Bovkamp (Sp).

247. Analysis and Design of Concrete Dams. (4) Three 1 1/2-hour lectures per week. Prerequisite: course 140. Selection of location and type; stability analysis, stress analyses of gravity, cantilever, buttress dams; problems imposed by construction conditions and use of mass concrete. Mr. Raphael (Sp).

248A. Inelastic Design of Structures. (3) Two 1 1/2-hour lectures per week. Prerequisite: course 220A; course 230A is desirable. Inelastic behavior. Limit states design: serviceability and ultimate states. Limit analysis and limit design: second order theories. Structures subjected to proportional excitations: design for strength, minimum weight, estimation of deformations; design for ductility; effects of generalized excitations: shaking theories. Mr. Bertero (W).

248B. Inelastic Design of Structures. (4) Four hours of lecture per week. Prerequisite: course 230A. Inelastic analysis and design of members subjected to combined stresses due to bending, shear and axial forces, combined bending and torsion, local actions. Design of connections. Design for strength (arches, grids, plates, shells and multistory frames). Design for ductilities, and capacity investigations. Mr. Bertero (F).

249. Advanced Concrete Technology. (3) Two 1 1/2-hour lectures per week. Prerequisite: course 110 or equivalent. Advanced topics in concrete technology, including concrete technology, modeling, and testing of concrete. Environmental effects; durability of concrete subject to chemical attack; composition and properties of special concretes such as lightweight, heavyweight, fiber-reinforced, polymer and expansive cement concretes. Mr. Polivka (Sp).

250. Transportation Policy and Administration. (3) Three 1 1/2-hour lectures per week. Prerequisite: graduate standing in engineering. Analysis of transportation demand and supply in contemporary economic, social, political, and legal settings. Comparative analysis of transportation modes. Transportation planning and policy as instruments of social and environmental guidance. Problems and processes of administering activities unique to transportation. Mr. Zettel (F, W).

251. Traffic Stream Characteristics. (3) Three hours of lecture per week. Prerequisite: graduate standing in engineering. An introduction to traffic characteristics and flow analysis for planning design and operations of streets and highways. Stream characteristics, capacity analysis, headways and headways, flow analysis includes flow interrelationships, headway distributions, traffic performance at intersections, etc. Mr. May (F).

252. Systems Analysis in Transportation. (3) Two 1 1/2-hour lectures per week. Prerequisite: graduate standing in engineering or related fields. A discussion of the tools of systems analysis and their application to transportation engineering and planning problems. Survey of systems analysis techniques with emphasis on transportation systems and models. Emphasis on formulation and decision analysis techniques. Application of systems analysis techniques to selected transportation problems. Mr. Kanafani (F).

253. Transportation Engineering. (4) Four hours of lecture per week. Prerequisite: graduate standing or consent of instructor. Technological characteristics of...
260A. Air Transport Engineering. (3) Three hours of lecture per week. Prerequisite: graduate standing or consent of instructor. Nature of civil aviation; aircraft characteristics and performance related to planning of terminal facilities. Air traffic control and navigation systems related to planning terminal facilities. Factors to be considered in selection of airport sites. Mr. Kanafani (W)

260B. Air Transport Engineering. (3) Three hours of lecture per week. Prerequisite: consent of instructor. Planning of the airport complex; factors affecting airport capacity; models for analysis of airport capacity; geometric design of runways and taxiways. Analysis of facilities for passengers and cargo; noise and noise control. Mr. Kanafani (Sp)

261. Feasibility Analysis of Transportation Systems. (3) Three hours of lecture per week. Prerequisite: graduate standing or consent of instructor. Objectives and criteria for choice of transportation investments. Problems of estimating benefits and costs; treatment of intangibles and uncertainty; selection of discount rates. Transportation investment planning in developing economies. Mr. Zefel (Sp)

262. Simulation of Transportation Systems. (3) Three hours of lecture per week. Prerequisite: graduate standing or consent of instructor. Development of computer simulation models for the analysis of the performance of complex, multivariable, time-dependent transportation systems, with application to surface and air systems. Mr. May (Sp)

263. Highway Traffic Control. (3) Three hours of lecture per week. Prerequisites: courses 251 and 257. Capacity and delay at isolated fixed-cycle and vehicle-actuated traffic signals. Traffic signal synchronization for single highways. Network control of urban streets, ramp control of freeways, route control. Mr. May, Mr. Newell (Sp)

264. Traffic Flow on Transportation Networks. (3) Three hours of lecture per week. Prerequisite: graduate standing or consent of instructor. Elementary theory of transportation networks. Shortest route, minimum network cost, and equilibrium models. Application to trip distribution and traffic assignments. Mr. Newell (Sp)

265. Pavement Design. (4) Two 2-hour lectures per week. Prerequisite: course 121, 133, 134. Theories, principles, and techniques in the structural design and construction of highways and airport pavements. Emphasis on flexible pavements, accelerated traffic loading tests, and the design of asphaltic mixtures. Mr. Monismith (F)

266A. Construction Scheduling and Resource Allocation. (3) Three hours of lecture per week. Planning, scheduling, and allocation of resources for construction projects. Critical Path Method. Networks diagramming and calculation; consideration for allocating constrained resources; and variation of schedules to optimize costs. Computer and non-computer solutions will be presented. Mr. Crandall (W)

266B. Construction Organization and Management. (3) Three hours of lecture per week. An introduction into business aspects of construction management including organization and financial concerns during early stages of project; design and construction operations. Topics include: legal, financial, labor relations, accounting practices as they affect decision making in the construction industry. Mr. Crandall (W)

266C. Marketing of Construction and Engineering Services. (3) Three hours of lecture per week. Business development for contractors, engineers, and the engineering-constructor-manager. Selection and analysis of markets; preparation of bidding strategy, change orders, contractual terms, and negotiations. Marketing of engineering, architectural, and construction ideas in letters, conferences, and personal calls. Mr. Gerwick (F)

266D. Management of International Construction and Engineering Projects. (3) Three hours of lecture per week. Prerequisite: course 181 or 194. Organization and management of major projects in international and multi-national environments. Planning, investigation, procurement, logistics, construction geography, personnel, relations with host area and government, environmental and social considerations, financing, special engineering and management controls. Construction under adverse climatic conditions including desert, tropical, mountain, and Arctic regions. Mr. Gerwick (W)

266E. Applications of Operation Research to Construction Management. (2) Two hours of lecture per week. Prerequisite: course 181. Analysis of risk relating to bid strategy, optimization of scheduling costs, aggregate and borrow optimization and decision theory. Relevant problems from the construction industry will be reviewed. Mr. Homburger (W)

266G. Construction Quality Assurance. (3) Three hours of lecture per week. Methods and considerations associated with construction quality assurance programs. Types of Quality Control. Mr. Crandall (Sp)

267A. Advanced Foundation Construction. (3) Three hours of lecture per week. Prerequisite: course 133 or 134, and 212. Evaluation of soil and structural problems connected with construction. Foundation problems connected with construction for major high-rise buildings and subways. Integration of engineering, cost, scheduling, political, environmental, and management factors; application to current major projects in urban environments. Mr. Gerwick (F)

267B. Advanced Concrete Construction. (3) Three hours of lecture per week. Prerequisite: course 155 and 156. Selection and evaluation of construction methods and planning for pre- and post-tensioned concrete, lightweight, high strength, and architectural concrete, precast and segmental construction. Application to bridges, buildings, pressure vessels, pollution control structures, ocean structures, and cryogenic containers. Mr. Hester (Sp)

267C. Construction of Harbor, Coastal, and Ocean Structures. (4) Four hours of lecture per week. Prerequisite: course 212, 133, 134. Construction methods and equipment for construction of cofferdams, breakwaters, marine terminals, outfall sewers, power plant intakes and discharges, submarine oil and gas pipelines, dredging, ocean structures. Ocean structures sub-sea and deep ocean facilities. Mr. Gerwick (W)

267D. Advanced Construction Estimating. (3) Three hours of lecture per week. Prerequisite: course 118 and 114, or equivalent. Advanced theories of cost engineering including cost estimating and cost control of construction projects. Estimating especially for highway and airport pavements; emphasis is placed on physical properties of asphalts, aggregates and their combinations and the relationship of these properties to proper design and construction of pavements. Mr. Monismith (Sp)

270A. Advanced Soil Mechanics and Foundation Engineering. (3) Three hours of lecture per week. Prerequisite: course 121 and 114, or equivalent. Advanced theories of soil mechanics including consolidation, settlement analysis, stress distribution, and pressures, bearing capacity, and their application in foundation engineering. Mr. Seed (F)

270B. Advanced Soil Mechanics and Foundation Engineering. (3) Three hours of lecture per week. Prerequisite: course 121 and 114. Techniques in soil mechanics and design and installation of pile and pier foundations; analysis and design of pile, driven and cast-in-place, and jacketed piles. Mr. Mitchell (Sp)

270C. Advanced Soil Mechanics Laboratory. (3) One 1-hour lecture and two 2-hour laboratories per week. Prerequisite: course 270A. One-hour lecture and two 2-hour laboratories per week. Lectures and laboratory activities as in course 270A. Laboratory activities include soil property evaluation and design considerations associated with foundation system design. Slow and rapid loading tests, pavement design procedures, advanced instrumentation and measurement techniques. Mr. Hester (Sp)

271. Seepage Through Soils. (2) Two 1-hour lectures per week. Principles governing the flow of water through soils and their application in civil engineering. Mr. Duncan (W)

272. Soil and Site Improvement. (4) Four hours of lecture per week. Prerequisite: graduate standing. Soil engineering-constructor-manager. Selection and analysis of problems and interface among modes; forecasting and planning studies; techniques for evaluating alternative plans. Mr. Homburger (F)

254A. Transportation Demand Analysis and Forecasting. (3) Three hours of lecture per week. Prerequisite: graduate standing or consent of instructor. Analysis of transportation demand and forecasting techniques. Transportation demand theory applied to transportation services. Use of demand models for forecasting. Peaking problems, choice of mode, and efficient prices for transport service. Mr. Kanafani (W)

254B. Transportation Planning Applications. (3) Two hours of lecture and 3 hours of laboratory per week. Prerequisite: CE 254A or consent of instructor. The analysis of land use and traffic data to develop traffic models. The use of transportation demand models in urban transportation planning. The forecasting of demand, and the design and evaluation of multimodal transportation networks. Use of computers in transportation planning and analysis. Mr. Daganzo, Mr. Sullivan (Sp)

255. Traffic Engineering. (3) Three hours of lecture per week. Prerequisite: graduate standing or consent of instructor. Analysis of highway and vehicular characteristics as they affect highway traffic flow, traffic regulation, accident cause and prevention; techniques for facilitating and increasing flow on existing traffic systems; planning new traffic systems; parking and other terminal problems. Mr. May (W)

256. Transportation Optimization Techniques. (3) Two 1 1/2-hour lectures per week. Prerequisite: course 252 and 253 or equivalent. A course which discusses optimization techniques and computer programs as applied specifically to the solution of selected ground and air transportation problems. These problems include: terminal locations, facility design, stage improvement, movement control, passenger services and freight handling. Mr. May (W)

257. Applications of Queueing Theory to Transportation. (3) Three hours of lecture per week. Prerequisite: courses 1344 or 2604. Deterministic queueing models. Strategy for design and control for queueing systems with multiple services and/or several types of customers. Application to highway intersections, airport terminals, and traffic bottlenecks. Diffusion approximations to stochastic queues. Exact solution of simple stochastic queueing systems. Mr. Newell (Sp)

258. Mass Transit Engineering. (3) Three hours of lecture per week. Prerequisite: graduate standing or consent of instructor. Analysis and design of mass transit systems, their operation and design. Technology of transit vehicles and structures. Impact on urban land use. Public policy and financing problems. Mr. Homburger (W)
stabilization using compaction, lime, cement, asphalt, and soil additives; in foundations, embankments, dams, slopes, highways, and airfields; design and construction with stabilized soils; principles of pavement design; in-place soil treatment methods; development of marginal lands; solid waste utilization.

Mr. Mitchell (W)

**273. Soil Behavior.** (3) Three hours of lecture per week. Prerequisite: course 101 or equivalent laboratory/demonstration per week. Prerequisite: course 121 or consent of instructor. Clay mineralogy, soil formation and composition, properties of soil particles, physical processes in soils, soil water, fabric–property relationships, analysis of mechanical behavior in terms of physicochemical principles, compaction, strength and deformation, consolidation phenomena.

Mr. Mitchell (F)

**274. Introduction to Soil Dynamics.** (3) Two 1-hour lectures plus two 1 1/2-hour computational laboratory periods per week. Prerequisite: knowledge of FORTRAN programming. However, the students need not be experienced programmers. The simple damped oscillation problem is presented in detail. Results and exercises are presented in the classroom. Dynamic field and laboratory tests. Dynamic soil properties. Foundation vibrations. Numerical methods for dynamic analysis.

Mr. Lysmer (W)

**275. Soil Dynamics—Earthquake Engineering.** (3) Three 1-hour lectures and one 1 1/2-hour computational laboratory per week. Prerequisite: course 274 or equivalent knowledge of FORTRAN programming. Influence of soils on ground motion characteristics: computation of response using lumped mass, finite element, and eigenvalue analysis; causes of soil failure during earthquakes; soil liquefaction; soil settlement; soil structure interaction; lateral pressures during earthquakes. Problems. Mr. Seed (Sp)

**276. Earth Dams.** (2) Two 1-hour lectures per week. Prerequisite: course 271 and 270B or consent of instructor. Principles of earth dam design; types of failure; numerical methods of practical computer simulation in dam design and construction. Mr. Seed (Sp)

**277. Theoretical Soil Mechanics.** (4) Three 1 1/2-hours of lecture per week. Prerequisite: knowledge of FORTRAN programming. Graduate standing in geotechnical engineering. Theories and numerical methods for consolidation, subgrade reaction, and laterally loaded pile; limit analysis of finite element method. Limit analysis by the theory of perfect plasticity. (Five of the class periods will have the format of computational laboratories.)

Mr. Lyons (F)

**280A. Principles of Rock Mechanics.** (3) Three hours of lecture per week plus some laboratory demonstrations. Rock properties and behavior; theory of failure for brittle, discontinuous and anisotropic rocks. Determination of in-stress stresses; laboratory and field testing techniques. Mr. Goodman (W)

**280B. Applied Rock Mechanics.** (3) Three hours of lecture per week plus laboratory demonstrations. Faulting, rock mass behavior; fault healing; influence of weathering; dynamic behavior of rock masses. Prerequisite: course 280A. Methods of analysis including physical models, stereographic projection, and numerical analysis. Applications to analysis of surface excavations, foundations, and underground openings. Mr. Goodman (Sp)

**281. Engineering Geology.** (3) Two hours of lecture and three hours of laboratory per week. Prerequisite: consent of instructor. Principles of earth and rock mechanics; design and construction.

Mr. Brekke (F)

**282. Geological Engineering of Underground Openings.** (3) Three hours of lecture per week. Prerequisite: an introductory course in engineering geology, or consent of instructor. Geotechnical exploration for underground openings; methods of excavation, rock reinforcement, support and lining; stability of rock in hanging walls or other soil tunnels; monitoring instrumentation; large openings for special purposes; case histories. Field trip to tunneling sites.

Mr. Brekke (W)

**287A–287B. Analytic Photogrammetry.** (4–4) Three hours of lecture and one 3-hour laboratory per week. Prerequisites: course 101 or equivalent laboratory demonstration per week. Prerequisite: course 101 or equivalent. Design of components of first- and second-order stereoradiometric instruments; interior, relative, absolute orientation; map compilation; extension in first-order instruments; independent model extension; adjustment to ground control; analysis of systematic and random errors; failure to meet final project requirements. Mr. Mollot (F), Mr. Monismith (W)

**288. Adjustment Computations.** (4) Four-hour lecture per week. Prerequisite: course 10. Brief review of matrix algebra and computer programming. Introduction to problems of computer-aided derivation of the method of least squares adjustment with application to surveying and photogrammetry problems. Mr. Anderson (F)

**290A. Methods of Analysis of Structural Systems.** (4) Three 1 1/2-hours lectures per week. Prerequisite: course 130, Mechanical Engineering 104A. Introduction to analysis of equilibrium stability and vibration of simple and compound continuous systems (strings, cables, beams, columns) by means of matrix methods; equations of motion; natural frequency; Fouier series, and Fourier integrals. Mr. Taylor (F)

**290G. Applications of Digital Computers to Structural Problems.** (3) Three hours of lecture per week. Prerequisite: course 200A and a course in FORTRAN programming. Numerical methods and computer programming techniques for the static and dynamic analysis of structural systems. Solution of equations, step-by-step integration, eigenvalues and eigenvectors appropriate for solution of structural equilibrium equations are given. Application to the computer analysis of truss and frame structures. Mr. Wilson (W)

**290L. Water Resources Development.** (2) One 2-hour lecture per week. Prerequisite: graduate standing. The engineering, economic, legal, and political implications of major decisions in water resources development. Mr. Todd (Sp)

**290M. Limnology and Plant Ecology.** (3) Three hours of lecture and one three-hour laboratory per week. Prerequisite: course 220A. Theoretical and practical study of the physical/chemical dynamics of lake ecosystems with an examination of plankton physiology, Respiration, photosynthesis, eutrophication, and the relationships of aquatic examples of lakes and reservoirs throughout the world. Mr. Horne (Sp)

**290R. Current Topics in Geological Engineering.** (1, 2, or 3) One to three hours lecture per week. Prerequisite: consent of instructor. Detailed discussion of topics of particular interest or too recent to have been incorporated into regular courses. Content will change from year to year and course can be repeated.

Mr. Goodman, Mr. Brekke (F, W, Sp)

**290S. Transportation Planning.** (3) Three hours of lecture per week. Prerequisite: graduate standing. Concepts, methodologies, and techniques used in transportation planning; planning institutions.

Mr. Garrison (F)

**290T. Advanced Topics in Transportation Theory.** (2) Two hours of lecture per week. Prerequisite: consent of instructor. Selected topics in transportation or traffic engineering, such as network analysis, queueing, traffic control, or transportation planning.

Mr. Newell (F)

**290W. Design of Mass Transit Facilities.** (2) Two hours of lecture and one 2-hour laboratory per week. Design elements of rail transit systems and of fixed facilities for bus systems. Characteristics of rolling stock as they affect the design of stations and roadways. Mr. Homburger (Sp)

**290Z. Models Related to Air Transportation.** (2) Two hours of lecture per week. Prerequisite: consent of instructor. Strategies for scheduling landings and take-offs. Models for passenger and baggage movements in airport terminals. Current developments in air traffic control. Mr. Katrien (Sp)

**299. Individual Research.** (1–12) Prerequisite: graduate standing. Independent study with approval of instructor. May be taken on a satisfactory/unsatisfactory basis.

Mr. Monismith (F, W, Sp)

**299A. Individual Studies in Engineering.** (1–4) Individual study in consultation with the major field advisor. The student is expected to provide an opportunity for qualified graduate students to participate in the various examinations required of candidates for Ph.D. (and other doctoral degrees). May be taken for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

Mr. Monismith (W, F, Sp)

**IDS 211. Geological and Engineering Factors in Environmental Planning.** (4) See Interdepartmental Studies for the complete description of this course.

**IDS 224. Cooperative Research Workshop in Transportation Engineering.** (1–4) See Interdepartmental Studies for the complete description of the course.

---

**Electrical Engineering and Computer Sciences**

The names appearing below the course descriptions are those of faculty members in charge of the courses. For the names of instructors who will teach the courses, please refer to the Quarterly Schedule of Classes.

**LOWER DIVISION COURSES**

**900. Topics in Electrical Engineering and Computer Sciences.** (1) One hour of lecture per week. Prerequisite: consent of instructor. Enrollment preference will be given to freshmen entering electrical engineering and computer sciences and those entering "advising" courses. Offered on a pass/no pass basis. May be repeated twice for credit. Presentation of topics of interest to Electrical Engineering and Computer Sciences freshmen on the activities of professionals in this field.

The Staff (F, W, Sp)

**UPPER DIVISION COURSES**

**100A–100B. Electrical Circuits, Electronics, and Instrumentation.** (3–3) Two hours of lecture and one 3-hour laboratory per week. Prerequisite: Mathematics 1G, Physics 5C. (Students who have taken Engineering 17 should not take 100A.) Course 100A is prerequisite to 100B. This course is not for students in Electrical Engineering.

100A. Transient and steady-state analysis of circuits; network theorems; analogs and duality; introduction to electronic circuits; associated laboratory experiments.

100B. Electronic circuits and models; amplifiers, feedback, and oscillators; analog and digital instrumentation and systems; associated laboratory experiments.

104A–104B. Electric Circuits, (4–4) Three hours of lecture and 2 hours of discussion per week. Prerequisites: Mathematics 5A, Mathematics 5C; Physics 5C; course 104A is prerequisite to 104B.

104A. Network elements (including operational amplifiers) and equations. Response of simple circuits to arbitrary excitations. Simple nonlinear and time-varying circuits. Teller, Mr. Chua, Mr. Sangiovanni-Vincentelli (F, W, Sp)


Mr. Chua, Mr. Sangiovanni-Vincentelli (F, W, Sp)

105. Analog and Digital Electronic Circuits. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: Engineering 17. (Electrical Engineering and Computer Science 105L must be taken concurrently.) Introduction to analog and digital electronic circuits; bipolar transistor models; single-stage and cascaded amplifiers; the differential pair and integrated operational amplifiers; frequency response, feedback concepts; instability and frequency compensation; oscillators, sweep and timing circuits.

Mr. Gray, Mr. Meyr, Mr. Pederson (F, W, Sp)

105L. Electronic Circuits Lab. (1) One 3-hour laboratory per week. Prerequisite: course 105 (must be taken concurrently). An electronic circuits laboratory to accompany EECS 105. Bipolar transistor characteristics.

NOTE: For key to symbols, see page 38.
112. Electric Power Devices Laboratory. (2) One 4-hour laboratory per week. Prerequisite: course 104A (may be taken concurrently) and 112 (must be taken concurrently). Study of the basic principles and operation of electric transformers and energy conversion devices, including d.c. and a.c. motors and generators. Mr. Hopkin (F)

113. Solid-State Power Electronics. (3) Three hours of lecture and one 4-hour laboratory per term. Prerequisites: EESCS 104A, EESCS 105. Characteristics of power semiconductor devices, including diodes, transistors, and thyristors. Circuit characteristics with emphasis on thyristor circuits. Application to power control and conversion for utilities, transportation, and industrial systems. Mr. Whinnery (W)


115. Semiconductor Circuits Laboratory. (2) One 4-hour laboratory per week. Prerequisite: course 105. Experimental study of bipolar and field-effect transistors, Schottky diodes, and pin diodes with cascaded, low-pass amplifiers; feedback amplifiers; frequency selective amplifiers; harmonic and relaxation oscillators. Mr. Meyer, Mr. Pedersen (F, W, Sp)

116. Microwave Communication Systems. (2) Two 1 1/2 hours lectures per week. Prerequisite: course 117A. Systems concept, electromagnetic fields and power flow, microwave amplifiers and oscillators, principles of solid state microwave devices, antennas, propagation of radio waves, noise and specific microwave communication systems. Mr. Angelakos (Sp)

117A–117B–117C. Electromagnetic Fields and Waves. (4–4–4) Four hours lecture and one hour of recitation per week. Prerequisite: course 104A. Mathematics 51B, 51C. 117A is prerequisite to 117B, 117B is prerequisite to 117C. Transmission of information over communication systems. Vector potential of ideal sources of electric and magnetic waves in free space. Plane waves in uniform media. The relation of lumped circuits to field concepts. Static electric and magnetic fields. Magnetic fields of currents and steady potentials of electric fields, with applications to dielectrics and magnetic materials. Mr. Whinnery, Mr. White, Mr. Van Duzer (F, W, Sp)

119. Linear Systems Analysis. (4) Two 1 1/2 hours lectures and one 1-hour recitation per week. Prerequisite: course 104B. Analysis of linear electrical, mechanical and electromechanical systems. Description by differential equations and vector differential equations and analysis of system behavior. Concept of state, Fourier analysis of steady-state and transient behavior, stability of systems. Mr. Polak, Mr. Wong, Mr. Varaiya (F, W, Sp)

123. Circuit Theory and Design. (4) Three hours of lecture and two hours of recitation per week. Prerequisite: course 104B. Selected topics on network analysis, approximation, synthesis, and design. Passive and active filter design. Optimization and computer-aided design. Sensitivity and tolerance analysis. Mr. Chua, Mr. McFarland (F, Sp)

124. Spectral Analysis and Modulation. (5) Four 1-hour lectures and one 1-hour recitation per week. Prerequisites: Math 51A, 51C. Fourier analysis; Fourier series; Parseval's theorem; minimum-phase systems; bandpass systems; amplitude modulation, frequency and phase modulation; pulse modulation; data transmission techniques. Mr. Messerschmitt, Mr. Fair, Mr. Turin (F, W, Sp)


126A–126B. Feedback Control. (4–4) Three lectures and one 1-hour recitation per week. Prerequisite: course 119A and synthesis of linear feedback control systems. Mr. Bergen, Mr. Hopkin, Mr. Polak, Mr. Jury, Mr. Wu (F, W)

128A–128B. Feedback Control. (4–4) Three lectures and one 1-hour recitation per week. Prerequisite: course 119A. Analysis and synthesis of linear feedback control systems. Mr. Bergen, Mr. Hopkin, Mr. Polak, Mr. Jury, Mr. Wu (F, W)

130. Electronics of Solids. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: Physics 5E, Electrical Engineering 17, 45. Overview of solid state science. Energy band structure and conduction properties of semiconductors and metals, dielectric properties of insulators. Optical effects. Mr. Wang (Sp)

131A. Integrated-Circuit Devices. (4) Three hours of lecture and one hour of recitation per week. Prerequisite: Physics 5E, Engineering 17, 45. Overview of basic semiconductor physical mechanisms, the electronic (finite impulse response) digital filters, windows and spectral analysis, fast Fourier transform, effect of quantization of coefficients and digital signal processing. Mr. Muller, Mr. Huang, Mr. Hu (W, W, W)


132A–132B. Communications Systems Laboratory. (2–2) Formerly 132C. 4-hour laboratory per week. Prerequisite: course 124 recommended. 132A: Measurement of frequency spectra. Time and frequency measurements on AM, FM, and PCM systems. 132B: Effects of noise on AM, FM, and PCM systems; bandwidth expansion and threshold phenomena. Mr. Bergen, Mr. Huang (F, W, Sp)

133A. Power System Laboratory. (2) 4-hour laboratory per week. Prerequisite: course 114A. Synchronous generator modeling. Steady state and transient behavior of power systems. Evaluation of stability. Mr. Bergen, Mr. Hu (W, F, Sp)

133B. Power Control Laboratory. (2) 4-hour laboratory per week. Prerequisite: course 114B. Steady state and transient behavior during short circuits. Effect of power system stabilizers on system damping. Analysis of the governor as a system element. Microcomputer applications to control, data logging and system protection. Mr. Bergen, Mr. Huang (W, W, W, Sp)

134. Solid-State Electronics Laboratory. (2) One 4-hour laboratory per week. Prerequisites: courses 133A and 114B. Experiments for measuring physical parameters and observing and interpreting fundamental phenomena in solid-state materials and devices. Mr. Muller, Mr. Oldham, Mr. Van Duzer (F, W, Sp)

135. Microwave Laboratory. (2) One 4-hour laboratory per week. Prerequisite: course 117A. Experiments illustrating the fundamental principles in the operation of active and passive microwave devices. Mr. Angelakos, Mr. Gustafson (W, Sp)

136. Introduction to Quantum Electronics. (3) Three hours of lecture per week. Prerequisites: courses 104B, 105. Development of nonlinear circuit models of electronic devices: pn junction diodes, bipolar junction transistors, Field effect transistors; effects of modeling complexity and accuracy of performance prediction; charge storage devices. Application in electronic circuit simulation of regenerative and non regenerative microwave oscillators. Mr. Whinnery (Sp)


160. Nonlinear Electronic Device Models and Circuits. (4) Four hours of lecture per week. Prerequisite: courses 104B, 105. Development of nonlinear circuit models of electronic devices: pn junction diodes, bipolar junction transistors, Field effect transistors; effects of modeling complexity and accuracy of performance prediction; charge storage devices. Application in electronic circuit simulation of regenerative and non regenerative microwave oscillators. Mr. Van Duzer (W)
118. Directed Group Studies for Advanced Undergraduate Students. Group study of selected topics in electrical engineering, usually related to new developments.

Mr. Staff (F, W, Sp)
230. Solid-State Electronics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 100C. Fundamental device properties; semiconductor materials, n- and p-type semiconductors, band structure, solid-state phenomena; and device fabrication. Mr. Tomlinson, Mr. Hofstadter (F).

231. Solid-State Devices. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 114A or 113B. Course 114A or equivalent; basic device fabrication; advanced device design; and device simulation. Application of present and probable future technologies. Mr. Oldham, Mr. Muller (W).


236A–236B. Quantum and Optical Electronics. (3–3) Three hours of lecture per week. Prerequisite: course 117B, 136, 130, or equivalent. Optical properties of solids; phototransistors, photodetectors; nonlinearities in waveguides; quantum interference in tunneling; and semiconductor devices. Mr. Gustafson, Mr. Schwarz 236A (F); Mr. White 236B (W).

237. Quantum Electronics of Solids. (3) Three hours of lecture per week. Prerequisite: course 117B, 136, 130, or equivalent. Properties of solids; analysis of specific laser systems such as gas lasers, ion lasers and solid-state lasers of the ruby type; laser operation; theoretical and experimental laser transmission systems; scientists selected applications of coherent optics. Mr. Gustafson, Mr. Schwarz 237A (F); Mr. W cover 237B (W).

240. Nonlinear Analog Integrated Circuits. (3) Three hours of lecture per week. Prerequisite: course 141, analysis of linear systems, introduction to digital signal processing and familiarization with the phenomena of subthreshold operation of the superconductor. Interconnections and design of alternating-current coupled and feedback amplifiers and large signal amplifiers; high frequency stability; functional and distortion; and frequency components of the complex system. Mr. Pederson (Sp).

241. Linear Integrated Circuits. (3) Three hours of lecture per week. Prerequisite: course 141. Analysis of linear systems, introduction to digital signal processing and familiarization with the phenomena of subthreshold operation of the superconductor. Interconnections and design of alternating-current coupled and feedback amplifiers and large signal amplifiers; high frequency stability; functional and distortion; and frequency components of the complex system. Mr. Pederson (Sp).

243. MOS Integrated Circuits. (3) Three hours of lecture per week. Prerequisite: course 145 or 135A or 135B or 225A. Design of metal-oxide semiconductor large scale integrated digital circuits. Device characteristics, fabrication processes, static and dynamic performance, design of mixed-signal layout; reliability. Considerations for system design using MOS LSIs. Mr. Hodges (W, Sp).

245. Digital Integrated Circuits. (3) Three hours of lecture per week. Prerequisite: course 145. Advanced studies of digital circuit design and performance with emphasis on integrated logic families and their characteristics. Noise margins, delay times, speed and reliability. The design of A/D and D/A conversion circuits and memory cells. Mr. Gray, Mr. Pederson (F).


260B. Stochastic Processes in Electrical Engineering. (3) Three hours of lecture per week. Prerequisite: course 145 or 135A or 135B or 225A. Stochastic processes. Deterministic and random signals; linear and nonlinear operations. Wide sense stationarity and linear operations. Gaussian processes. Stochastic process of communication. Applications. Mr. Sakrison, Mr. Wong (Sp).

261. Statistical Communication Theory. (4) Four hours of lecture per week. Prerequisite: course 260A. Communication theory: estimation of parameters, detection and estimation; nonsequential and sequential decision rules. Communication systems design with and without feedback. Rader parameter modulation; analog communication over the gaussian channel. Rate distortion bounds. Mr. Singer, Mr. Turin, Mr. Messerschmitt (W).

265A. Introduction to Information Theory. (3) Three hours of lecture per week. Prerequisite: course 260A or 205A. Fundamental concepts and results in Shannon information theory: rate of stochastic sources; capacity and proof of coding theorems for noisy memoryless channels, both discrete and continuous; and applications to particular code and source coding with a fidelity criterion. Mr. Sakrison, Mr. Thomasian, Mr. Messerschmitt (Sp).

266B. Topics in Information Theory. (3) Three hours of lecture per week. Prerequisite: course 265A. In certain years course 260A may also be required. Rate distortion; source coding; analysis of error probability with optimum coding, decoding methods, continuous channels with input constraint and unconstrained; and information theory for Markov chains. Mr. Thomasian, Mr. Messerschmitt (Sp).

270A–270B–270C. Plasmas. (3–3–3) Two 1 1/2-hour lectures per week. Prerequisite: course 117A or course 117B and Physics 110A. Theory and applications of plasmas including particle orbit theory, oscillations and propagation of waves, instabilities, and plasma diagnostics; analysis of various controlled fusion experiments. Mr. Birdsall, Mr. Lieberman, Mr. Segel, Mr. Millikan (F); Mr. Kubat (W, Sp).

281. Dynamic Systems in Biology. (3) Three hours of lecture per week. Prerequisites: courses 119, 181. Advanced applications of linear and nonlinear systems theory to biological systems. Frequency analysis; threshold, oscillations, and other stability considerations; spectral analysis of input functions; applications to biological feedback control systems. Mr. Keller (W).

282. Biomedical Instrumentation. (3) Formerly 230K. Three hours of lecture per week. Prerequisites: courses 183A–183B recommended. The application of biomedical systems and instrumentation techniques in medical measurement to parameters of direct clinical significance, nuclear magnetic resonance, and other medical phenomena. Mr. Singer (F).

286. Neurophysiology of the Visual System. (3) Three hours of lecture per week. Prerequisite: course 170 or Physics 142, some computer skills. Simulation of human visual processing. State of the art computer models of visual processes. Mr. Sakrison, Mr. Thomasian, Mr. White (Sp).

290L. Laboratory in Electrical Engineering. (1) Three hours of laboratory work. Prerequisite: consent of instructor. Theory and practical applications of computer-aided circuit analysis programs; development of computer-aided circuit analysis programs. Mr. Birdsall, Mr. Lieberman, Mr. Segel, Mr. Millikan (F); Mr. Kubat (W, Sp).

290M. Theory and design of plasma simulation, using many-particle models on computer. Projects on cold plasma oscillations, waves and instabilities in 1 dimension. Mr. Birdsall (W).

290P. Topics in Solid-State Electronics. (3) Three hours of lecture per week. Prerequisite: courses 114A or 114B, 231, or permission of instructor. Advanced treatment of topics chosen from research areas such as: space-charge compensation in solids, high power and power-regulated phenomena, quantum phenomena, elastic wave interactions, surface effects on semiconductors. Mr. Pederson (Sp).

290Q. Microwave Electrical Engineering. (3) Three hours of lecture per week. Prerequisites: course 290P or EE 212 or EE 218. Theory and design of microwave circuits, using many-particle fluid models on computer. Applications to analysis of linear and non-linear microwave and to laboratory experiments on oscillations, waves, instabilities, heating, and diffusion in 1, 2, and 3 dimensions. Mr. Birdsall (Sp).

290R. Microwave Acoustics. (3) Four hours of lecture per week. Prerequisite: course 290P or EE 185 or EE 189. Theory and design of microwave circuits, using many-particle fluid models on computer. Applications to analysis of linear and non-linear microwave and to laboratory experiments on oscillations, waves, instabilities, heating, and diffusion in 1, 2, and 3 dimensions. Mr. Birdsall (Sp).

290S. Topics in Quantum Electronics. (4) Three hours of lecture per week. Prerequisite: course 117A and Physics 115, or the equivalent, and graduate standing. Topics in classical and electronic-magnetic resonance phenomena. Mr. Sakrison, Mr. Thomasian, Mr. White (Sp).


290U. Introduction to Information Theory. (3) Three hours of lecture per week. Prerequisite: ECE 117A and ECE 130. Information measures, entropy, relative entropy, and mutual information. Applications to circuits and control problems. Recent results for the literature. Mr. Desoer (Sp).

290V. Adaptive and Identification Systems. (3) Three hours of lecture per week. Prerequisite: Statistics 200A or equivalent. Design of autonomous systems responsive to changes in commands, disturbances, components and models. Time-varying systems; estimation of unknown parameters. General class of adaptive models, error steepest descent and instrumental variables. Nonlinear identification by adjustable decision functions. Convergence with noise and less state variables. Mr. Smith (Sp).
290W. Pattern Classification. (2) Two hours lecture per week. Prerequisite: Statistics 204A or equivalent. Selected topics in pattern classification; representation of patterns, selection of measurements, decision procedures. Mr. Wong (Sp)

290X. Radio Telescopes. (4) Three hours lecture per week. Prerequisite: course 117A. Synthesis of celestial procedures. Mr. Wong (Sp)

290Z. Topics in Optimization Based Computer-Aided Design of Electronic Circuits. (3) Three hours lecture, one hour of discussion per week. Prerequisite: course 77, 77A, 227, and 227A (EECS 226A is recommended and can be taken concurrently). Formulation of design problems as optimization problems. Mr. Sangiovanni-Vincentelli (Sp)

291. Individual Study and Research for Undergraduates. (1/2–8) Advanced study in various subjects through special seminars on topics to be selected each year, informal group studies of special problems, group participation in comprehensive design problems, or group research on complete problems for analysis and experimentation. Sections 1 through 12 are graded on a satisfactory/unsatisfactory basis and sections 13 through 30 are graded on a letter grade basis. The Staff (F, W, Sp)


602. Individual Study for Doctoral Students. (1–8) Independent study in consultation with the major field advisor, intended to provide an opportunity for qualified students to prepare themselves for the various examination requirements of the Ph.D. (and other doctoral degrees). May not be used for unit or resident requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

IDS 1. Technology and Society. (4) See Interdepartmental Studies for the complete description of this course.

IDS 111. Introduction to Neurobiology. (3) See Interdepartmental Studies for the complete description of this course.

IDS 100. Economic and Biological Feedback Systems. (3) See Interdepartmental Studies for the complete description of this course.

IDS 201. Cellular Mechanisms Underlying Nervous Activity. (4) See Interdepartmental Studies for the complete description of this course.

IDS 201L. Laboratory in Cellular Mechanisms Underlying Nervous Activity. (5) See Interdepartmental Studies for the complete description of this course.

IDS 202. Neural Integration and Coordination. (4) See Interdepartmental Studies for the complete description of this course.

IDS 202L. Advanced Laboratory in Neural Integration and Coordination. (3) See Interdepartmental Studies for the complete description of this course.


---

**Computer Science**

**LOWER DIVISION COURSES**

1. Introduction to Programming for Engineering and Physical Sciences. (4) Two hours of lecture and one hour of discussion per week plus scheduled consultation. Prerequisite: Mathematics 1A. An introduction to computer programming. Lower division engineering and physical science students. Algorithms, programs, and computers. Extensive practice with one or more high-level languages. Both numerical and non-numerical applications. Mr. Gill, Mr. Clancy (F, W, Sp)

1S. Self-Paced Introduction to Programming for Engineering and Physical Sciences. (1–4) Three to twelve hours of discussion per week. Prerequisite: Math 1A (can be taken concurrently). Only one of the courses 1S, 3, 3S, 101, 101S, 103, 103S can be taken for credit. The same material as CS 1 but in a self-paced format. Three to twelve hours of discussion per week. Mr. White, Mr. Clancy (F, W, Sp)

2. The Art and Science of Computing. (2) Two hours of lecture per week. Prerequisite: consent of instructor. A systematic approach to the design and construction of computer programs. Course objective: to teach the student to write clear, reliable, efficient and easily modifiable programs. Introduction to the PASCAL programming language. Programming exercises illustrating advanced programming techniques. Mr. White, Mr. Clancy (F, W, Sp)

3. Introduction to Programming. (2) Two hours of lecture and one hour of discussion per week and scheduled consulting. Prerequisite: None. Only one of the courses 1S, 3, 3S, 101, 101S, 103, 103S can be taken for credit. Not open to students in engineering. Introductory programming course for lower division non-engineering science students. Algorithms, programs, and computers. Extensive practice with one or more higher-level languages. Mostly non-numerical applications. Mr. Clancy (F, W, Sp)

3S. Self-Paced Introduction to Programming. (1–4) Two hours of meetings with staff and two hours of programming laboratory per week. Prerequisite: None. Only one of the courses 1S, 3, 3S, 101, 101S, 103, 103S can be taken for credit. Not open to students in engineering. The same material as course 3 but in a self-paced format. Units assigned depend on number of study units and program assignments completed. Algorithms, programs, and computers. Computer solution of problems drawn from various fields may be repeated for a total of 4 units. Mr. White, Mr. Clancy (F, W, Sp)

40. Programming Style. (3) Three 1-hour lectures per week and scheduled consulting. Prerequisites: CS 2 and either CS 1, CS 15, CS 3, or 3S. A systematic approach to the design and construction of computer programs. Course objective: to teach the student to write clear, reliable, efficient and easily modifiable programs. Introduction to the PASCAL programming language. Programming exercises illustrating advanced programming techniques. Ms. S. Graham, Mr. Prener (F, W, Sp)

41. Machine Structures. (3) Three hours of lecture and one hour of discussion per week. Prerequisite: course 103, Electrical Engineering and Computer Science 106, Engineering 41, or Electrical Engineering and Computer Science 151. An introduction to the structure of computers, including the instruction set architecture. May not receive credit for this course. Characteristics of stored-program computers, number representations, programmable storage, and computer addressing. Mr. Gill, Mr. Stonebraker (F, W, Sp)

95. Topics in Computer Science. (1) One hour lecture per week. Prerequisite: consent of instructor. Enrollment preference will be given to freshmen. S Computer Science students in the “cluster” advising program. P/NP. May be repeated for credit. This is a seminar course in which computer scientists describe their professional activities and interests. The aim is to give students a comprehensiv e view of the field. Students will be required to write a term paper, based on relevant literature, exploring in great depth one of the topics covered in the lectures.

99. Individual Study and Research for Undergraduates. (1–2) Prerequisite: course 1 or equivalent. A course for lower division students in good standing who are interested in an individual inquiry. Initiated jointly by the student and a professor. There are no formal prerequisites, but the supervising professor of the project is an advisor to the student. Units assigned depend on number of study units and program assignments completed. Algorithms, programs, and computers. Extensive practice with one or more high-level languages. Both numerical and non-numerical applications. Mr. Gill, Mr. Clancy (F, W, Sp)

**UPPER DIVISION COURSES**

110. Introduction to Computing for Engineering and Physical Sciences. (4) Two hours of lecture and one hour of discussion per week and scheduled consulting. Prerequisite: Mathematics 1C. Only one of the courses 101, 101S, 103, 103S can be taken for credit. Design, communication, and cost/performance considerations for system configuration. Design of large programs. Mr. Kahan, Mr. Berliner, Mr. Stonebraker (F, W, Sp)

107. System Architecture. (3) Three hours of lecture per week. Prerequisite: course 41. Not open to Electrical Engineering and Computer Science students. Not open to students in engineering. An introduction to computer architecture. Characteristics of stored-program computers, number representations, programmable storage, and computer addressing. May be repeated for credit up to a total of 4 units. Mr. White, Mr. Clancy (F, W, Sp)

105S. Self-Paced Introduction to Computing. (1–4) Two hours of meeting with staff and two hours of programming laboratory per week. Prerequisite: None. Only one of the courses 105, 105S can be taken for credit. Not open to students in engineering. The same material as course 105 but in a self-paced format. Units assigned depend on number of study units and program assignments completed. Algorithms, programs, and computers. Computer solution of problems drawn from various fields may be repeated for credit up to a total of 4 units. Mr. White, Mr. Clancy (F, W, Sp)

111. System Simulation. (3) Replaces engineering 111. Three hours of lecture per week. Prerequisite: course 41. Not open to Electrical Engineering and Computer Science students. Not open to students in engineering. An introduction to computer architecture. Characteristics of stored-program computers, number representations, programmable storage, and computer addressing. May be repeated for credit up to a total of 4 units. Mr. White, Mr. Clancy (F, W, Sp)

120A–120B. Computers in the Humanities. (4–4) Three hours of lecture and one 1-hour problem session per week. Prerequisite: upper division standing or consent of instructor. Not open to students who have taken Mathematics 113A, Proof versus opinion. Mathematical induction and other mathematical techniques. Introduction to logic and an axiom-based theory such as the Zermelo-Frankel set theory. Mr. Partlett (F, W, Sp)

125. Computers and Society. (3) Replaces IDS 108 and course 103. Three hours of lecture per week. Prerequisite: upper division standing or consent of instructor. Not acceptable as a technical elective in engineering. Upper division computer science courses. Structure of simple computers. Applications in industry, government, and education. Advantages of computers and problems they generate. Impact of computers on pre-
sent and future society. No previous knowledge of computer is assumed.

148. Introduction to Information Processing. (3) Three hours of lecture per week. An introduction to some of the basic aspects of information processing with emphasis on formal languages and their applications. Markoff algorithms. Syntax and semantics of natural languages. Knuth semantics and attributed grammars. Query languages and relational models of data. Mr. Zadeh (F, W)

149. Information Processing Techniques and Natural Language Understanding. (3) Three hours of lecture per week. Prerequisite: course 148 or equivalent. Syntax and semantics of natural languages. Parsing algorithms for context-free languages. Augmented transition networks. Formal languages and their operation. Syntax and semantics of natural languages. Mr. Zadeh (Sp)

150. Logic Design and Components of Digital Systems. (4) Formerly Electrical Engineering and Computer Science 150. Three hours of lecture and three hours of laboratory per week. Prerequisites: course 149 or equivalent. Design and implementation of digital systems, including integrated circuits. Introduction to digital logic circuits and their design. Mr. Rabin (F, W)

151A. Computer Memory and Storage Devices. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: Electrical Engineering and Computer Science 105, 105L and course 152A. Characteristics of computer memories and storage devices and their applications. Overview of storage, storage organization, and computer system memory. Mr. Sevin (Sp)

151B. Input-Output Devices and Microprocessors. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: Electrical Engineering and Computer Science 105, 105L and course 152A. Characterization of input/output devices, design of interface and device controllers, design of computer input/output, design of microprocessors, design of computer control, and design and implementation of computer hardware. Mr. Sevin (W, Sp)

152A. Introduction to Computer Organization and Design. (3) Three hours of lecture and one hour of discussion per week. Prerequisite: courses 41 and 150. Students will not receive credit for both courses 152A and 152B. Organization and design of computer organization and computer design and current trends in computer organization. Mr. Sevin (F, W)

152B. Computer Organization. (3) Three hours of lecture per week. Prerequisite: course 152A or equivalent. Organization and design of computer organization. Memory, processor, instruction set, memory hierarchy, cache memory, dynamic memory, instruction set, processor architecture, instruction set architecture, processor design, processor microprogramming, processor design and implementation, processor design and impleme

286. Error Correcting Codes. (3) Three hours of lecture per week. Prerequisite: Mathematics 113A-113B. The construction of burst-error correcting codes, BCH and other codes based on the theory of finite fields. Topics such as algebraic decoding, weight enumeration, convolutional codes, applications to the design of disk memories and deep space probes. Mr. Bertlekamp (Sp)

267. Theory of Formal Languages. (3) Three hours of lecture per week. Prerequisite: course 163 and 164. Phrase structure grammars and languages. Applications of context-free techniques to programming language design and the limitations of computer. Machine-independent theorems on speed of computation. Recursion theorem. Proof of non realizability of techniques containing lower bounds on computation time. Applications of recursive function theory to such topics as proving program correctness, inductive inference, and learning. Mr. Blum (W, Sp)

269. Combinatorial Computing. (3) Three hours of lecture per week. Prerequisite: course 153 and either 167 or 169. Formulation and solution of combinatorial problems. Methods of combinatorial optimization, such as branch-and-bound, network flows, matroid programming. Analysis of relative complexities of algorithms. Mr. Lawler (W)


274. Algorithmic Complexity. (3) Three hours of lecture per week. Prerequisite: course 174; Mathematics 113A. The study of the inherent complexity of specific computational problems; algebraic complexity theory; fast Fourier transform; algorithms to manipulate integer and polynomial arithmetic; and applications to number theory. Mr. Karp, Mr. Kahan (F)

276. Automatic-Selected Computation Complexity. (3) Three hours of lecture per week. Prerequisite: course 257. Polynomial time and storage models; computational problems; first representation functions; computing schemes. Mr. Karp, Mr. Kahan (F)

277. Theory of Parsing and Translating. (3) Three hours of lecture per week. Prerequisite: course 267. Parsing, translator construction, and their computational complexity. Deterministic languages. Special classes of grammars, applications to programming languages. LR(k) grammars, bounded (right) context grammars. Covers and canonical precedence parsing. Models of computers and translation schemes. Mr. Graham, Mr. Hendricks (Sp)

281. Data Base Management Systems. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: CS 155 or equivalent. Fundamentals of data base management systems including relational, hierarchical and network views of data, query languages appropriate to each case, design of efficient access methods to secondary storage, security, integrity, control of concurrent access, and recovery. Mr. Stonebraker, Mr. Wong (F, Sp)

282. Artificial Intelligence. (4) Three hours of lecture per week. Prerequisite: course 154 or consent of instructor. Symbolic computation and problem-solving. Discussion of techniques for search and traversal, game playing, learning, and heuristic search. Use of pattern recognition, robotics, natural language translation, computational mathematics, theorem proving, and programming languages for solving cognitive processes. Mr. Karp (W)

285. Advanced Computer Architecture. (3) Formerly 2202. Three hours of lecture per week. Prerequisite: Computer Science 152A-152B or equivalent. Non-VonNeumann machines: data flow architecture, parallel and cascade organizations, multiprocessor networks. Data base and chess machines. Signal processors including FFT, vision and image processors. A term project or paper will be required. Mr. Despain (W), Mr. Patterson (F)

292. Advanced Graduate Study in Computer Science. (2-8) Lecture courses on advanced topics in computer science. Staff and quarter are variable. Mr. Ramamoorthy (W)


292D. Sorting and Searching. (3) Three hours of lecture per week. Prerequisite: course 169 recommended. Huffman codes, entropy; sorting with minimum number of comparisons; minimum-storage sorting; replacement selection; optimal tape sorting; disk sorting; sorting networks; address calculation sorting and hashing; AVL trees and other data structures for file management. Mr. Karp (Sp)

292E. Correctness of Programs. (4) Three hours of lecture per week. Prerequisite: course 254. Mathematical foundations for course aimed at solving the general problem of obtaining correct computer programs. A variety of methods will be considered: (a) logical and informal correctness proofs, (b) automatic verification and type-checking systems, (c) programming languages to facilitate correctness proofs. Students will be expected to do projects of their own devising. Mr. Mont-reynaud (F)

292F. Advanced Programming Language Design. (3) Two hours of lecture per week. Prerequisite: course 257. System programming languages. Very high-level languages. Applications languages. Current research in the design of programming languages. Mr. S. Graham, Mr. Rowe (F)

292G. Computer System Analysis. (3) Three hours of lecture per week. Prerequisites: courses 225, Statistics 151A, and (Computer Science 152A or equivalent). A detailed study will be made of operating systems. Mr. DeWitt, Mr. Snow, Mr. Cragin (F)


292J. Digital Computers in Experimental Systems. (3) Three hours of lecture per week. Prerequisite: permission 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 such fields as biology, artificial intelligence, and psychology. Mr. M. Graham (Sp)

292K. Sequencing and Scheduling. (3) Three hours of lecture per week. Prerequisites: CS 167 or CS 169 or IECR 166. Algorithms for solving sequencing and scheduling problems, including single processor, parallel processor, open shop, flow shop and job shop problems. NP-hardness results and complexity classification of problem types. Mr. Lawler (W)

292R. High Level Language Computer Architecture. (4) Three hours of lecture and one hour of laboratory per week. Prerequisite: course 254. Study of software-directed computer architecture, intermediate languages, and direct execution. Examples covered are EULER, RS500-56700, B1700, TIE, SYMBOL 2R, LISP and APL machines. Substantial project is required (design of a HLL computer and its implementation in microcode or logic). Mr. Fateman (Sp)

298. Algorithmic Graphs. (3) Three hours of lecture per week. Prerequisite: Mathematics 113B, course 154, or permission of instructor. Theory and construction of symbolic algorithms for computer programs. Polynomial arithmetic, GCD, factorization. Integration of elementary functions. Analytic approximation. Simplification. Design of computer systems and techniques for symbolic mathematics. Programming exercises. Mr. Fateman (Sp)

299. Group Studies, Seminars, or Group Research. (1-8) Advanced study in various subjects, with special seminars on topics selected each year, informal group studies of special problems, group participation in comprehensive design problems, or group research on complete problems for analysis and experimentation. Sections 1 through 10 are graded on a satisfactory/unsatisfactory basis and sections 11 through 15 are graded on a letter grade. Mr. DeWitt, Mr. Fateman, Mr. Hendricks (W, Sp)

300. Individual Research. (1-12) Investigation of problems in computer science. The Staff (F, W, Sp)

602. Individual Study for Doctoral Students. (1-6) Major field advisor, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required for the Ph.D. (and other doctoral degrees). May not be used for unit or resident requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

**Industrial Engineering and Operations Research Research**

**UPPER DIVISION COURSES**

130. Modeling and Simulation of Dynamic Systems. (3) Four hours of lecture and two hours of discussion per week. Prerequisites: Mathematics 51A, 51C. Concepts of dynamic feedback systems, including stability and characteristics of linear and non-linear systems. Practice in modeling and analysis of systems of moderate complexity; simulation of non-linear and non-stationary systems. The Staff (W, Sp)

150. Production Systems Analysis. (4) Three hours of lecture and two hours of laboratory per week. Prerequisite: Engineering 120 and 162. Operations analysis of production systems; use of operating models and quantitative methods of operations research. Mr. Grassi (W)

153. Facilities Planning and Design. (4) Two 1 1/2 hour discussion and 1 hour laboratory per week. Prerequisite: course 150. Consideration of mathematical models for layout, line balancing and conveyor systems. Analysis of integrated materials control systems involving functions of storing, recalling, delivery, inventory and computer control. Design of automated warehousing and order-picking systems and computer simulation. Mr. Grassi (Sp)

**NOTE:** For key to symbols, see page 36.
154. Information and Data Systems. (4) Two 1 1/2-hour lectures and one hour of laboratory session per week. Prerequisite: EOR 102 or EOR 180. Introduction to the design of management information systems with applications in marketing, finance, production, distribution, and personnel. Issues of implementation and examples of such systems are illustrated through case studies. Term project. The Staff (F)

160. Operations Research I. (4) Two 1 1/2-hour lectures and one hour of discussion per week. Prerequisite: Mathematics 1C. Deterministic methods and models in operations research. Unconstrained and constrained optimization. Equality, inequality and mixed constraints. Sequential decisions: dynamic programming. Resource allocation, equipment replacement, inventory control, production planning. The Staff (F)


162. Linear Programming. (5) Two 1 1/2-hour lectures and one 1/2-hour problem session per week. Prerequisite: Mathematics 51A. An introduction to linear programming formulation, the simplex method, duality theory, post-optimization problems, network models and applications to industrial systems. The Staff (F, W, Sp)

163. Reliability and Quality Control. (4) Two 1 1/2-hour lectures and one 1/2-hour laboratory per week. Prerequisite: Statistics 134A or equivalent. A survey of models and techniques useful in reliability, safety, and quality control problems of engineering. Principles of design, rules and symbols for fault tree construction. Binarial and exponential acceptance sampling plans. Operating characteristical curve. Quality control charts and their uses. Economics of control charts. Mr. Barlow, Mr. Ross (F)

164. Network Flow Models and Critical Path Scheduling. (4) Two 1 1/2-hour lectures and one hour of discussion per week. Prerequisite: Mathematics 51A or 51C. Network optimization models, with emphasis on formulation of problems. Parameters will be: flows on networks; maximal and optimal flows; transportation and dynamic network flows; shortest and longest routes; formulations, time and cost-time critical path scheduling; computer solutions, economic interpretations. Mr. Jewell, Mr. Grady (W)

165. Introduction to Queueing Theory. (4) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: Statistics 134A or equivalent. A general introduction to the theory of queues. The Staff (F, W, Sp)

166. Introduction to Queuing Theory. (4) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: Statistics 134B or equivalent. A survey of models and techniques useful in reliability, safety, and quality control problems of engineering. Principles of design, rules and symbols for fault tree construction. Binarial and exponential acceptance sampling plans. Operating characteristical curve. Quality control charts and their uses. Economics of control charts. Mr. Barlow, Mr. Ross (F)

167. Financial Investment and Decision Theory. (3) Three hours of lecture per week. Prerequisites: Mathematics 134A or 134B, and EOR 102. Theory of stochastic processes, utility and portfolio theory. Mr. Grossman (F)

168. Two 1/2 hour lectures and one hour of discussion per week. Prerequisite: Math 104A recommended. The application of the theory of stochastic processes in finance and economics. Mr. Grossman (F)

169. Time Series Analysis and Forecasting. (4) Two 1 1/2-hour lectures and one 1-hour laboratory per week. Prerequisite: EOR 263A, may be taken concurrently; Stat 135A-135B or equivalent. Stochastic models for time series data; use of computer models in forecasting. Auto- and cross-correlation functions, and models for discrete time series; use of such models in forecasting. Mr. Barlow, Mr. Ross (F, W)

200. Economic Models of Production. (4) Two 1 1/2-hour lectures and one and one-half hours of discussion per week. Prerequisite: Math 104A recommended. Economic and programming activities analyzed in terms of optimal resource allocation and output possibilities in production, shadow pricing, indirect production functions and cost-benefit analyses. Introduction to Dynamic Production Models. The Staff (F)

211. Mathematical Optimization. (5) Three hours of lecture per week. Prerequisites: Mathematics 139A or 139B, and EOR 102. Resource allocation, equipment replacement, inventory control, production planning. Mr. Adlakha, Mr. Ross (F)

221. Policy-Level Problems. (4) Two 1-hour lectures per week. Prerequisite: course 162 or 167, or Mechanical Engineering 102A. Applications of the mathematical optimization of non linear, differentiable functions. Theory of optimality conditions, and duality. Study of convergence properties of algorithms for such constrained and constrained problems by theoretical and experimental methods. Applications and model formulation. Extensive interactive computer aids. C.R. Glasssey, Mr. Adlakha (Sp)

261. Applied Stochastic Models. (4) Formerly 261A-261B. Two 1 1/2-hour lectures and one hour of discussion per week. Prerequisite: Math 111 or Statistics 135A, B. A survey of basic stochastic methods to models of traffic, queueing, inventory, replacement and maintenance, and sequential decision-making. Mr. Wolf (Sp)

262A. Linear Programming. (4) Two 1 1/2-hour lectures and one hour of discussion per week. Prerequisites: course 162 and course 167. An introduction to linear programming. The simplex method and its variants. Convergence proofs. Duality theory. Geometry of linear programs. Parametric programming. Mr. Wolf, structural such as decomposition and upper-bounded variables. Introduction to matrix games. Introduction to network flow models. Mr. Gale, Mr. Glasssey (F, W)

262B. Advanced Mathematical Programming. (4) Two 1 1/2-hour lectures and one hour of discussion per week. Prerequisites: course 261A-261B. Advanced topics in decomposition of linear programs, quadratic programming; bimatrix games; complementary pivot methods; stochastic programming; convex analysis; duality and conjugate functions. Mr. Glasssey, Mr. Adler (Sp)

263A. Applied Stochastic Processes I. (4) Two 1 1/2-hour lectures and one 1/2-hour laboratory per week. Prerequisite: Statistics 134A or Statistics 200F (may be taken concurrently). Models of renewal theory and Markov chains. Applied problems arising from processes and queueing, and other stochastic systems. Emphasis in asymptotic behavior. Mr. Ross, Mr. Wolff (W)

263B. Applied Stochastic Processes II. (4) Two 1 1/2-hour lectures and one 1/2-hour laboratory per week. Prerequisite: course 263A and Math 104A. Study of Markov renewal processes, continuous time Markov chains, branching processes, and decision processes in queuing with application to applied problems in replacement, queueing, and other stochastic systems. Emphasis on asymptotic behavior. Mr. Ross (Sp)

266. Network Flows and Graphs. (4) Two 1 1/2-hour lectures and one hour of discussion per week. Prerequisite: course 162 or course 167 and one 1/2-hour laboratory. Prereqirerequisite: course 262—may be taken concurrently. Survey of solution techniques and problems that have maximum flow-min-cut theorem. Minimum cost flows. Multitermination and multimodality flows. Relationship with linear programming, transportation problems, electrical networks and critical path scheduling. Mr. Jewell, Mr. Oliver, Mr. Karp (F, W)

267. Advanced Queueing Theory. (4) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: course 236A. Review of elementary queueing models; Markovian and M/G/1 queues. Little's formula and its consequences; GI/G/1 queues. Approximations and bounds for single and multiple channel queues. Mr. Dreyfus (F)

268. Applied Dynamic Programming. (4) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: course 267. Dynamic programming: formulation of dynamic programming problems, analytical and computational methods of solution; application to problems of equipment replacement, resource allocation, scheduling, search and routing. Mr. Dreyfus (F)

269. Integer Programming And combinatorial Optimization. (4) Two 1 1/2-hour lectures and one 1/2-hour discussion per week. Prerequisite: course 262A or 266. Course 266 is usually taken before 269, but it
is not a strict prerequisite for students who have taken construction.

**270. Engineering Psychology.** (4) Two 1 1/2-hour lectures and one 2-hour laboratory per week. Prerequisite: course 171. Theoretical and experimental analysis of human information-processing and skilled performance, with emphasis on quantitative models for use in man-made system design. Laboratory projects as appropriate.

Mr. Crossman (W)

**271. Advanced Topics in Work Systems Design.** (4) Two 1 1/2-hour lectures and one 2-hour projects laboratory per week. Prerequisite: course 171. Impacts of technology on task performance, supervision, coordination, and control in sociotechnical systems. Dynamics of social interaction in a technical environment. Design of organizational models to enhance emergence of stable cohesive and productive social structures. Students will undertake individual projects.

The Staff (Sp)

**274. Manual Control and Manned Systems Design.** (4) Three hours of lecture and one hour of discussion per week. Prerequisite: any course in stochastic processes. Mathematical modeling and analysis of environmental problems with special emphasis on topics in air pollution, demography, and ecology; population dynamics; air pollution forecasting. Mr. Grossman (W)

**290A. Theory of Production.** (3) Three hours of lecture per week. Prerequisite: Mathematics 104A. Review of Theory of Steady State Models of Production; Axiomatic development, special structures (homothetic, semi-homogeneous, etc.), duality, shadow pricing and cost-benefit analysis. Analysis of a dynamic theory of production functions. Development of Dynamic Activity Analysis Model with time variable technical coefficients and production time lags. Mr. Shephard (Sp)

**290B. Mathematical Models for the Environment.** (4) Three hours of lecture and one hour of discussion per week. Prerequisite: any course in stochastic processes. Mathematical modeling and analysis of environmental problems with special emphasis on topics in air pollution, demography, and ecology; population dynamics; air pollution forecasting. Mr. Crossman (W)

**290C. Statistical Aspects of Discrete Event Simulation.** (3) Three hours of lecture per week. Prerequisites: courses 267, Statistics 200G, and knowledge of Fortran or an appropriate simulation language. Statistical design and analysis of discrete event simulation of queues and other stochastic models. The initial transient and optimal starting conditions. Variance estimation techniques including the regenerative method, the method of batches, and batch means and reductions. Indirect estimators. Mr. Wolf (W)

**290D. Decision Analysis.** (4) Three hours lecture and one hour discussion per week. Prerequisite: IEOR 263A and 268 or consent of instructor. Study of decision analysis culminating in an application project. Discussion of behavioral validity of the methodology.

Mr. Dreyfus (Sp)

**290E. Large-Scale Programming.** (3) Three hours of lecture per week. Prerequisite: course 262A and 262B or 290G (latter may be taken concurrently). Techniques of large-scale linear and non-linear mathematical programs. Partition, decomposition, relaxation, and resource allocation methods. Generalized upper bounding and compact inverse methods. Mr. Adier (F)

**290F. Risk Theory.** (3) Two 1 1/2-hour lectures per week. Prerequisite: any course in stochastic processes. Introduction to mathematical risk theory, with emphasis on various models of insurance operations: utility theory; insurance and gambling; life and casualty; mortality; credibility theory; risk reserves; risk-sharing; objectives of the firm.

Mr. Jewell (W)

**290G. Modeling and Analysis of Environmental Quality.** (3) Two 1 1/2-hour lectures per week. Prerequisite: course 260A (may be taken concurrently with consent of instructor). Knowledge of computer programming and statistics desirable. Mathematical and statistical models for data analysis, design, optimization and cost-benefit analysis of solid waste management and water quality control systems.

Mr. Glasssey (W)

**290H. Advanced Theory of Reliability with Applications.** (3) Two 1 1/2-hour lectures per week. Prerequisite: IEOR 260A or equivalent course in stochastic models, plus some familiarity with nonlinear programming such as IEOR 260 or 262B. Selected topics in the theory and application of stochastic programming, portfolio analysis and information analysis.

Mr. Zemba (Sp)

**290P. Systems Analysis & Design Project. (4)** Two 1 1/2-hour lectures per week. Prerequisite: IEOR 262A, 260, and 263A. A project course for students interested in applications of operations, methods, and models. One or more systems, which may be public or in the private sector, will be selected for detailed analysis and re-design by student groups.

**298. Group Studies, Seminars, or Group Research.** (1-8) Advanced seminars in industrial engineering and operations research.

Mr. Jewell (in charge) (F, W, Sp)

**299. Individual Study or Research.** (1-12) Individual investigation of advanced industrial engineering problems. Sections 1 through 19 are graded on a satisfactory/unsatisfactory basis and Section 20 through 39 are graded by letter grades. The Staff (F, W, Sp)

**601. Individual Study for Master’s Students.** (1-8) Individual study for the comprehensive or language examinations. Units may not be used to meet either unit or residence requirements for a master’s degree. Must be taken on a satisfactory/unsatisfactory basis.

Mr. Jewell (in charge) (F, W, Sp)

**602. Individual Study for Doctoral Students.** (1-8) Individual study in consultation with the major field advisor. Units may not be used to meet either unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

Mr. Jewell (in charge) (F, W, Sp)

**Materials Science and Mineral Engineering**

**Materials Science**

**UPPER DIVISION COURSES**

**100. Field Trips.** (2) One 4-hour laboratory per week. Prerequisite: junior standing in ceramics or metallurgy. Selected plant visitations, lectures by practicing metallurgical and ceramic engineers, and reports on industrial organizations engaged in the manufacture or use of ceramic and metallic products.

Mr. Shephard (Sp)

**101. Crystal Chemistry and Diffraction.** (3) Three hours of lecture per week. Prerequisite: Chemistry 1B. Introduction to X-ray, neutron, and electron diffraction techniques for the characterization of crystalline materials.

Mr. Thomas (F)

**101L. Crystal Chemistry and Diffraction Laboratory.** (1) Three hours of laboratory per week. Laboratory work on applications of powder and single crystal diffraction techniques.

Mr. Bragg (F)

**102. Thermodynamics.** (4) Four hours of lecture per week. Prerequisite: Chemistry 1B. Chemical thermodynamics with emphasis in thermodynamic principles important in materials science.

Mr. Searcy (Sp)

**103. Phase Equilibria and Transformations.** (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 102 or Chemistry 14. Principles and mechanisms determining material microstructure. Multiphase equilibria and phase diagrams. Phase transformations: nucleation, diffusion and diffusionless growth processes.

Mr. Zieglar (F)

**106. Electric and Magnetic Materials.** (4) Three hours of lecture per week. Prerequisite: course 102 or equivalent. Chemical properties of metals and metallic compounds; interaction with one another, with gases, liquids, and refractories, and with the environment; production and refining of metals and nonmetals.

Mr. Evans (W)

**108. Electric and Magnetic Materials.** (4) Three hours of lecture per week. Prerequisite: senior standing in engineering or a physical science. Conducting, semi-conducting and insulating materials of practical importance. Permanent magnets, soft magnetic materials,
109. Physical Metallurgy. (3) Three hours of lecture per week. Prerequisite: Engineering 45. Laboratory for course 109. Preparation of specimens for observation by metallographic equipment; alteration of microstructures to control properties; effects of microstructural changes on mechanical, electrical, and chemical properties; microstructures and properties of commercial alloys: fracture modes. Mr. Parker (Sp)

110L. Advanced Metallurgy Laboratory: Failure Analyses. (3) Three lecture hours and one 3-hour laboratory per week. Prerequisite: Engineering 45. Laboratory for course 109. Preparation of specimens for observation by metallographic equipment; alteration of microstructures to control properties; effects of microstructural changes on mechanical, electrical, and chemical properties; microstructures and properties of commercial alloys: fracture modes. Mr. Parker (W)

111. Glass and Crystalline Ceramic Materials. (3) Three hours of lecture per week. Prerequisite: Engineering 45. Laboratory for course 109. Preparation of specimens for observation by metallographic equipment; alteration of microstructures to control properties; effects of microstructural changes on mechanical, electrical, and chemical properties; microstructures and properties of commercial alloys: fracture modes. Mr. Thomas (Sp)

112. Ceramic and Metal Powder Processing. (3) Three hours of lecture and 3 hours of laboratory per week. Principles of forming methods and nature of materials response in slip casting, extrusion, dry pressing, etc. Behavior of slurries and plastic masses. Sintering and vitrification. Correlation of processing steps to microstructure development. Mr. Pask (W)

112L. Ceramic and Metal Powder Processing Laboratory. (1) One 3-hour laboratory per week. Prerequisite: course 121 is a prerequisite and can be taken concurrently. Preparation of specimens by slip casting, extrusion, dry pressing, etc. Sintering and vitrification. Mr. Pask (Sp)

120. Advanced Mineral Processing. (4) Four hours of lecture per week. Prerequisite: Engineering 45. Laboratory for course 120. Preparation of specimens for observation by metallographic equipment; alteration of microstructures to control properties; effects of microstructural changes on mechanical, electrical, and chemical properties; microstructures and properties of commercial alloys: fracture modes. Mr. Zackay (F)

121. Glass and Crystalline Ceramic Materials Laboratory. (1) One 3-hour laboratory per week. Prerequisite: course 121 is a prerequisite and can be taken concurrently. Preparation of specimens for observation by metallographic equipment; alteration of microstructures to control properties; effects of microstructural changes on mechanical, electrical, and chemical properties; microstructures and properties of commercial alloys: fracture modes. Mr. Morris (Sp)

122. Ceramic and Metal Powder Processing Laboratory. (1) One 3-hour laboratory per week. Prerequisite: course 122 is a prerequisite and can be taken concurrently. Preparation of specimens by slip casting, extrusion, dry pressing, etc. Sintering and vitrification. Mr. Pask (Sp)

130. Materials Engineering. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: Chemistry 1A, and Physics 5A. Students who have taken Engineering 45 may not receive credit for course 130. Structure and properties of metallic, ceramic and polymer materials; application of metallic and polymeric materials in engineering problems. Topics covered include heat treatment of steel, design limitations of structures with respect to fatigue and fracture, and influence of chemical composition on mechanical properties of materials. Mr. Merriam (W)

141L. Particulate Materials Laboratory. (1) One 3-hour laboratory per week. Prerequisite: course 141 is a prerequisite and can be taken concurrently. Experiments in the measurement of particle size, surface area, size distributions, the packing of powder, size reduction, mixing, agglomeration, and rheology of particulate systems. Mr. Sastry (F)

141L. Particulate Materials Laboratory. (1) One 3-hour laboratory per week. Prerequisite: course 141 is a prerequisite and can be taken concurrently. Experiments in the measurement of particle size, surface area, size distributions, the packing of powder, size reduction, mixing, agglomeration, and rheology of particulate systems. Mr. Sastry (Sp)

142. Materials Process Engineering. (4) Four hours of lecture per week. Material and energy balances; materials and energy balances; fuel flow and heat transfer in metallic solid fuels; combustion in furnaces. Mr. Evans (Fa)

160. Materials Problems in Energy Systems. (3) Three hours of lecture per week. Prerequisite: E 45 and completion of lower division engineering curriculum. Selection of materials with emphasis on energy conversion system. Establishment of material selection criteria for representative components in systems characterized by complex requirements including those of high temperature, severe stresses, radiation and corrosive gases and liquids. Mr. Zackay (F)

198. Directed Group Studies for Advanced Under- graduates. (1–5) Group study of selected topics. The topic is announced at the beginning of the semester. Mr. Wark (W, Sp)

199. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations listed on page 36. For students in good standing who wish to work on planned projects initiated jointly by the student and a professor. There are no other formal prerequisites; but the supervising professor must be convinced that the student is able to profit by the program. Must be taken on a passed/not passed basis. Mr. Fuerstenau in charge (F, W)

GRADUATE COURSES

200A–200B. Materials Science and Engineering. (4–4) Three hours of lecture and one hour of discussion per week. Prerequisite: graduate standing in Engineering Sciences. Crystals, crystal defects, lattice defects, modern imaging and diffraction methods, solid state phase relations, thermodynamics, kinetic models, transport phenomena, phase transformations, electron microscopy, mechanical behavior, fracture, technological materials, environmental effects. Mr. Thomas (W, F)

220. Diffraction and Crystallography Laboratory. (1) One hour of lecture and one 3-hour laboratory per week. Prerequisite: graduate standing. Laboratory for course 200A. Experiments on application of powder and single crystal diffraction techniques. Kikuchi, Debye-Scherrer, diffractometer, and Laue methods; x-ray qualitative and quantitative analysis, orientation of single crystals, electron microscopy of crystals, crystal size determinations. Mr. Bragg (Sp)

221. Applications of Chemical Thermodynamics. (4) Four hours of lecture per week. Prerequisite: course 121 or equivalent. Examination of atomic and chemical concepts and principles of thermodynamics of solutions, non-stoichiometric solids, and aqueous and non-aqueous electrolytes; estimation of missing data. Mr. Seary (F)

222. Bonding and Crystal Structures. (4) Four hours of lecture per week. Prerequisite: course 121 or equivalent. Bonding models and semi-empirical correlations, principles of the thermodynamics of equilibrium, with emphasis on the equilibrium of phases in condensed multicomponent systems. Mr. Morris (Sp)

224. Statistical Thermodynamics. (4) Four hours of lecture per week. Prerequisite: familiarity with vector calculus and partial differential equations. Principles of statistical thermodynamic emphasizing principles and methods important in material science: alloy theory, crystal imperfections, atom migration in crystals. Mr. Morris (Sp)

225. Diffusion in Solids. (4) Four hours of lecture per week. Prerequisite: vector analysis, partial differential equations; course 101, 102, or equivalent. The theory of diffusion in solids: mass balance equations; thermodynamics of diffusion; atom migration in crystals; molecular theory of diffusion. Mr. Morris (F)

226. Dislocation Theory. (3) Three hours of lecture per week. Consideration of perfect and imperfect dislocations, their mutual interaction, relation to point defects and stacking faults, theories of glide and climb motion, dislocations in single-crystal and polycrystalline systems. Emphasis is on the quantitative treatment of dislocations in important crystal structures. Mr. Washburn (F)

228. Dislocation Mechanics. (3 or 4) Three hours of lecture per week. Prerequisite: students who have not taken course 207 or equivalent should register for 4 units and will be given an intensive introduction to dislocation theory during the first two weeks of the course. Application of dislocation theory to provide a basic understanding of mechanical properties of crystalline solids: theories of yielding, strain hardening, twinning, creep, recovery, superplasticity, fracture, and effects of radiation damage. Mr. Washburn (Sp)

210. Surface Properties of Materials. (4) Four hours of lecture per week. Thermodynamics of surfaces and phase boundaries, surface tension and contact angles, interfacial tensions, adsorption, phase equilibria and solid-gas and solid-liquid separations; surfactants and interfacial phenomena; colloidal systems. Mr. Thomas (W, Sp)

211. Thermal and Optical Properties of Materials. (4) Three hours of lecture per week. Prerequisite: any undergraduate course in solid-state physics or physics of materials, etc. Physics 140, 141. Applied Engineering and Computer Sciences 130 or course 108. This prerequisite will be waived for students with undergraduate degrees in physics or chemistry. Applied solid-state physics of materials and materials phenomena of engineering importance, especially non-metallic materials. Development of theory of semiconductors, electronic structure, crystal optics and lasers, elastic constants, phonons, thermal conductivity and thermal expansion.

212. Electromagnetic and Magnetic Properties of Materials. (4) Three hours of lecture per week. Prerequisite: any undergraduate course in solid-state physics or physics of materials, etc. Physics 140, 141. Applied Engineering and Computer Sciences 130 or course 108. This prerequisite will be waived for students with undergraduate degrees in physics or chemistry. Applied solid-state physics of materials and materials phenomena of engineering importance, especially non-metallic materials. Development of theory of semiconductors, electronic structure, crystal optics and lasers, elastic constants, phonons, thermal conductivity and thermal expansion.

213A. Electron Diffraction and Microscopy. (3) Three hours of lecture per week. Prerequisite: course 101 or equivalent. Development of concepts and kinematical theory of diffraction and imaging: contrast from perfect and imperfect crystals, Kikuchi patterns, high resolution electron microscopy; applications to modern research projects in Materials Science and Engineering. Mr. Thomas (W)

213B. Electron Diffraction and Microscopy. (3) Two hours of lecture and three hours of laboratory per week. Prerequisite: course 213A. Development of concepts and kinematical theory of diffraction and imaging: contrast from perfect and imperfect crystals, Kikuchi patterns, high resolution electron microscopy; applications to modern research projects in Materials Science and Engineering. Mr. Thomas (W, Sp)

213L. Electron Microscopy and Diffraction Laboratory. (6) Six hours of laboratory per week. Prerequisite: course 213A: may be taken concurrently: limited to 12 students (W and Sp). Operation of Electron Microscope: high resolution scanning and transmission microscopy; applications to modern research projects in Materials Science and Engineering. Mr. Thomas (W, Sp)

214. X-Ray Diffraction. (3) Three hours of lecture and three hours of laboratory per week. Prerequisite: course 101 or equivalent. Kinematical theory of diffraction, interpretation of diffraction patterns. Structure of single crystals, polycrystalline, and amorphous materials. Laboratory experiments: texture, precipitation and ordering phenomena, stacking faults, dislocations, x-ray topography, small angle scattering. Mr. Bragg (Sp)


216. Solid State Phase Transformations. (3) Three hours of lecture per week. Significance of crystallographic factors in homogeneous, heterogeneous, and martensitic phase transformations; role of lattice defects and ordered phases in nucleation and growth. Mr. Thomas (Sp)

220. Advanced Mineral Processing. (4) Four hours of lecture per week. Prerequisite: graduate standing in engineering or physical science. Characterization of solid particulate materials, size distributions; advanced treatment of principles of mineral processing; comminution, classification and sorting; hydrometallurgy; solid separations and solid-liquid separations; agglomeration, process flowsheet development, analysis of mineral and coal processing circuits; secondary resource recovery. Mr. Sastry (Sp)

221. Applied Colloidal Phenomena. (3) Three
systems. Primary emphasis on the interaction of colloid, coagulation, and dispersion phenomena; selectivity and/or flocculation. Mr. Fuerstenau (Sp)

222. Metallurgical Transport and Rate Phenomena. (3) Three hours of lecture per week. Prerequisite: graduate standing in Engineering. Mr. Sastry (Sp, odd years)

223. Modeling of Metallurgical and Ceramic Processes. (3) Three hours of lecture per week. The steady-

244. Sintering. (3) Formerly numbered 225. Three hours of lecture per week. Prerequisite: graduate standing in Metallurgical and Ceramic Processes. Mr. Fuerstenau (Sp)

245. Nuclear Materials. (4) Four hours of lecture per week. Mr. Pask (W)

246. Sintering. (3) Formerly numbered 225. Three hours of lecture per week. Prerequisite: graduate standing in Metallurgical and Ceramic Processes. Mr. Fuerstenau (Sp)

247. Chemistry of High-Temperature Materials. (3) Three hours of lecture per week. Prerequisite: Chemistry 110A. The chemical reactions of high-temperature materials are described (or predicted), kinetics of high-temperature reactions are demonstrated. Mr. Sastry (W, odd years)

248. Ceramic Processing. (3) Formerly MSE 227. Three hours of lecture per week. Treatment of particulate materials; rheological behavior of solid-liquid systems in controlled temperature and pressure conditions; densification mechanisms. Control of process parameters to develop desired structures (materials) and components. Mr. Sastry (Sp, odd years)

249. Advanced Graduate Study in Materials Science and Engineering. *228. Advanced Extractive Metallurgy. (3) Three hours of lecture per week. Prerequisite: MSE 220 and MSE 223, or consent of the instructor. Analysis of the design of physical systems in relation to ceramic forming processes; densification mechanisms. Control of process parameters to develop desired characteristics (structures) of material. Mr. Sastry (Sp, odd years)

250. Mineral Process Engineering—II. (3) Three hours of lecture per week. Prerequisite: MSE 220 and MSE 223, or consent of the instructor. Analysis of the design of physical systems in relation to ceramic forming processes; densification mechanisms. Control of process parameters to develop desired characteristics (structures) of material. Mr. Sastry (Sp, odd years)

252. Surface Chemistry of Flotation. (3) Three one-hour lectures per week. Application of surface and crystal chemistry to the separation of minerals by flotation. Surface adsorption of surfactants; natural floating ability; flotation of fine particulates, precipitates, oil droplets. Mr. Fuerstenau (Sp)

253. Metallurgical Transport and Rate Phenomena. (3) Three hours of lecture per week. Prerequisite: graduate standing in Engineering. Mr. Sastry (Sp, odd years)

254. Transport Phenomena. (3) Three hours of lecture per week. Analysis of the design of physical systems in relation to ceramic forming processes; densification mechanisms. Control of process parameters to develop desired characteristics (structures) of material. Mr. Sastry (Sp, odd years)

255. Mineral Process Engineering—II. (3) Three hours of lecture per week. Prerequisite: MSE 220 and MSE 223, or consent of the instructor. Analysis of the design of physical systems in relation to ceramic forming processes; densification mechanisms. Control of process parameters to develop desired characteristics (structures) of material. Mr. Sastry (Sp, odd years)

256. Advanced Transport Phenomena. (3) Three hours of lecture per week. Prerequisite: graduate standing in Engineering. Mr. Sastry (Sp, odd years)

257. Advanced Extractive Metallurgy. (3) Three hours of lecture per week. Prerequisite: MSE 220 and MSE 223, or consent of the instructor. Analysis of the design of physical systems in relation to ceramic forming processes; densification mechanisms. Control of process parameters to develop desired characteristics (structures) of material. Mr. Sastry (Sp, odd years)

258. Advanced Transport Phenomena. (3) Three hours of lecture per week. Prerequisite: graduate standing in Engineering. Mr. Sastry (Sp, odd years)

259. Optimal Design of Metallurgical and Mineral Processes. (3) Three hours of lecture per week. Discussion of the procedures used in the design of metallurgical and mineral processes; evaluation of process alternatives; economic optimization of a design. Mr. Evans, Mr. Sastry (F)

241. Numerical Methods in Materials Science and Engineering. (3) Three hours of lecture per week. Prerequisite: At least one senior or graduate course in both Physical Metallurgy (course 109, 200A—200B) and Applied Mechanics (Mechanical Engineering 185, 225A). Identification of alloy needs in the advanced technologies of energy, transportation, etc. Design of alloys based upon first principles of materials science and engineering, intended to provide an introduction to the materials science literature. Mr. Evans (Sp)

243. Design of Alloys for Advanced Engineering Systems. (3) Three hours of lecture per week. Prerequisite: graduate standing in Engineering. Calculus, linear algebra, and computer programming are used to prepare students for the design of alloys, composites, and structural materials. Mr. Evans, Mr. Sastry (F)

244. Dispersions and Composites. (3) Three hours of lecture per week. Treatment of the behavior of composite materials composed of equiaxed, plate-like, fibrous, or filamentary phases dispersed in a second phase. Applications to strengthening, engineering and economic restraints specific to the intended application will be emphasized in design efforts. Mr. Zazkay (F)

245. Nuclear Materials. (4) Four hours of lecture per week. The behavior of fuel, moderator, control and structural materials in nuclear reactor environments with emphasis on the mechanism of irradiation damage and the effect of irradiation damage on the properties of materials. The Staff (W, odd years)

246. Sintering. (3) Formerly numbered 225. Three hours of lecture per week. Prerequisite: graduate standing in Metallurgical and Ceramic Processes. Mr. Fuerstenau (Sp)

247. Chemistry of High-Temperature Materials. (3) Three hours of lecture per week. Prerequisite: Chemistry 110A. The chemical reactions of high-temperature materials are described (or predicted), kinetics of high-temperature reactions are demonstrated. Mr. Sastry (W, odd years)

248. Ceramic Processing. (3) Formerly MSE 227. Three hours of lecture per week. Treatment of particulate materials; rheological behavior of solid-liquid systems in controlled temperature and pressure conditions; densification mechanisms. Control of process parameters to develop desired structures (materials) and components. Mr. Sastry (Sp, odd years)

249. Advanced Graduate Study in Materials Science and Engineering. *228. Advanced Extractive Metallurgy. (3) Three hours of lecture per week. Prerequisite: MSE 220 and MSE 223, or consent of the instructor. Analysis of the design of physical systems in relation to ceramic forming processes; densification mechanisms. Control of process parameters to develop desired characteristics (structures) of material. Mr. Sastry (Sp, odd years)

250. Mineral Process Engineering—II. (3) Three hours of lecture per week. Prerequisite: MSE 220 and MSE 223, or consent of the instructor. Analysis of the design of physical systems in relation to ceramic forming processes; densification mechanisms. Control of process parameters to develop desired characteristics (structures) of material. Mr. Sastry (Sp, odd years)
205. Electronic Instrumentation In Applied Geophysics. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: Geophysics 3A, 3B, or equivalent. The course covers general instrumentation techniques used in geophysical exploration, including laboratory equipment and techniques used in data acquisition and interpretation.


207A-207B. Computer Methods In Applied Geophysics. (4-4) Seven hours of laboratory per week. Prerequisites: courses 104B, 105B, 106A. Experimental investigation and analysis of the steady-state and dynamic behavior of mechanical systems and of their thermal and dynamic processes. 

210A-210B. Fluid Mechanics and Transport Processes. (4) Four and one-half hours of lecture and one hour of discussion per week. Prerequisite: course 105A, 106A or 106B. 

211. Plasticity and Metal Forming. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 104B, 105B, 106A. 

212. Design of Welded and Cast Structures. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 102B. 

213. Advanced Methods In Mechanical Design. (3) Three hours of lecture per week. Prerequisite: course 102B or 102C. 

214. Applied Stress Analysis. (4) Four and one-half hours of lecture and one hour of discussion per week. Prerequisites: Engineering 3A, 3B or equivalent. 

215. Electronic Instrumentation In Applied Geophysics. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: Geophysics 3A, 3B, or equivalent. The course covers general instrumentation techniques used in geophysical exploration, including laboratory equipment and techniques used in data acquisition and interpretation. 

216. Fluid Mechanics and Transport Processes. (4) Four and one-half hours of lecture and one hour of discussion per week. Prerequisite: course 105A, 106A or 106B. 

217. Design of Welded and Cast Structures. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 102B. 

218. Plasticity and Metal Forming. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 104B, 105B, 106A. 

219. Advanced Methods In Mechanical Design. (3) Three hours of lecture per week. Prerequisite: course 102B or 102C. 

220. Applied Stress Analysis. (4) Four and one-half hours of lecture and one hour of discussion per week. Prerequisites: Engineering 3A, 3B or equivalent. 

221. Electronic Instrumentation In Applied Geophysics. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: Geophysics 3A, 3B, or equivalent. The course covers general instrumentation techniques used in geophysical exploration, including laboratory equipment and techniques used in data acquisition and interpretation. 

222. Fluid Mechanics and Transport Processes. (4) Four and one-half hours of lecture and one hour of discussion per week. Prerequisite: course 105A, 106A or 106B. 

223. Design of Welded and Cast Structures. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 102B. 

224. Plasticity and Metal Forming. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 104B, 105B, 106A. 

225. Advanced Methods In Mechanical Design. (3) Three hours of lecture per week. Prerequisite: course 102B or 102C. 

226. Applied Stress Analysis. (4) Four and one-half hours of lecture and one hour of discussion per week. Prerequisites: Engineering 3A, 3B or equivalent. 

227. Electronic Instrumentation In Applied Geophysics. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: Geophysics 3A, 3B, or equivalent. The course covers general instrumentation techniques used in geophysical exploration, including laboratory equipment and techniques used in data acquisition and interpretation. 

228. Fluid Mechanics and Transport Processes. (4) Four and one-half hours of lecture and one hour of discussion per week. Prerequisite: course 105A, 106A or 106B. 

229. Design of Welded and Cast Structures. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 102B. 

230. Plasticity and Metal Forming. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 104B, 105B, 106A. 

231. Advanced Methods In Mechanical Design. (3) Three hours of lecture per week. Prerequisite: course 102B or 102C. 

232. Applied Stress Analysis. (4) Four and one-half hours of lecture and one hour of discussion per week. Prerequisites: Engineering 3A, 3B or equivalent. 

233. Electronic Instrumentation In Applied Geophysics. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: Geophysics 3A, 3B, or equivalent. The course covers general instrumentation techniques used in geophysical exploration, including laboratory equipment and techniques used in data acquisition and interpretation. 

234. Fluid Mechanics and Transport Processes. (4) Four and one-half hours of lecture and one hour of discussion per week. Prerequisite: course 105A, 106A or 106B. 

235. Design of Welded and Cast Structures. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 102B. 

236. Plasticity and Metal Forming. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 104B, 105B, 106A. 

237. Advanced Methods In Mechanical Design. (3) Three hours of lecture per week. Prerequisite: course 102B or 102C. 

238. Applied Stress Analysis. (4) Four and one-half hours of lecture and one hour of discussion per week. Prerequisites: Engineering 3A, 3B or equivalent. 

239. Electronic Instrumentation In Applied Geophysics. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: Geophysics 3A, 3B, or equivalent. The course covers general instrumentation techniques used in geophysical exploration, including laboratory equipment and techniques used in data acquisition and interpretation. 

240. Fluid Mechanics and Transport Processes. (4) Four and one-half hours of lecture and one hour of discussion per week. Prerequisite: course 105A, 106A or 106B. 

241. Design of Welded and Cast Structures. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 102B. 

242. Plasticity and Metal Forming. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 104B, 105B, 106A. 

243. Advanced Methods In Mechanical Design. (3) Three hours of lecture per week. Prerequisite: course 102B or 102C. 

244. Applied Stress Analysis. (4) Four and one-half hours of lecture and one hour of discussion per week. Prerequisites: Engineering 3A, 3B or equivalent. 

245. Electronic Instrumentation In Applied Geophysics. (4) Three hours of lecture and three hours of laboratory per week. Prerequisites: Geophysics 3A, 3B, or equivalent. The course covers general instrumentation techniques used in geophysical exploration, including laboratory equipment and techniques used in data acquisition and interpretation. 

246. Fluid Mechanics and Transport Processes. (4) Four and one-half hours of lecture and one hour of discussion per week. Prerequisite: course 105A, 106A or 106B. 

247. Design of Welded and Cast Structures. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 102B. 

248. Plasticity and Metal Forming. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 104B, 105B, 106A. 

249. Advanced Methods In Mechanical Design. (3) Three hours of lecture per week. Prerequisite: course 102B or 102C. 

250. Applied Stress Analysis. (4) Four and one-half hours of lecture and one hour of discussion per week. Prerequisites: Engineering 3A, 3B or equivalent.
131. Kinematics of Mechanism. (3) Two hours of lecture and three hours of laboratory per week. Prerequisite: course 103 or 104A. Ad- vanced kinematic analysis and synthesis of typical mechanisms. In this course, the student will be introduced to the theory of mechanism design, including the topics of motion motion, Lagrange’s principle, damped, mechanical resonance, transient and random excitation. Mr. Steidel, Mr. Mote (F, Sp).

132. Dynamics of Machinery. (3) Three hours of lecture per week. Prerequisite: course 103 or 104A. Kinematic and dynamic analysis of rigid body mecha- nisms. Topics covered include graphical and analytical-kinematic methods. Dynamics of car driven systems. Dynamics of rotating systems. Balancing of rotors. Dynamic re- sponse of rigid body systems. Design of mechanisms.

Mr. Radcliffe (W)

133. Mechanical Vibrations. (3) Three hours of lecture per week. Prerequisite: course 103 or 104A. An introduction to the theory of mechanism design, including the topics of motion motion, Lagrange’s principle, damped, mechanical resonance, transient and random excitation. Mr. Steidel, Mr. Mote (F, Sp).

134. Automatic Control Systems. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: Math. 11C, 11D, Physics 5C, ME 134. Configurations and functional descrip- tions of instruments and actuators for control. Treat- ment of the control of gas and liquids. Analysis of the analog and digital control system design and applica- tion to laboratory systems. Introduction to design and analysis techniques for application to switching control or control computer interfacing.

Mr. Tomizuka (Sp)

142. Atmospheric and Thermal Environmental Control. (4) Four and one-half hours of lecture per week. Prerequisite: courses 105B, 106B. Production and control of atmospheric and thermal environmental for- ecasts. Topics in forecast conditions and trends, air pol- lution and psychrometric processes, and air pollu- tion control.

Ms. Kendall (W)

145. Energy Conversion Principles. (4) Four and one-half hours of lecture per week. Prerequisite: courses 105B, 106B. Thermodynamic principles of en- ergy conversion systems. Emphasis on direct energy conversion including thermoelectric, photovoltaic, thermionic, magnetohydrodynamic and electro- hydrodynamic devices, fuel cells, and nuclear power sources. Mr. Daily (F)

146. Combustion Processes. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 105B, 106B, or equivalent. Fundamentals of combustion, flame spread, fuel com- bustion, ignition, stirred reaction, kinetics and nonequilib- rium processes, pollutant formation.

Mr. Oppenheim (W)

147. Combustion Engines. (4) Four and one-half hours of lecture per week. Prerequisite: course 105B, 106B; 146 recommended. Application of thermodynamics and fluid mechanics to combustion en- gines, including system performance. Mr. Pagni (Sp)


Mr. Oppenheim (W)

198. Group Studies for Advanced Undergradu- ate Students. (1-5) Enrollment is restricted by regulations of the department. Advanced studies in a given field. Enrollment is subject to approval by the student’s department and the relevant faculty instructor. Treatment of elastic, plastic, and creep deformation, the behavior of materials under dynamic and impact loading. Mr. Rosenberg (F, W, Sp)

GRADUATE COURSES

1210. Biological Control Systems. (2) Two hours of lecture per week. Engineering analysis of biological control systems in two areas of current research effort: the application of modern control theory to complex systems illustrated by biological and chemical engineering systems. The reductionist approach to anatomical-physiological ele- ments and classical analytical evaluation of dynamical and biomaterial characteristics. Mr. Stark (F)

1211. Biological Control Laboratory. (2) Six hours of laboratory per week. Experimental methods of analysis and application of specialized bioengineering transducers, on-line digital computers and display and recording equipment to biomedical engineering systems. Modelling with digital simulation will be em- phasized to interpret quantitative experimental data and to show how classical and modern control theory elucid- ates the design features of these living systems. Mr. Stark (F)

213. Physiological Fluid Mechanics. (3) Three hours of lecture and one hour of discussion. Prerequisite: course 105A or 106A, course 150C, 151C. Introductory course in physiological fluid dynamics, mechanical properties of substances and evaluation of transport coefficients. Mr. Tien (F)

216. Transport Processes in Biological Sys- tems. (4) Three hours of lecture and one hour of discus- sion per week. Prerequisite: course in differential equations, basic knowledge of mechanical, thermal and fluid me- chanics, and elementary biology or physiology. Transport of heat and mass in biological systems; mass transfer in transport devices; transport phenomena; applications to the design of biological systems. Mr. Carroll (F)

222. Applications of Theory of Plasticity. (3) Three hours of lecture per week. Prerequisite: course 122A or 234, or 222B. Concepts of mechanical behavior of materials. Stress and strain analysis by the methods of the theory of plasticity. Emphasis on the analysis of plasticity problems and applications. Mr. Frisch (Sp)

225A. Mechanical Behavior of Engineering Mate- rials. (4) Three hours of lecture and one hour of discus- sion per week. Prerequisite: CE 130A, or consent of instruc- tor. Treatment of elastic, plastic, and creep deforma- tion under static and cyclic loads with emphasis on the prediction of service performance from simple tests. Failure due to fatigue, creep-rupture, and plastic instability will also be considered. Mr. Finnie (F)

225B. Fracture of Engineering Materials. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: CE 150A, or consent of instructor. Treatment of fracture from engineering point of view. The
230. Real-Time Applications of Mini and Micro Computers. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: graduate standing in engineering and knowledge of assembly language programming. The purpose of the course is to build competence in the engineering use of such systems through lectures stressing small computer programming and design, output/input operations, and through laboratory work with mini and micro computer systems. Mr. Auslander (W)

231. Advanced Kinematics and Mechanics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: ME 104B. Kinematic analysis and synthesis of planar and spatial mechanisms. Emphasis on computer-aided design using modern numerical and matrix methods. Synthesis of plane and spatial mechanisms to yield a rigid body through multiple positions with finite and infinitesimal displacement constraints. Mr. Radcliffe (W)

232. Dynamic Systems in State Space and Transfer Domain. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: ME 232, or consent of instructor. Frequency response concept. Limit cycle and nonlinear systems. Design and analysis of digital control systems. Discrete and continuous state variable control feedback systems. Frequency response concept. Limit cycle and nonlinear systems. Design and analysis of digital control systems. Discrete and continuous state variable control feedback systems. Mr. Takahashi (F)

233. Advanced Automatic Control Techniques. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: ME 232, or consent of instructor. Lyapunov stability and Popov hyperstability and their application to adaptive and servomechanisms. Mr. Auslander (F)

234. Optimal and Adaptive. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: ME 232, or consent of instructor. Lyapunov stability and Popov hyperstability and their application to adaptive and servomechanisms. Mr. Takahashi (W)

235. Switching Control and Computer Interfacing. (4) Three hours of lecture and 3 hours of laboratory per week. Prerequisite: Engineering 230A, course 162. Incompressible airfoil and wake flows. (Sp)

240. Experimental Methods in Mechanical Engineering. (3) One and one-half hours of lecture and one and one-half hours of laboratory per week plus term project. Prerequisite: graduate standing; Principles and techniques of experiment design and execution; response characteristics and error sources and the design of experiments. Reduction of observations. Laboratory experience in the design and use of contemporary measurement systems. Mr. Hurbit (F)

241. Heat Conduction. (3) Three hours of lecture and one hour of discussion per week. Prerequisite: Engineering 117, Mechanical Engineering 151, 159. The transport of heat in solids. Mr. Seban (F)

242. Heat Convection. (3) Three hours of lecture per week. Prerequisite: Engineering 117, Mechanical Engineering 151, 159. Thermal radiation properties of gases, liquids and solids; the calculation of radiant energy exchange. Mr. Grall (Sp)

243. Equilibrium Thermodynamics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 155 or equivalent. Statistical formulation of classical thermodynamics. Statistical mechanics of pure substances and of mixtures. Mr. Pagli (W)

244. High Temperature Thermodynamics. (3) Three hours of lecture and one hour of discussion per week. Prerequisite: course 155. Chemical thermodynamics, statistical mechanics applied to equilibri um chemical systems, chemical reactions, molecular spectroscopy and reaction kinetics. Mr. Daily (Sp)


246. Introduction to Non-Equilibrium Thermodynamics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 155 or equivalent. General formulation of coupled transport phenomena. Detailed application to diffusion processes, electrokinetic phenomena, thermoelectrically, memory processes, thermal diffusion, and others. Mr. Spiegler (W)

247. Waves in Fluids. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 159 or 162. Propagation of linear and non-linear waves in fluids. Wave interaction in gases, including plane and curved waves. Dispersion, and dissipation. Analog by surface water waves. Mr. Tien (W)

248. Theoretical Hydrodynamics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 162 and Engineering 230A. Development of the theoretical methods for solving some of the classical problems in hydrodynamics with emphasis on the applications to current research work in fluid mechanics. Mr. Tien (W)

249. Wing Theory. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: Engineering 230A, course 159 or 162. Course 263A is prerequisite to 263B. Laminar and turbulent deflagrations. Rankine-Hugoniot relations. Diffusion flames. Boundary layer combustion. Ignition and stability. Mr. Hsu (Sp)

250. The Dynamics of Rockets. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 175. Oscillations, Shock Dynamics, flight mechanics, problems having one degree of freedom. Qualitative and quantitative methods: phase-plane, graphical, iteration, perturbation and asymptotic methods. Adiabatic, nonadiabatic, and nonequilibrium systems. Mr. Goldsmith (Sp)

251. Oscillations in Nonlinear Systems. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 104A and 133 or equivalent. Nonlinear systems including high speed flow, transonic flow, boundary layer and wake flows. Mr. Oppe (W)

252. Magnetohydrodynamics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: background in gasdynamics. Gas-liquid chemical systems; deposition of energy in a compressible medium, with particular attention given to the effects of exothermic processes in closed chemical systems. Theory of combustion, detonation, and blast waves. Mr. Oppel (F)

253. Methods of the Calculus of Variations and Applications. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: Engineering 115 or course 175. Methods of the calculus of variations for fixed, free and movable endpoint problems without and with side constraints. Application to stationarity and minimum principles and to problems of optimal control and design of dynamical systems. Mr. Rosenbeg (W)

254. Oscillatory Perturbations. (3) Three hours of lecture per week. Prerequisite: course 104A and 133 or equivalent. Nonlinear systems and distributed parameters. Mr. Berger 263A (W); Mr. Sherman 263B (Sp)

255. Numerical Methods in Fluid Dynamics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 261 or consent of instructor. Application of finite difference and other numerical techniques to current problems of fluid dynamics, including high speed flow, transonic flow, boundary layer and wake flows.

256. Advanced Reservoir Engineering. (4) Four and one-half hours of lecture and discussion per week. Prerequisites: ME 253B or ME 259 or CS 295A; knowledge of computer programming. Analytical and numerical techniques used for analysis of discrete systems. Emphasis is on the development of computer programs to obtain eigenvalues: systems response and system stability. Integration methods for large order systems are discussed.

257. The Finite Element Method. (4) Four and one-half hours of lecture and one hour of discussion per week. Prerequisite: Engineering 260A. Course develops foundations of the finite element method for application to solid and fluid mechanics, including discretization methods which precede Initial value, boundary value, and eigenvalue problems. Use of the finite element method to solve problems of fluid dynamics, heat transfer and field problems. Emphasis on the formulation of elements, element state equa-
281. Methods of Tensor Calculus and Differential Geometry. (3) Three hours of lecture per week. Prerequisites: 115 or course 185. Methods of tensor calculus and classical differential geometry. The tensor concept and the calculation in various types of coordinate systems and in Riemannian and Euclidean spaces. Geometry of a surface, formulas of Weingarten and equations of Gauss and Codazzi. Mr. Naghdi (F).

282A. Theory of Elasticity I. (3) Three hours of lecture per week. Prerequisite: course 185. Fundamentals of the linear theory of elasticity (in three dimensions) and of various types of non-linear problems. Solution of problems arising in the torsion and bending of elastic solids. Mr. Bogy (Sp).

282B. Theory of Elasticity II. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 185. General theories including variational theorems and minimum principles, representation of the basic field equations in terms of displacement potentials (and stress functions). Three-dimensional problems of elasticity and related special theories. Mr. Bogy (Sp).


283. Wave Propagation in Elastic Media. (4) Three hours of lecture and two hours of discussion per week. Prerequisite: ME 155. Propagation of mechanical disturbances in unbounded and bounded media. Surface waves, wave reflection and transmission, interference, stress waves due to periodic and transient sources. Other topics may vary with instructor; odd years Professor Bogy, even years Professor Goldsmith. Mr. Goldsmith (F).


286. Theory of Plasticity. (3) Three hours of lecture per week. Prerequisite: course 185. Fundamentals of plasticity, concept of yield and associated constitutive equations for the elasto-plastic solids such as those for perfectly plastic, and elastic-perfectly plastic solids. General theories. Application to torsion and plane problems of plasticity. Mr. Bogy (W).

287. Impact. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 185. Collisions of solid bodies. Wave propagation and contact processes problems in elastic, plastic, and visco-elastic media by inverse or impact loading. Penetration, perforation and hydrodynamic phenomena. Response of materials to impact. Applications to rails, anti-ballistics, rods, bombs, and semi-infinite solids. Mr. Goldsmith (W).

288. Theory of Elastic Stability. (3) Three hours of lecture and one hour of discussion per week. Prerequisite: course 292A. General concept of stability of elastic systems and its connection with eigenvalue problems. Stability under static and dynamic conditions as postbuckling behavior, stability of nonlinear systems, dynamic stability. Stability theory based upon the work of Timoff, Goodier, etc. Mr. Wehausen (W).

*290A. Topics in Nonlinear Oscillations. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 277. Oscillations in nonlinear systems. Introduction to the study of nonlinearity. Theoretical and practical methods of analyzing nonlinear oscillations. Mr. Naghdi (F).

*290B. Topics in Nonlinear Continuum Mechanics. (3) Three hours of lecture per week. Prerequisite: course 292A. Recent developments in nonlinear continuum mechanics, e.g., a general theory of oriented (or directed) media, non-linear theory of diffusion, theory of electrified and magnetized continuous media, etc. Mr. Naghdi (Sp).

290C. Topics in Dynamic Games. (3) Three hours of lecture per week. Prerequisite: course 271 or equivalent. Introduction to the theory of dynamic games and many player games. Necessary and sufficient conditions for Nash equilibrium strategies, including saddle points. Applications of the minimax or Pareto-optimal controls for systems governed by ordinary differential equations. Applications to design, economics, etc. Mr. Naghdi (Sp).

*290D. Powder Metallurgy. (2 or 3) Two to three hours of lecture per week. A study of the consolidation of powders into useful materials and products from both the scientific and technological viewpoints. Mr. Naghdi (Sp).

290F. Relativistic Mechanics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: courses 175 and 185. Critical examination of relativity and conceptual foundation of principle of principle. Tracing relativistic evolution of mechanics and development of important consequences in particle and continuum mechanics based on generalization of Hamilton's Principle. Mr. Naghdi (Sp).

*290G. Topics in Dynamical Systems. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 271 or equivalent. Critical treatment of dynamical systems, emphasizing those for perfectly plastic and elasto-plastic solids. General theorems. Application to torsion and bending of elastic solids and study of nonlinear systems, and their stability. Mr. Naghdi (Sp).

*290H. Topics in Nonlinear Continuum Mechanics. (3) Three hours of lecture per week. Prerequisite: course 292A. Recent developments in nonlinear continuum mechanics, e.g., a general theory of oriented (or directed) media, non-linear theory of diffusion, theory of electrified and magnetized continuous media, etc. Mr. Naghdi (Sp).

290I. Topics in Linear Continuum Theories. (3) Three hours of lecture per week. Prerequisite: course 262B. Some topics from recent developments in linear continuum theories, for example, linear elasticity and linear viscoelasticity and others which bear on modern concepts of material behavior. Topics may change from year to year. Mr. Naghdi (Sp).


290 O. Boiling Heat Transfer. (3) Three hours of lecture per week. Prerequisite: course 151 and Engineering 106A and Civil Engineering 130. Geometry of the ship's form, conditions of static and dynamic stability, methods of floating and submerged bodies, the application of digital computers and modern concepts of material behavior. Topics may change from year to year. Mr. Naghdi (Sp).

290Q. Numerical Methods for Heat and Mass Transfer. (3) Three hours of lecture per week. Prerequisite: course 252. The application of numerical methods for boundary layer calculation, for boundary layer flows such as layers on surfaces, plumes, jets, and flow in conduits, accounting for radiation, rotation, and chemical reaction. Some consideration of the calculation of elliptic problems. Mr. Seban (W).

*290S. Advanced Natural Gas Engineering. (3) Three hours of lecture per week. Prerequisite: Graduate Standing. Advanced topics in three problems in phase behavior of natural gas systems including water-hydrocarbon systems, vapor-liquid equilibria, and non-steady state phenomena. Use of digital computers in underground storage of natural gas. Mr. Naghdi (Sp).

*290V. Advanced Topics in Mechanics Design. (4) Three hours of lecture per week. Prerequisite: Introduction to design of space and planetary mechanisms. Differential geometry of motion. Curve theory. Dynamics of spatial mechanisms. Numerical methods and computer-aided design. Mr. Naghdi (Sp).

298. Group Studies, Seminars, or Group Research. (1–5) Advanced studies in various subjects through seminar or topic courses to be selected each semester. Prerequisite: 185 and approval of special problems, group participation in comprehensive design problems, or group research on contemporary problems for students in good standing who wish to undertake a program of individual inquiry initiated jointly by the student and a professor. There are

### Naval Architecture

**Upper Division Courses**

151. Statics of Naval Architecture. (3) Three 1-hour lectures per week. Prerequisite: Mechanical Engineer- ing 106A and Civil Engineering 130. Geometry of the ship's form, conditions of static and dynamic stability, methods of floating and submerged bodies. Mr. Wehausen (F).

152A. Ship Resistance and Propulsion. (3) Three 1-hour lectures per week. Prerequisite: course 151 which may be taken concurrently. Elementary theory of wave water. Fundamentals of ship resistance (F) and dimensional analysis. Estimates of resistance from model tests and tabulated data. Mr. Pauling (F).

152B. Ship Dynamics. (3) Three 1-hour lectures per week. Prerequisite: course 152A. Rigid-body dynamics of ships. Introduction to theories of motion of objects in a sea way. Mrs. Pauling (W).

153. Marine Engineering. (5) Three 1-hour lectures and three 1-hour discussions per week; three to five field trips. Prerequisite: Mechanical Engineering 105B (recommended course 125B). A description and analysis of the important characteristics of marine propulsion and auxiliary machinery systems, especially as they interact with the design of the ship as a whole. Mr. Wehausen (F).

154A–154B. Ship Design. (3–3) One 1-hour lecture and two 3-hour laboratories per week. Prerequisite: course 152A. Mr. Webster (Sp).

154A. Preliminary design of a ship of the student's choice, including weight and size estimates, preparation of a lines drawing and a preliminary structural design. Mr. Pauling (F).

154B. More detailed study of some single aspect of the design. Mr. Webster (Sp).

198. Directed Group Studies for Advanced Under- graduates. (1–5) Prerequisite: requirements will be specified by the instructor. Group studies of selected topics which will vary from year to year. The Staff (Mr. Pauling in charge) (F, W, Sp).

199. Supervised Independent Study and Research. (1–5) Prerequisite: approval of special problems. Independent 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. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp).

IDS 225A–225B. Experimental Design Project in Solid Waste Management. (4–4) See Inter- departmental Studies for the complete description of this course.
Nuclear Engineering

**GRADUATE COURSES**

240A–240B–240C. Theory of Ship Structures. (3–3–3) Three times weekly. Prerequisite: course 151. Design and performance of ship structures using rational methods. Predictions of force and moment systems, energy levels; distributions of stress, strains, and displacements; and interpretation of large-scale experiments and performance data. (M. Pauling (sequence beginning F)


242. Advanced Ship Design. (3) One 1-hour conference plus one 4-hour laboratory period per week. Prerequisite: courses 240A–240B–240C, 241A–241B–241C. Each student will execute a design project involving part of the whole of a ship. Instead of typical design methods, advanced (more speculative) techniques of rational mechanics, deriving from the analyses of Naval Architecture 240 and 241 will be applied. (The Staff (Mr. Webster in charge) (Sp)

290. Advanced Graduate Study in Naval Architecture. Current and advanced topics in theory and design of structural dynamics of free surfaces, ship vibrations, and other specialized studies in related areas of naval architecture. (W. Menzies (F and W)

290B. Special Topics in Ship Hydrodynamics. (3) Three 1-hour lectures per week. Prerequisite: course 241B. Approximation methods in ship hydrodynamics, formulation and solution of special boundary-value problems, stabilization of ship motion, investigation of an irregular seaway, topics from current literature. (M. Wehausen (W)

290C. Dynamics of Marine Structures. (3) Three 1-hour lectures per week. Prerequisite: course 241A or permission of instructor. Behavior of ships and other mobile marine structures in response to externally or internally generated forces. Topics include motions of ships and stable platforms in waves, steering and control of surface ships and submarines, behavior of moored and towed bodies. (M. Maclennan (Sp)

290D. Analysis of Ship Systems. (3) Three hours of lecture per week. Prerequisite: course 154A–154B (or consent of instructor). Analysis of a system of reactor safety; cost calculation, reliability, and optimization. Applications of techniques to problems of ship routing, construction cost, fleet selection, and cargo handling. (M. Webster (Sp)

290E. Vehicles for Ocean Engineering. (3) Three hours of lecture per week. Prerequisite: graduate standing in Engineering. Advanced study of vehicles for performing engineering functions in the ocean. Topics include environment, deep ocean tasks, vehicle types, design requirements, mooring stability, structural problems. (M. Pauling (Sp)

299. Group Studies, Seminars, and Group Research. (1–8) Advanced study in subjects to be selected each year, informal group studies of special problems, group participation in comprehensive design projects, or group study of complete proposed research and analysis/experimentation. The Staff (Mr. Wehausen in charge) (F, W, Sp)

**Nuclear Engineering**

**UPPER DIVISION COURSES**


102. Nuclear Instrumentation Laboratory. (3) One hour of lecture and four hours of laboratory per week. Prerequisite: course 101 or other upper division course in nuclear physics or nuclear chemistry. Use of electronic and instrumentation involved in radiation detection and analysis. Study of the interaction of radiation with matter. (M. Kaplan (F)

103. Experimental Neutronics Laboratory. (2) Four hours of laboratory per week. Prerequisite: courses 102 and 150A–150B. Calibration of control rods, pre-operational checkout, reactor pulsing, neutron noise measurements, axial flux and power determination, dosimeter calibration, neutronics calculations, compensated on chambers, flux shape and relaxation length in an exponential pile. (M. Ruby (Sp)

120. Nuclear Materials. (4) Three and one-half hours of lecture and one hour of discussion per week. Prerequisite: upper division course in thermodynamics. Fundamental aspects of the nuclear fuel cycle, structural and irradiation properties of metals and cer- tain, statistical thermodynamics, thermal and co- hesive properties of solids; chemistry and atomic mobility; collision dynamics and energy transfer; the collision cascade; effect of fast neutrons; computer simulation. (Mr. Olander (W)

124. Nuclear Chemical Engineering. (4) Three and 1/2 hours of lecture and one hour of discussion per week. Prerequisite: upper division course in thermodynamics. Uranium demand and availability, fuel cycles for various reactor types; uranium ores, milling, feed material purification; fuel element fabrication; uranium enrichment gas centrifuge; ideal cascades and enrichment costs; fuel reprocessing by solvent extraction; radioactive waste management. (M. Olander (F)

150A–150B. Introduction to Nuclear Reactor Theory. (4–3–4) 150A. Four hours of lecture per week. Prerequisite: Physics 51C, and either course 101 or an upper division course in nuclear physics. Neutron interactions, nuclear fission, chain reactions in thermal and fast nuclear reactors. Diffusion and slowing down of neutrons. Critically calculations. Nuclear reactor dynamics and reactivity feedbacks. Fuel cycles and fuel management. Production of radionuclides in nuclear reactors. (M. Schrock (Sp)

153. Environmental Aspects of Nuclear Technology. (3) Three hours of lecture per week. Prerequisite: Chemistry 1A–1B, Nuclear Engineering 101. Power demands and needs. Nuclear power: growth, production and distribution. Environmental impacts of the nuclear fuel cycle. Radioactivity properties, sources and control of environmental releases, biological and ecological effects. Consequences and patterns of nuclear accident research; siting and considerations: demographical, geological, meteorological. Standards and regulations. (Mr. Kaplan (F)

160A–160B. Nuclear Power Engineering. (4–4) Four hours of lecture per week. Prerequisites: Mechanical Engineering 105A and Junior department in thermodynamics; Mechanical Engineering 106A or Civil Engineering 165A or a junior-level course in fluid mechanics. Nuclear Power Engineering 101 and a sufficient prerequisite. Engineering analysis in the design of nuclear fission power reactors and systems. Energy conversion in thermal and structural design of reactor cores and plant components. Energy conversion. Safety evaluation, design of engineered safeguards. Introduction to economics of nuclear power generation. (M. Chambria (F, W)

162. Radiation Protection and Control. (4) Four hours of lecture per week. Prerequisite: course 101 or permission of instructor. The design, operation, and control of nuclear installations. Passage of radiation through matter, dosimetry units and measurement, somatic and genetic effects of radiation, protection of personnel and equipment from occupational exposure, calculation of inhaled and ingested dose, atmospheric dispersion of radioactive, attenuation of radiation fields. (M. Kaplan (W)

198. Group Study for Advanced Undergraduates. (1–5) Prerequisite: upper division standing. Group studies of selected topics. (The Staff (F)

199. Supervised Independent Study and Research. (1–5) Enrollment is restricted by regulations listed on page 36. For students desiring to undertake a program of individual inquiry initiated and guided by the student and a professor. There are no specific prerequisites, but the supervising professor must be convinced that the student is able to profit by the program. Must be taken on a passed/not passed basis. (The Staff (F, W, Sp)

**GRADUATE COURSES**

201A–201B. Nuclear Reactions and Interaction of Radiation With Matter. (3–3) Three hours of lecture per week. Prerequisite: course 102. Behavior of nuclear reactors and metals under irradiation; fuel and fissile product thermochromy, redistribution and swelling, fission gas release; hardening, embrittlement and fracture of neutron-irradiated metals; void swelling and creep; fuel modeling codes; plasma-wall interactions in fusion reactors. (Mr. Olander (W, Sp)

220A–220B. Irradiation Effects in Nuclear Materials. (4–4) Four hours of lecture per week. Prerequisite: course 122. Behavior of nuclear fuels and metals under irradiation; fuel and fission product thermochromy, redistribution and swelling, fission gas release; hardening, embrittlement and fracture of neutron-irradiated metals; void swelling and creep; fuel modeling codes; plasma-wall interactions in fusion reactors. (Mr. Olander (W, Sp)

224. Process Technology in the Nuclear Fuel Cycle. (4) Four hours of lecture per week. Prerequisite: course 102. Analysis of fuel cycles for nuclear power reactors, including converters and breeders. Reactivity lifetime, fuel burnup; fuel management; economic analysis and optimization; uranium and thorium fueling; uranium and plutonium recycle; resource utilization. Requirements for enrichment, reprocessing, and waste management; proliferation-resistant fuel cycles. (M. Pigford (W)

240. Biological Effects of Radiation and Radiation Safety. (4) Four hours of lecture per week. Prerequisite: consent of instructor. Safety criteria. Effects of charged particles and gamma radiations on function and cell growth. (M. Wallace (F)

250A–250B. Nuclear Reactor Theory. (4–4) Four hours of lecture per week. Prerequisite: Engineering 117, course 121. Neutron transport theory; slowing down of neutrons; thermal spectra; multigroup theory; perturbation theory and adjoint function; applications to reactor reactivity coefficients; reactor kinetics; fuel depletion, and cycling. (M. Grossman (W, Sp)

255. Numerical Methods of Reactor Analysis. (4) Four hours of lecture per week. Prerequisite: course 250A–250B. Mathematics 120A-120B-120C recommended. Computational methods of the numerical analysis of various approximations to the neutron
transport equations in problems of nuclear reactor theory, difference equations for neutron diffusion problems, criticality and eigenvalue problems, transport methods, Monte Carlo techniques.

Mr. Grossman (Sp)


Mr. Pigford (F, W, Sp)

601. Individual Study for Master's Candidates. (1-8) Individual study for the comprehensive or language examination. May not be used to meet either unit or residence requirements for the master’s degree. Must be taken on a satisfactory or unsatisfactory basis.

Mr. Pigford (F, W, Sp)

602. Individual Study for Doctoral Students. (1-8) Individual study in consultation with the major field adviser. Units may not be used to meet either unit or residence requirements for the doctoral degree. Must be taken on a satisfactory or unsatisfactory basis.

The Staff (F, W, Sp)

260A-260B. Thermal Aspects of Nuclear Reactors. (3) Three hours of lecture per week. Prerequisite: upper division course in thermodynamics. Fluid dynamics and heat transfer; thermal and hydraulic analysis of nuclear reactors; two-phase flow, boiling; compressible flow; stress analysis; energy conversion methods.

Mr. Yadgaroglu (F, W)

*262. Radiation Shielding and Environmental Effects. (3) Three hours of lecture per week. Prerequisite: upper division course in nuclear physics or nuclear chemistry. Sources of neutrons and gamma rays in reactors; calculation of neutron and gamma ray shielding materials. Elements of dosimetry and radiation effects. Regulations affecting radiation exposure. Meteorological dispersion of fission products, radiation transport and attenuation in various geometries.

Mr. Yadgaroglu (F, W)

264A-264B. Dynamics of Nuclear Systems. (3) Three hours of lecture per week. Prerequisite: upper division course 250A-250B, Math 120A-120B, 120C recommended. Response of reactor systems to time-varying sources and applied control reactivity changes; reactor parameters from experiments employing neutron waves, pulses, and noise in both the frequency and time domains; pulsed reactors; xenon oscillations; stability analysis of zero-power reactors and of reactors with temperature feedback; optimal control of nuclear reactors.

285. Design Analysis of Nuclear Reactors. (4) Four hours of lecture per week. Prerequisite: consent of instructor. Principles and techniques of economic analysis to determine capital and operating costs, fuel management and fuel cycle optimization, thermal limits on reactor performance, thermal converters and fast breeders; control and transient problems; reactor safety and licensing; source of radioactivity from reactors and fuel processing plants.

Mr. Schrock (F)

286. Two Phase Flow and Heat Transfer. (4) Four hours of lecture per week. Prerequisite: Mechanical Engineering 10B. Study of the hydrodynamics and heat transfer of two-phase flows and applications in nuclear power and propulsion systems. Emphasis is on the study of the single and two-component gas liquid systems. Aspects of gas-solid and liquid-solid systems are also treated.

Mr. Yadgaroglu (Sp)


Mr. Yadgaroglu (Sp)

288. Fusion Reactor Engineering. (3) 288. Three hours of lecture per week. Prerequisite: upper division course in nuclear physics or nuclear chemistry. The principles and construction of controlled thermonuclear fusion reactors. Efficiency of magnetic containment devices, ion injection and entrainment, plasma heating, instabilities, direct conversion, materials problems, radiactivity and fuel cycle considerations.

Mr. Pigford (Sp)

289. Group Studies, Seminars, or Group Research. (1-8) Advanced study in various subjects through special seminars on topics to be selected each year, for those who have completed the special studies of the preceding semester. Participation in comprehensive design problems or group research on complete problems for analysis or experimentation.

The Staff (F, W, Sp)

294. Individual Research. (1-12) Prerequisite: graduate standing. Investigation of advanced nuclear engineering problems. To be graded on a satisfactory/unsatisfactory basis.

The Staff (Mr. Pigford in charge) (F, W, Sp)
on the nature, methods and aims of environmental design. Must be taken on a Pass/No Pass basis. Staff (F, Sp)

3. Introduction to Environmental Design. (5) Two 1-hour seminars and two 1-hour laboratories per week. Prerequisite: course 4 and 6 or consent of instructor. Problems in design and applied problems of graphic communication. Mr. Treib (F, Sp), ________ (W)

4. Man and Environment. (4) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisites: course 152 and consent of instructor. Enrollment limited. Evolution of the American landscape since 1800 considered in social and historical context. Mr. Tobriner (W)

5. Energy, Resources and Environmental Design. (4-4) Two hours of lecture and six hours of lab per week. Prerequisite: ED 4 or consent of instructor. ED 6A is prerequisite to ED 6B. The two-quarter sequence must be completed in consecutive quarters. Introduction to freehand drawing and mechanical drawing systems as analytic tools for environmental design. Emphasis on the understanding of basic drawing conventions: their implications and applications. Mr. Dubovsky, ________ (F, Sp)

71. History of the Environment. (4) Three 1-hour lectures per week, and four 8-hour field trips per quarter. Prerequisite: sophomore standing. The study of the development and change in the natural and constructed environment of California from Spanish Colonial times to the present. Emphasis will be on existing architectural forms and urban patterns of the San Francisco Bay Region. Mr. Cardwell (F)

UPPER DIVISION COURSES

169A. History of the Man-Made Environment of the U.S.A., 1800-1970. (4) Four hours of lecture and discussion per week. Prerequisite: upper division standing and consent of instructor. Geography 152 or equivalent geography course strongly recommended. Emphasis on interconnections among energy systems, social and technological variabilities, and their relation to the design of the built environment. Assessment of present and future implications of resource use on environmental design. Mr. Treib (W)

170. Architecture and Urbanism of Antiquity and the Middle Ages. (4) Three hours of lecture and one 1-hour discussion per week. Ancient and medieval architecture studied in its social and historical context. A selective survey of major building types and a few specific sites and monuments treated in detail. Mr. Kostof (F)

171. Architecture and Urbanism from the Renaissance to the Modern Period. (4) Three hours of lecture and one 1-hour discussion per week. Architecture and urban design since 1400 considered in social and historical context. Mr. Tobriner (W)

172. History of the Environment. (4) Three 1-hour lectures per week. The theory and practice of design from preindustrial handicrafts to mechanical production and the evolution of a machine aesthetic. Mr. Schaefer (Sp)

175. Great Cities. (4) Two 1 1/2-hour lecture-discussions per week. Prerequisite: courses 170 and 171 or consent of the instructor. A study of the major monuments of a great city and its changing character from its founding to the present. Course may be repeated for credit. Mr. Kostof (W)

177. Survey of Urban Design. (4) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: courses 170 and 171 or consent of instructor. The evolution of urban form, civic design, and planning theory with emphasis on the development of the modern city. Ms. Evenson (Sp)

178. The Architecture of the Far East. (4) Two 1 1/2-hour lectures per week. Prerequisite: ED 170 or consent of instructor. Selected topics in the history of Far Eastern architecture including the building and landscape traditions of Japan, China, India, or South-East Asia. Emphasis is on design as a product of environmental, societal, technological, and esthetic constraints. Course may be repeated for credit. Mr. Treib (W)

The basic course leading to the M.Arch. degree takes 10 semesters and 36 months to complete. Course requirements will vary depending upon undergraduate preparation. However, the length of the required residence period, the number of required quarter course units, and the specific list of required courses will vary depending upon undergraduate major, professional and other work experiences, and previous graduate study, if any. The basic course leading to the M.Arch. degree takes

Undergraduate Programs

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

Graduate Programs

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

Master of Architecture. The professional degree, Master of Architecture, will be awarded to students who successfully complete a program of studies of from one to three years duration depending upon previous educational and work experience. The department makes no restriction as to undergraduate preparation. However, the length of the required residence period, the number of required quarter course units, and the specific list of required courses will vary depending upon undergraduate major, professional and other work experiences, and previous graduate study, if any.
three academic years and requires the completion of at least 108 units during that period of residence. Persons who hold a B.A. or B.S. degree with a major in architecture, or B.S. degree, up to one year of advanced standing. The Graduate Studies Committee of the department will determine the specific amount of advanced standing individually for each student at the time of admission, based on the student's background. Persons holding the five-year, professional graduate degree, Bachelor of Architecture from an accredited school, or comparable five-year degrees from foreign universities, are considered to hold the equivalent of M.Arch, degree after one academic year in residence and completion of at least 36 units of coursework.

For additional information contact the departmental graduate secretary.

**Doctor of Philosophy Degree in Architecture.** The Doctor of Philosophy in Architecture program is open to exceptionally qualified students who present outstanding academic records along with clear evidence of commitment and ability in architectural research and scholarship. Graduate Division requirements with respect to academic rank, language requirement, candidacy, and the dissertation under A. A. apply (see index). Applicants must hold a bachelor’s degree from an accredited institution, but the department makes no restriction as to the duration of undergraduate education. Additional information is available from the departmental graduate secretary.

**Joint Program with the Department of City and Regional Planning.** The two departments offer a joint program for exceptionally qualified students who hold the five-year Bachelor of Architecture degree or the M.Arch degree. Students may take courses in any sequence of three quarters and 36 units in the Department of Architecture, and four quarters and 48 units in the Department of City and Regional Planning, the candidate may receive both the M.Arch and the M.C.P. degrees. Applicants should seek admission to the Department of Architecture and indicate on their application that they wish to be considered for the joint program.

**Joint Program with the Division of Structural Engineering and Structural Mechanics and the Department of Architecture.** The two departments offer a joint program for exceptionally qualified students. Students must fulfill the course requirements for both departments, but must satisfy the core coursework associated with the M.Arch program before proceeding to coursework in the other department. Only students admitted to both departments through normal admission procedures will be eligible to participate in the joint program.

**Study Area A—Design Problems**

100. The Timeless Way of Building. (4) Two 1 1/2-hour lectures and one 2-hour discussion per week. Basic theory of environment: towns and buildings which are alive, difference between human and man-made environments; pattern languages as means of generating environments which live; shared pattern languages in society, politics, economics; implications of implementing human means of design.

Mr. Alexander (F, W, Sp)

101. Social and Behavioral Considerations as Architectural Design Determinants. (4) Three 1-hour lectures and two 1-hour discussion per week. Prerequisite: Environmental Design courses 3, 4, and 5; Architecture 102B; 211 and 212; related architectural design problems. Investigation of behavioral, social, and cultural considerations as form determinants. Study of circulation patterns, hierarchy and choice in architectural spaces through design exercises. Case studies and seminars.

Mr. Lifchez (W, Sp)

102A. Structure and Production as Architectural Design Determinants. (5) One 1-hour lecture, one 2-hour and two 3-hour laboratories per week. Prerequisite: course 102A. Introduction to the design of architectural forms as influenced by load bearing systems, structural mechanics, standardization of parts, materials, handling, and assembly.

102B. The Physical Environment as an Architectural Design Determinant. (5) One 1-hour lecture, one 2-hour and two 3-hour laboratories per week. Prerequisite: course 102A. Investigation of architectural designs emphasizing environmental factors, natural and man-made, as design determinants. Study of electrical, hydraulic, and structural design concepts. 

102C—102D—102E. Synthesis of Determinants of Architectural Design. (10) Two 2-hour lecture and 1-hour discussion per week. Prerequisite: course 102B. Introduction to architectural design synthesis; study of architectural design problems as studies will be assigned which require the coordinated resolution of the design determinants introduced in 101, 102A and 102B. An introduction to aesthetic and style as design determinants will also be included.

Mr. Lifchez (W, Sp)

103A. Introduction to Urban Design. (5) Three 1-hour lectures and one 2-hour lecture and discussion per week. Prerequisite: course 101, 102A and one hour of architectural design. Conceptual, method, context of urban design practice; professional roles, tasks, and values. Topics include neighborhood design, new towns, central development, city scale design and uniting principles. Problem sets, readings and final examination.

Mr. Peters (W)

103B. Laboratory Problems in Urban Design. (5) Two 4-hour laboratories per week. Prerequisite: course 103A or consent of instructor. Application of urban design concepts and methods explored in 103A, with a focus on creative inclusive study, analysis, graphic communication, spatial composition, environmental quality. Topics selected from real situations dealing with field trips, program development, and design.

Mr. Brown (F, W, Sp)

104A—104B—104C. Community Design. (4—4—4) Two 2-hour laboratory-seminars per week. Prerequisite: consent of instructor. Projects dealing with community issues: the social, political, and technological determinants. Analysis, problem formulation, design, and implementation. (F, W, Sp)

105A—105B. Theory and Application in Architecture Design. (5;10) 105A: four hours of lecture and three hours of laboratory per week. 105B: four hours of lecture and three hours of laboratory per week. Prerequisite: course 101, 102A, 102B. A course providing a mechanism for the physical construction and testing of theoretical solutions to architectural design problems. Emphasis will be on the construction of architectural models and the systematic evaluation of their performance.

Mr. Brown (F, W, Sp)

200A—200B—200C. Graduate Introduction to the Field of Architecture. (8—8—8) Five 5-hour laboratory-seminars per week. Prerequisite: graduate standing. An integrated course including introductory study of social, technological and environmental factors relevant to architectural design, study of design and practice and methodology of architectural design, and study of role of the architect and the profession.

Mr. Brown (F, W, Sp)

203. Commercial Facilities. (4) One 2-hour lecture and two 3-hour laboratories per week. Prerequisite: course 202A. Introduction to commercial design problems involving the range of relevant factors and difficulties concerning typical cases. Courses shall present topical problems as case studies and may be taken in any sequence.

Mr. Lifchez (W, Sp)

204A. Architectural Design I—Architectural Design I. (5) Two 2-hour laboratory-seminars per week. Prerequisite: courses 102A, 102B, 102C. Architectural design problems entailing the range of relevant factors and difficulties concerning typical cases. Courses shall present topical problems as case studies and may be taken in any sequence.

Mr. Lifchez (W, Sp)

205. Multi-Level Real Estate. (4) One 2-hour lecture and two 3-hour laboratories per week. Prerequisite: course 202A. Introduction to real estate development. May be repeated for credit.

206A. Introduction to Urban Design. (4)

206B. Topics in Urban Design. (4) Two 2-hour lectures per week. Prerequisite: graduate standing, completion of two or three design laboratory courses, or consent of instructor. Graduate introduction to the field including individual reading program and short design projects.

207. Special problems. (4) Can be repeated for credit.


209. Environmental Design. (4)

**Course Series: Design Group II—Architectural Design and Research.** Two or three 2-hour laboratory-seminars per week. Prerequisite: enrollment in Option I or completion of required courses in Design Group I and completion of required courses in professional electives in the particular study area of the course offering. Design and research in special study areas are expected to enrich the individual student’s work. Laboratory-seminary for a minimum of two consecutive quarters. At the end of the first quarter, an “in progress” grade will be given, and at the end of the second quarter, a letter grade will be assigned for the two-quarter work. Following completion of the second quarter and at the option of the instructor, students may repeat for one additional quarter.

Staff (F, W, Sp)

210. Study in Area A, Urban Design Problems. (6)

211. Study in Area B, Environmental Control Systems. (6)

212. Study in Area C, Structure and Production as Related to Design Problems. (6)

213. Study in Area D, Theory and Methods as Related to Design Problems. (6)

214. Study in Area E, Social and Economic Factors as Related to Design Problems. (6)

215. Study Area B—Environmental Control Systems

110. Introduction to Environmental Control Systems. (5) Two 1 1/2-hour lectures and one 2-hour laboratory per week. Prerequisite: consent of instructor. Evaluation and design of the luminous and acoustic environments using qualitative and quantitative methods to relate design alternatives to human perceptual responses.

Mr. Peters (W)

211. Environmental Control Systems. (3) One 2-hour lecture and one 2-hour laboratory per week. Prerequisite: consent of instructor. Design and research in special study areas are expected to enrich the individual student’s work. Laboratory-seminary for a minimum of two consecutive quarters. At the end of the first quarter, an “in progress” grade will be given, and at the end of the second quarter, a letter grade will be assigned for the two-quarter work. Following completion of the second quarter and at the option of the instructor, students may repeat for one additional quarter.

Staff (F, W, Sp)

212. Environmental Control Systems. (3) One 2-hour lecture and one 2-hour laboratory per week. Prerequisite: consent of instructor. Design and research in special study areas are expected to enrich the individual student’s work. Laboratory-seminary for a minimum of two consecutive quarters. At the end of the first quarter, an “in progress” grade will be given, and at the end of the second quarter, a letter grade will be assigned for the two-quarter work. Following completion of the second quarter and at the option of the instructor, students may repeat for one additional quarter.

Staff (F, W, Sp)

213. Design Problems in Environmental Control Systems. (2) Two 2-hour laboratory-seminars per week. Prerequisite: course 212 or consent of instructor. Combined course must be taken concurrently with 208 and 222.

213A. Design Problems in Environmental Control Systems. (2)

213B. Design Problems in Environmental Control Systems. (2)

214. Laboratory Problems in Environmental Control Systems. (2) Two 2-hour lab per week. Prerequisite: course 212 or consent of instructor. Combined course must be taken concurrently with 208 and 222.

218A. Light in Architectural Design. (4)

218B. Acoustics in Architectural Design. (4)

219. Seminar in Environmental Control Systems. (2) One 2-hour lecture per week. Prerequisite: enrollment in Option I or completion of required courses in Design Group I and completion of required courses in professional electives in the particular study area of the course offering. Design and research in special study areas are expected to enrich the individual student’s work. Laboratory-seminary for a minimum of two consecutive quarters. At the end of the first quarter, an “in progress” grade will be given, and at the end of the second quarter, a letter grade will be assigned for the two-quarter work. Following completion of the second quarter and at the option of the instructor, students may repeat for one additional quarter.

Staff (F, W, Sp)

NOTE: For key to symbols, see page 36.
Study Area C—Structure and Production

120. Structural Systems for Buildings. (5) Two 1 1/2-hour lectures and one 3-hour discussion, laboratory, or field trip. Prerequisites: EEB229D, EED229D, upper division standing or consent of the instructor. An introduction to the study of structural systems: their requirements, construction, and interactions.

121. Principles of Construction. (4) Two 1-1/2 hour lectures per week. Prerequisite: Architecture 120 or consent of instructor. A survey of typical building subsystems: their requirements, construction, and interactions.


129. Undergraduate Seminars in Structure and Production. (4) Two 1-1/2 hour seminars per week. Prerequisite: Course 121 or consent of instructor. Combined course must be taken concurrently with 208, 213A, 213B. Synthesis of structural considerations, seismic factors, and relation to architectural design.

223. Architectural Design for Seismic Forces. (4) Two 1-1/2 hour lectures per week. Prerequisite: Civil engineering 120 or consent of instructor. Elements of seismic design and construction problems of buildings, with emphasis on experience gained from actual earthquakes; seismic risk concepts; design considerations in earthquake geologically hazardous areas.

224. Advanced Building Methods and Processes. (4) Two 2-hour seminars per week. Prerequisite: Architecture 121 or consent of instructor. Roles, processes, and methods of production, design, and construction. Changing patterns in the industry: management techniques, performance analysis, and level of industrialization.

225. Seminar, Structure and Production in Architecture. (2) Two 1-hour seminars per week. Prerequisite: Courses 120, 121 and 122, or consent of instructor. Advanced study of the design and production in architecture. (F, Sp)

229A. Light Weight Tension Structures. (4) (W)

229B. Industry and Technology. (4) (F)

229C. Modern Shell Design. (4) (F)

290. Experimental Structures. (4) Mr. Lagori (F)

229E. Special Problems in Structure and Production. May be repeated for credit.

Study Area D—Design Theories and Methods

130. Design Theories and Methods. (5) Two 1 1/2-hour lectures and one 1-hour seminar per week. Comparison and discussion of design and production methods and processes and the effect of changes on the effectiveness of architectural design and related fields. Prerequisite: Mr. Protenz (F), Mr. Rittel (Sp)

132. Computer Applications in Design. (4) One 2-hour lecture and one 2-hour laboratory per week. The course develops a theoretical framework for application of digital computers in design. Survey of existing applications and potential potential and limitations. Models of numerical problems in design and their utility.

133A–133B. Proseminar in Computer Applications in Design. 2 hours. Prerequisites: Architecture 120 or consent of instructor. Application and development of specific computer applications in the context of individual design projects. May be repeated for credit. Mr. Protenz (W)

134. Freehand Drawing for Architecture. (4) One 1-hour lecture and two 3-hour laboratories per week. Prerequisite: Environmental Design 120; freehand drawing (for Architecture majors) for the development and communication of design concepts. Theory in drawing and a workshop on communication of ideas in describing form, judging proportion and graphic discipline.

135. Advanced Graphics for Architecture. (4) One 1-hour lecture and three 2-hour laboratories per week. Prerequisite: Completion of design 120. Emphasis on the presentation of architectural ideas. Emphasis on systems of drawing rather than individual drawing techniques. Emphasis on ideas through drawings on opaque materials, as well as projected images. Photography as a communication medium and systems of graphic presentation.

136. Theory and Methods of Graphic Communication in Architecture. (4) Two 1-hour lectures and two 2-hour laboratories per week. Prerequisite: upper division standing or consent of the instructor. Theories and methods of organizing two- and three-dimensional visual information dealing with architectural space, volume, and color, and the graphic presentation. Exploratory work may be initiated by the student with the consent of the instructor.

137. Watercolor Painting in Architecture. (4) One 1-hour lecture and two 3-hour laboratories per week. Prerequisite: Architect. 136 and upper division standing, or consent of instructor. Theory of color, color composition, and the use of color in presentation of design concepts.

230. Advanced Design Methods. (4) Two 1 1/2-hour seminars per week. Prerequisite: course 130 or consent of the instructor. Intensive study of a particular area of design methodology. Theoretical explorations and applications to problems of environmental design.

232. Seminar in Architectural Research. (4) Two 1 1/2-hour seminars per week. Prerequisite: graduate standing or consent of instructor. Elements of scientific research and the use of research in environmental design. Each participant develops and carries out a small-scale research project. Mr. Rittel (F), Mr. Protenz (W)

233. Methods of Quantitative Analysis in Design. (4) Two 2-hour seminars per week. Prerequisites: graduate standing and consent of instructor. Workshop on operational methods for analysis of large-scale architectural and urban design projects. Emphasis on practical application of theoretical concepts to real-life projects. Topics include engineering economy, fiscal and economic impact analysis, and methods for environmental impact assessments.

237. Architectural Research Methods and Documentation. (3) One 2-hour lecture per week. Prerequisite: doctoral standing or consent of instructor. Assesses literature related to research in architectural, serials, technical reports, books, abstracts, indexes. Study Area C—Social and Behavioral Factors in Architectural and Urban Design.

140. Social and Cultural Factors in Architectural and Urban Design. (5) Three 1-hour laboratories and one 2-hour discussion per week. A survey of the relations of social forces in architecture, with respect to individual, group, family, neighborhood, and complex organizational units. Identification and definition of recognized "institutionalized" forms and symbolic roles. Mr. Rittel (Sp), Ms. Cranz (Sp)

141. Form Determinants of the Dwelling. (3) Three 1-hour lectures per week. Interaction of technological and aesthetic influences and the physical environment of the residential community.

143. Seminar in Architectural Problems and Issues. (3) One 2-hour seminar per week. Prerequisite: upper division standing. Discussion of problems and issues of architecture; development of proposals for solutions. Problems presented by the instructor or the student. May be repeated for credit.

145. Design Consequences of Public, Technological, and Social Change. (4) Two 2-hour meetings per week. Prerequisite: consent of instructor. Ms. Cranz (W)

145A: Design Consequences of Public Change.

145B: Design Consequences of Technological Change.

145C: Design Consequences of Social Change.

240. Advanced Study in Social and Cultural Factors in Architecture and Urban Design. (4) One 1 1/2-hour laboratory per week. Prerequisite: graduate standing or consent of instructor. Intensive study of relationship of social and institutional functions to environmental factors.

241. Major Problems of Architecture. (4) Three 2-hour seminars per week. Prerequisite: enrollment in Option I. Identification of major problems of architecture; development of approaches to solutions. Problems proposed by the instructor or the student.

Staff (F, W, Sp)

242. Seminar in Architecture. (4) Two 2-hour seminars per week. Prerequisite: course 232 or consent of instructor. Research problem on the social and cultural factors relating to the design of the built environment. Research project on topics related to theory and practice.

243. A Sociology of Space. (4) Two 1 1/2-hour seminars per week. Prerequisite: graduate standing or consent of instructor. Consideration of the role played by social values in the design, allocation, and utilization of space.

Mr. Ellis (Sp)

244. Architectural and Environmental Program Analysis. (4) Two 2-hour lectures and one 1 1/2-hour seminar per week. Prerequisites: courses 130, 140 and/or 240 and/or consent of instructor. Formulation of pre-design decisions affecting architectural forms. Topics include the nature of institutions: issues of size, growth, and change; determination of diverse user needs; values and value systems. Specific projects will be evaluated relative to diverse user needs.

245. Group Relations and Environmental Design. (4) Two 1 1/2-hour seminars per week. Prerequisite: consent of instructor. Focus on the structural and group and organizational processes in the design of land and non-human environments. Participants will study and experience their own covert group processes and apply what is learned to a variety of environmental design situations and projects.

249A. Social and Behavioral Factors.

249B. Behavioral Factors.

249C. Technological Factors.

IDS 238. Environmental Design: Stress and Health. (3) See Interdepartmental Studies for the complete description of this course. Mr. Lindehein (W)

Study Area F—Architectural Administration and Related Professional Studies

160. Introduction to Architectural Administration. (4) Two 2-hour lectures per week. Prerequisite: upper division standing and completion of architectural design program courses from following series: 101–104, 201–209, 280–284. Architect, owner, contractor relations, contract documents, and the ethics of the profession. Mr. Friedman (W)

161. Construction Administration. (4) Two 2-hour lecture-discussions per week. Prerequisite: course 160. Design, administration and supervision of construction, industry practices and the application to the construction process.

162. Real Estate Economics, Analysis, and Development Strategy. (4) Three 1-hour lectures per week. Prerequisite: upper division standing or consent of instructor. Introduction to study of property investment principles and the real estate industry. Ms. Cranz (W)

Mr. Friedman (W)
267B. Architectural Preservation and Conservation. (4) One 2-hour seminar per week. Prerequisite: course 267A, or consent of instructor. Survey of existing laws and policies governing the protection or enhancement of architectural preservation, rehabilitation, or conservation of buildings, neighborhoods, or districts. Class members will be required to devote at least five hours to field research projects involving preservation or rehabilitation.

Mr. Cardwell (W)

269A. Seminar in Architectural Administration. Two 1 1/2-hour seminars per week. Prerequisite: course 260 or consent of instructor.

269A. Construction Law. (4) (F)

269B. Architectural Practice. (4) (Sp)

269C. Architectural Administration. (4) (W)

269D. Specifications. (4)

**Study Area G—History of the Environment**

See Environmental Design 169 through 177.

**171. American Architecture.** (4) Two 1 1/2-hour lectures per week and other meetings as scheduled. Prerequisite: Environmental Design 170 and 171 or consent of instructor. The architecture of America from Colonial times to the present.

174. Modern Architecture. (4) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: Environmental Design 170 and 171 or consent of instructor. An examination of specific aspects of architecture in modern society, with particular emphasis on current developments.

**176. The Architecture of Islam.** (4) Two 1 1/2-hour lectures/discussions per week. Prerequisite: Environmental Design 170 and 171 or consent of instructor. A study of the architecture of Islam from the ninth century to the present with emphasis on the early period and on buildings in Spain and the Near East. Independent student research under faculty guidance.

176. Baroque Architecture and Urbanism. (4) Two 1 1/2-hour lecture/discussions per week. Prerequisite: Environmental Design 170 and 171 or consent of instructor. A study of the Baroque style of architecture and urban design in the Western world from the 17th century to the 18th century.

**179. The Architect and the Profession.** (4) Formerly 191G. Two 1 1/2-hour lectures per week. Prerequisites: Environmental Design 170 and 171. A history of the development of the profession and an introduction to specific aspects of architecture in the field of urban and regional planning.

**180. The Architecture and Urbanism of Ancient and Colonial Mesopotamia.** (4) Two 1 1/2-hour lectures per week. Prerequisite: upper division standing. Survey of the pre-Columbian architecture and architecture of Mexican and Guatemalan cities before and after the Spanish conquest. To be offered 1978-79 only.

Mr. Trubinin (Sp)

271. History of Architecture Theory. (4) Two 1 1/2-hour seminars per week. Prerequisite: Environmental Design 170 and 171, plus one course from Environmental Design 173 or 174 or consent of instructor. Examination of theories of architecture from Vitruvius to the present.

Mr. Kostof (Sp)

**272. Seminar in the Architecture of Antiquity.** (4) Two 1 1/2-hour seminars per week. Prerequisite: Environmental Design 170 and 171, plus one course from Environmental Design 173 or 174 or consent of instructor. Development and theory of technical graphic communication as an architectural language related to drawings and contract documents. Laboratory projects in graphic form as an expression of architectural concepts, architectural detailing, and materials.

Mr. Cardwell (W)

273. Seminar in American Architecture. (4) Two 1 1/2-hour seminars per week. Prerequisite: Environmental Design 170 and 171 plus Environmental Design 173 or 174 or consent of instructor. Consideration in depth of selected aspects of modern architecture.

Mr. Tobriner (F)

**274. Seminar in Modern Architecture.** (4) Two 1 1/2-hour seminars per week. Prerequisite: Environmental Design 170 and 171. Consideration of selected aspects of urban design through discussion and directed research.

Ms. Evenson (W)

**278A—278B. Methods of Historical Research and Criticism in Architecture.** (4-4) One 3-hour seminar per week and other meetings to be arranged. Prerequisites: graduate standing and consent of instructor. Consideration of critical aspects of architectural research techniques, including the use of archival sources and the study of architectural history.

Ms. Tobriner (Sp)

181. Architectural Research in Practice. (4) One 3-hour seminar per week plus 10-12 hours internship per week as field project. Prerequisites: upper division standing and consent of instructor. Combined field research and internships in architectural research.

Mr. Trubinin (Sp)

279. Seminar in Technology and Architecture. (4) One 3-hour seminar per week. Prerequisite: Environmental Design 170 and 171 or consent of instructor. A study of the relationship between technology and architecture through history.

191A. The Architecture and Urbanism of Ancient Greece and Rome. (4) Two 1 1/2-hour seminars per week. Prerequisite: upper division standing. Survey of the architecture of ancient Greece and Rome from prehistoric times to the 5th century B.C.

Mr. Trubinin (Sp)

602. Individual Study for Doctoral Students. (1—8) 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. This course may not be used for units or credit hours beyond those required for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.
ical understanding necessary to attack those problems. Courses in planning theory and practice are supplemented by field studies and projects. The course requires the study of major principles of current growth, legal and institutional framework, and scientific methods in developed and developing countries.

107. The Urban Planning Process. (5) Four hours of lecture and two hours of discussion per week. Prerequisite: upper division standing. An introduction to doing urban planning through a series of problems designed especially for this course. Lectures and readings supplement and extend the techniques and concepts introduced in the problem sets. Final exam required.

110. Introduction to City Planning. (4) Three 1 1/2-hour lectures per week. Prerequisite: open to majors in all fields. This course covers the fundamentals of city planning in metropolitan areas, including their economic, social, and political contexts. Discussion of the role of city planning in improving urban environments.

111. Introduction to Housing. (5) Three 1 1/2-hour lectures or discussion sections per week; tutorial sessions, two half-day field trips. Prerequisite: open to all majors in all fields. Development of the housing problem and government housing policy especially in the United States, selected aspects of design and planning, critical current issues and the future of housing.

112. The Idea of Planning. (4) Three hours of lecture per week. Prerequisite: CP 110 or consent of instructor. Planning in retrospect: the causes and consequences of urban crises. Thus, nature and critiques of the planning idea and its appropriateness of planning, sources of legitimacy for justification of planning. Planning, styles of planning, and future directions of the planning idea are examined.

113. Urbanization and Community. (4) Three hours of class meetings per week. Prerequisite: Course CP 110 or permission of instructor. The process of urbanization and its social consequences. The search for community continues. Problems of planning and community organizing in the contemporary large American city.

114. Minority Perspectives in Urban Structure. (4) Two 1 1/2-hour lectures per week. Prerequisite: Open to all students with consent of instructor. A survey of minority groups and the problems of education, health, business and economic development within their socio-cultural patterns, and social, economic, and political elements of urban thinking on these issues.


199. Special Study for Advanced Undergraduates. (1-5) Prerequisite: consent of instructor. May register on a pass or no pass basis.

200A-200B. The Evolution of Cities. (3) Three hours of lecture meetings per week. The role of cities in civilization. The historical origin and growth of cities in the physical environment. The structures and functions of cities in developed and developing countries.

201. Introduction to City Planning. (4) Two 1 1/2-hour lectures and one 2-hour seminar per week. Origins and evolution of urban functions, influences of urban growth, legal and institutional frameworks, and philosophical premises. Major principles of current practice; roles of analysis, projection, design, and public and private policy. Alternative approaches.

202. Introduction Studio-Laboratory: Plan Preparation. (4) Formerly CP 213. Two 1 1/2-hour studio meetings per week. An introductory laboratory experience in urban design. Planning, including the use of graphic methods and models, to city planning and involving individual and collaborative student-group efforts in formulating planning policies and programs for urban areas.

203. Planning and Governmental Decision-Making. (4) Two 1 1/2-hour lectures per week. Prerequisite: consent of instructor. Survey of data sources and types, card handling equipment, computer methods, mapping and information display, and other methods used in the formulation, analysis, and interpretation of planning questions. Problems. Mr. Jacobs (F). Mr. Dowall (W)

204. Introduction to Planning Analysis. Prerequisite: Computer Programming. (1) One 1 1/2-hour laboratory per week. Prerequisite: consent of the instructor. The process of land use planning and the use of quantitative analysis. readings and discussions.

205. Methods of Planning Analysis. (4) Four hours of lecture per week. Prerequisite: courses 204B and 204C or equivalent. The course emphasizes the techniques of analysis and evaluation used by urban and regional planners. Topics may include indices for measuring the effectiveness of solutions. Mr. Dodson (F). Mr. Dodson (W)

206. City Planning Legislation and Governmental Organization. (4) Three hours of meetings per week. Prerequisite: CP 201 or consent of instructor. Duties and role of the planning agency in municipal and metropolitan government; major alternative definitions of city planning; responsibilities of local governments; significance of the planning legislation for reorganization of governmental services.


208. Studio: Urban District and Physical System Planning. (6) Twelve hours of studio per week. Preparation of detailed physical plans for major city districts, e.g., a central district, or physical system. Determination of urban functions, urban land use, development policies, timing and implementation devices. Introduction to survey and analysis techniques for physical development design.

209. Introduction to Housing, Renewal, and Development. (4) Two 1 1/2-hour lectures per week. Prerequisite: consent of instructor. Structure of the housing industry, planning for public and private developments for neighborhoods, new development, urban renewal. Roles of the market, public action, design and building processes. Social consequences of alternative policies.

210. The Analysis of Urban Livability. (4) Three hours of meetings per week. Prerequisite: consent of instructor. Focus on the measurement and satisfaction-disatisfaction with urban conditions and services. Methodological emphasis is on the use of survey techniques, especially those developed for the field of urban planning. Mr. Foley (W).

211. Location Theory and Spatial Interaction Models. (4) Three hours of meetings per week. Prerequisite: Economics 100B or equivalent; one semester of college calculus. Density and interactional approaches to analysis of spatial distribution. Ecological and behavioral theories of interaction and spatial interaction. Introduction to static situations; simulation analysis; and growth models of residential and commercial locational behavior. Governmental influences on spatial distribution of urban activities.

212. Introduction to Economics of Public Enterprises. (5) Four hours of lecture-discussion per week. Prerequisite: Economics 100A or equivalent. Roles of governmental agencies as producers of urban services in normative economic terms. Analysis of benefits and costs, and their incidence. Criteria and procedures for investment decisions concerning types and qualities of services and facilities.

213. Studio: Community General Plan and Developmental Studies. (5) Formerly CP 202. Two 4-hour studio meetings per week. A study of the community planning process and the use of land use planning and community development in planning for small urban communities.

214. Land Use Controls. (4) Two hours of lecture and one hour of laboratory per week. The course focuses on the theory, practice and impacts of zoning, growth management, land banking and other techniques of development control. The objective is to acquaint the student with regulatory techniques and the efficiency and equity aspects of various control mechanisms.

215. Transportation and Land Use. (4) Four lecture hours per week. Prerequisite: Economics 100A and 208, courses 205A, 211, and 212, or the equivalent; consent of instructor. An advanced seminar dealing with the issues of land use and the impacts of transportation policies on land use and development policies, Pricing, investment, land use control, administrative behavior, and political decision making for representative aspects of the problem.

216. Workshop Studio In Metropolitan Planning. (5) Ten hours of studio per week. Field project in major aspects of city and regional planning. A collaborative student-group effort in formulating policy recommendations within specific governmental frameworks. A comprehensive workshop in metropolitan planning. This is to provide opportunity for field work in the spheres of public planning and community development covered in course 217.

217A. Community Development. (4) Three hours lecture-discussions and two hours workshop per week. Prerequisite: consent of instructor. Description and analysis of public planning and community development action in housing, urban redevelopment and rehabilitation particularly in older, central cities.

217B. Community Development. (4) One 1 1/2-hour lecture-discussion session and four hours workshop per week. Prerequisite: Course 217A or consent of instructor. Workshop in community development planning. This is to provide opportunity for field work in the spheres of public planning and community development covered in course 217.

219. The Urban Economy. (4) Two 1 1/2-hour sessions per week. Prerequisite: Economics 100A-100B or equivalent. Analysis of the urban and metropolitan economy for planning. Economic base and other urban macro-economic models. Analysis and projection of changing labor force and industrial structure. Demographic-economic interaction. Issues in growth, income distribution, and planning control.

220. Comparative Urbanization. (3) Three hours of meetings per week. Prerequisite: consent of instructor. Problems of urbanization, migration, slums or squatter settlements, and industrial development between the United States, and the Socialist countries. Historical, social, cultural, economic, and political dimensions of the processes through which urban activities generate changes in social structures and political systems.

221. Rural Poverty and the Urban Gang. (4) Two 1 1/2-hour seminars per week. Prerequisite: consent of instructor. Analysis of the relationship between rural and urban poverty. Appraisal of alternative development strategies and public policies for coping with geographically-clustered poverty.

226. The Metropolitan Region. (3) Three hours of meetings per week. The social organization and spatial patterns of the large metropolitan area. Physical development problems and policies.

227. Seminar on Urban Planning in Latin America. (4) Two 2-hour lectures per week. Prerequisite: knowledge of city planning policy and of Latin American development; a reading knowledge of Spanish is desirable.
231. Topics in City and Metropolitan Planning. (4) Three hours of meetings per week. Prerequisite: graduate standing in a social science department or profession. Study of regional planning problems and objectives; emerging views of regional planning. Regional models as planning tools. Intra- and inter-regional interaction; study of the developments process. Review of current regional planning activity. Ms. Markusen (Sp)

232. Urban Politics and Planning. (4) Three hours of meetings per week. Prerequisite: consent of instructor. Basic course in political science essential to understanding of political processes and objectives; power and influence, elitism vs. pluralism, conflict and coalition. Community mobilization of political power; roles of central and supra-local inter-relationships, the politics of planning and the decision-making process. Mr. Perlman (Sp)

233. Introduction to Regional Analysis and Planning. (4) One 2-hour seminar and one 1-hour seminar per week. The concept of region and methods of regionalization; survey of regional problems and objectives; emerging views of regional planning. Regional models as planning tools. Intra- and inter-regional interaction; study of the developments process. Review of current regional planning activity. Ms. Markusen (Sp)

235. Political Economy and Planning. (4) One 3-hour seminar and one 2-hour seminar per week. Introduction to the political economy of planning, investigating the interaction of political-economic forces and of social outputs in the planning process. The political forces that will be used will be introduced in the course for examining the literatures from the various social sciences for their relevance to development planning. Mr. Phillips (F)

236. Urban Problems and the Legal Process. (4) Two 2-hour meetings per week. Introduction to the legal framework relevant to urban planning problems, stressing the law surrounding intergovernmental relations in metropolitan areas; legal restraints on the use of various techniques of intervention; and procedures and processes of distinctive "legal" character. Mr. Phillips (F)

273. Citizen Involvement in the City Planning Process. (4) Two 1 1/2-hour sessions per week. An examination of the roles of the citizen and citizen organizations in the city planning process. Models for citizen involvement ranging from advising to community control to examination of effectiveness of different organizational models in different situations.

238. The Municipal Budget as an instrument for Planning. (4) Formerly 291A. One 3-hour seminar per week, one 2-hour discussion section per week. The budgeting process at the city government level. Selective treatment of issues in projecting need, cost analysis, evaluation, tax capacity, revenue competition across programs, spatial and individual equity and access to services. The use of the budget to implement urban planning. Mr. Teitz (Sp)

244. Housing and Urban Development. (4) Two 1 1/2-hour lectures per week. Prerequisite: course 209. Housing and related development in urban fringe areas; social, economic and political implications. Effects upon journey to work, social overhead investment requirements, regulatory policies. New towns, land assembly, open space, and other problems. Mr. Gellen (F)

246. Planning Land-Use and Communications Systems. (4) Three hours of meetings per week. Prerequisite: consent of instructor. Structure of urban systems and interdependencies among subsystems. Predictive growth models; valuations, land-use planning; open space and recreation planning strategies. Emphasis upon regional land-use, transportation, and communications systems and balances planning exercises in anticipation of operational models.

247. Methods of Program Planning. (4) Two 2-hour lectures per week. Prerequisite: CP 203 and 212, or consent of instructor. Techniques for simulating and evaluating alternative sequences of government actions. Designing community-development programs with an awareness of their rationality and objectives. Benefit-costs analysis; cost effectiveness bases for budgeting and programming; the politics of program planning.

250. Theories of the Planning Process. (4) Three hours of meetings per week. Prerequisite: courses 203 and 212, or consent of instructor. Planning as a special type of organization; application in evaluating urban spatial development. Mr. Cohen (Sp)

251. The Logics of Planning. (4) Two 1 1/2-hour meetings per week. Prerequisite: course 203 or consent of instructor. An advanced course, primarily for doctoral students, focusing upon the conceptual and methodological bases of contemporary planning approaches, especially how to employ the value, theory, decision theory, and the new policy sciences. Mr. Webber, Mr. Rittel (Sp)

253. Research Seminar in Regional Development. (4) One 3-hour seminar per week. Prerequisite: course 203 or consent of instructor. A close examination of selected issues in policy, methods and patterns of regional development, through student and faculty research papers and class discussion. Ms. Markusen (W)

255. Seminar on the Urban General Plan. (4) Three hours of meetings per week. The legislative and technical functions of the urban general plan: characteristics; organization of general-plan documents. (W)

256. Field Observation and Diagnosis of Urban Environments. (4) Six hours of field work per week. Prerequisite: Graduate student in Environmental Design. Course consists of five 4 to 5 hour field trips and five 2-1/2 hour seminars. Students will look at measure, record and learn from a variety of urban environments, including physical, social and economic conditions. They will review limitations and possibilities of observations for city planning. Course to be given on a satisfactory/unsatisfactory basis.

261. Basic Urban Planning. (4) Formerly 291A. Three hours of meetings per week. Prerequisite: consent of instructor. Roles of the citizen and citizen organizations in metropolitan areas; legal restraints on the use of various techniques of intervention; and procedures and processes of distinctive "legal" character. Mr. Jacobs (W)

263. Deliberate Social Change in the City. (3) One 2-hour seminar per week. Prerequisite: course 260 or 261 and consent of instructor. Theories of the behavioral and sociopolitical dynamics of social and institutional change will serve as the basis for discussion of a series of case studies of efforts to effect social change in the city. The case studies will be prepared and presented by students. Mr. Duhl (W)

264. Social Indicators. (4) Two 1 1/2-hour seminars per week. The design and use of measurement in planning and policy. Topics include index construction, technical measurement, conceptualization problems, politics and indicators, institutionalizing indicators, use of indicators and their relationship to policy and planning. Ms. deNeuville (Sp)

266A. Policy Analysis and Program Evaluation for Social Planning. (5) Four hours of meetings per week. Prerequisite: CP 205 or equivalent; CP 212 or equivalent; or consent of instructor. Techniques and politics of evaluation and analysis of social programs and policies. Course explores the use of analysis to assess and explain program impact, the role of the analyst's values, and program evaluation as a vehicle for organizational change and policy reform. Mr. Collignon (F)

290. Seminar. (4) Prerequisite: consent of the instructor. Advanced study in city and regional planning. Special topics will be announced at the beginning of each quarter. The Staff (F, W, Sp)

291A. Housing Finance. (4) Two 1/2-hour sessions per quarter. Prerequisites: Course 100A, Econ 1008, or CP 209 (or equivalent) of cover). Provides urban planning students with the analytic skills and conceptual knowledge to evaluate the performance and design of public programs which rely for their effectiveness on innovations in financing methods and regulations of the mortgage market. To be offered 1978-79 only. Mr. Gellen (Sp)

258. Land Use, Growth Management and Environmental Law. (4) Three hours of seminar per week. Prerequisite: CP 236 or consent of the instructor. An analysis of the major issues and doctrines in the law of environmental protection and growth management, and their relationship to land use planning. To be offered 1978-79 only.

291D. Professional Practice Seminar. (3) One 2-hour seminar per quarter. Prerequisite: Graduate standing. Evaluation of professional roles in various settings and the character of current planning practice. Selection of goals and methods needed in a planning agency. Organizing and scheduling complex planning tasks. To be offered 1978-79 only.

291E. Human Development and the Planning Process. (4) One 3-hour seminar per week. Prerequisite: consent of the instructor. Life cycle and human development processes will be the vehicle and impetus for implementation of the themes and topics of the course. The Staff (F, W, Sp)

291G. Introduction to Analytical Planning Methodology. (3) Three hours of lectures and 2 hours of laboratory per week. Prerequisite: consent of instructor. Introduction to the techniques of quantitative planning. Focus on the use of statistical and computer models. To be offered 1978-79 only.

291H. Urban Land Economics. (4) Three hours of lectures per week. Prerequisite: Fundamentals of intermediate microeconomics. The Staff (F, W, Sp)

291J. Foundations of Planning Analysis. (4) Two 1 1/2-hour class meetings per week. Prerequisite: Fundamentals of intermediate microeconomics. To be offered 1978-79 only.

291K. Workshop in Social Program Evaluation. (4) One 2-hour seminar per week. Prerequisite: Fundamentals of intermediate microeconomics. To be offered 1978-79 only. The Staff (F, W, Sp)

291L. A Nontechnical Introduction to Operations Research. (3) See Interdepartmental Studies for the complete description of this course.

299. Individual Study or Research. (1-12) Prerequisite: consent of instructor. For students who wish to work on a research project. To be announced at beginning of each quarter. No more than 5 units may be taken in any one section. Sections A through L are letter graded. Sections M through Z are graded satisfactory/unsatisfactory. The Staff (F, W, Sp)

300. Individual Study for Master's Students. (1-8) Individual study for the comprehensive examination. To be offered only upon the written recommendation of the field adviser. Units may not be used to meet either unit or residence requirements for a master's degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

302. Individual Study for Doctoral Students. (1-8) 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 to meet either unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

IDS 175. A Nontechnical Introduction to Operations Research. (3) See Interdepartmental Studies for the complete description of this course.

IDS 219A-219B. Multidisciplinary Design. (3-4) See Interdepartmental Studies for the complete description of this course.

IDS 224. Cooperative Research Workshop in Transportation Economics (3) See Interdepartmental Studies for the complete description of this course.

IDS 230. Amenity Resources Planning. (4) See Interdepartmental Studies for the complete description of this course.


NOTE: For key to symbols, see page 36.
Landscape Architecture

Department Office, 202 Wurster Hall

Professors:
Donald Appleby, M.C.P.
William Garrett, M.L.A.
Bruce Leon, M.L.A.
Luna B. Leopold, Ph.D.
R. Burton Litton, Jr., M.L.A.
Richard L. Meyer, Ph.D.
Edward C. Stone, Ph.D.
Robert J. Tch A., M.L.A.

Associate Professors:
Thomas G. Dickert, M.L.A., M.G.C.
Michael L. Laurie, M.L.A.
Claire Cooper Marcus, M.A., M.G.C.
Joe R. McBride, Ph.D.

Assistant Professor:
David L. Gates, M.L.A.

Lecturer:
Russell A. Beatty, M.L.A.

The Profession

The profession of Landscape Architecture plays an important role in identifying and solving problems associated with the visual and functional use of the land, including the land's sites and spaces. Landscape Architecture is concerned with the entire environment of the landscape, from the scale of detailed form to the patterns of regional landscape environments. A common feature of the profession is the development of a comprehensive design program that will provide for the protection, development, and use of the landscape in which they are to be located. Because the increasing complexity of the problems, Landscape Architecture is structured to give the student an opportunity to study, more intensively, all aspects of landscape. The professional practice includes planning for conservation of open space and natural amenities; land management and development; design of parks and recreation areas, schools, housing, and urban re-development projects. Landscape Architects are involved in the design and development of such projects as public and private exterior spaces and landscapes, including the study of project planning and programming, natural and behavioral factors of open space design, plant materials, professional practice, site construction technology, and conservation concerns related to soil, water and energy. Environmental planning is concerned with the larger context of natural and urban environments, including the study of ecology, conservation planning, environmental law, resource development, computer applications, recreation planning, and urban open space and highway systems.

Current faculty research and professional involvement in impact and planning analysis, human factors and design, environmental simulation, landscape visual and scientific assessment, ecology and plant succession, and community participation in design and planning enriches study opportunities in the program.

The professional graduate landscape architectural program offered by the Department is accredited by the American Society of Landscape Architects.

Joint Program in Urban Design. The departments of Landscape Architecture and City and Regional Planning jointly offer a program of study in urban design leading to the Master of Landscape Architecture and Master of City Planning degrees. Applicants must be admitted separately by both the Department of Landscape Architecture and the Department of City and Regional Planning.

The Ph.D. Degree in Environmental Planning. The Doctor of Philosophy program in Environmental Planning will have a core field of "environmental planning and design" with "natural" and "social" minor fields. It is aimed toward the education of teachers, researchers, and advanced professionals in the fields of landscape architecture and environmental planning. Applicants may be from landscape architecture or other fields. They must present outstanding academic records. It is anticipated that most applicants will have completed a professional degree or other master's degrees before entering. Students with only a bachelor's degree need to apply to the M.L.A. program first, or otherwise complete an appropriate Master's degree before application. For information about this program please consult the Department of Landscape Architecture. (P)

For more complete information, see the Announcement of the College of Environmental Design. For courses offered in Summer Session, see the Summer Session Announcement.

Graduate Program

The Master of Landscape Architecture Degree. The program offers advanced work in Landscape Architecture, from the scale of detailed form to that of regional landscape environments. A common group of courses in the Department is required of all students, emphasizing the relationship between the design and the environmental planning aspects of the field. This core group forms the foundation for extended course work. Students may select additional courses in the areas of specialization represented by the faculty to shape various career options. Course work in the College or in other departments expands the range of choice. Advanced work will normally require additional preparation beyond the minimum contact afforded by the core group of courses.

Landscape design is concerned with the detailed design of public and private exterior spaces and landscapes, including the study of project planning and programming, natural and behavioral factors of open space design, plant materials, professional practice, site construction technology, and conservation concerns related to soil, water and energy. Environmental planning is concerned with the larger context of natural and urban environments, including the study of ecology, conservation planning, environmental law, resource development, computer applications, recreation planning, and urban open space and highway systems.

Current faculty research and professional involvement in impact and planning analysis, human factors and design, environmental simulation, landscape visual and scientific assessment, ecology and plant succession, and community participation in design and planning enriches study opportunities in the program.

The professional graduate landscape architectural program offered by the Department is accredited by the American Society of Landscape Architects.

Lower Division Courses

10. Ecological Analysis. (3) Three 1-semester hours and one 4-hour lecture per week. Prerequisite: Consent of instructor. Open to non-majors. Enrollment limited. Analysis of environmental factors, ecosystem functions, and ecosystem dynamism as they relate to decision-making for landscape planning and design. Mr. McBride (Sp)

11. Introduction to Landscape Plants. (4) Two 1-hour laboratories and two 3-hour field study laboratories per week. Prerequisite: landscape architecture 101 or consent of instructor. Introduction to plants suitable for Central California; the relationship of plant growth and maintenance factors. Mr. Arbegast, Mr. Razzano (Sp)

30. Introductory Graphics for Landscape Architects. (4) Two 4-hour laboratories per week. Introduction to the principles of landscape architecture. Mr. Beatty (F)

30. Introductory Graphics for Landscape Architects. (4) Two 4-hour laboratories per week. Introduction to the principles of landscape architecture. Mr. Beatty (F)

Upper Division Courses

100. Introduction to the Principles of Landscape Architecture. (4) Two 4-hour laboratory sessions per week. Investigation of the design process and ownership form in Landscape Architecture. Preference given to majors in Landscape Architecture. (W)

101. Landscape Design. (4) Two 4-hour laboratory sessions per week. Prerequisite: Landscape Architecture 100. Process-oriented design in the community setting. Landscape projects of limited scale; parks, recreation areas, housing, and community facilities. Mr. Gates. (W)

102. The Urban Landscape. (4) Two 4-hour laboratory sessions per week. Prerequisite: Landscape Architecture 101. Design of the urban context; urban open spaces, plazas and public squares, landscape rehabilitation and improvement. Mr. Dillingham (Sp)

103. Landscape Planning. (4) Two 4-hour laboratory sessions per week. Prerequisite: Landscape Architecture 100 and Landscape Architecture 121. Comprehensive treatment of landscape projects of limited scale, such as gardens, small parks, or plazas, including details and selection of the specific materials. Mr. Dillingham (Sp)

111. Planting Design. (4) Two 1-hour lectures and two 3-hour laboratory sessions per week. Prerequisite: Landscape Architecture 101. Application of aesthetic, functional, and design principles in the selection and arrangement of plants in landscape architecture. Mr. Beatty (W)

112. Landscape Horticulture. (4) Two 1-hour lectures, two 2-hour workshops and one 3-hour laboratory per week. Prerequisite: Consent of instructor. Enroll in one of the courses listed above or equivalent. Plant identification course desirable. Personalized System of Instruction. Horticultural factors in landscape design, installation, and management. Plant growth, microclimate, soil management, pruning, planting and maintenance factors. Mr. Beatty (F)

120. Topographic Form and Design. (4) Two 1-hour lectures and two 3-hour laboratory sessions per week. Prerequisite: Civil Engineering 21 recommended. Topographic and grading problems in landscape construction. Design and structural relationships; graphic and computational exercises; technical graphics. Mr. Newton (W)

121. Landscape Structures and Materials. (4) Two 1-hour lectures and two 3-hour laboratory sessions per week. Prerequisite: Consent of instructor. Enroll in one of the courses listed above or equivalent. Landscape Structures and Materials, graphic and computational exercises; technical graphics. Mr. Telford (F)

122. Landscape Site Engineering. (4) Two 1-hour lectures and two 3-hour laboratory sessions per week. Prerequisite: Consent of instructor. Enroll in one of the courses listed above or equivalent. Landscape Site Engineering, graphic and computational exercises; technical graphics. Mr. Beatty (F)

130. Survey of Landscape Architecture. (3) One 3-hour laboratory and one 1/2-hour lecture per week. Introduction to the history, theory, and materials of landscape architecture; contemporary application and practice. Open to non-majors. Mr. Laurie (W)

131. Landscape Analysis and Problem Organization. (3) Two 11/2-hour laboratory sessions per week. Theories and methods in landscape architecture, recognizing natural factors and design problem organization. Mr. Arbegast, Mr. Razzano (Sp)

132. Recreation and Open Space Systems. (4) Two 3-hour laboratory sessions per week. Recreation and open space systems. Mr. Arbegast, Mr. Razzano (Sp)
2-hour lecture and visitor-presentation sessions; plus one discussion meeting per week. Prerequisite: consent of instructor. The function and meaning of leisure. Recreation as a socio-ecological system in time and space. Environmental systems. Planning issues and design criteria. Student-selected field studies.

133. Design Implications in Forestry and Resource Management. (4) Two 2-hour lectures and one 3-hour laboratory per week. Prerequisite: upper division standing and consent of instructor. Exploration of environmental design processes as a means of understanding visual composition as a base to which forestry and resource management decisions may be given form and meaning. Mr. Litton (Sp)

134. Presentation Graphics for Landscape Architecture. (4) 2-hour laboratories per week. Prerequisite: Landscape Architecture 30 or Environmental Design 6. Freehand and formal perspective methods for graphic representation of design concepts. Pen, ink, and color media. Mr. Telow (Sp)

140. Social and Psychological Factors in Open Space Design. (4) Two 1 1/2-hour lectures and 3 hours of field observation per week. Theories of home, neighborhood, territory, communication, public behavior, and play. Feedback research on user-behavior in existing housing developments, parks, urban squares, playgrounds, campgrounds. Observation and evaluation of local open spaces; programs for redesign. (F)

160. Professional Practice Seminar. (4) 2-hour seminars per week. Discussion with practicing professionals in the field. Mr. Brown (Sp)

170. History and Literature of Landscape Architecture. (4) Two 2-hour lectures per week. Developmental history of landscape design practice; relationships to society, climate, and topography. Mr. Brown (Sp)

197. Field Study in Landscape Architecture. (2–4) To be arranged. Prerequisite: upper division standing and consent of instructor. See individual information sheet for limitations. Supervised experience relative to specific aspects of landscape architecture for design students with local or outside sponsors. Reports required. Must be taken on a pass/no pass basis only. The Staff (F, W, Sp)

198. Directed Group Study. (1–5) To be arranged. Prerequisite: consent of the instructor. The Staff (F, W, Sp)

199. Supervised Independent Study and Research. (1–5) Enrollment restricted by regulations listed in the University Catalog. Must be taken on a pass/no pass basis. The Staff (F, W, Sp)

See Environmental Design course listings for description of required environmental design courses for landscape architecture major.

200A. Landscape Design and Graphics. (4) Two 4-hour studios per week. Prerequisite: Landscape Architecture 103 or Landscape Architecture 202A. Problems in landscape design and site planning, grading and drainage on topographically complex sites. Mr. Litton (Sp)

200B. Site Planning and Topographic Form. (4) Two 4-hour studios per week. Prerequisite: Landscape Architecture 120 and Landscape Architecture 202A. Problems in landscape design and site planning, grading and drainage on topographically complex sites. Mr. Litton (Sp)

201. Problems in Environmental Planning. (4) Two 4-hour laboratories per week. Prerequisite: Landscape Architecture 103 or consent of instructor. Problems in planning for the protection and improvement of natural and physical environments of urbanizing regions. Mr. Leopold, Mr. Twiss (W)

202A. Landscape Analysis for Site Planning. (4) Two 4-hour studios per week. Prerequisite: Landscape Architecture 200A and 200B. The practical approach to the determination of the site's form through comprehensive analysis of the program and the site. To be taken in conjunction with Landscape Architecture 202A. Mr. Gates (F)

202B. Landscape Design. (4) Two 4-hour studios per week. Prerequisite: Landscape Architecture 202A and 202B. Advanced problems in design investigated in terms of construction, detailing, land form and implementation on specific sites. To be taken in conjunction with Landscape Architecture 203B. Mr. Gates (F)

203B. Landscape Design and Planning. (4) Two 4-hour studios per week. Prerequisite: Landscape Architecture 202A and 202B. Advanced problems in design investigated in terms of planning, planting design and implementation on specific sites. To be taken in conjunction with Landscape Architecture 203A. Mr. Gates (F)

204. Advanced Problems in Landscape Design. (4) Two 4-hour studios per week. Prerequisite: Landscape Architecture 203A and 203B. Preparation of design and working drawings for a project arranged by the student with the faculty. Mr. Telow (Sp)

205. Environmental Simulation. (Variable 2–4). Six to nine hours of laboratory per week. Prerequisite: consent of instructor. An experimental workshop using the Environmental Simulator. Model-making for movie and video presentation; analysis of alternative simulation techniques; comparative behavioral studies of simulations and the real world; new methods of urban and highway system design. Mr. Appleward (F, W, Sp)

210. Vegetation Analysis for Environmental Planners. (4) Two 4-hour laboratories per week. Prerequisite: Forest and Conservation 123A or the consent of the instructor. Vegetation treatment is treated as a basis for the study of natural processes and their relationship to land use. The concepts of ecological and environmental principles, control, and management in relation to the application of vegetation for environmental objectives are examined in a case study framework. Enrolment limited. Mr. Stone (F)

220. Natural Factors in Planning and Design. (3–4) Two lectures and three to six hours of laboratory per week. Identification of natural and physical factors necessary to control this process in order to achieve specific environmental objectives are examined in a case study framework. Mr. Litton (F)

221. Quantitative Methods in Environmental Planning and Design. (4) Two 2-hour seminars per week. Prerequisite: consent of instructor. Discussion and critique of the application of quantitative methods to environmental assessment, analysis and evaluation in planning and design. Topics include multivariate analysis, optimization, simulation modeling, and operational gaming. Emphasis will be given to the use of quantitative methods in landscape architecture and design research. Mr. Dickert (F)

222. Hydrology for Planners. (4) Three lectures, three and two hours of laboratory per week. Prerequisite: none; assumed knowledge of soil, vegetation, hydrology, climate, and linkage with visual aspects; synthesis for planning. Mr. Twiss (F)

223. Communications in Landscape Architecture. (4) Two 4-hour studios per week. Prerequisite: consent of instructor. Discussion of the communication process in landscape architecture with primary emphasis on graphic presentation, but also including photography, videotape, workshops, the spoken and written word reports and models. Mr. Leopold (W)

224. Landscape as a Visual Resource. (4) Two lectures, three and two hours of laboratory per week. Prerequisite: open to 2nd year graduate students in landscape architecture. The visual aspects; synthesis for planning. Mrs. Marcus (Sp)

230. Community Planning. (4) Two 4-hour studios per week. Prerequisite: Landscape Architecture 203A and 203B. Participation by invited guests from the profession. Mrs. Marcus (Sp)

231. Principles of Site Planning. (4) Four hours of lecture and discussion per week, and field outings to be arranged. Prerequisite: consent of instructor. Discussion of the planning process with emphasis on relationships of the physical environment to urban design. Mr. Gates (W)

232. The Landscape as a Visual Resource. (4) Two lectures and three hours of laboratory per week. Prerequisite: Landscape Architecture 203A and 203B. Advanced problems in planning and design, especially related to public wildlands. Mr. Litton (F)

233. Introduction to Computer Graphics and Mapping. (4) Two lectures, two hours of laboratory and one 1-hour discussion per week. Prerequisite: basic computer programming course may be taken concurrently. Introduction and exercises using programs for both primitive two-dimensional mapping, three-dimensional plotting, and graphic subroutines, with data from student's area of interest. Individual problem sessions to be included, as necessary. Mrs. Leiman (W)

234. Seminar in Landscape Design and Environmental Planning. (1) One 1 1/2-hour seminar per week. Prerequisite: consent of instructor. Faculty points of view with relation to landscape design and environmental planning. Problem identification and solution, values, and the processes involved including definitions of the professional field. Examples drawn from current educational, professional and research projects by faculty. Must be taken on a satisfactory/unsatisfactory basis. (F)

235. Thesis and Comprehensive Examination Seminar. (2) One 2-hour seminar per week. Prerequisite: completion of the first graduate year. Comprehensive examination, and research methods and strategies for written and design thesis research and for the comprehensive examination. (F)

237. Seminar in Environmental Design. (2) Two 2-hour seminars per week. Prerequisite: graduate standing. Consultation with the graduate advisor and consent of instructor. Collective intervention into the living environment. How is action taken? Ethical and philosophical implications of design decisions, including design decision-making processes and their relationship to the environment. Participation by invited invited guests from the profession. Mrs. Laurie (Sp)

240. Advanced Seminar in Behavioral Factors in Open Space Design. (4) Two 2-hour seminars per week. Prerequisite: Landscape Architecture 140. Advanced study of behavioral factors in open space design and planning. Participatory invited guests from the profession. Mrs. Laurie (Sp)

249. Group Study. (1–5) To be arranged. The Staff (F, W, Sp)

259. Individual Research. (1–5) To be arranged. The Staff (F, W, Sp)

601. Individual Study for Master's Students. (1–8) Prerequisite: last quarter of residence in the MLA program. Individual study for comprehensive requirements in consultation with the advisor. Units may not be used to meet either unit or residence requirements for the degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

602. Individual Study for Doctoral Students. (1–8) Individual study in consultation with the major field advisor. Individual study for course credit. Students must pass the comprehensive examination, and be approved by the academic committee. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

IDS 211. Geological and Engineering Factors in Environmental Planning. (4) See Interdepartmental Studies for the complete description of this course.

IDS 230. Amenity Resources Planning. (4) See Interdepartmental Studies for the complete description of this course.


IDS 241. The Urban Environment. (4) See Interdepartmental Studies for the complete description of this course.

IDS 242. Environmental Psychology. (4) See Interdepartmental Studies for the complete description of this course.

NOTE: For key to symbols, see page 36.
Program in Visual Design

Program Office, 235 Wurster Hall

Professors:
Margaret Dhaemers (D’Hammer), M.A., M.F.A.
Herwin Schaeferr, Ph.D.

Assistant Professor:
Anthony Dubovsky, M.A.

(Chairman)

Undergraduate Program

For information about the undergraduate program, see the Announcement of the College of Environmental Design.

Graduate Program

The graduate program is organized to provide advanced study in visual design. The degree awarded is the Master of Arts in Design.

For detailed information about the graduate program consult the Announcement of the College of Environmental Design and the graduate adviser for the Program in Visual Design.

UPPER DIVISION COURSES

103A–103B–103C. Graphic Composition. (4–4–4)
One hour of lecture and six hours of laboratory per week. Prerequisite: 103A. Environmental Design 6 or consent of instructor; 103B: course 103A or consent of instructor; 103C: course 103B or consent of instructor. Design problems in the various communication media stressing principles of graphic order and expression. Mr. Dubovsky (F, W, Sp)

112A–112B–112C. Constructed Textiles. (4–4–4)
Six hours of laboratory per week. Prerequisite: consent of instructor. 112A is prerequisite to 122B. Laboratory study of woven and non-woven textile structures, emphasizing the interrelation of techniques and materials in textile design. 122B may be repeated once for credit. Mr. Rossbach.

120. Basic Techniques of Photography. (4)
Six hours of laboratory per week. Prerequisite: passed basis. Studies developed to meet individual needs. No more than 5 units may be applied to graduate work and research. Review of the development of thesis contents. Mr. Rossbach.

197. Field Studies In Design. (1–5)
Prerequisite: 103A: Environmental Design or consent of instructor. Regular individual meetings with faculty sponsor and on subjects of the student’s interest and in the field of the student’s thesis. Mr. Rossbach.

198. Special Group Study. (1–5)
To be arranged. Mr. Rossbach.

199. Individual Study and Research for Master’s. (1–5)
Individual study and research under the supervision of a faculty adviser. Mr. Rossbach.

GRADUATE COURSES

202. Seminar in Experimental Approaches to Media and Methods. (4)
Three hours of seminar per week. Emphasis on critical problems through development, presentation, and production. Mr. Rossbach.

222. Seminar in Experimental Approaches to Media and Methods. (4)
Three hours of seminar per week. Emphasis on critical problems through development, presentation, and production. Mr. Rossbach.

226. Seminar in Photography. (3)
Three hours of seminar per week. Prerequisite: course 129. Emphasis on photographic projects related to environmental design and documentation of current history. Mr. Rossbach

233. Special Problems in Light, Motion, and Form. (4)
One hour of lecture and two 3-hour laboratories per week. Prerequisite: course 133. The visualization of light, motion, and form in T.V. or multimedia and their effects on spatial orientation and arrangement. Mr. Rossbach

234. Special Problems in Photography. (4)
Three hours of seminar per week. Prerequisite: course 233 or consent of instructor. Photography as a means to pursue light and motion relationships in a separate context from content. Mr. Rossbach

235. Seminar in Photography. (3)
Mr. Dhaemers (Sp)

Special Studies

179. Field Study in Design. (1–5)
Prerequisite: consent of instructor. Supervised experience relevant to design study. Mr. Rossbach.

181B. Architectural Photography. (4)
Two hour lectures and two 2-hour laboratories per week. Prerequisite: Visual Design 127 or consent of instructor. Theory applicable to some practical aspects of architectural photography. Mr. Schaeferr (F, W, Sp)

191A. Calligraphy. (4)
Two hours of lecture and four hours of lab per week. Prerequisite: E.D. 6. This course provides an introduction to the basic principles of calligraphy. Credit will not be given to students in the College of Environmental Design. Mr. Schaeferr (F, W, Sp)

192. Special Group Study. (1–5)
To be arranged. Mr. Rossbach.

199. Individual Study and Research for Master’s. (1–5)
Individual study and research under the supervision of a faculty adviser. Mr. Rossbach.

ENVIRONMENTAL DESIGN COURSE

172. History of the Environment. (4)
See Environmental Design for the complete description of this course. Mr. Schaeferr (Sp)

School of Journalism

School of Journalism Office, 607 Evans Hall

Professors:
Ben H. Bagdikian, A.B.
Edwin R. Bayley, B.A. (Dean)
David Littlespe, Ph.D. (Associate Dean)
Joseph P. Lyford, B.A.

Lecturers:
Darrell DeCosta, M.J.
Lacy E. Foxburgh, B.A.
Rasa Gustaitis, M.S.
Richard Reinhardt, M.S.
Peter Schrag, B.A.

Graduate Advisers: Mr. Spaulding, Mr. Littlejohn, Mr. Pickrell, Mr. Bayley, Mr. Taper.

Undergraduate Advisers: Mr. Lyford, Mr. Pickrell, Mr. Spaulding, Mr. Littlejohn, Mr. Leonard.

The School of Journalism offers programs leading to the degrees of Bachelor of Art (A.B.) in Journalism and Master of Journalism (M.J.). The M.J. program seeks to provide training in the skills and techniques of journalism and a knowledge of the traditions and principles of the profession, combined with the study of other academic disciplines that constitute the subject matter of journalism.

Candidates for the M.J. degree shall ordinarily have completed six quarters in graduate study in journalism and related disciplines. They shall have completed 48 units of approved upper division or graduate courses, including not less than 36 units in graduate courses in journalism, and shall have presented an acceptable thesis or reporting project. Students generally will take about two-thirds of their courses in journalism and one-third in a related field of specialization.

An applicant for graduate study should hold a bache- lor’s degree comparable to that given to the students of California. Requirements and procedures are outlined in the circular Admission to Graduate Study, available at the office of the Dean of the Graduate Division, and in the Announcement of the School of Journalism.
The A.B. program in journalism is limited to undergraduate students simultaneously enrolled in a second bachelor's degree program on the Berkeley campus. The student may declare either major first, but should take courses each quarter that will facilitate progress towards completion of the requirements for both degree programs. No student will be admitted to the A.B. program in journalism who has not completed two years (90 quarter units) of approved college-level work, and who cannot reasonably expect to complete all requirements for the journalism A.B. and a second bachelor's degree within a total of 195 quarter units. The A.B. in journalism will only be awarded when all requirements for both degree programs are completed.

The A.B. program is designed primarily for students who do not expect to continue with graduate work in journalism. Although less professional in its emphasis than the journalism major, it is based on the same principle: that the best journalist is one who combines a broad general education and superior writing skills with some degree of area specialization, and basic training in the skills, techniques and background of the profession. The dual-degree bachelor's program also represents a broad and demanding liberal arts education in its own right, suitable to students with other career plans.

Further information, application requirements, and copies of the Announcement of the School of Journalism 1978/79 are available from the Office of the School of Journalism, 607 Evans Hall.

UPPER DIVISION COURSES

100. Introduction to News Writing. (4) Three hours of lecture and eight hours of field work per week, with periodic tutorial sessions. Survey of journalistic principles and practices, and study and practice of methods of gathering, writing, and editing news. The Staff (F, W, Sp).

101. Advanced Writing for Journalists. (4) Three hours of lecture and discussion and eight hours of field work per week. Prerequisite: course 100. Advanced course in Journalism 100 for students who seek additional instruction and practice in gathering, writing, and editing news, editorials, and features. Individual sections may be devoted to one or more specialized forms of journalistic writing; the topic will be announced each quarter. The Staff (F, W, Sp).

110. Undergraduate Colloquium. (1) One and one-half hours of lecture and discussion per week. Introduces students to the journalistic profession by means of weekly meetings and discussions with the faculty of the School of Journalism and visitors. Can be repeated for credit. Must be taken on a Pass/Nopass basis. Mr. Reinhardt (F, W, Sp).

140. History of the American Press. (4) Three hours of lecture and discussion per week. How "news" has been reported and communicated through newspaper and periodical times to the present. Students will do research on the political, social, economic, or cultural role of the press. Mr. Leonard.

141. The Mass Media and Society. (4) Three hours of lecture per week (attendance required) and three hours of discussion, for which attendance is voluntary. Critical analysis and discussion of contemporary trends, problems, and objectives of the media of mass communications. Mr. Lyford, Mr. Bagdikian.

151. The Literature of Journalism. (4) Three hours of lecture and discussion per week. Study of the works of outstanding writers for the American and European press, from the eighteenth century to the present. Mr. Lyford.

155. Propaganda and the Mass Media. (4) Three hours of lecture and discussion per week. A survey, beginning in the 19th century, of the origins and the effects of news in American political and educational life. Mr. Leonard (Sp).

165A. Legal Aspects of the News Media. (4) Three hours of lecture and discussion per week. Introduction to legal and ethical concepts of the press and their application to news media analysis of legal rights and restrictions on news media, including invasion of privacy, criminal libel, contempt, and fairness standards. Mr. Pickrell.

165B. Legal Aspects of the News Media. (4) Three hours lecture and discussion per week. Consideration of contemporary legal problems of the news media, including free press-fair trial, obscenity and censorship, licensing and taxation, FCC and the Fairness Doctrine, access to meetings and judicial proceedings, and administrative regulations. (165A is not a prerequisite.) Mr. Pickrell.

175. The Critical Review. (4) Three hours of lecture and discussion or tutorial, and eight hours of field work per week. Prerequisite: consent of instructor. Limited to 15 students. Advanced study of the field of critical reviewing (books, film, drama, music, art, and architecture). Mr. Littlejohn.

180. Issues in Television Journalism. (4) Four hours of lecture and discussion per week. Prerequisite: course 180 (of which this course is an extension). Advanced study of selected issues in broadcast journalism and research in the areas of broadcast news quality, the use of film and videotape as reporting tools, financial pressures, and federal regulation. Mr. Stern, Mr. Shore (Sp).

181. Television News Research Seminar. (4) Four hours of lecture and discussion per week. Prerequisite: course 180 or equivalent. Study of and practice in reporting news of judicial, legislative, and administrative functions of city, county, and state government. The Staff (F, W, Sp).

185. Advanced Reporting of Public Affairs. (4) Three hours of lecture and discussion and eight hours of field work per week. Prerequisite: course 180 or equivalent. An extension of course 184, for students who seek additional instruction and practice in the reporting of governmental function.

190. Comparative World Journalism. (4) Three hours of lecture and discussion per week. Examination of international news flow in news from nations, with attention to sources of information, media characteristics, and consideration of performance. The Staff (F, W, Sp).

197. Field Study in Journalism. (1–5) Supervised experience in the practice of journalism in off-campus organizations. Individual meetings with faculty sponsor and written reports required. The Staff (F, W, Sp).

198. Directed Group Study in Journalism. (1–6) Prerequisite: total grade-point average of not less than 3.0 and consent of instructor in charge.

199. Supervised Individual Study and Research. (1–5) Prerequisite: total grade-point average of not less than 3.0 and consent of instructor in charge. Enrollment is restricted by regulations. The Staff (F, W, Sp).

200. Reporting the News. (6) Five hours of lecture and discussion of newspaper principles, ethics, and practices; periodic tutorial and all day laboratory sessions, and 15 hours field work and news reporting, writing and editing each week required. Required as prerequisite for advanced reporting and broadcasting courses.

201. Advanced News Writing. (4) Three hours of lecture and discussion each week. Prerequisite: course 200. Advanced study of the news reporting enterprise and features. Individual sections may be devoted to one or more specialized forms of journalistic writing; the topic will be announced each quarter. The Staff (F, W, Sp).

205A. News Editing. (3) Three hours of lecture and laboratory per week, and outside assignments and reading. Study of the principles and practice of news editing, copyreading, headline writing and makeup. Must be taken on a satisfactory/unsatisfactory basis. The Staff (W).

205B. Advanced Editing. (3) Three hours of lecture and laboratory per week, plus outside assignments and reading. Course 205A is prerequisite to 205B. News editing, with emphasis on creative editing and critique of manuscripts. Must be taken on a satisfactory/unsatisfactory basis.

207. Magazine Editing. (3) Four hours of seminar and laboratory per week. Study of and practice in creative editing of manuscripts. Study and critique of magazine editing and practice in creative editing, layout, and production processes. The Staff (F, W, Sp).

210. News Photography. (3) Two hours of lecture and discussion and four hours of laboratory per week. Fundamentals of photography and taking news photographs. Field assignments. Limited to Journalism graduate students and majors. The Staff (W, Sp).

212. Photojournalism. (3) Two hours of lecture and four hours of laboratory per week. Prerequisite: course 210 or equivalent and consent of instructor. Critical study of photojournalism. Field assignments to produce magazine and newspaper photographic stories. Mr. Stern (W).

220. Public Affairs in Perspective. (4) Three hours of seminar per week, with outside reading and field study. Study of and practice in the writing of opinion such as columns, commentaries, and editorials.

225A–225B. Reporting on the American Community and Urban Affairs. (4–4) Three hours of lecture and discussion and eight hours of field work per week. Prerequisite: for journalism students, course 200 or equivalent; for others, consent of instructor. Course 225A is prerequisite to 225B. Examination of the structure and the political and social character of communities, and practice in reporting on urban problems such as education, health, welfare, housing, and administration. Mr. Lyford, Mr. Taper (W, Sp).

226. Reporting of Science and the Environment. (4) Three hours of lecture and discussion and eight hours of field work each week. Prerequisite: for journalism students, course 200 or equivalent; for others, consent of instructor. Advanced study of methods of reporting developments in such fields as science, education, mental or physical health, psychology, or the environment. Mr. Spaulding (W).

227. Reporting of Cultural Events. (4) Three hours of lecture and discussion and eight hours of field work each week. Prerequisite: for journalism students, course 200 or equivalent; for others, consent of instructor. Advanced study of reporting and critical writing in fields such as drama, film, music, fine arts, literary or architecture. Mr. Littlejohn, Mr. Taper (W, Sp).

228. Political Reporting. (4) Three hours of lecture and discussion and eight hours of field work each week. Prerequisite: for journalism students, course 200 or equivalent; for others, consent of instructor. Study and discussion of politics and practice in reporting political events and campaigns. Offered in alternate years. Mr. Bayley.

229. Reporting of Crime and the Courts. (4) Three hours of lecture and discussion and eight hours of field work per week. Prerequisite: for journalism students, course 200 or equivalent; for others, consent of instructor. Study of the function of the mass media in its relationship to the legal system, with field work in re-
240. History of American Journalism. (4) Three hours of lecture and discussion per week. Study of and research in the history of American journalism and its relation to social, economic, and political conditions of the period.

241. The Journalist as Social Critic: An Historical Perspective. (4) Three hours of discussion per week. The personal, professional, and political factors that have led American journalists to seek dramatic change in their society. The course will focus on the makrakers of the Progressive era and the impact of Marxism on journalism of the 1930s.

242. The Writing of Profiles, Personality Sketches, and Short Biographies. (4) Three hours of seminar per week. Reading and discussion of eminently successful articles by professional writers, and of student assignments. Mr. Sessler

245. Investigative Reporting. (4) Three hours of lecture and discussion and eight hours of field work per week. Preparation of 200 student reports. Students identify, research and write profiles of newsmen: libel, privacy, access, shield laws, free press/fair trial, court organization and procedure. Mr. Pickerell

247. Social Aspects of the Mass Media. (4) Three hours of lecture and discussion per week. Critical analysis of the socialization of problems of ethics and responsibility. Mr. Lyford, Mr. Bagdikian

248. Introduction to Television Reporting. (4) Three hours of lecture and discussion per week. The personal, professional, and political factors that have led American journalists to seek dramatic change in their society. The course will focus on the makrakers of the Progressive era and the impact of Marxism on journalism of the 1930s.

249. Field Study in Journalism. (1-5) Supervised study and research not covered by any other course or seminar. Units of credit to be determined by the instructor.

250. Investigative Study in Individual Mass Communications (1-6) Supervised research projects and reports.

251. Individual Study in Mass Communications. (4) Three hours of lecture per week. Use of law and tactics to obtain access to public information at local and state levels, from public bureaus, courts, and public corporations; field work searching records and writing articles based on findings.

252. Access to Public Documents. (2-4) Three hours of lecture and discussion per week. Use of law and tactics to obtain access to public information at local and state levels, from public bureaus, courts, and public corporations; field work searching records and writing articles based on findings.

260. Individual Study for Master's Students. (2-6) Units not to be used to satisfy any master's degree and in course offerings are often necessary. After the first year, students must take at least one unit per quarter to receive the degree of Master of Laws (LL.M.) or the degree of Doctor of Jurisprudence (J.S.D.). The School of Law (Boalt Hall) has a three-year curriculum leading to the Juris Doctor (J.D.) degree. In addition to preparing its students to practice law, the School attempts to develop a study of law and to foster legal research. The School is a member of the Association of American Law Schools and is approved by the American Bar Association. Its graduates are qualified to become applicants for admission to practice in any state of the United States.

No single "pre-law" major is required or even recommended. However, these suggestions are made: students should learn to write by taking courses in which their work is vigorously edited; enroll in courses demanding analytical skills; obtain some breadth in humanities and social sciences that will help in understanding the social context within which legal problems arise; and acquire a general understanding of the business world. The student should not merely because their undergraduate education has not emphasized these areas. Diversity of undergraduate background enhances and enriches the legal experiences of all students.

The School of Law has also instituted a Graduate Program in Jurisprudence and Social Policy, leading to M.A. and Ph.D. degrees. It is a multidisciplinary program, involving faculty from the humanities and social sciences as well as law. It is designed for students who are interested in careers in teaching, research, and policy analysis. No prior legal training is required for admission. Descriptions of several of the offerings in this program are described under courses numbered: 206.2; 245.5; 258.3; 273.8. Others will subsequently be added. A year-long four-unit orientation seminar, Jurisprudence and Social Policy, will be required of all students in the program.

The School does not offer a part-time or evening program. The work of the first year is prescribed; the second and third years' courses are elective.

The School also offers programs leading to the degree of Master of Laws (LL.M.) or the degree of Doctor of the Science of Law (J.S.D.). The following list indicates the courses usually offered each academic year, although changes in instructors and in course offerings are often necessary. After the title of each course is the credit value in semester units in parentheses, a brief description of the subject mat-
ter, and the names of the faculty who usually teach the course. Note: The term of instruction for the School of Law is fifteen weeks rather than ten weeks. Therefore, the units in the School of Law, only, are indicated as semester units.

Explanation of Course Numbering System

1. Courses are listed alphabetically, with two exceptions: Prescribed first-year courses are numbered 200 to 209, and special programs are numbered 295 to 299.

2. Courses that substantially are the same (although the emphasis or the number of units may differ) are given the same number, but a different identifying number following a hyphen.

3. Where no number is available at the place in the list at which a course belongs, the preceding number is assigned followed by a decimal point and another number.

4. Two-semester courses are indicated by letters (e.g., 200A, 200B). Unless otherwise indicated, completion of only one part of the course is a prerequisite to taking the other part.

For further information and admission requirements of the School of Law, see the Announcement of the School of Law, available without charge from the Law School Admission Office, 220 Boalt Hall, Berkeley, California 94720.

PROFESSIONAL CURRICULUM

First Year

The first-semester program is composed of six prescribed courses. Four of the classes are in large sections, with approximately 110 students in each. The fifth section is limited to 25 to 30 students. In the second semester, five courses are prescribed, and the student chooses one elective course. There are large sections and small sections in each of the first-year courses except Law 205 which is all small sections.

200A–200B. Civil Procedure. (3–3) 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.

Mr. Degnan, Ms. Kay, Mr. Stolz, Mr. Vetter

201A–201B. Contracts. (3–3) The law of contracts, including formation, operation, and termination. Mr. Coons, Mr. Sweet, Mr. Eisenberg, Ms. Shultz


Ms. Foote, Mr. Johnson, Mr. Cohen, Mr. Schuhalter


Mr. Fletcher, Mr. Heyman, Mr. Riesenfeld, Mr. Witherspoon

204A–204B. Torts. (3–3) The law of civil injuries, including both intended and unintended interference with personal and property interests as well as liability without fault.

Mr. Fleming, Mr. Wheeler, Mr. O'Brien, Mr. Gordy

205. Introduction to Law. (1–1) Instruction in legal research and writing in the fall semester, and a moot court program in the spring. Associates

Second and Third Year

206. Administrative Law. (2) A study of administrative procedure and of agency rules, orders, and regulations (federal and state). Emphasizes the problems that lawyers encounter when they deal with government agencies and their innumerable rules and regulations.

Mr. Stolz

206.2 Administration of Criminal Justice. (2) A research seminar exploring the historical and contemporary changes in sentencing laws, practices, and patterns. The emphasis is on social, political, and administrative sources and consequences of discretionary elements in sentences of imprisonment. The California experience from 1850 to date will provide the main example.

Mr. Messinger

208.6. Ancient Law. (2) Discussion will focus on the ancient Orient (including the Bible) and Greece. It will deal with both in so far as we find it in the use of theology, myths and narratives as well as legal materials. Source and form criticism, the nature of comparison and similar methodological problems will receive attention.

Mr. Daube

209. Antitrust Law. (3) Legal and economic problems in the public control of corporate market power. Topics covered include monopolies, cartels, oligopolistic interdependence, Knoll cooperation among firms, vertical restraints, and merger.

Mr. Sullivan

210. Appellate Advocacy. (3) Open to second-year students only. Comprises evening lecture teaching by faculty members and judges in the art of written and oral appellate argument, with exercises in that art under the supervision of members of the Moot Court Board and the faculty. Exercises in written argument are subject to detailed critique and analysis by members of the Moot Court Board and, after revision, by the student, by faculty. This is followed by the briefing and argument of an actual case. Satisfactory completion is a prerequisite for candidacy on the Moot Court Board.

Mr. Feller and the members of the Moot Court Board

211-2. Business Associations (Corporations). (5) Basic principles of corporation law: formation of the corporation, operation and control of the corporation, authority of corporate executives, shareholders' derivative suits, obligations of management to corporations and shareholders, distribution of assets, corporate reorganization and recapitalization, and alteration of shareholders' rights.

Mr. Buxbaum

211-3A–211-3B. Business Associations (Corporations). (3–2) Cover substantially the same material as Law 211-3A–211-3B, except that less attention is devoted to the legal aspects of corporate finance.

Mr. Choper, Mr. Jennings

211-4A–211-4B. Business Associations (Corporations). (3–2) Cover substantially the same material as Law 211-3A–211-3B, except that less attention is devoted to legal aspects of corporate finance.

Mr. Eisenberg

212. Business Planning, Selected Problems in. (2) Principles of business organization in a non-corporate form. Business planning and formation of non-corporate entities is followed by a study of the basic materials on corporations in the federal system, with emphasis on the interaction of state and federal law on corporate regulation. Topics include formation of corporations, management-shareholder relations, and the protection of minority shareholders, dividend and other distributions of assets, corporate reorganization and recapitalization, and alteration of shareholders' rights.

Mr. Buxbaum

213.5. Civil Procedure. (3–3) A brief introduction to non-corporate legal entities in a state corporation. The California and other Western states law of corporations. Mr. Coons

214.5. Children and the Law. (2) Seminar addressed to law and social policies that affect children, exploring what it means for purposes of the law to be a minor—infant, child, or adolescent—in America today.

Ms. Noyola

215. Credit, and Articles 7 on Documents of Title. (2) Study of consumer protection, the course is near-essential for practitioners (including poverty lawyer).

Mr. Fleming

218. Commercial Law (Sales). (2) Substantive course in the Uniform Commercial Code, especially Article 2 on Sales, Articles 3 and 4 on Leases, and Article 9 on Secured Transactions. The latter are covered in Law 218B. Commercial Law II (Secured Transactions, Documents of Title, Payment Transactions).

Mr. Mookin

218A. Commercial Law I (Sales). (2) Substantive course in the Uniform Commercial Code, specifically Article 2 on Sales, Articles 4 on Negotiable Instruments, and Article 7 on Documents of Title, but omitting Articles 3 on Leases, Article 9 on Secured Transactions, and Article 9 on Bank Deposits. The latter are covered in Law 218B. Commercial Law II (Secured Transactions, Documents of Title, Payment Transactions).

Mr. Mookin

218B. Commercial Law II (Secured Transactions, Documents of Title, Payment Transactions). (2) Commercial Law I (Sales), or, as a prerequisite, Law 218A. Mr. Coons

219.3. Community Property. (2) The marital property law of California and other states and practical problems of state taxation, family law, and state and federal bankruptcy law. Mr. Mosteky

220. Computer Research in the Law. (2) A survey of the applications of computers to legal research and law practice, with an emphasis on problem solving and with a discussion of implications of legal reasoning, jurisprudence, and future development of legal procedures and development of the law in the field and its considerable breadth, the discussion will concentrate on a few of the topics listed below to permit more extended discussion of legal arguments and experience of the class. A written critical analysis of a particular system or a specific topic will be required.

Ms. Barton

223. Conflict of Laws. (3) Jurisdiction, choice of law and recognition of judgments in cases involving interstate and state-federal conflicts, particularly in the law of procedure, torts, workers' compensation, contracts, property, domestic relations, estates, and business associations.

Ms. Kay


Mr. Mishkin

224-2A–224-2B. Constitutional Law. (3–3) Analysis of the judicial process in constitutional cases, the sources and nature of national legislative power, limitation of state power, judicial implementation of the Bill of Rights to the states; freedoms of expression, association, and religion; equal protection. Mr. Cole

225. Consumer Protection Seminar. (2) Study of substantive problems and abuses confronting consumers, and evaluation of the existing as well as proposed societal responses to these problems.

Mr. Blasi

226. Contract Writing and Analysis. (2) Seminar designed to develop the student's skills in writing contracts. Skill will be examined through model fact situations and will include the drafting of several agreements from simple employment agreements and leases through more complex provisions of partnership buyout agreements and real estate purchase documents.

Ms. Novola

227. Copyright and Unfair Competition. (2) Statutory and common law protection of literary, musical, and artistic works, public policy implications of unfair competition and trade mark protection.

Mr. Boorstyn

230. Creditors' Remedies and Debtors' Protections. (3) Enforcement of judgments, exemptions, conveyancing, the general assignment, creditors' agreements, and bankruptcy arrangements and other forms of debtors' relief.

Mr. Schuhalter

235-1. Criminal Procedure. (3) A survey of criminal law and trial procedures. Topics include the law of arrest, search and seizure, electronic eavesdropping, interrogation, identification, entrapment, pretrial motions and hearings, plea bargaining, jury trial and double jeopardy.

Mr. Schuhalter

235.5. Criminal Trial Practice. (2) Students will participate in simulated criminal cases from arrest to arraignment. Topics include arrest, written motions, jury trial. Emphasis on Bail, preliminary hearing, suppression, presentation of evidence, examination and cross-examination of witnesses, Court/Jury evidentiary and procedural objections. Mr. Portman, Mr. Simons

236. Economic Analysis of Legal Issues. (2) The impact of law on economic behavior and institutions.

Mr. Schuhalter

237. English Legal History Seminar. (2) Emphasis on the judges, the executive, and practical effects of the legal system. Primary reading is from 1100 to 1700. Substantive and procedural topics and the nature of litigation, and judicial institutions are topics for research.

Mr. Barnes

238. Environmental Law. (2) Primary emphasis is on...
the regulation of air and water pollution at national, state, and regional levels and through private law. Economic as well as legal concepts are studied. A portion of the course is also devoted to conservation issues, litigation strategies, and the roles of lawyers in solving environmental problems.

239-2. Estate and Gift Taxation. (2) A study of the statutory, judicial, and administrative material constituting the federal estate and gift taxes. Mr. McNeil

239-3. Estate Taxation and Planning. (3) Prerequisite: Law 250A (Income Taxation I). A basic study of the federal estate, gift, and income tax laws, and their interaction, and the estate and tax planning required to operate on, and affect planning for, gratuitous inter vivos and testamentary transfers. Mr. Haitch

239-4. Estate Taxation and Planning. (2) Prerequisite: Law 250A (Income Taxation I). A study of the federal estate and gift tax laws, together with some aspects of state and local taxation and state inheritance taxes; a study of how these taxes, and other legal rules, and numerous other considerations affect the planning of gratuitous inter vivos and testamentary transfers and other forms of wealth transmission. Mr. Haitch

240. Estate Planning. Selected Problems in. (2) Prerequisite: Law 241 ( Estates and Trusts); Law 250A-250B (Income Taxation I and II), and either Law 239-3 (Estate Taxation and Planning) or Law 239-1 or 239-2 (Estate and Gift Taxation). Selected problems in estate administration and estate settlement, including the probate, guardianship, and trusts utilizing future interest, class gifts and gifts of power of appointment; planning of insurance and disposition of business interests. Mr. Friedman

241-1. Estates and Trusts. (2) The law of intestate succession including administration, creation, modification of trusts; problems of construction; administration of estates and decedents’ estates. Mr. Haitch

241-2. Evidence. (Basic). (3) Concentration on the fundamentals questions of evidence and theory of proof with the object of providing understanding of the legal rules. Mr. Robertson

242. Family Law: The Child, the Family, and the State. (3) This course will be given as an introduction to a variety of family law issues by examining how laws affect the family, the state, and their constitutions, and by introducing the student to the legal implications of family issues. Mr. Hetland

243-24. Family Law: The Child, the Family, and the State. (3) This course will be given as an introduction to a variety of family law issues by examining how laws affect the family, the state, and their constitutions, and by introducing the student to the legal implications of family issues. Mr. Hetland

244. Family Law Seminar. (2) Prerequisite: Law 243 (Family Law). A seminar offered jointly by the School of Law and the Family Planning Service. Students will include law students and psychiatric residents. The course centers around a particular problem area, such as custody, divorce and adoption. Mr. Vetter

245-1. Federal Courts. (5) Prerequisite: Law 224-1 or 224-2 (Constitutional Law). The constitutional and statutory role of courts in the federal system, including their relationship to other branches of federal and state governments, and to private rights of action and to federal law; and the distribution of judicial power between federal and state courts. Mr. Mislin

245-9 Freedom of Speech. (2) A research seminar on current issues in speech and dissent. Each student will present a paper on a topic such as the danger of “ab-solute” approaches, “the public forum,” right of access, libel, libel, right to assemble and engage in free expression, flag display, symbolic speech, or commercial speech. Mr. Shaprio

245.3. History of Canon Law. (2) Prerequisite: reading knowledge of Latin. This seminar provides an introduction to the medieval sources of the canon law and its commentaries. Mr. Kuttner

245.4. Housing and Urban Development Law. (2) An examination of the legal, economic, social and political rights of persons and organizations involved in the deterioration and the remedial potential of past and present program approaches, including emerging landlord-tenant and regulatory law, urban renewal, community development block funds, federal mortgage insurance and housing subsidy programs, tax subsidies, and state housing agencies. Mr. Phillips


250A. Income Taxation I. (3) A study of the statutory, judicial, and administrative material constituting the federal income tax as applicable to the individual. Ms. Barton, Mr. McNulty

250B. Income Taxation II. (3) Prerequisite: Law 250A (Income Taxation I). Continuation of the study of federal income tax, with emphasis on the taxation of business enterprises, including partnerships and corporations, and other financial institutions. Ms. Barton, Mr. McNulty

251.1. International Business Transactions Seminar. (2) Prerequisite: Law 251.3. The effect of the course of this seminar on the foreign business is the determination of basic principles of the study of the basic principles of the course for the foreign business. Mr. Hetland

251.1. International Business Transactions Seminar. (2) The seminar studies and clarifies the standards used to approach the issues involved in foreign business transactions. Mr. Feller, Mr. Vetter

252. International Tax Seminar. (2) Prerequisite: Law 250A-250B (Income Taxation I and II). A seminar in taxation problems in practice, with emphasis on admirability and deportability of aliens and immigration and deportation of noncitizens. Mr. Ungar

255. Labor Law. (3) or (4) The law governing relations between employers and employees, including the legal, economic, and political rationales for the law; the effect of the National Labor Relations Act on collective bargaining, including the law of the collective agreement, the strike, the boycott, and picketing. Mr. Vetter

255. Labor Law, Critical Issues in. (2) Prerequisite: Law 255 (Labor Law). A seminar examining in depth selected questions of current interest in the legal regulation of labor-management relations. Mr. Feller, Mr. Vetter

255.6. Land Financing Transactions. Seminar on. (3) Prerequisite: Law 271.5 (Secured Land Transactions). Preparation required in financing and banking context including current and advanced secured transactions, the protection and enforcement of security interests, the legal and practical aspects of security matters. Mr. Vetter

257A-257B. Land Use and Development. (2-3) Prerequisite: Law 250B (Administrative Law). A seminar examining in depth selected questions of current interest in the legal regulation of labor-management relations. Mr. Feller, Mr. Vetter

263. Legal and Social Theory Seminar. (2) The seminar studies and clarifies the standards used to approach the issues involved in foreign business transactions. Mr. Finn

264. Legislative Process, The Lawyer in the. (2) The course provides experience in the various roles of the lawyer in the modern legislative process, including policy development, committee work, and legislative drafting. Student legislative projects, prepared under faculty supervision, are submitted to the class in simulated committee hearings.

265.3. Legal Reasoning and Legal Theory Seminar. (2) Students will analyze several related problems in judicial (and moral) reasoning. They will derive principles and practice from fundamental sources such as describing events, characterizing behavior, making judgments of justification, and stating values. Some particular statements of the legal system that influence these intellectual operations will be described. For instance, to what extent do the imperatives of the law influence a defendant's or defendant's attorney's concern about legal responsibility control its reasoning? What are the implications of a legal system where the role of the lawyer is to determine who wins in the system simply by using language? Mr. Cole

266.3. Legislative Process, The Lawyer in the. (2) The course provides experience in the various roles of the lawyer in the modern legislative process, including policy development, committee work, and legislative drafting. Student legislative projects, prepared under faculty supervision, are submitted to the class in simulated committee hearings.

266.3. Marxian Theory of the State and the Law. (2) An introduction into the Marxian approach to state and law in the capitalist society, and its role in the development of law. The course will focus on the specific attention to problems of corporate capitalism (The New Industrial State). Topics include: Marx's and Lenin's analysis of the state and law as tools of the state and the state as a tool of the state. Mr. Vetter

267A-257B. Land Use and Development. (2-3) Prerequisite: Law 250B (Administrative Law). A seminar examining in depth selected questions of current interest in the legal regulation of labor-management relations. Mr. Feller, Mr. Vetter

268.3. Legal and Social Theory Seminar. (2) The seminar studies and clarifies the standards used to approach the issues involved in foreign business transactions. Mr. Finn

269. Freedom of Speech. (2) A research seminar on current issues in speech and dissent. Each student will present a paper on a topic such as the danger of “absolute” approaches, “the public forum,” right of access, libel, right to assemble and engage in free expression, flag display, symbolic speech, or commercial speech. Mr. Shaprio

269.3. History of Canon Law. (2) Prerequisite: reading knowledge of Latin. This seminar provides an introduction to the medieval sources of the canon law and its commentaries. Mr. Kuttner


255. Labor Law, Critical Issues in. (2) Prerequisite: Law 255 (Labor Law). A seminar examining in depth selected questions of current interest in the legal regulation of labor-management relations. Mr. Feller, Mr. Vetter

255. Labor Law. (3) or (4) The law governing relations between employer and employee and the impact of state and federal law on the interstate and collective bargaining, including the law of the collective agreement, the strike, the boycott, and picketing. Mr. Vetter

255. Labor Law, Critical Issues in. (2) Prerequisite: Law 255 (Labor Law). A seminar examining in depth selected questions of current interest in the legal regulation of labor-management relations. Mr. Feller, Mr. Vetter

255. Labor Law. (3) or (4) The law governing relations between employer and employee and the impact of state and federal law on the interstate and collective bargaining, including the law of the collective agreement, the strike, the boycott, and picketing. Mr. Vetter

256. Labor Law, Critical Issues in. (2) Prerequisite: Law 255 (Labor Law). A seminar examining in depth selected questions of current interest in the legal regulation of labor-management relations. Mr. Feller, Mr. Vetter

256. Land Financing Transactions. Seminar on. (3) Prerequisite: Law 271.5 (Secured Land Transactions). Preparation required in financing and banking context including current and advanced secured transactions, the protection and enforcement of security interests, the legal and practical aspects of security matters. Mr. Vetter

257A-257B. Land Use and Development. (2-3) Prerequisite: Law 250B (Administrative Law). A seminar examining in depth selected questions of current interest in the legal regulation of labor-management relations. Mr. Feller, Mr. Vetter

258. Practical Aspects of the Law. (2) This seminar for second and third year students is an introduction to the practice of law. Subjects covered include the techniques of legal research, prosecution, defense, and discovery; motion practice, witness examination and how to get paid for doing all these things. Other classes will cover business development, taxation, constitutional law, public interest law, setting up an office, and the psychology of persuading a judge. Mr. Sax, Mr. Zeldin

267.5. Professional Responsibility. (3) The teaching of professional responsibility in law schools. What is done, what might be done in relationship to the Bar.
in the course of this investigation, the meaning of pro-

fessional responsibility itself is considered and clar-
ed. Mr. Noonan

268. Psychiatry and the Criminal Law. (2) Legal, philo-

sophical, and behavioral science aspects of crimi-

nal responsibility; historical development of the con-

cept of mens rea; the psychology of punishment and 
guilt; problems of the criminal responsibility of the 
mentally ill. Mr. Diamond

270. Remedies. (3) Introduction to the forms of judi-
cial remedies, principles governing their scope and availability, and consideration of grounds for choosing between alternative remedies. Includes general princi-

ples of damages, specific performance, and injunction.

Mr. Fletcher

271. Roman Law. (2) Introductory course on Roman law, its sources, persons, property, obligations, succession, and a few general topics. Mr. Daube

271.5. Secured Transactions (Real Property). (3) Real property secured transactions, including perfection, security interests, collateral, remedial, and economic attributes of various security devices; deficiency and subordination prob-

lems; limitations; priority; redemption; transfer and allocation of ultimate loss. Mr. Helland

272A. Securities Regulation. (2) Prerequisite: Law 211A-211B, 211-3A-211-3B, or 211-A4-

211-A4-211-3A-211-3B. A course concentrates on the regulation of the distribu-
tion of securities under the Securities Act of 1933 and under state laws. Some attention is given to the development of the international capital markets and the regulation of the distribution of new issues of securities. Mr. Kay

272B. Securities Regulation. (2) Prerequisite: Law 211A-211B, 211-3A-211-3B, or 211-4A-

211-3A-211-3B (Business Associations (Corporations)). Law 272B continues the course concentrating on the regulation of trading of securities on stock ex-
changes and in the over-the-counter market; broker-
dealer regulations; insider trading under state and fed-
eral law; civil liabilities under federal and state securi-
ties acts; and regulation of investment companies and investment advisors. Mr. Kay

273. Sex-Based Discrimination. (3) The course deals with the legal issues raised by legal and social discrimination between men and women and explores a range of potential remedies including framing issues drawn from state and federal constitutional law, statutory en-
actments, and common law developments. Subject matter areas include sex-based discrimination in family law, employment law (including Title VII, the Equal Pay Act, and Executive orders), educational opportunity, and criminal law.

273.5. Social Welfare Legislation. (3) Income maintenance and related programs: "poverty" tied— AFDC ("Welfare"), the adult programs (blind, aged, and dis-
able) tied— "Work敖 OASDI ("Social Security"), "work" tied— OASDI; workmen’s compensation and un-
employment compensation; and reform proposals—"negative income tax" and national health insurance. Mr. Suganum

273.7. Social Welfare Legislation. (2) An examina-
tion of welfare law: food stamps, aid to families with dependent children, and income maintenance reform. Mr. Suganum

273.8 Social and Legal Issues in Decriminaliza-
tion. (2) The seminar will examine four major topics: the limits of criminal sanction; decriminalization mod-
els; problems of occupational entry, e.g., licensing, 
into decriminalized settings; and the limits of adminis-
trative sanctions in regard to control and discipline. A paper will be required. Based in part on student research, or some aspect of licensing or disciplinary processes.

275. State and Local Government Law. (3) Power allocation among governmental units: between state and local units, and among local units. Objectives and methods of governmental restructuring in metropolitan areas. Limitations to make governmental responsive to the people. Operational problems: personnel, financ-
ing, contracting, torts and resource allocation. Mr. Sato

276. State and Local Taxation. (2) A study of sub-
estative provisions and procedure relating to property tax issues, including income tax allocation, inheritance tax, and other local taxes. Attention given to intertax problems, such as allocation of income among the states, jurisdiction to tax, and commerce clause restrictions.

Mr. Sato

286. Trial Practice, Elements of. (1) A one-semester series of lectures and demonstrations providing a gen-

eral introduction to trial practice, procedures, and strategies. Mr. Healey

287A-287B. Trial Practice. (1-2) Preparation and presentation of a civil case for jury trial, including dis-
covery and depositions, law and motion, pre-trial con-
ferences, selection of jury, trial tactics, and the filing of all appropriate pleadings. A one-year course involving lect-
ures in the fall and practice trials in the spring.

287.5. Urban Planning and Land Use Regulation. (3) This course deals with the legal framework within which land use decisions affecting metropolitan areas are made. The roles of state, regional, county and municipal actors are examined, and attention is paid to the increasing impact of the federal programs. Among the land use techniques singled out for special attention are: urban renewal, subdivision regulations, zoning, mapping, and eminent domain. The principal legislative sources are considered, including federal laws and regulations, enabling acts, and county and munici-
pal ordinances. In addition, decisions of the state and federal courts examining the legitimacy and role of these techniques in various contexts are also treated.

288. Water Resources Law. (2) Water taken as the resource to examine allocative regime for use and waste discharge and its economic consequences; alter-
ative methods of promoting efficiency; international 
governmental conflicts; and decision-making concepts for public investment in resource development and for distribution. Mr. Sato

295. Student-initiated Courses or Projects. (1 or 2) Open-year course. Students registered in the seminar must prepare a final paper on a subject selected by the student, and present it in small group discussion. Mr. Sato

295.1. Clinical Semester. (10) Students placed in selected law offices (e.g., law firms, governmental agencies, judicial bodies, legal staff of various pro-
grams). Students working either under the supervision of an attorney. Intended to share role of educator between the practicing and the aca-
demic communities.

295.2. Clinical Studies. (5) The clinical program pro-
vides a direct experience with clients in both daily prob-
lems and major litigation. The course is conducted in cooperation with Bay Area attorneys in both public and private practice. Working in law offices, students will interview clients, handle individual cases, draft plead-
ings, prepare discovery and have some courtroom experience. Students will also participate in a simulated litigation designed to teach necessary practice skills. Mr. Kayne, Mr. Sitkin

295.5. Practical Aspects of Law Practice. (2) This seminar is an introduction to the practice of law and the problems raised by new lawyers. Subjects includ-
clude the techniques and strategies of pleading, settle-
ment, discovery, motion practice, witness examination and how to get paid for doing all these things. Two judges and several practicing lawyers will be guests. Students will participate in programs such as mock settlement conferences.

Mr. Sax and Mr. Zeldin

296. Legal Dissertation. (8-13) Open to third-year students who have completed a qualifying seminar in the second year. Research and writing toward a major piece of legal scholarship on a subject matter selected by an individual faculty member pursuant to faculty consent.

The Staff

297. Self-Tutorial Seminar. (1-2) Open to students 
who have completed the first-year curriculum. A pro-
gram to enable individual self-instruction, primarily in subject matter areas not covered by the regular cur-
riculum. requires the consent of a member of the fac-
ulty to serve as supervisor and approval of the Dean.

The Staff

298. Group Research Projects. (1-2) Open to stu-

dents who have completed the first-year curriculum. A pro-
gram to enable groups of students to study or re-
search special legal topics of common interests, pri-

tected by member of a member of the regu-

lar curriculum. requires the consent of a member of the faculty to serve as supervisor and the approval of the Dean.

The Staff

299. Individual Research Projects. (1-2) Open to students who have completed the first-year curriculum. A program to enable individual study and research in

depth of selected topics under the supervision of a 
member of the faculty with a goal of producing an 
original paper or report. Requires the consent of a 
member of the faculty to serve as supervisor and the 
approval of the Dean.

The Staff
Students who have completed 84 to 105 quarter units:
1. General biology with laboratory or a course in botany plus a course in zoology (12 quarter or 8 semester units)

Students who have completed 106 to 120 quarter units:
1. and 2. above plus
3. Introductory organic chemistry with laboratory (9 quarter or 6 semester units)

Requirements for the Bachelor of Arts Degree

The student must complete a minimum of 180 units, distributed according to regulations which appear in the Announcement of the College of Letters and Science. There are also scholarship, residence, breadth, and major requirements; these are described in the Announcements of the College as well as in the Announcements of the Department of Interdisciplinary and General Studies or D.I.G.S. (formerly referred to as the College of Letters and Science, or D.I.G.S.). It has also been charged with administering the Summer Session Program. For complete descriptions of the Special Programs majors and major courses, please see the entries listed alphabetically by major.

Letters and Science List of Courses

Of the 180 units required for graduation, 162 must be complete in courses on the Letters and Science List of Courses. The List is included in the Announcement of the College of Letters and Science, available by mail from 201 Campbell Hall or in person at 113 Campbell Hall.

Afro-American Studies

Department Office, 3355 Dwinnell Hall

Professor: Reginald Jones, Ph.D.

Associate Professors: William M. Banks, H. Ed. D. (Chairman) Barbara Christian, Ph.D.

Assistant Professors: Eleonor de Almeida, Ph.D. Erskine Peters, Ph.D. Henry Jackson, Ph.D. Michel S. Laguerre, Ph.D. Alpert Ruben, Ph.D. Agboyi Yansane, Ph.D.

Lecturer: Margaret Wilkerson, Ph.D.

The Major

Students majoring in Afro-American studies must declare an area of concentration in either the social sciences or the humanities. Within each area they are required to complete a sequence which provides academic depth as well as breadth, and they are expected to enroll in related offerings scheduled by other campuses. Students concentrating in the social sciences are strongly encouraged to take additional upper division courses in appropriate research methodologies.

Lower Division. All major students are required to take Afro-American Studies 5, one section of which focuses on the humanities and the other on the social sciences. Students emphasizing the humanities will elect at least one of the following courses: Art 60 or 61, Dramatic Art 40A or 40B, English 27, 28, or 30, Music 27. Students emphasizing the social sciences will take an introductory lower division course specific to a social science discipline, for example Sociology 1 or Anthropology 3.

Upper Division. In addition to the 10-unit lower division requirement, students will complete nine upper division courses totaling 45 units from one of the following plans:

Plan A: Social Science. The social science concentration requires the following: History 169A-169B; Sociology 5 or Psychology 101A; Afro-American Studies 110 or 180; 115 or 117; 109A or 109B or 128A or 173; 118 or 175 or 177; History 180A—180B or Afro-American Studies 186—186B.

Plan B: Humanities. The humanities concentration requires the following: Afro-American Studies 150A, 150B or 150C; 152A, 152B or 152C; 153 or 156A; 143; 156 or 157 or English 133 (or any course focusing on an Afro-American writer). Afro-American Studies 159 or Anthropology 184; Afro-American Studies 163 or Music 130; Afro-American Studies 164, 167A or 167B; one additional upper division course in a related field.

Recommended. Some awareness of the situation of other ethnic minorities is important to the completion of the Black experience, so it is strongly recommended that students in the major enroll in a course dealing with the history and experiences of other minority groups in the New World.

Honors Program. To be eligible for admission to the honors program, a student must have completed at least three quarters at UC Berkeley and have attained standing with a grade-point average of 3.30 or higher in all University work, or a grade-point average or higher in the Afro-American studies major. Students in the program must complete two consecutive quarters of Afro-American Studies H195A—H195B under the supervision of a faculty member, culminating in the completion of a senior honors thesis or equivalent project.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

LOWER DIVISION COURSES

1A. Freshman Composition. (Formerly 1.) Four hours of lecture per week. Prerequisite: Subject A. Trained in expository, argumentative, and styles of composition. The writing will focus on themes or issues in Afro-American life and culture.

1B. Freshman Composition. (Formerly 2.) Four hours of lecture per week. Prerequisite: course 1A and Subject A. Continued training in expository and argumentative writing, with more emphasis on modes of argument, tools and techniques of research, and literary forms. Mr. Peters (F, W, Sp)

3. Exposition and Argument. (6) Four hours of lecture per week. Prerequisite: course 1B or equivalent proficiency. Continued instruction in composition with intensive practice in the techniques of argument and exposition of themes and issues in Afro-American life and culture.

5A—5B. Black Life and Culture in the United States. (5—5) Four hours of lecture per week. This course is a multi-disciplinary introduction to Afro-American Studies, from a humanities perspective (5A) and a social science perspective (5B).

5A. Introduction to Afro-American culture by means of audio-visual media, lectures, and discussion. An examination of selected forms, themes, and individuals with emphasis upon understanding cultural expression, in historical context, as statements of meaning and identity. Mr. Raboteau (W)

5B. Emphasis on the social experience of Afro-Americans, an interdisciplinary approach, designed to help students understand the forces which have helped shape both the individual and collective experience of black Americans. Mr. Banks (F)

12. The Pop Music Industry. (4) Formerly 19IE. Three hours of lecture per week. Analysis of the American popular music industry, focusing on the role of music critics, recording companies, broadcasting, fashions, nightclubs, and rating systems. Emphasis on the industry in the social and cultural context of black-white relations.

UPPER DIVISION COURSES

109A—109B. Black Economic History. (5—5) Four hours of lecture per week. Prerequisite: Afro-American History; introductory course in economics is strongly recommended. The black community's economic status in American society; the role of racism in the thwarting of minority group interests. 109A will cover the period from 1619 to 1818; 109B from 1818 to present. Mr. Yansane (Sp)

*110. Black Community Development: A Historical Perspective. (5) Four hours of lecture per week. An examination of the historical evolution of black communities in the United States from slavery to the contemporary era; focus on the spatial, social, and economic conditions of the black community.

Ms. de Almeida (Sp)

111. Minority Groups in the American Economy. (5) Four hours of lecture per week. Prerequisite: lower
division course in economics recommended strongly. The status of selected racial minority groups with respect to their economic position in society. Special attention to various strategies of economic development.

113. Selected Topics and Issues in Black Life and Culture. (5) Four hours of lecture per week.
Mr. Jackson (F), Ms. de Almeida (W), Ms. Wilkerson (Sp)

115. Black Social Institutions. (4) Four hours of lecture per week. Prerequisite: course 5 or introductory course in psychology or sociology. A sociological analysis of the development, structure, and function of social institutions as they affect and are affected by black people. The sociological analysis of the role of social institutions within the black community. An examination of the role of the various social institutions in the black community. Prerequisite: completes the reading and composition requirement. The role of black women in the black community. Ms. Wilkerson (Sp)

117A. Black People and Psychology: Historical Development. (5) Four hours of lecture per week. Prerequisite: course 5 or introductory course in psychology or sociology. The relationship between the nature and uses of psychological theory and research by the dominant society and the reality of the black psychological experience in the period 1860-1970. 

117B. Black People and Psychology: Current Issues. (5) Four hours of lecture per week. Prerequisite: course 117A. Current psychological theory and research by the dominant society. Emphasis placed on examining the historical development of psychology and the black community. Prerequisite: completes the reading and composition requirement. The role of black women in the black community. Ms. Wilkerson (Sp)

118A–118B. Issues in Domination: Race and Sex. (5–5) 118A: Three hours of lecture and 2 hours of discussion per week. 118B: Four hours of lecture and 1 hour of discussion per week. Prerequisite: course 118A: 5 (Social Science) or introductory sociology. A sociological analysis of the development, structure, and function of social institutions as they affect and are affected by black people. The sociological analysis of the role of social institutions within the black community. An examination of the role of the various social institutions in the black community. Prerequisite: completes the reading and composition requirement. The role of black women in the black community. Ms. Wilkerson (Sp)

119A–115B. Issues in Domination: Race and Sex. (5–5) 119A: Four hours of lecture per week. 119B: Four hours of lecture per week. Prerequisite: course 118A–118B. Four hours of lecture per week. The role of black women in the black community. Prerequisite: completes the reading and composition requirement. The role of black women in the black community. Ms. Wilkerson (Sp)

138. Afro-American Linguistics. (5) Four hours of lecture per week. Prerequisite: upper division standing. A sociological analysis of the development of Afro-American linguistic forms, with emphasis on the historical, descriptive, and comparative dimensions, and with special attention to the relationship between the linguistic characteristics of "Black English." (Sp)

140. Jazz: Black Classical Music. (4) Three hours of lecture and one hour of discussion per week. An historical examination of jazz music, focusing on the evolution of the blues and ragtime genres. Emphasis placed on the role of African American musicians in the development of jazz music. Ms. Wilkerson (F)

149A–149B. Research and Bibliographic Methods in Afro-American Studies. (5–5) Four hours of lecture per week. Prerequisite: completion of reading and composition requirement. An introduction to research methods and bibliographic procedures in Afro-American studies. Prerequisite: completion of reading and composition requirement. An introduction to research methods and bibliographic procedures in Afro-American studies. Ms. de Almeida (W)

149C. Nontraditional Methods. Description and analysis of resources available for Afro-American Studies with emphasis on nontraditional sources and methods. Ms. de Almeida (C)

149D. Traditional Methods. An evaluation of traditional social science theories and methods as applied to the study of black Americans including major theoretical perspectives. A focus on the way that social science research is conducted. A sociological analysis of the role of social institutions within the black community. Ms. de Almeida (W)

150A–150B–150C. Survey of Afro-American Literature. (5–5–5) 150A: Four hours of lecture per week. Prerequisite: completion of reading and composition requirement and course 5. 150B: Four hours of lecture per week. Prerequisite: completion of reading and composition requirement and course 5. 150C: Four hours of lecture per week. Prerequisite: completion of reading and composition requirement and course 5. Survey of the literature of the black community. Emphasis placed on the social, economic, and political implications of the works of black American writers and poets. Ms. Wilkerson (W)

151A–151B. Images of Black People in Literature. (5–5) Four hours of lecture per week. Prerequisite: completion of reading and composition requirement. The role of black women in the black community. Ms. Wilkerson (Sp)

155A–155B. Images of Black People in Literature. (5–5) Four hours of lecture per week. Prerequisite: completion of reading and composition requirement. The role of black women in the black community. Ms. Wilkerson (Sp)

156. Major Afro-American Authors. (5) Four hours of lecture per week. Prerequisite: completes the reading and composition requirement. The role of black women in the black community. Ms. Wilkerson (Sp)

158. The Literature of Black Africa (in English). (5) Four hours of lecture per week. Prerequisite: completion of reading and composition requirement. The role of black women in the black community. Ms. Wilkerson (Sp)

162A. African Dance and Rhythms. (Formerly 191 C). Three hours of lecture and three hours of rehearsal per week. An introduction to the study of African dance and rhythm. Emphasis placed on the cultural and social implications of African dance and rhythm. Ms. de Almeida (W)

162B. Black Dance in the New World. (2) Four hours of lecture per week. A sociological analysis of the role of black dance in the black community. Ms. de Almeida (W)

166. Slavery: A Comparative Analysis. (4) Four hours of lecture per week. An examination of the institution of slavery as it existed in various parts of the world during different periods; examination of the philosophical, economic, and social factors that relate to the institution. Ms. Wilkerson (W)

167A. Third World Cinema. (5) Four hours of lecture and 2 hours of film and discussion per week. Prerequisite: completion of the reading and composition requirement. The role of black women in the black community. Ms. Wilkerson (W)

167B. Afro-Americans in the World of Cinema. (5) Four hours of lecture and 2 hours of discussion per week. Prerequisite: completion of the reading and composition requirement. The role of black women in the black community. Ms. Wilkerson (W)

173A. Law and The Black Community: The Criminal Process. (5) Four hours of lecture per week. Prerequisite: completion of reading and composition requirement. The role of black women in the black community. Ms. Wilkerson (W)

173B. The Black American: A Legal History. (5) Four hours of lecture per week. The role of black women in the black community. Ms. Wilkerson (W)

179. Political Development and Socialization of Black Children. (Formerly 119.) Formerly 119. Four and one-half hours of lecture per week. Prerequisite: course 119 A, winter quarter 1974. An examination of the social, economic, and political implications of the role of black women in the black community. Ms. Wilkerson (W)

180. Black Politics in the United States. (5) Four hours of lecture per week. Prerequisite: History 169A and 169B or comparable course in Afro-American history. An examination of the role of black women in the black community. Ms. Wilkerson (W)

NOTE: For key to symbols, see page 36.
theological and its historical and intellectual development. Analysis of the structure and meaning of spirit possession, the folk sermon, spirituals and gospel music, narratives of constructure and meaning of spirit possession, the folk traditions in Black religious expression. Analysis of the quest for black theology will be emphasized.


188. The Black Church: A Historical Perspective. (F) Four hours of lecture per week. Prerequisite: course 186A or 186B. The rise of racism as a systematic ideology to 18th and 19th Century colonial and slave economies in Africa and the New World.

189. Religion and Culture in Black America. (F) Four hours of lecture per week. Prerequisite: AAS 5 or AAS 113. A multi-media, audiovisual approach to the forms of Black religious expression. Analysis of the structure and meaning of spirit possession, the folk sermon, spirituals and gospel music, narratives of conversion, religious themes in Black literature, and the quest for black theology will be emphasized.

190A–190B. Traditional Socio-Economic Systems of Africa & Modernity. (F–S) Four hours of lecture per week. Prerequisite: 190A not open to students who have received credit for AAS 113. Fall 1975 course examines the traditional concepts and notions of West African tribal systems. The influence of western cultural imperialism on those beliefs and alternative development models. 190B involves further research in topics introduced in 190A.

190C. African Paleolithic. (F) Four hours of lecture per week. Open only to students admitted to honors program in African Studies. Students must enroll for 6 hours of credit, and grade will be assigned upon completion of the full sequence. Mr. Jones (in charge) The Staff (F, W, Sp)

197A. Field Study in Afro-American Life. (1–5) Supervised field work in off-campus organizations. Regular individual meetings with faculty members. Written report required. The Staff (W, Sp)

197B–197C. Oral History in the Black Community. (5–S) Two hours of seminar and 10–12 hours of field work per week. Prerequisite: two quarters of the se-
The collections and research facilities of the Robert H. Lowie Museum of Anthropology are available for study in archaeology, ethnography, physical anthropology, and related subjects by graduate and undergraduate students and by visiting scholars; the museum’s exhibition hall is used for instructional and educational purposes, particularly in connection with class work. Those interested may address the Director, 103 Kroeber Hall. For further information on the Lowie Museum, see Index.

The 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 the Campus Computer Center. Courses 190A–190B, 190D, 190E, 190L–190M, and 252 use these facilities. Package programs for statistical analysis, mapping, and computer graphics are available for use by students and faculty of the Department.

The Major

Anthropology 1, 2, 3, 4; and one course from three of the following groups: Group I—all courses in Physical Anthropology; Group II—all courses in Archaeology; Group III—all courses in Social and Cultural Anthropology; Group IV—all courses in Language, Culture, and Society; Group V—all Area Courses. Also required are 12 elective upper division units to total 40 units of upper division courses in anthropology. These elective units may be taken from any of the groups I–VI; however not more than 12 units of courses 191, 196, 197, and 199 combined will be accepted toward fulfilling major requirements.

Substitutions may be permitted among these additional elective courses of not more than 10 units in allied subjects approved by the Department.

Students applying for admission to the major are required to have completed three of the four lower division course requirements (Anthropology 1, 2, 3, 4). In planning their workload students should be aware that the Department adheres to Academic Senate Regulation 760: “The value of a course in units shall be reckoned at the rate of one unit for three hours’ work per week per term on the part of a student, or the equivalent.”

Honors Program. The Department of Anthropology provides several specialized programs leading to the A.B. degree with honors. Students with an overall grade-point average of 3.3 or higher and a grade-point average of 3.8 or higher in courses 101, 102, 104, and 105 combined will be accepted toward fulfillment of major requirements. Substitutions may be permitted among these additional elective courses of not more than 10 units in allied subjects approved by 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 only candidates for the Ph.D. will be accepted. The M.A. degree is awarded in the course of study leading to the doctorate.

Because of the number of students who wish advanced treatment of particular topics and human variation can be applied. Applications are considered only once a year for the following fall quarter. The deadline for application is December 1.

The Graduate Major

The program for the Ph.D. degree normally takes five 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 two to two and a half years, students undertake seminars, carry out individual research projects related to their fields of specialization, and prepare for the Ph.D. oral qualifying examination. With the successful passing of this examination, students are advanced to candidacy for the Ph.D. degree.

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

For further information, please address correspondence to the Graduate Adviser, Department of Anthropology, University of California, Berkeley, California 94720.

Courses and Seminars

Courses and seminars are listed below. Instructor listings, quarterly offerings, course descriptions, and schedule changes are available in 213 Kroeber Hall.

LOWER DIVISION COURSES

1. Introduction to Physical Anthropology. (5) Three 1-hour lectures and one 1-hour section meeting per week. Facts and problems of human evolution, human fossils, race, and racial differences. Mr. Washburn (F), Mr. White (Sp)
2. Introduction to Archaeology. (5) Three 1-hour lectures and one 1-hour section meeting per week. Prehistory and cultural growth. Mr. Deetz
3. Introduction to Social and Cultural Anthropology. (5) Three 1-hour lectures and one 1-hour section meeting per week. Structure and dynamics of culture. Mr. Nader (F), Mr. Brandes (Sp)
4. Introduction to Linguistic Anthropology. (5) Two and a half hours of lecture and two hours of sections per week. Language in its interrelationships with man’s biology, his culture and his society. Mr. Berlin (W)
5. Human Evolution. (5) Three hours of lecture and one hour of discussion per week. Limited to freshmen and sophomores. Reading and one hour of discussion on the problems and meaning of human evolution. Why the understanding of evolution should be a part of every person’s education.
6. Freshman Seminars. (2) One 2-hour meeting per week. Prerequisite: appropriate lower division courses. Limited to 12 freshmen per section. Discussion, substantial reading and written papers developing the salient problems which guide anthropological work.

UPPER DIVISION COURSES

General prerequisite: junior standing or courses 1, 2, 3, 4.

Undergraduate seminars: Certain upper division lecture courses are followed in the next quarter by an undergraduate seminar which provides an opportunity for more advanced work in the subject matter of the lecture course. Enrollment in these seminars is restricted to students who have received a grade of B or better in the antecedent lecture course and/or who have the instructor’s permission. Undergraduate seminars are given as sections of Anthropology 195.

Class meetings: Unless otherwise noted, lecture courses meet for three lecture hours and one consultation hour per week. Enrollment may be limited.

Group I. Physical Anthropology and Primatology

100. Fossil Man. (5) Three hours of lecture and 1 hour of discussion per week. Prerequisite: course 1 or equivalent. Origin and relationships of the extinct forms of mankind. Mr. Howell (Sp)
101. Human Adaptations. (4) Three hours of lecture per week. Prerequisite: Anthropology 1 or equivalent. Homo sapiens as a biological organism: evolutionary history, adaptive responses, human condition in terms of its anatomical, behavioral, physiological, ecological, and biochemical dimensions. Mr. Sarich (F)
102. Human Variation in an Evolutionary Perspective. (5) Three hours of lecture and one hour of laboratory per week. Prerequisite: course 1 or equivalent. Human variation in both prehistoric and historic contexts; basic genetics (both molecular and populational); theories of racial origins; selective bases of human variation. Mr. Darrow (Sp)
104L. Physical Anthropology Laboratory. (2) Two 2-hour meetings per week. Prerequisite: course 100, or 102, or 108 (may be taken concurrently). Enrollment limited to twelve students: primarily for majors in anthropology and the life sciences. Descriptive and analytical techniques and methods applicable to the study of intra- and inter-group resemblances and differences. Mr. Sarich (W)
105. Introduction to Human Osteology. (5) Three hours of lecture and two hours of laboratory per week. Prerequisite: course 100. An intensive study of the human skeleton. Reconstruction of individual and population characteristics emphasizing methodology and analytical relations from archaeological contexts; introduction to use of statistics in osteological analysis. Enrollment limited to 16 students.

106. Advanced Human Osteology. (4) Two hours of lecture and three hours of laboratory plus one hour of consultation per week. Prerequisite: course 105 or consent of instructor. Theories and methods in advanced human osteology. Variable topics include paleoanthropology, paleodemography, forensic anthropology, metric and nonmetric analysis, dental anthropology, computer use and statistical applications. May be repeated with instructor’s consent as content changes. Enrollment limited to 12 students.

108. Primate Evolution. (5) Prerequisite: course 1 or equivalent. A consideration of the major groups of primates with emphasis on the evolution of behavior. Mr. White (F)

108L. Primate Evolution Laboratory. (4) Four hours of lecture and laboratory sessions per week. Prerequisite: course 108 (preferably taken concurrently). Enrollment limited to twelve students; primarily for majors in anthropology and the life sciences.

109. Primate Social Behavior. (5) Three hours of lecture per week. Prerequisite: course 1 or equivalent. Survey of the social behavior and organization of monkeys and apes; their relevance to the evolution of human behavior and social groups. Ms. Dohlman (W)

110. Primate Social Behavior Laboratory. (2) Four hours of lecture and laboratory sessions per week. Prerequisite: course 110. Enrollment limited to twelve students; primarily for majors in anthropology and the life sciences.

111. Problems in Primate Social Behavior. (4) Prerequisite: course 110. Special topics of primate social behavior such as socialization, aggression, communication, and their biological bases. Mr. Dohlman (Sp)

117. Theory and Method in Physical Anthropology. (4) Three hours of lecture per week. Prerequisite: course 1 or consent of instructor. An examination of major theoretical and methodological bases of physical anthropological science. Historical and modern trends in the discipline will be stressed and computer science emphasized.

Group II. Archaeology, Prehistory, and Culture History

120. Culture Growth. (5) Three hours of lecture per week. Prerequisite: course 2 or consent of instructor. Archaeology as a discipline and the theories and methods, illustrated by the origin and development of civilization in the Old World and the New. Mr. Rowe (Sp)

NOTE: For key to symbols, see page 36.
122. Archaeology of North America. (5) Three hours of lecture per week. Prerequisite: course 2 or consent of instructor. Prehistory of North American Indians; prehistoric culture areas; relations with historic Indians. 

124. Ancient Civilization of Mexico and Central America. (4) Three hours of lecture per week. A study of the development, form, and history of pre-Columbian Indian civilization, surveying the achievements of the Maya, the Aztec, and their neighbors. 

125. The World of the Ancient Maya. (4) Three hours of lecture per week. A comprehensive study of the development and culture history of the longest sustained tradition of aboriginal New World civilization. 

126. Peoples of the Andes. (5) Three hours of lecture per week. Prerequisite: course 2 or consent of instructor. Incas culture and its antecedents; a survey from the earliest times to the present. 

127. The Olmec World. (5) Three hours of lecture per week. Prerequisite: course 2 or consent of instructor. Intensive study of the culture, sites, and chronology of the Preclassic Olmec civilization. 

128A–128B–128C. Old World Prehistory. (5–5–5) Prerequisite: upper division standing or consent of instructor. Courses are designed to be taken independently, and no quarter is prerequisite to any other. 

128B: Africa. 

128A: Europe and Asia in the Paleolithic. 

128C: Post-Paleolithic cultural phenomena of Europe and Asia. 

129D. Special Topics in Old World Prehistory. (5) Three hours of lecture and one hour of discussion/ presentation per week. Prerequisite: upper division standing or consent of instructor. Descriptive and analytical methods used in classification and discussion of prehistoric cultures of the Old World. 

130. Invention and Technology. (5) Three hours of lecture per week. Prerequisite: upper division standing or consent of instructor. Origin, history, and spread of fundamental inventions; illustrative material from the Lowie Museum of Anthropology. 

131. Science in Archaeology. (5) Prerequisite course 2. A survey of the application of techniques deriving from the physical and life sciences to the interpretation of archaeological materials. 

132. Archaeology and Society. (5) Three hours of lecture per week. Prerequisite: course 2 or consent of instructor. Archaeological research methods and their uses in the study of man’s past. 

133. Field Course in Archaeological Method. (5) One hour of lecture and one 8-hour (Saturday) field course meeting per week. Prerequisite: course 2 or consent of instructor. Enrollement limited to eighteen students, admitted by the consent of the instructor. May be repeated without duplication of credit. Advanced field investigation, and guidance in preparation of materials for publication. 

134. Archaeological Method. (5) One 3-hour laboratory meeting with three hours of independent laboratory work required per week. Prerequisite: course 133 or consent of instructor. A critical review of the historical background and philosophical premises of past and current anthropological theory. Methods will be illustrated as they apply to research in these areas. 

135. Field Practice in Archaeology. (15) Forty hours of lab per week. Prerequisite: consent of instructor. Practice experience in the field study of archaeological sites and materials. 

136. History and Theory of Archaeology. (3) Three hours of seminar and one hour of tutorial per week. Prerequisite: senior standing or consent of instructor. A critical review of the historical background and philosophical premises of past and current anthropological theory with respect to the concepts of time and change. 

Group III. Social and Cultural Anthropology: Theory and Method 

140. The Nature of Culture: An Introduction to Cultural Anthropology. (5) Not open for credit to students who have taken course 3. Advanced level introduction to cultural anthropology for nonmajors. 

141. Comparative Society. (5) Prerequisite: course 3 or 140 or consent of the instructor. Theories of social structure, functional interrelationships of social institutions. Primary emphasis on non-Western societies. 

142. Kinship and Social Structure. (5) Prerequisite: course 141. Comparison of kinship and family types throughout the world; techniques of kinship and structural analysis. 

143. Plural Societies. (5) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. Comparative examination of the theories of plural societies with ethnographic examples from various parts of the world. 

144. Social and Cultural Change. (5) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. Theories of social and cultural change: social evolution, diffusion, acculturation, pattern dynamics, innovation, structural-functional approach to change. Illustrative materials from anthropological sources. 

145. Urban Anthropology. (5) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. A consideration of sociocultural content and methods for the study of the urbanization process in towns and cities. 

146. Comparative Peasant Society. (5) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. A comparative study of peasant societies as a social type contrasted with primitive and industrial society. 

147. Anthropology and Development. (5) Three hours of lecture per week. Prerequisite: course 3. Critical examination of the relationships of applied theoretical anthropology. 

148. Man’s Ecological Relationships. (5) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. Survey of theories, methods, and applications of the ecological perspective to cultural and physical attributes of human populations. 

149. Culture and Personality. (5) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. Relationships of cultural, social, and personality factors in human behavior; personality in representative societies; techniques for studying culture/personality relations. 

150. Social Problems in Changing Cultures. (5) Three hours of lecture and two hours of tutorial and special seminars per week. Prerequisite: course 3 or background course in the social sciences with consent of instructor. Cross-cultural approach to conflict in society, culture, and personality. Topics covered: basic socialization, social learning, deviancy, minority status, religious revivalism, alienation, culture patterns in suicide, ethnic conflict, migration, and cultural influences in mental illness. Personality methods will be illustrated as they apply to research in these areas. 

151. Anthropology of Tourism. (5) Three hours of lecture per week. Prerequisite: Anthropology 3 or equivalent. This course considers (i) the nature of the touristic impulse and the society that generates it, and (ii) the local, economic and cultural impacts of tourism on host cultures. 

152. Anthropology in Modern Life. (5) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. Anthropological methods applied to problems in such fields as medicine, agriculture, education, and international technical-aid programs. 

153. Introduction to Medical Anthropology. (4) Three hours of lecture per week. Prerequisite: no medical requirements for anthropology students; no anthropology requirements for students in disciplines related to health. Social and cultural aspects, in the United States and overseas, of definitions, causes, symptoms, and treatments of illness; of selections of types of medical care available; of organization and evaluations of health services; and interactions among practitioners and with patients. 

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

155. Economic Anthropology. (5) Three hours of lecture per week. Prerequisite: Anthropology 3 or Sociology 1A or consent of instructor. Economic behavior in nondustrial societies; its social and cultural setting, and its modern changes. 

156. Politics and Anthropology. (5) Three hours of lecture per week. Prerequisite: course 3 or the consent of instructor. Anthropological concepts relevant to the comparative analysis of political ethnography. 

157. Law and Anthropology. (5) Three hours of lecture per week. Prerequisite: course 3 or the consent of instructor. Comparative survey of the ethnography of
law; methods and concepts relevant to the comparative analysis of the forms and functions of law.

158. Religion and Anthropology. (5) Three hours of lecture per week. Prerequisite: course 3 or the consent of instructor. A consideration of the interplay between religious beliefs and institutions and other aspects of culture.

159. The Forms of Folklore. (5) Three hours of lecture per week. Prerequisite: upper division standing. A worldwide survey of the major and minor forms of folklore, with special emphasis upon proverbs, riddles, superstitions, games, and narratives.

160. Narrative Folklore. (5) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. The study of folktales, myths, legends, and other forms of verbal art; methods and theories of folklore.

162. Art and Culture. (5) Three hours of lecture per week. Prerequisite: course 3 or the consent of instructor. Graphic and plastic arts and their relations to culture in nonliterate societies; illustrative material from the Lowie Museum of Anthropology.

163. Education and Culture. (5) Prerequisite: course 3 or consent of instructor. Anthropological theory and method applied to the problems of education in traditional and modern cultures.

164. Man's View of Nature. (4) Three hours of lecture per week. Prerequisite: consent of instructor. Comparative study of man's conceptual organization of his natural environment, especially his views of the biological environment. Implications of folk classification in preliterate societies for general principles of thought, with special culture-bound examples.

165. Advanced Survey of Social and Cultural Anthropology. (5) Three hours of lecture per week. Prerequisite: course 3 and senior standing or consent of instructor. Historical survey of anthropological theories, methods, and findings. Mr. Phillips (W)

167A–167B. Research Theory and Methods in Ethnology. (5–5) Four hours of lecture per week. Prerequisite: course 3 or consent of instructor. An introduction to the study of people and how they learn, think, and act.

168. Variation in Language. (4) Three hours of lecture per week. Prerequisite: two courses in linguistic anthropology or linguistics. Synchronic variation in phonology, syntax, and semantics and its implications for theory.


170B. Communist China. (5–5) Three hours of lecture per week.


175. North American Indians. (5) Historical survey of the cultures of the native peoples of the United States. Mr. Hefler (W)

176. Indians of California. (5) Survey of the cultures of the native people of California. Tribal divisions, arts, customs, archaeology. Mr. Heizer (F)

178. Native Peoples of South America. (5) Archaeology, ethnohistory and ethnography.

179. Contemporary Latin America. (5) Emphasis on the economic, social, political, and cultural changes in Latin America since 1940. Mr. Basque (W)

180. Mexico and Central America. (5) Ethnology of Indian cultures, with special emphasis on comparative organization, belief systems, law, economics, kinship, language and communication.

181. General Anthropology of Oceania. (4) Three hours of lecture per week. Theoretical issues, some of which were formulated for the first time in anthropological theory, arising from field studies of Oceania; and monographs about Pacific peoples, with varying emphases from year to year on Polynesia, Micronesia, Melanesia, New Guinea, and Australia.


183. European Peasant Societies. (5) Representative groups considered in modern and historical peasant cultures, stressing rural-urban relationships and the dynamics of change.

184. Afro-American Ethnohistory. (5) A comparative survey of social and cultural organizations of African-American peoples living in the Caribbean, North, Central and South America, considered in both historical and contemporary perspective.

185. The Near East. (5) Cultures of the contemporary Near East, with special emphasis upon Arab populations.

186. Africa South of the Sahara. (5) Cultural and social institutions of Sub-Saharan Africa.


188B. Social organization and social trends.

199A–199B. Southeast Asia. (5–5) Peoples and cultures of Southeast Asia.

199C. Mainland: emphasis on Burma, Thailand, and Viet Nam. Mr. Phillips (W)

*199B. Insular: emphasis on Indonesia, Malaysia, and the Philippines.


200C. Primate Behavior. (5–5) Two hours of lecture per week. The behavior of primates in the wild.

200D. Primate Socialization. (5–5) Two hours of lecture per week.

200E. Primate Evolution. (5–5) Two hours of lecture per week.

200F. Comparative Anatomy. (5–5) Two hours of lecture per week.

200G. Primate Evolution. (5–5) Two hours of lecture per week.

200H. Molecular Anthropology. (5–5) Two hours of lecture per week.

200J. Human Variation. (5–5) Two hours of lecture per week.

220. Archaeology Seminars. (4) Two hours of lecture per week. Prerequisite: consent of instructor.

220A. Southeast Asia. (5–5) Two hours of lecture per week. Prerequisite: consent of instructor.

220B. Mesoamerica. (5–5) Two hours of lecture per week. Prerequisite: consent of instructor.

220C. South America. (5–5) Two hours of lecture per week. Prerequisite: consent of instructor.

220D. African Prehistory. (5–5) Two hours of lecture per week. Prerequisite: consent of instructor.

220E. African Prehistory. (5–5) Two hours of lecture per week. Prerequisite: consent of instructor.

220F. European and Near Eastern Prehistory. (5–5) Two hours of lecture per week. Prerequisite: consent of instructor.
260B. Psychology and Folklore.
260C. North American Indian Folklore.
260D. Additional Seminars on Special Topics to be Announced. Mr. Bascom (W)

270. Seminars in Linguistic Anthropology. (4) Two hours of lecture per week. Prerequisite: consent of instructor. May be repeated for credit with consent of instructor. The following seminars extend over two consecutive quarters. Credit and grade will be assigned upon completion of the full sequence. Consult departmental listings for accurate course information.

270A. Semantics.
270B. Interactional Sociolinguistics.
270C. Language Variation.
270D. Information Processing.
270E. Formal Ethnography.
270F. Ethnobiology.
270G. Color Categorization.
270H. Ethnolinguistics.
270I. Decision Making.
270J. Recent Developments.

*271. Two-Quarter Seminars in Linguistic Anthropology. (4-4) Two hours of lecture per week. Prerequisite: consent of instructor. May be repeated for credit with consent of instructor. The following seminars extend over two consecutive quarters. Credit and grade will be assigned upon completion of the full sequence. Consult departmental listings for accurate course information.

271A–271B. Semantics.
271C–271D. Interactional Sociolinguistics.
271E–271F. Language Variation.
271K–271L. Ethnobiology.
271M–271N. Color Categorization.
271O–271P. Ethnolinguistics.
271S–271T. Recent Developments.

*275A–275B–275C. Proseminar in Linguistic Anthropology. (4-4-4) Three hours of seminar per week. Prerequisite: graduate standing or consent of instructor. Required of all first-year graduate students concentrating in linguistic anthropology. Advanced survey of current theory and research in linguistic anthropology. Topics in ethnographic semantics, language development, natural conversation, folk biological nomenclature, formal rule systems.

280. Area Studies Seminars. (4) Two hours of lecture per week. Prerequisite: consent of instructor.

280A. Contemporary Latin American.
280B. Africa South of the Sahara.
280C. South Asia.
280D. China.
280E. Japan.
280F. Southeast Asia.
280G. Oceania.

280H. Additional Seminars on Special Topics to be Announced. Ms. Nader (W), Mr. Brands (Sp), Mr. Berman (Sp), Mr. Berreman (Sp), Mr. Simmons (Sp).

*281A–281B–281C. United States Culture and Society. (4-4-4) Three hours of lecture per week. Prerequisite: consent of instructor.

281A. American Historical Anthropology. Mr. Brands (Sp)
281B. United States in the Modern World. Mr. Berman (Sp)
281C. United States Culture and Society. Mr. Brands (Sp)

283A–283B–283C. Medical Anthropology. (4-4-4) Three hours of lecture per week. Prerequisite: background in behavioral or health science. Credit and grade awarded upon completion of full sequence. Anthropological theory, data, and methodology and its relationship to health sciences. Lectures, readings, and supervised field research.

285. History and Theory of Anthropology. (4) Two hours of lecture per week. Prerequisite: consent of instructor. Mr. Rowe (W)

286A. Practice in Original Field Research Under Staff Supervision. Mr. Graham (W)
286B. Supervised Research. (4-9) Two hours of lecture per week. Prerequisite: consent of instructor. Mr. Isaac (F)

290. Directed Research. (2-12) Prerequisite: consent of instructor. Individual conferences to be arranged. Intended to provide directed reading in subject matter not covered in available seminar offerings. Two or more sections may be taken concurrently.

290. Directed Research. (4-9) Prerequisite: consent of instructor. Individual conferences to be arranged. Intended to provide supervision in the preparation of an original research paper or dissertation.
from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Graduate Programs

The Department of Art and History of Art offers programs of graduate study leading to the M.A. degree and the M.F.A. degree in Practice of Art. Further information concerning these programs may be obtained from the Practice of Art office, 238 Kroeber Hall.

LOWER DIVISION COURSES

2A. Form In Drawing. (4) Three 3-hour studio classes per week. Introduction to the basic elements of form and their interrelationship. The Staff (F, W, Sp).

2B. Form In Color. (4) Three 3-hour studio classes per week. Prerequisite: course 2A. Introduction to color and its relationship to the other elements of form. The Staff (F, W, Sp).

3. Composition In Life Drawing. (4) Three 3-hour studio classes per week. Prerequisite: course 2A-2B. An exploration of the techniques and methods of studio classes per week. The Staff (F, W, Sp).


14A. Introduction to Sculpture. (4) Three 3-hour studio classes per week. The Staff (F, W, Sp).

14B. Materials and Processes of Sculpture. (4) Three 3-hour studio classes per week. Prerequisite: course 14A. The Staff (F, W, Sp).

UPPER DIVISION COURSES

The various courses in Art differ in content, use of materials, and type of subject matter, depending upon the interest of the artist in charge. All but Art 120 and Art 121 may be repeated for credit.

It is a requirement for the major in Art that the student complete at least 12 units of upper division courses under three instructors of the regular staff.

Students must have completed 20 units of lower division studio courses to enter upper division courses.

102. Advanced Drawing And Painting. (4) Three 3-hour studio classes per week. Group Prerequisites. (F, W, Sp)

102A. Ms. Brown
102B. Ms. Lark
102C. Mr. McCray
102D. Ms. Ruvolo
102E. Mr. Kasten
102F. Mr. Hartman
102G. Mr. Bischoff
102H. Mr. Allen
102J. Mr. Miyasak
102K. Mr. Simpson
102M. Mr. Ballaine
102V. Visitors

103A. Advanced Drawing and Composition. (4) Formerly 100. Three 3-hour studio classes per week. Prerequisite: group prerequisites. Principles of two-dimensional composition, emphasis on drawing media. Recommended for upper division transfer students in Practice of Art who have not taken a course equivalent to course 2A. Should be taken during the first quarter in residence. The Staff (F, W, Sp).

103B. Human Figure Drawing. (4) Formerly 103. Three 3-hour studio classes per week. The Staff (F, W, Sp).

105. Mural Painting. (4) Nine hours of laboratory per week. Prerequisite: courses 2A, 2B, 3, 4 and upper division standing. The Staff (F, W, Sp).

106. Practice in the Graphic Arts: Emphasis on Etching. (4) Three 3-hour studio classes per week.

107. Practice in the Graphic Arts: Emphasis on Lithography. (4) Three 3-hour studio classes per week. The Staff (F, W, Sp).

114. Advanced Sculpture. (4) Three 3-hour studio classes per week. Prerequisite: group prerequisites. The Staff (F, W, Sp).

114B. Mr. Gordin
114C. Mr. Paris
114D. Mr. Vollkos
114E. Mr. Melchert
114G. Mr. Wall
114V. Visitors

120. Art Analysis (Emphasis on Painting). (4) Three hours of lecture per week. Prerequisite: course 2A, 2B, and ten units of Art History. A survey course analyzing ideas in art. Primarily for art majors.

141A. Art Analysis. (4) Three hours of lecture per week. Prerequisite: course 2A, 144A, and ten units of Art History. A survey course analyzing ideas in art, including sculpture, painting, graphics, photography and architecture. Primarily for art majors.

146. Ceramic Sculpture. (4) Three hours of lecture per week. Prerequisite: general group prerequisites; 20 hours of lower division studio courses. Emphasis on the unique aesthetic possibilities of clay and ceramic materials as sculpture.

SPECIAL STUDY COURSES

H195A—H195B—H195C. Special Study for Honors Candidates in the Practice of Art. (4-4-4) Individual hours to be arranged. Prerequisite: eligibility for admission to the honors program. Credit and grade will be awarded on completion of two or three quarters of the sequence with the same instructor. May be applied to upper division studio art requirement for major.

199T. Supervised Independent Study and Research in Practice of Art. (1—8) Enrollment is restricted by regulations listed on page 36. Staff approval required. Must be taken on a passed/not passed basis, therefore does not apply to Art major requirements. The Staff (F, W, Sp).

GRADUATE COURSES

General prerequisite for graduate courses in the Practice of Art is at least a B average in the undergraduate major in Art. Students may not enroll in more than two sections of the following courses per quarter: 202, 212.

202. Graduate Seminar in Art: Emphasis on Two-Dimensional Media. (4) Three hours of seminar per week. Emphasis on origami works; group discussion and criticism. Ancillary topics of a contemporary and historical nature will be introduced. May be repeated for credit. The Staff (F, W, Sp).

212. Graduate Seminar in Art: Emphasis on Three-Dimensional Media. (4) Three hours of seminar per week. Emphasis on origami works; group discussion and criticism. Ancillary topics of a contemporary and historical nature will be introduced. May be repeated for credit. The Staff (F, W, Sp).

294. M.F.A. Seminar. (4) Three hours of seminar per week. Studio work emphasizing various aspects of form. Group criticism, intended for specially qualified M.F.A. candidates. May be repeated for credit. The Staff (F, W, Sp).

295. Individual Study for Graduate Students. (1—12) Individual study intended to provide opportunity for qualified students to prepare themselves for the M.F.A. Comprehensive Project. The Staff (F, W, Sp).

298. Special Study for Graduate Students. (1—4) Staff approval required. The Staff (F, W, Sp).

NOTE: For key to symbols, see page 36.

History of Art

History of Art Office, 405 Doe Library

L&S: Art and History of Art / 103

Professors: Svetlana Alpers, Ph.D., James Cahill, Ph.D., Herschel B. Chipp, Ph.D., D. L. Eltinge, Ph.D., Peter H. Hales, Ph.D., D.F.A. (hon.), Joana Williams, Ph.D.

Associate Professors: Jacques de Caso, Ph.D., Loren Partridge, Ph.D.

Assistant Professor: Lawrence A. Silver, Ph.D.

Lecturer: Alfred Frankenstein, Ph.B., D.F.A. (hon.) (Emeritus)

Major Program

Lower Division. Two of the following: History of Art 30, 31, 40, 41, 80, 81. Also Art 2A and either Art 2B or 4A. One of the following: History 4A, 4B, 4C, 4D. Students planning graduate study in History of Art are urged to develop a reading knowledge of German and .

Upper Division. Eight courses: seven courses in four of the designated areas of the History of Art (see below), including at least one course in either the Ancient or Renaissance-Baroque area, plus History of Art 102; or eight courses: six courses in four of the designated areas of the History of Art (see below), including at least one course in either the Ancient or Renaissance-Baroque area; one course in a related history of literature, studio art, or another course if approved by petition in advance to the major advisor; and History of Art 102.

(Designated areas of the History of Art: Oriental, Ancient, Medieval, Renaissance-Baroque, Modern.)

Note: It is recommended that an appropriate lecture course be taken as a background for the particular section of History of Art 102 selected. Additional sections of History of Art 102 may be substituted for required upper division lecture courses, if space is available.

Restrictions: Only one 199 of 5 units may be offered as part of the upper division course requirement.

Honors Program in the History of Art. Students who achieve and maintain an overall grade-point average of at least 3.3 in all upper division courses completed in the major are eligible for 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). Candidates must take at least two quarters of continuing academic work under the supervision of one regular member of the faculty in History of Art. The first quarter of the project will normally be taken as History of Art 199Z, with the permission of the instructor and of the undergraduate major advisor. Work done in History of Art 102, or in another upper division course requiring an acceptable research paper, may be counted as the first quarter of the project. The second quarter of the project will be taken as History of Art 199Z (which does not count as a regular upper division course for the major requirements). Applications, which require the signatures of the project director and the undergraduate major advisor, are available at the History of Art office.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Graduate Programs

The Department of Art and History of Art offers programs of graduate study leading to the M.A. and Ph.D. degrees in the History of Art.
Further information concerning these programs may be obtained from the History of Art Office, 405 Library. See the History of Art Office for updated information.

LOWER DIVISION COURSES

30. The Art of India and Southeast Asia. (5) Four hours of lecture and one hour of discussion per week.
31. The Art of China and Japan. (5) Four hours of lecture and one hour of discussion per week.

32. History of Ancient Mediterranean Art. (5) Four hours of lecture and one hour of discussion per week. The Stone Age in Europe and the Near East; Egyptian Art, Art of the Ancient Near and Middle East.
33. History of Ancient Classical Art. (5) Four hours of lecture and one hour of discussion per week. Aegean, Greek, Etruscan, and Roman Art.
34. Introduction to European Painting. (5) Four hours of lecture and one hour of discussion per week, and additional directed study. Medieval, Renaissance, and Modern.

35. Introduction to the History of Art: Sculpture. (5) Three hours of lecture and one or one-and-a-half hours of discussion per week. Selected examples of sculpture emphasizing the human figure, including portraits and narrative reliefs, from the Pyramid Temples to Picasso.

UPPER DIVISION COURSES

Open to nonmajors. General prerequisite: upper division standing or consent of instructor. Unless otherwise stated, the "A" part of a sequence is not prerequisite to the "B" part. No part A, B, or C is prerequisite to another.

104. Undergraduate Seminar—Special Topics. (5) Four hours of lecture per week. Prerequisite: open to non-majors with consent of instructor. Topics of special concern to the instructor, usually related to current research, which fall outside of regular departmental offerings. See departmental flyer each quarter for precise schedule. Limited enrollment.

130A-130B. Early Chinese Art. (5-5) Three hours of lecture per week and additional directed study. Ms. Williams
130A. Chinese art from the Prehistoric period through the Chou Dynasty.
130B. Chinese art from the Han Dynasty through the T'ang Dynasty. Mr. Cahill

131A-131B. Later Chinese Art. (5-5) Three hours of lecture per week and additional directed study. Mr. de Caso
131A. Chinese art of the Sung and Yuan dynasties.
131B. Chinese art of the Ming and Ch'ing Dynasties. Mr. Williams

134A-134B. The Art of Japan. (5-5) Three hours of lecture and at least one additional hour of discussion per week, and additional directed study. Mr. Ettlinger
134A. Japanese art through the late 13th century.
134B. Japanese art from the 14th century through the present. Mr. Shimizu

136B-136C. The Art of India. (5-5) Three hours of lecture per week.
136A. Indus Valley through 550 A.D., primarily Bud- dhist sculpture. Mr. Williams
136B. 500-1350 A.D., primarily the Hindu temple and its sculpture. Mr. Cahill
136C. 1350 A.D. to the present, primarily Muslim and Rajput miniature painting. Mr. Williams

137. The Art of Southeast Asia. (5) Three hours of lecture per week. The art of Cambodia, Thailand, Burma, and Indonesia focusing on the period from 400 to 1500 A.D. Sculpture and architecture will be considered as a balance of Indian and indigenous elements. Ms. Williams

140A-140B-140C. Greek Art. (5-5-5) Three hours of lecture per week and one or one-and-a-half hours of discussion per week. Prerequisite: upper division standing and consent of instructor.
140A. Greek Art, Geometric and Archaic. 1100-480 B.C.
140B. Greek Art of the Classical Period. 480-323 B.C.
140C. Greek Art of the Hellenistic Period. 323-30 B.C.

141. Aegean Art. (5) Three hours of lecture and one hour of discussion per week. Prerequisite: upper division standing and consent of instructor. The art of Crete and Greece in the Bronze Age, with attention to connections with neighboring cultures.

144A-144B. Etruscan and Roman Art. (5-5) Three hours of lecture and one hour of discussion per week. Prerequisite: upper division standing and consent of instructor. The first part (144A) will treat Etruscan and Roman art as background to Roman art, and carry Republican history to the accession of Augustus. The second part will deal with art under the Empire, particularly in Rome itself.

145. Roman Art. (5) Four hours of lecture per week. The art of Rome from the Roman Empire, from its sources in the Republican era to the Age of Constantine the Great. Mr. Wright

150A-150B. Early Medieval Art. (5-5) Three hours of lecture and one hour of discussion per week. No prerequisite, but it is helpful to have some background in medieval history and in Christian theology.
150A. c. 300 to 750 A.D. Mr. Silver
150B. c. 750 to 1100 A.D. Mr. Silver

History of Art 150A and 150B may be taken separately; for students taking 150A and 150B in succession, credit and grade will be assigned upon completion of the sequence. Research papers will normally extend through two successive quarters.

151A-151B. Later Medieval Art. (5-5) Formerly 150C. Three hours of lecture per week. Prerequisite: a knowledge of history and of Christian theology equivalent to History 114A-114B (which may be audited simultaneously). Reading knowledge of at least one useful language (normally German, Italian, French or Russian).

154A-154B. Late Roman and Byzantine Art. (5-5) Three hours of lecture per week. Prerequisite: a knowledge of history and of Christian theology equivalent to History 114A-114B (which may be audited simultaneously). Reading knowledge of at least one useful language (normally German, Italian, French or Russian).

154A. The tradition of Roman imperial art from the third century to the eighth century.
154B. Byzantine art from the ninth century to the fifteenth century, and its influence in Western Europe. Research projects will normally extend through the two quarters and credit and grade will be assigned upon completion of the sequence. Either half may be taken separately with special consent of the instructor.


157A. Romanesque Architecture. Mr. Bony
157B. Gothic Architecture. Mr. Bony
157C. Romanesque Sculpture. Mr. Bony

Development of sculpture in western Europe between the late-IOth and mid-12th century: Traditions and innovations. Mr. Ettlinger

Development of sculpture in western Europe between the tenth century to the eighth century. Mr. Ettlinger

Development of sculpture in western Europe between the late-IOth and mid-12th century: Traditions and innovations. Mr. Ettlinger

158. Late Gothic Art in Northern Europe. (5) Three hours of lecture per week and one hour of discussion per week. Major developments in Northern European Art from the late phases of medieval art. Principal centers in French and German regions will be highlighted with emphasis on both royal and civic patronage; major media include architecture, sculpture, manuscripts, panel paintings, and early prints. Mr. Silver

160A-160B. Italian Renaissance Art. (5-5) Three hours of lecture per week and additional directed study. Prerequisite: course 160A and consent of the instructor.

160A. The Fifteenth Century Mr. Partridge
160B. The Sixteenth Century. Mr. Partridge

161. The Trajanos. (5) Three hours of lecture per week and additional directed study. Italian painting and sculpture, 1250-1400. Mr. Ettlinger

163. Michelangelo and Raphael. (5) Three hours of lecture per week and additional directed study. Prerequisite: course 160B and consent of the instructor.

Intensive study of the work of these two artists and their milieu. Mr. Partridge

165. Italian Renaissance Architecture. (5) Three hours of lecture per week and additional directed study. Mr. Partridge

166A—166B. Northern Art of the Period of the Renaissance. (5-5) Four hours of lecture per week. Major developments in paintings and graphics, with emphasis on the Netherlands from van Eyck to Bruegel and on the Germanic lands during the High Renaissance.

166A. Early Netherlandish Painting. Mr. Silver
166B. Sixteenth Century Art. Mr. Silver

170A. Southern Baroque Art. (5) Four hours of lecture per week. The major artists (among them Caravaggio, Bernini, Velazquez, and Poussin) and the major concerns (including genre, landscape, low-life, and notions of imitation and illusionism) of seventeenth century art in Italy, France, and the Netherlands.

Ms. Alpers

170B. Northern Baroque Art. (5) Four hours of lecture per week and one hour of discussion per week. The works of the leading painters of the seventeenth century will be contrasted and used to introduce the major concerns of northern artists of the time. Ms. Alpers

180A—180B. Modern Art. (5-5) Four 1-hour lectures and one 1-hour discussion per week. Mr. de Caso

180A. Roccoco to Realism. Painting in Europe during the Romantic age. Mr. de Caso
180B. Cezanne to Modern America. Mr. Chipp

180C. Impressionism and Post-Impressionism. (5) Three hours of lecture and one hour of discussion per week. Prerequisite: course 160A or 160B and consent of the instructor. From Monet's early landscapes to Art Nouveau. Mr. Chipp

180D. Rodin. (5) Four hours of lecture and one hour of discussion per week. A study of the art of Rodin from 1870 to 1914, with references to the sculpture and art of the Symbolist and Art Nouveau periods. Mr. Chipp

180E. European Painting in the Early Industrial Age 1810—1890. (5) Three hours of lecture per week and one hour of discussion per week. The self-portrait as a manifesto of views and aims. The themes of painting during this period. The impact of the Industrial Revolution on art. Artists withdrawing from the problems of the age. The relationship of art to social and intellectual history. Mr. de Caso

181. Contemporary Art. (5) Four hours of lecture per week. Painting and sculpture in America and Europe from World War II to the present. Mr. Selz

185. Picasso and Cubism. (5) Three hours of lecture per week and additional directed study. Prerequisite: course 180B and consent of instructor. Limited to 25 students. The development of Cubism in painting and sculpture. Mr. Selz

186. Twentieth-Century Sculpture. (5) Three hours of lecture per week and additional directed study. Sculpture from Rodin to the present. Mr. Selz

188. Photography as a Visual Art. (5) Four hours of lecture per week and additional time for viewing movies. The development of photography, both still and motion picture, from 1839 to the present. Emphasis on questions of style studied in the perspective of developments in technique, in the other visual arts, and in society. Mr. Wright

189A—189B. American Art. (5-5) 189A. The Eighteenth and Nineteenth Centuries. Mr. Selz

189B. The Twentieth Century. Mr. Selz

188C. American and Bay Area Architecture. (5) Three hours of lecture and one 2-hour field trip (not including travel time) per week. The lectures will trace the major trends in the history of American architecture and the effects of these trends from the colonial period to the present. In the field trips, individual buildings and the urban development of the
Asian Studies

Group Major Office, 260C Stephens Hall
Advisers: Mr. John Bryan Starr (Department of Political Science), head adviser; Mr. Chalmers A. Johnson (Department of Political Science), Mr. William Geoghegan (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 the student a groundwork in an Asian language, a broad range of interdisciplinary area-related course work, and as a least a minimal familiarity with the methods of one discipline relevant to his or her area studies. The major program assists the student by organizing the rich course offerings in the Asian field at the University in such a way as to permit him or her 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 (three quarters) of a language appropriate to the area of regional specialization (Area I—China, Area II—Japan, Area III—Southeast Asia).
2. Four courses drawn from the following list. Since majors are required to take upper division course work in at least two departments, at least two of these introductory courses must be selected from those two departments in which the candidate for the major intends to fulfill this requirement:

Agricultural Economics 23, World Agriculture (4)
Anthropology 1, Introduction to Physical Anthropology (5)
Anthropology 3, Introduction to Social and Cultural Anthropology (5)
Economics 1, Introduction to Economics (5)
Geography 1, Introduction to Physical Geography (5)
Geography 4, Introduction to Cultural and Historical Geography (5)
Geography 7, Spatial Organization of Human Activity (5)
History 19A—19B, Asian History (5—5)
History of Art 31, The Art of China and Japan (5)
Political Science 2, Introduction to Political Science—Comparative Government and Politics (5)
Political Science 3, Introduction to Political Science—Scope and Methods (5)
Sociology 1A, Introduction to Sociology (5)

Additional Major Requirements

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

1. One additional year of language appropriate to the area of regional specialization. Further study of the language is encouraged and will count toward the major unit requirement as indicated in the following sections. It is to be noted that, in the case of Malay/Indonesian, all of the first two years’ work carries upper division credit. In this instance the first

NOTE: For key to symbols, see page 36.
two years' work will satisfy the language requirement but will not count toward the major unit requirement. 

2. Upper division course work in at least two departments, totaling 45 units. At least 12 of these units must be in one department (not a language department) — referred to herein as the "disciplinary focus" — and must include one course in that department which relates to the theories, methods and techniques of that discipline, but which is not exclusively an area studies course.

3. A senior thesis of approximately fifty pages in length to be completed under the supervision of the major adviser or other appropriate member of the faculty. Up to five units of independent study credit may be given for work on the thesis; those units to count among the 45-unit major requirement.

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 disciplinary foci and complete at least 12 units of work from the courses listed there (see item 2 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 170A or 170B, China (5,5)

3. One course from among the following: Anthropology 143, Plural Societies (5); Anthropology 146, Comparative Peasant Society (5); Anthropology 148, Man's Ecological Relationships (5); Anthropology 153, Medical Anthropology (5)

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 158, The Opening of the Pacific, 1513–1800 (5); History 164A, 164B, 164C, China (5,5,5); History 169A, Social History of China (5); History 190, Modern Chinese Intellectual History (5)

Economics

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

2. Economics 106, The Economics of Marxism (4)

3. Economics 163, The Economics of the Communist World (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 140H, Comparative Communism (5); Political Science 141E, 141F, Political Theory in Communist Political Systems (5,5); Political Science 143A, 143B, 143C, Government and Politics of Northeast Asia (5,5,5); Political Science 128A, American Role in Asia (5)

Sociology

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

2. Two courses from among the following: Sociology 120A, Social Change in Underdeveloped Countries (5); Sociology 164, Folklore and Society (5); Sociology 166, Agricultural Oriental Societies (5); Sociology 184, Social Structure of Communist Societies (5)

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 Crosscurrents in Twentieth Century China (4)
Geography 164, China, Japan and Korea (4) Public Policy 166, Population and Public Policy (5)

D. Up to 20 units of the major requirement may be elected from the following language and literature courses offered by the Department of Oriental Languages:

Oriental Languages (Chinese) 100A, 100B, 100C, Advanced Chinese (4,4,4)
Oriental Languages (Chinese) 103, Classical Chinese: Medieval Texts (4)
Oriental Languages (Chinese) 105, Advanced Mandarin (4)
Oriental Languages (Chinese) 110A, 110B, 110C, Readings in Chinese Buddhist Texts (4,4,4)
Oriental Languages (Chinese) 113, Classical Chinese: Medieval Texts (Historical)
Oriental Languages (Chinese) 123, Classical Chinese: Medieval Poetry (4)
Oriental Languages (Chinese) 156A, 156B, Readings in Chinese Vernacular Literature (4,4)
Oriental Languages 112A, 112B, Chinese Literature in Translation (4,4)
Oriental Languages 140C, Civilizations of East Asia, China (4)
Oriental Languages 171A, 171B, Development of Buddhism in the Far East (4,4)

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

Area II: Japan

A. The student must complete one additional year of Japanese. Further study of the language is encouraged, but will count toward the major unit requirement as indicated below.

B. The student must select one of the following disciplinary foci and complete at least 12 units of work from the courses listed there (see item 2 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 (5)

3. One of the following courses: Anthropology 149, Culture and Personality (5); Anthropology 150, Social Problems in Changing Cultures (5)

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 158, The Opening of the Pacific, 1513–1800 (5); History 185A, 185B, 185C, Japan (5,5,5); History 189B, Social History of Japan (5)

Political Science

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

2. Two courses from among the following: Political Science 143A, 143B, 143C, Government and Politics of Northeast Asia (5,5,5); Political Science 128A, American Role in Asia (5)

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 111, System of Cities and Regional Development (5)
Geography 164, China, Japan and Korea (4) History of Art 134A, 134B, The Art of Japan (5,5)
Public Policy 186, Population and Public Policy (5)
Sociology 165, Japanese Society (5)

D. Up to 20 units of the major requirement may be elected from the following language and literature courses offered by the Department of Oriental Languages:

Oriental Languages (Japanese) 100A, 100B, 100C, Advanced Japanese (4,4,4)
Oriental Languages (Japanese) 139A, 139B, Japanese Grammar (4,4)
Oriental Languages (Japanese) 160, Japanese Drama (4)
Oriental Languages (Japanese) 189, Japanese Documents (4)
Oriental Languages 132, History of Japanese Literature (4)
Oriental Languages 141, Civilizations of Eastern Asia, Japan (4)
Oriental Languages 152, Modern Japanese Literature in Translation (4)
Oriental Languages 155, Traditional Japanese Historical Writing (4)

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

Area III: Southeast Asia

A. The student must complete one additional year of Malay/Indonesian or 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 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' work will satisfy the language requirement but will not count toward the major unit requirement.

B. The student must select one of the following disciplinary foci and complete at least 12 units of work from the courses listed there (see item 2 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 189A or 189B, Southeast Asia (5,5)

3. One course from among the following: Anthropology 143, Plural Societies (5); Anthropology 146, Comparative Peasant Societies (5); Anthropology 148, Man's Ecological Relationships (5); Anthropology 153, Introduction to Medical Anthropology (5)

Geography

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

2. Geography 163, Southeast Asia (5)
Astronomy

Department Office, 601 Campbell Hall

Professors:

- C. Stuart Bowyer, Ph.D.
- John E. Gaustad, Ph.D.
--thirds
- John G. Phillips, Ph.D.

Associate Professors:

- Jonathan Arons, Ph.D.
- Christopher Moeke, Ph.D.

Lecturer:

- David C. Dusabochek, Ph.D.

Departmental Major Advisers: Mr. Spinrad, Mr. Phillips

Graduate Advisers: Mr. Gaustad, Mr. Shu

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

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

The Major

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

1. Basic principles of mechanics, properties of matter, electricity and magnetism, heat, wave-motion, sound and light. (Physics 5A, 5B, 5C, 5D, 5E)
2. Basic mathematics: analytic geometry, differential and integral calculus, differential equations, and linear algebra. (Math. 1A, 1B, 1C, followed by Math. 51A, 51B, 51C)

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

The last two years, leading to the A.B. degree in astronomy, are spent in more intensive work, primarily in the fields of astronomy, mathematics and physics. The specific plan of study to be followed by each student is to be worked out in consultation with the departmental adviser for the major, and must include at least 36 units of upper division work in astronomy and allied fields.

All astronomy majors are required to take Astronomy 127A-127B-127C-127D.

The remainder of the student's courses will generally be chosen from the following list:


Students of marked ability may take certain graduate courses in astronomy during the senior year.

Honors Program

For honors in astronomy a student must fulfill the following requirements: (1) a grade-point average of at least 3.5 in all courses in astronomy and related fields and an overall grade-point average of at least 3.3 in the University; (2) a minimum of two A's and two B's or three A's and one C; (3) an individual project of research or study, involving at least 3 units of Astronomical Research (Math. 127A-127B-127C-127D) and related work; (4) a thesis on an original research project that has been evaluated by an instructor and the major adviser, and the written report is judged by the major adviser and one other faculty member.

Letters and Science List of Courses: 182 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Graduate Programs

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

In addition to the qualifying examination on the thesis topic required by the University, the Department requires students to pass a preliminary examination which tests breadth and depth of knowledge of four specialized research areas chosen by the student from a list of about ten. Students choose, with the aid of their adviser, courses in the Department which are useful in preparing for the preliminary and qualifying examinations. In addition, students must pass a modest number of courses in other departments and must acquire one year's teaching experience. A tutorial program is designed to maintain regular contact with the faculty. The program normally takes four to five years. Additional information on the program is available upon request to the Department.

The requirements for the M.A. degree are 36 units in graduate or upper division undergraduate courses (18 of them in graduate courses) and the preliminary examination.

LOWER DIVISION COURSES

1. Current Research in Astronomy and Astrophysics. (3) Three hours of lecture per week. Prerequisite: Astronomy 10 or consent of instructor. A non-mathematical discussion of current ideas in astrophysics, and for the precise measurement of optical images and spectra.

The Solar System and Beyond. (3) Three hours of lecture per week. Prerequisite: Astronomy 10 or consent of instructor. Primarily devoted to non-mathematical discussion of modern cosmological models, galaxy formation, quasars, and the cosmic background radiation. Intended for non-science majors.

3. Descriptive Cosmology. (3) Three hours of lecture per week. Prerequisite: Astronomy 10 or consent of instructor. Non-mathematical discussion of current ideas on the origin, evolution, and fate of the Universe. Topics include the expansion of the universe, the Big Bang, the Big Rip, and the cosmic background radiation. Intended for non-science majors.

4. The Solar System and Beyond. (3) Three hours of lecture per week. Prerequisite: Astronomy 10 or consent of instructor. Primarily devoted to non-mathematical discussion of ancient and primitive astronomy, the motions of the moon and planets, and modern astronomical tests of special and general relativity. Additional topics may include interstellar communication and some aspects of cosmology. Mr. Heiles (Sp).

5. Ancient and Modern Astronomy. (3) Three hours of lecture per week. Prerequisite: Astronomy 10 or consent of instructor. Ancient and modern astronomical tests of special and general relativity. Additional topics may include interstellar communication and some aspects of cosmology. Mr. Heiles (Sp).
emotional description of modern astronomy with emphasis on the structure and evolution of stars, galaxies, and the universe. Additional topics optionally discussed include quasars, pulsars, black holes and extra-terrestrial life. Textbooks are selected from those available from the University. May be repeated for credit up to a total of 4 units.

105. Self-paced Introduction to General Astronomy. (1-4) One to 4 hours of discussion and 0-1 hours of laboratory per week. Prerequisite: Math 17A. Credit is not given for courses 116, 16A or 16B in 17A. Topics in the field of modern astrophysical research. Topics chosen to represent the major areas of interest in the field. May be repeated for credit up to a total of 4 units. 

The Staff (F, W, Sp)

98. Undergraduate Seminar in Astronomy. (1) One hour of lecture per week. Prerequisite: course 102 should be taken concurrently and consent of instructor. Participation by advanced students. Topics are determined by the undergraduate adviser, intended to provide an opportunity for qualified students to perform research for the various examinations required for graduate degrees. Participation is limited to students who have taken a satisfactory undergraduate core. May be repeated for a total of 4 units. 

The Staff (F, W, Sp)

201. Historical Problems in Astronomy. (4) Three 1-hour lectures and one 1-hour discussion per week. Prerequisite: courses 10A and 10B. A history of science and the development of modern astronomy. Current problems to be discussed will be determined by the instructor. May be repeated for credit up to a total of 12 units. 

The Staff (F, W, Sp)

215A-215B. Orbit Theory and Practice. (5-5) Three 1-hour lectures and two 1-hour discussion sections per week. Prerequisite: courses 12A-12B-12C-12D-12E and Physics 105A-105B (may be taken concurrently). The study of the motion of celestial objects, both in the solar system and in interstellar space, under the influence of gravity. May be repeated for credit up to a total of 12 units. 

The Staff (F, W, Sp)

216. Interstellar Matter. (3) Three hours of lecture per week. A survey of the observational data on the interstellar medium, with emphasis on the inferred physical conditions. Enrollment limited to students who have taken courses 116 and 16A prior to Fall 1975. 

The Staff (W)

217. Introduction to Stellar Atmospheres. (3) Three hours of lecture per week. Spectral characteristics of normal and nova-like stars. A study of stellar spectra to learn about the physical conditions of stars. May be repeated for credit up to a total of 6 units. 

The Staff (F, W, Sp)

218. Stellar Dynamics and Galactic Structure. (3) Three hours of lecture per week. A basic course stressing the kinematics and structure of the galaxy, stellar population concepts, a discussion of galactic systems and with and without encounters. (Not open to students who have taken courses 116 and 16A prior to Fall 1975.) 

The Staff (F, W, Sp)

220. Interstellar Medium and High Energy Astrophysics. (3) Three 1-hour lectures and two 1-hour discussion sections per week. Prerequisite: Physics 105F. An introduction to the high energy astrophysics and current methods of data analysis. 

The Staff (W)

222A-222B-222C. Galactic Mechanics. (5-5-5) Three 1-hour lectures and two 1-hour discussion sections per week. Prerequisite: Physics 105F. 

The Staff (F, W, Sp)

224. Radio Astronomy. (3) Three 1-hour lectures per week. Prerequisite: course 216. A study of the radio and optical instrumentation and techniques. Details of radio astronomy will be presented. The interpretation of radiation and physics to objects observed in the radio range, including emission nebulae, gas clouds, and relativistic plasmas, will be presented. 

The Staff (F, W, Sp)

236. Radio Astronomy. (3) Three hours of lecture per week. Prerequisite: course 216. A comparison of radio and optical instrumentation and techniques. 

The Staff (F, W, Sp)

238. Special Topics in Astronomy. (3) Three hours of lecture per week. Prerequisite: Consent of instructor. 

The Staff (F, W, Sp)

239. Solar System Astrophysics. (3) Three 1-hour lectures per week. Prerequisite: course 216 and 16C. 

The Staff (F, W, Sp)

246A. Stellar Evolutionary Models. (3) Three hours of lecture per week. Prerequisite: course 216. 

The Staff (F, W, Sp)

247. Stellar Evolutionary Models. (3) Three hours of lecture per week. Prerequisite: course 216. 

The Staff (F, W, Sp)

250. Interstellar Medium and High Energy Astrophysics. (3) Three 1-hour lectures per week. 

The Staff (F, W, Sp)

252A. Stellar Structure and Evolution. (3) Three 1-hour lectures per week. Prerequisite: courses 12A-12B-12C-12D-12E and Physics 105A-105B (may be taken concurrently). The study of the structure and evolution of stars, galaxies, and clusters. 

The Staff (F, W, Sp)

254A-254B. Stellar Structure and Evolution. (3) Three 1-hour lectures and two 1-hour discussion sections per week. Prerequisite: courses 12A-12B-12C-12D-12E and Physics 105A-105B (may be taken concurrently). The study of the structure and evolution of stars, galaxies, and clusters. 

The Staff (F, W, Sp)

255A-255B. Orbit Theory and Practice. (5-5) Three 1-hour lectures and two 1-hour discussion sections per week. Prerequisite: courses 12A-12B-12C-12D-12E and Physics 105A-105B (may be taken concurrently). The study of the motion of celestial objects, both in the solar system and in interstellar space, under the influence of gravity. May be repeated for credit up to a total of 12 units. 

The Staff (F, W, Sp)

256. Advanced X-Ray Astrophysics. (2) Two hours of lecture per week. Prerequisite: consent of instructor. 

The Staff (F, W, Sp)

289. Seminar. (2-5) Two-hour meeting each week. In addition to the weekly colloquium the department offers seminars in advanced topics, several of which are announced at the beginning of each quarter. A maximum of 10 units may be taken per quarter with a limitation of 5 units in any one semester. 

The Staff (F, W, Sp)

290A. Introduction to Current Research. (1) One hour of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. 

The Staff (F, W, Sp)

290B. Introduction to Current Research. (1) One hour of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. 

The Staff (F, W, Sp)

300. Interdisciplinary Seminar in General Astronomy. (1) Two hours of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. 

The Staff (F, W, Sp)

301. Undergraduate Astronomy Instr. (1-2) One hour of lecture and 3-6 hours of laboratory per week. Prerequisite: consent of instructor. May be taken concurrently with an approved course. May be repeated for credit up to a maximum of 4 units. 

The Staff (F, W, Sp)

302. Undergraduate Seminar in Astronomy. (1-2) One hour of lecture and 3-6 hours of laboratory per week. Prerequisite: consent of instructor. May be taken concurrently with an approved course. May be repeated for credit up to a maximum of 4 units. 

The Staff (F, W, Sp)

323. Special Topics in Astronomy. (3) Three hours of lecture per week. Prerequisite: Astronomy 266 or consent of instructor. 

The Staff (F, W, Sp)

327. Special Topics in High Energy Astrophysics. (4) Four hours of lecture per week. Prerequisite: Astronomy 266 or consent of instructor. 

The Staff (F, W, Sp)

Bacteriology and Immunology

Department Office, 3573 Life Sciences Building

Professors

Phyllis S. Blair, Ph.D.
Alexander Glazer, Ph.D.
Robert I. Mehl, M.D.
Hiroshi Nikaido, M.D.
Charlene O. Plopper, Ph.D.
Marlen E. Koch, Ph.D.
Leon Wolf, Ph.D.

Assistant Professor

Teresa Leighton, Ph.D.
The Major

Plan I

Lower Division. Chemistry 1A–1B–1C, 5; Chemistry 8A–8B, or 12A–12B; Mathematics 16A–16B; Physics 6A–6B; Biology 1A; Molecular Biology 1 and/or Biology 1B.

Upper Division. Bacteriology 100A–100B, 101A–101B; Biochemistry 102, 102L, Chemistry 109A. At least 10 additional units chosen from: Bacteriology 103, Molecular Biology 110A–110B; Zoology 104, 110A–110B, 155; Botany 101, 130–130L or other related courses pertinent to the major, with the approval of the adviser.

Plan II

Lower Division. Chemistry 1A–1B–1C, 5, 8A–8B; Mathematics 16A and either Mathematics 16B or Statistics 2; Physics 6A; Biology 1A; Biology 1B and/or Molecular Biology 1; Physics 6B and 6C are recommended.

Upper Division. Bacteriology 102–102L; Biochemistry 102, 102L; Biomedical and Environmental Health Sciences 180A–180L, 180B–180M. At least 9 additional units chosen from: Bacteriology 103, Biomedical and Environmental Health Sciences 182, 182L, 184, 281; Molecular Biology 110A–110B or Genetics 100; Zoology 104, 156; Zoology 110A–110B or Botany 130–130L or other related courses pertinent to the major, with the approval of the adviser.

Honors Program. With the consent of the major adviser, students with an overall grade-point average of 3.3 or higher and a grade-point average of 3.3 or higher in courses in the major may apply for admission to the honors program. Students enrolled in the program must take at least 6 units of research courses (H195 and/or H180), and must present the results of their research in a paper and in a seminar at the end of their last quarter. The honors program adviser will help plan each honors program individually. Approval of the program by the honors program adviser is required. The honors program adviser is authorized to exempt students in the honors program from requirements concerning specific courses or sequences of courses in the major. Students interested in enrolling in the program should consult the honors program adviser, Mr. Thorner.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Preparation for Graduate Study

For the pursuit of graduate work in either bacteriology or immunology, the undergraduate training outlined under Plan I is preferable. Other courses strongly recommended as basic preparation for future graduate work are: Chemistry 109B; Chemistry 112E (for students who have taken Chemistry 12E); Physics 6C. Useful foreign languages include French, German, Russian and Japanese, German is recommended.

The Graduate Program

The Department offers the M.A. and Ph.D. degrees in bacteriology and immunology. There is no separate M.A. program; the M.A. degree is usually earned as part of the doctoral program. The completion of teaching assignments for a minimum of three quarters is required of all students working for the Ph.D. degree in bacteriology. Information is available from the graduate adviser in 3573 Life Sciences Building.

LOWER DIVISION COURSE

6. Immunity and Defense. (1) One two hour session. Prerequisites: High school course in biology, freshman status. Lectures, selected readings, and discussion. Topics will be limited in number, but explored in depth suitable for freshmen who plan to major in life sciences. To be taken Pass/Not Pass. Mr. Wofsy (F)

UPPER DIVISION COURSES

100A–100B. General Bacteriology. (4–4) Three 1 1/2-hour lectures per week. Prerequisite: course 100A. Not open to students who have credit in courses 101A–101B. Chemistry 102, 102L. Mr. Wofsy, Mr. Zusman (F)

101A–101B. General Bacteriology Laboratory. (4–4) Two 1 1/2-hour laboratories per week. Prerequisite: course 101A–101B. Chemistry 102, 102L. Mrs. Blair (F); Mr. Nikaido (W)

102. An Introduction to General Bacteriology. (4) Two 1 1/2 hour lectures and one 1 hour lecture per week. Prerequisites: Biology 1A–1B, Chemistry 1C and 8A–8B. Not open to students who have credit in courses 100A–100B. Mr. Glazer, Mr. Nikaido (F)

102L. Bacteriology Laboratory. (4) One 1 hour lecture per week and two 4-hour laboratories per week. Prerequisite: course 102. Mr. Glazer, Mr. Nikaido (F)

103. An Introduction to Immunology. (4) Two 1 1/2-hour lectures and one 2 hour discussion per week. Prerequisites: Biology 1A–1B, or Molecular Biology 1. Mr. Wofsy, Mr. Zusman (F)

NOTE: For key to symbols, see page 36.
**H120. Research Seminar, (0) One hour seminar per week. Prerequisite: Biochemistry 102 or Bacteriology 100A-100B, Bacteriology 103, or, consent of the instructor. Presentations and informal discussions designed to introduce students to research being conducted in the Department of Bacteriology and Immunology. Open to juniors eligible for the departmental honors program who intend to take course H120 in their senior year.** The Staff (Sp)

**H180. Research. (3–5) Formerly numbered H197. Open to students in their senior year who are enrolled in the Department of Bacteriology and Immunology. Associated honors program.** Lectures and discussion periods to be arranged. The Staff (Mr. Thörner in charge) (F, W, Sp)

**H195. Individual Study. (3–5) Open to students in their senior year who are enrolled in the Department of Bacteriology and Immunology.** The Staff (Mr. Thörner in charge) (F, W, Sp)

**199. Supervised Independent Study and Research. (1–5) Formerly numbered 195. Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis.** The Staff (F, W, Sp).

**GRADUATE COURSES**

**202A–202B. Immunology, (4–3) 202A. Two 1 1/2-hour lectures per week. Prerequisite: Biochemistry 102 or the equivalent. A study of the interaction of body reactions, structure and function of antibody molecules; genetic basis of immunoglobulin diversity; lymphocyte differentiation; cellular interactions; and immunoregulatory mechanisms of immunity and tolerance. Mrs. Koshland (F) 202B. Two 1 1/2-hour lectures per week. Cell-mediated immunologic reactions, the allograft reaction; mechanisms of antibody production; the major histocompatibility antigens: ontogeny and phylogeny of the immune response; antigenic alterations in neoplasia and immunologic surveillance.** Mr. Good (W)

**202L. Immunology—Immunochemistry Laboratory. (4–4) Laboratory, seminar, and discussion periods to be arranged. Prerequisite: course 202A or 103, or consent of instructor. A project involving a variety of immunologic techniques, and participation in seminars on the application of experimental immunology to research problems. Under special circumstances, a student may take the course for more than one quarter and receive credit.** Mrs. Good (F, W, Sp)

**203. Microbial Metabolism. (2) Seminar and discussion periods to be arranged. Prerequisite: Bact. 100A–100B or the equivalent; Biochem. 100A–100B or the equivalent; a course in molecular genetics. Lectures and discussion centered on selected topics in the metabolism of various microorganisms, with special emphasis on intermediary metabolism.** Mr. Thörner (F)

**204. Tumor Immunology. (3) Two 1 1/2-hour lectures per week. Prerequisite: Graduate standing in a biological science or permission of instructor. Antigens of normal and neoplastic cells; immune interference; immune surveillance in neoplasia. To be taken on a satisfactory/unsatisfactory basis.** Mrs. Blair (F, W, Sp)

**205. The Nature of the Immune Response. (2) Three hours of lecture per week. Prerequisite: Graduate standing in any biological science, and consent of instructor. An analysis of new developments in research into the molecular and cellular basis of the immune response. To be taken on a satisfactory/unsatisfactory basis.** Mr. Mitchell (F) Mr. Wolfs (W), — (Sp)

**206. Immunogenetics. (2) Two hours of lecture per week. Prerequisite: Biochemistry 190, or consent of instructor. Reading and discussion on current problems of immunogenetics: analysis of complex loci in red blood cell systems and transplantation antigens; genetically controlled antigenic variation in microbes and viruses; genetics of immunoglobulins and antibody synthesis. To be taken on a satisfactory/unsatisfactory basis.** Mr. Leighton (Sp)

**207. Structure and Function of the Procaroytic Cell. (2) Two hours of lecture per week. Prerequisite: Biochemistry 102 or Advanced Chemistry 14 and 110A–110B. An investigation of the physical and biochemical knowledge about the principal component of procaroytic cells, with emphasis on categories of envelopes. Related course on eucaroytic cell membranes, Biochem 203, offered in the alternate year.** Mr. Glazer, Mr. Nikaido (Sp)

**208L. Laboratory Methods in Cellular Immunology. (4–4) Laboratory, seminar, and discussion periods to be arranged. Prerequisite: course 202A, 202B, and 202L, or consent of instructor. Students will work on a project involving a variety of techniques in cellular immunology. Under special circumstances, a student may arrange to take the course for more than one quarter and receive credit.** Ms. Good, Ms. Henry (Sp)

**209. Microbial Models of Development. (4) Two 1 1/2-hour lectures per week. Prerequisite: Immunology 102 or 100A–100B–100C; course 202A; or consent of instructor. A critical analysis of the advantages and disadvantages of microbial systems for studying principles of growth, morphogenesis, differentiation, and cellular plasticity. Genetic and biochemical approaches will be emphasized. Open to advanced undergraduates and graduate students.** Mr. Leighton, Mr. Thörner, Mr. Zusman (F)

**212. Seminar in Current Research. (1–3) Two hours of lecture and 4–8 hours of laboratory per week. An introduction to research and to the analysis of scientific literature. Required of all first-year graduate students in bacteriology and in immunology. To be taken on a satisfactory/unsatisfactory basis.** The Staff (Mr. Leighton, Mr. Mishell in charge) (F, W, Sp)

**213. Seminar in Advanced Laboratory Methods. (2) Three hours of lecture per week. Prerequisite: Graduate standing in bacteriology and immunology, and for at least four quarters. To be taken on a satisfactory/unsatisfactory basis for first-year graduate students in bacteriology and immunology. To be taken on a satisfactory/unsatisfactory basis.** The Staff (Sp)

**216. Seminar in Tumor Immunology. (1) Two hours of lecture per week. Prerequisite: course 204 or equivalent background, and consent of instructor. Student presentations and discussion of current research on the immunology of neoplastic cells. To be taken on a satisfactory/unsatisfactory basis.** Mr. Blair (F)

**218. Current Topics in Immunology. (1) One hour lecture per week. Prerequisite: Graduate standing in the Department of Bacteriology and Immunology, or in the Group in Microbiology or Immunology, or consent of the instructor. Presentations by graduate students and others of top selections from the current research literature. Required of all graduate students in bacteriology and microbiology for at least four quarters. To be taken on a satisfactory/unsatisfactory basis.** Mr. Zusman (W, Sp)

**220. Seminar in Cellular Immunology Research. (2) Two hours of lecture and 4–8 hours of laboratory per week. Prerequisite: Graduate standing in Immunology or consent of the instructor. This course is an advanced seminar in cellular immunology. Student participation involves reading, presenting, discussing and preparing written critiques of selected papers from the current literature. To be taken on a satisfactory/unsatisfactory basis.** Mr. R. I. Mishell (W, Sp)

**280. Research. (1–12) Formerly numbered H197. Enrollment is restricted by regulations listed on page 36. Must be taken on a satisfactory/unsatisfactory basis.** The Staff (F, W, Sp)

**295. Special Topics. (1–3) Consent of instructor. To be offered on topics of current interest. To be taken on a satisfactory/unsatisfactory basis.** The Staff (F, W, Sp)

**299. Special Study for Graduate Students. (2–4) The Staff (F, W, Sp)

**601. Individual Study for Master's Students. (1–8) Individual study for the comprehensive or language requirements in consultation with the field adviser.** The Staff (F, W, Sp)

**602. Individual Study for Doctoral Students. (1–8) 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. Must be taken on a satisfactory/unsatisfactory basis.** The Staff (F, W, Sp)

**Biochemistry**

**Department Office, 401 Biochemistry Building**

**Professors:**
Bruce N. Ames, Ph.D.  
Clintond B. Ballou, Ph.D.  
Frederick H. Carpenter, Ph.D.

**Assistant Professors:**
C. Arthur Knight, Ph.D. (Molecular Biology) (Emeritus)

**Adjunct Professor:**
James A. Bassham, Ph.D.

**Adjunct Associate Professor:**
Debra Ferro-Luzzi Ames, Dottorezza in Biologia

**Lecturer:**
Harold O. Kammern, Ph.D.

**Departmental Major Advisers:**
Mr. Ames, Mr. Ballo, Mr. Chamberlin, Mr. Cole, Mr. Kirsch, Mr. Linn, Ms. Maizez, Mr. Neildans, Mr. Penhoet.

**Graduate Advisers:**
Mr. Dekker, Mr. Rabinowitz, Mr. Schekman, Mr. Wilson.

**The Undergraduate Major:**
The Department offers two programs for the major. Students expecting to pursue graduate study in biochemistry, and Plan II for those who do not. Students in Plan I may elect the honors program.

**The Major**

**Lower Division.**
Chemistry 44A–44B–4C (or 1A–1B–1C and 5); Chemistry 124A–124B (or 84A–8B for those expecting to follow upper division Plan II, see below); Mathematics 1A–1B–1C; Physics 6A–6B–6C (or 5A–5B–5C); Biology 1A–1B–1C.

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

**Upper Division.**
Plan I: Biochemistry 100A–100B–100C; Biochemistry 101A–101B; Biochemistry 190; Chemistry 109A–109B (or 14 and 110A–110B); Chemistry 112; Related elective (3 units).

**Plan II:**
Biochemistry 100A–100B–100C; Biochemistry 101A–101B; Biochemistry 190; Chemistry 109A–109B; Related electives (8 units).

**Recommended:**
Plans I and II: additional courses in biochemistry and in allied subjects, chosen in accordance with a plan approved by the departmental adviser.

**Honor's Program.**
A student enrolled in the major under Plan I who has an overall grade-point average of 3.0 or higher and a grade-point average of 3.0 or higher in courses acceptable in the major may, with the approval of the major adviser, enroll in the honors program no later than the beginning of the senior year. In addition to the courses prescribed under the Plan I major, the student in this program will be required to complete 4 units in course 180 and to write a thesis based on the research. Certain graduate biochemistry courses will be open to these students on approval of the instructor and adviser. To remain in the honors program a student must maintain a grade-point average of at least 3.0 in biochemistry courses and in those courses acceptable in the major. To graduate with hon-
ors, a student must also have a cumulative grade-point average of 3.3 or higher on all work completed in the University.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Graduate Study

The Department offers the M.A. degree (under either Plan I or Plan II as described in the Graduate Division section of the Bulletin), and the Ph.D. degree. All students working for the Ph.D. degree are required to serve as teaching assistants for two quarters. For information concerning the requirements of either degree consult a graduate adviser in the Department.

LOWER DIVISION COURSE

20. Current Topics in Biochemistry. (1) One 1-hour lecture per week. Prerequisite: sophomore standing or equivalent. A course intended primarily to acquaint potential biochemistry majors with recent developments in this area. Typical topics include: genetic code, regulation of biochemical processes, molecular action of vitamins and hormones, biochemistry of evolution, and analysis in living systems, membrane processes. Must be taken on a passed/not passed basis. The Staff, Mr. Wilson in charge (W)

UPPER DIVISION COURSES

100A–100B–100C. General Biochemistry. (4–4) Three hours of lecture and one hour of section meeting per week. Prerequisite: Chemistry 8B, 129 or equivalent and a course in physical chemistry and biology. Consent of the instructor. Designed for biochemistry majors (students who have completed Biochemistry 102 may earn 3 units for each quarter of 100A–100B–100C, and on the chemical and physical factors concerned in life processes, including the chemistry, function, degradation, and biosynthesis of major cellular constituents: enzymatic catalysis; energy and metabolism and control of metabolic processes. Sequence begins in the fall. M. Koshland, Mr. Alper (F); Mr. Ballou, Mr. Kirsch (W); Mr. Linn, Mr. Schekman (Sp)

101A–101B. General Biochemistry Laboratory. (4–4) Two 1-hour lectures and two 3-laboratory per week. Prerequisite: 100A–100B–100C or consent of instructor. Laboratory experiments planned to accompany the lectures in course 100A-100B-100C. Sequence, beginning in the fall and in the winter. 101A: Mr. Linn, Mr. Maizels (F); Mr. Cole, Mr. Linn, Mr. Schekman (W); Mr. Ames, Mr. Neillands (W); Mr. Ames, Mr. Wilson (Sp)

102. A Survey of the Principles of Biochemistry. (5) Four 1-hour lectures, one 1-hour review lecture and 1 hour of section meeting per week. Prerequisite: Chemistry 8B or equivalent. Recommended: courses in physical chemistry and biology. Designed for non-biochemistry majors. Not open for credit to students who have credit in courses 100A–100B–100C or 103A–103B. Mr. Cole, Ms. Maizels (Sp)

102L. Biochemistry Laboratory. (5) Two 1-hour lectures and two 4-hour laboratories per week. Prerequisite: Chemistry 5 and course 102A may be taken concurrently. Not open for credit to students who have credit in courses 100A–100B–100C or 103A–103B. Mr. Cole, Ms. Maizels (Sp)

103A–103B. A Survey of the Principles of Biochemistry. (2, 2–2.5) Two 1-hour lectures and one 1-hour section meeting per week. Prerequisite: Chemistry 5B or equivalent. Recommended: courses in physical chemistry and biology designed for non-biochemistry majors. Equivalent to Biochem 102. Not open for credit to students who have credit in courses 100A–100B–100C or 103A–103B. Mr. Kammen (F); Mr. Kammen, Mr. Dekker (Sp)

104. Biochemistry and Society. (2) Two 1-hour lectures per week. Prerequisite: course 102, 100A or consent of instructor. A biochemical perspective on the technological intrusions which threaten life; and an analysis of the professional responsibilities of the biochemist to society. Must be taken on a passed/not passed basis. Mr. Neillands in charge (Sp)

190. Research. (2–4) Formerly 180. Prerequisite: courses 100A and 101A and enrollment in the Biochemistry Honors Program. Laboratory research for advanced students under the direction of a member of the staff. The Staff (F, W, Sp)

190. Proseminar. (1) Prerequisite: courses 100A–100B and 101A–101B. Seminar in biochemistry majors, based on the biological literature. Must be taken on a passed/not passed basis. Mr. Wilson in charge (Sp)

195. Special Topics in Biochemistry. (1–3) One to three hours of lecture per week. Prerequisite: consent of instructor. Lecture and discussion dealing with topics of current interest in biochemistry. May be repeated for credit. Must be taken on a passed/not passed basis. The Staff (Mr. Dekker in charge) (F, W, Sp)

199. Supervised Independent Study and Research. (2–4) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. The Staff (F, W, Sp)

GRADUATE COURSES

Courses 201 to 214, intended to acquaint graduate students with recent advances in biochemistry, are also open to senior students with honor standing by consent of the instructor.

201A–201B. Advanced Biochemical Laboratory Methods. (4–4) Three 1-hour lectures and three 3-hour laboratories per week. Prerequisite: grade standing in biochemistry and consent of instructor. The Staff (Mr. Dekker in charge) is expected to teach this course in the fall of 2018 for 2 units of credit.

201A. Purification and characterization of enzymes not previously described in Lecture 101B. Mr. Linn, Mr. Biel (F); Mr. Biel, Mr. Neillands (W); Mr. Ames, Mr. Wilson (Sp)

202. Biochemistry of Carbohydrates. (3) Three hours of lecture per week. Prerequisite: courses in biochemistry and biology of macromolecules, including the use of specific techniques for laboratory work in biochemistry. (2.5-2.5) Two 1-hour lectures and one 1-hour section meeting per week. Prerequisite: chemistry 102 may earn 3 units for each quarter of 100IB for 2 units of credit. Mr. Schekman (F)

203. Structure and Function of Eukaryotic Cellular Membranes. (2) Two 1-hour lectures per week. Prerequisite: courses 100A–100B–100C or consent of instructor. The Staff (Mr. Dekker in charge) is expected to teach this course in the fall of 2018 for 2 units of credit. Mr. Schekman (F)

204. Biochemistry of Proteins. (3) Three hours of lecture per week. Prerequisite: courses 100A–100B–100C. The chemistry of proteins with emphasis on three-dimensional structure determination, and to the elucidation of structure-function relationships. Theoretical considerations of protein purification. Mr. Cole (F)

205. Biochemistry of Nucleic Acids. (3) Three 1-hour lectures per week. Prerequisite: courses 100A–100B–100C or consent of instructor. The Staff (Mr. Dekker in charge) is expected to teach this course in the fall of 2018 for 2 units of credit. Mr. Schekman (F)

206. Physical Biochemistry. (4) Four and one-half hours of lecture per week. Prerequisite: a year course in organic and physical chemistry or consent of instructor. Recommended: course 102 or 100A–100B–100C. Application of modern physical concepts and experimental methods to the analysis of the structure, function, and interaction of large molecules of biological interest. Mr. Chamberlin (F)

207. Comparative Biochemistry. (2) Two hours of lecture per week. Prerequisite: Graduate standing. Open to undergraduates who have received a passing grade in upper division Biochemistry or Molecular Biology course. Contributions of comparative biochemistry to knowledge of the molecular basis for organismic diversity, the mechanism of evolution and the phylogenetic relationships of species. Mr. Wilson (Sp)

213. Enzyme Synthesis and Control. (3) Three 1-hour lectures per week. Prerequisite: course 102 or 100A–100B–100C and a course in genetics, or consent of the instructor. Biochemistry of the pathway of genetic expression with an emphasis on prokaryotic cells. Regulation of transcription and translation. Mr. Chamberlin (W)

214. Mechanisms of Enzyme Action. (3) Three 1-hour lectures per week. Prerequisite: course 102 or 100A–100B–100C, physical chemistry and advanced organic chemistry, or consent of the instructor. Current concepts of the mode of action of enzymes. The modes of binding of substrates and allosteric effectors to enzymes and analysis of the thermodynamics and kinetics of these reactions. Catalytic mechanisms utilized by enzymes and correlation of mechanism with 3-dimensional structure. Mr. Kirschen (Sp)

280. Research. (3–12) Thesis research for graduate students majoring in biochemistry. Must enroll for at least 3 units, except special permission of the chairman of the department. The Staff (F, W, Sp)

285. Research Seminar. (1) Two to four hours of lecture per week. Prerequisite: Biochemistry 201 or 280 taken concurrently. Seminar presents and evaluates results in the area of the student's current research. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

290. Seminar. (1) Graduate student seminar in biochemistry dealing with various topics which differ from year to year. The program will include several sections each quarter, each emphasizing a different subject. The Staff (F, W, Sp)

299. Special Study for Graduate Students. (2–4) Reading and conference for properly qualified graduate students in biochemistry under the direction of a member of the staff. The Staff (F, W, Sp)

602. Individual Study for Doctoral Students. (1–8) Individual study in consultation with the major field advisor, intended to provide an opportunity for qualified students to prepare for examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

Biology

Department Office, 4583 Life Sciences Building

Professors:
Herbert G. Baker, Ph.D. (Botany)
William Balamuth, Ph.D. (Zoology)
Howard A. Bern, Ph.D. (Zoology)
William B. N. Berry, Ph.D. (Botany)
Ralph Emerson, Ph.D. (Zoology)
Ned K. Johnson, Ph.D. (Zoology)
Raymond W. Schneider, Ph.D. (Zoology)
William Z. Cande, Ph.D. (Botany)
Thomas O. Duncan, Ph.D. (Zoology)
Russell L. Jones, Ph.D. (Botany)
Paul Licht, Ph.D. (Zoology)
William Z. Liddaker, Ph.D. (Zoology)
Charles S. Nicol, Ph.D. (Physiology)
Robert Ornston, Ph.D. (Zoology)
Robert Orten, Ph.D. (Zoology)
Fred H. Wilt, Ph.D. (Zoology)

Associate Professors:
Robert K. Colwell, Ph.D. (Zoology)
Alexander J. Home, Ph.D. (Hydraulic and Sanitary Engineering)
James L. Patton, Ph.D. (Zoology)
Raymond W. Schneider, Ph.D. (Zoology)

Assistant Professors:
William Z. Cande, Ph.D. (Botany)
Thomas G. Duncan, Ph.D. (Botany)
Carole S. Hickman, Ph.D. (Paleontology)

NOTE: For key to symbols, see page 36.
Field Major in Biological Sciences

Field Major Office, 4583 Life Sciences Building

Major Advisers: Plan A, Mr. R. Cooper, Mr. W. Z. Cande; Plan B, Mr. A. J. Home, Mr. R. Smith, Mr. J. West

Program serves the needs of students who can profit from broader training in the biological sciences than is possible in a departmental major. Four plans are offered under the Department of Biology, namely, A, specialization in functional biology; B, specialization in systematic biology and morphology; C, specialization in ecology; and D, specialization in the area of marine biology.

Lower Division Courses. Required of all students in the major: Chemistry 1A-1B (8 units); Chemistry 8A-8B (9 units); Mathematics 16A (4 units); Physics 6A-6B-6C (12 units); Biology 1A-1B (12 units). Chemistry 1A-1B and Biology 1A-1B are required for admission to the field major.

Upper Division Courses. Required of all students in the major: Genetics 100 (5 units), or Genetics 110 (5 units), or Molecular Biology 110A (5 units), or Genetics 150 (5 units); at least one course in Botany: A course in the history or philosophy of biological science (2–5 units) is recommended.

Although students are expected to select the appropriate upper division courses from one of the four plans listed below for their major course of study, advisers may permit substitution of similar courses.

Other courses as follows: Plan A. (specialization in the area of functional biology as evidenced by a study of the physiological and biochemical aspects of living things):

Option I. Cellular emphasis: Chemistry 109A–109B (6 units); Biochemistry 102 (5 units); Biology 102 (5 units); Physiology 101 (2 units); or two quarters from among the following: Zoology 102, 200, 301; Zoology 110A–110B (3–3 units); Botany 130 (5 units); additional upper division courses in biological science to complete a minimum of 45 units of upper division work in the major.

Option II. Organismal emphasis: Biochemistry 102 (5 units); Botany 144 (5 units); Physiology 102A (5 units), or Physiology 123 (5 units), or Zoology 131 (4 units), or Entomological Sciences 103 (2 units) and Entomological Sciences 106 (2 units); Zoology 107A–107B (5–5 units), or Zoology 108A–108B (5–5 units); or Zoology 105 (5 units), or Botany 158 (5 units); or Anatomy 151 (4 units).

As units in Option I, 45 units of upper division work are required.

Plan B. (specialization in the area of systematic and evolutionary biology: study of the structure, classification, and evolution of living things): Botany 102 (5 units); Botany 103 (5 units); Botany 104 (5 units); Botany 125 (3 units) and Botany 125L (2 units); Botany 144 (5 units), or Entomological Sciences 103 (2 units) and Entomological Sciences 106 (2 units); or Physiology 123 (5 units), or Zoology 104 (5 units); Zoology 107A–107B (5–5 units), or Zoology 108A–108B (5–5 units); or Entomological Sciences 106 (5 units); or Zoology 109 (5 units), or Genetics 131 (5 units); to complete a minimum of 45 units of upper division work are required.

Plan C. (specialization in the area of ecology: study of the relations between living things and their environment): Botany 150 (4 units); Botany 102 (5 units), or Botany 103 (5 units) or Botany 104 (10 units), or Botany 120 (5 units), or Botany 125 (2 units) and Botany 125L (2 units); Zoology 107A–107B (5–5 units), or Zoology 157 (10 units), or Biology 100 (15 units), or Zoology 108A–108B (5–5 units); 6 units from Entomological Sciences 103 (5 units); Physiology 123 (5 units), or Zoology 124 (4 units), or Zoology 131 (4 units), or Entomological Sciences 103 (2 units) and Entomological Sciences 103L (2 units); Entomological Sciences 105 (4 units), or Zoology 140 (3 units), or Botany 154 (3 units); additional upper division courses in biological sciences to complete a minimum of 45 units of upper division work in the major. When in statistics is strongly recommended (Public Health 160A).

Plan D. (specialization in the area of marine biology): Biology 150 (4 units); Biology 160A–160B (4–4 units); Zoology 142 (4 units) or Zoology 143 (10 units); Zoology 108A–108B (5–5 units) or Zoology 157 (10 units) or Botany 100 (10 units) or Botany 122 (5 units) or Botany 104 (10 units); one quarter course or summer course (4–unit minimum) at a marine laboratory; additional upper division courses in biological science to complete a minimum of 45 units of upper division work in the major. At least one course in statistics is strongly recommended (Public Health 160A).

Honors Program. The honors program consists of completion of Biology H198, Proseminar in Biology (1 unit), and two quaters of Biology H195, Special Study for Honors Candidates (6 units total), followed by a written report.

Single Subject Teaching Credential in Life Science. All credential candidates must be certified under the provisions of the California Teacher Preparation and Licensing Law of 1970 which became effective on September 15, 1974.

Plan A, specialization in functional biology; B, specialization in systematic biology and morphology; C, specialization in ecology; and D, specialization in the area of marine biology.

UPPER DIVISION COURSES

100. Problems in Marine Biology. (15) Full-time study at the Bodega Marine Laboratory. Prerequisite: Biology 1 or 11 and consent of instructor. Lectures, laboratory, field work, and directed study on selected topics, stressing experience in original research. Mr. Emerson (W)

150. General Ecology. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 40 or 40F or the equivalent. An introduction to the principles of ecology, stressing the structure and dynamics of natural ecosystems, designed for biological science majors. Mr. Colwell, Ms. Livette (F)

151. MicrEcological. (4) Two 1–1/2-hour lectures and one 3-hour discussion per week. Prerequisite: course 40 or 40F or the equivalent. An introduction to principles of ecosystem interactions, population dynamics, and aquatic and terrestrial ecosystems: cycles of elements; activities of bacteria, algae, fungi, protozoa, population dynamics. Limited enrollment. Mr. Hand (Sp)

153. Developmental Biology. (3) Three hours of lecture and one hour of discussion per week. Prerequisite: course 1A–1B. An introduction to principles of development, developmental genetics, embryological and population genetics, and cell biology, with emphasis on mammalian systems. Mr. Wilt (W)

160A–160B. Marine Geobiology. (4–4) Two hours of lecture and two hours of laboratory and one hour of discussion or a field trip per week. Prerequisite: course 1A–1B. Intermittent oceanography, oceanic geology, and biological marine science, with examples from present seas and the geologic record. 160A: General oceanic cycles with emphasis on microorganisms: 160B: The oceanographic and geomorphic context of marine biology. Mr. Mo, Ms. Hickman (W); 160B: Mr. Smith, Mr. Wilt (Sp)

1167. Biogeography. (3) Three hours of lecture per week. Prerequisites: senior or graduate standing. Principles underlying patterns of geographic distribution and dispersal of organisms, based on critical analysis of evidence from the fossil record and modern groups, with emphasis on the western hemisphere. Mr. Smith, Mr. Hand (Sp)

H195. Special Study for Honors Candidates. (3) Prerequisite: H-198. Study, followed by a written report, with any faculty member in the Department of Biology and Agriculture. May be repeated for credit. The Staff (W, Sp)

H198. Proseminar in Biology. (1) One 1-hour meeting per week, plus individual conferences. Prerequisite: upper division standing with an overall 3.0 grade-point average or higher in the major. Reporting and group discussion on selected topics. The Staff (F)

199. Supervised Independent Study and Research (1–5). Prerequisite: Background courses in chosen subjects. Enrollment is restricted by regulations listed on page 36. Must be taken on a pass/fail basis. The Staff (W, Sp)

GRADUATE COURSES

221. Comparative Physiological and Endocrinology Seminar. (1) One hour of lecture per week. Prerequisite: permission of the instructor. Reviews and reports of current research in vertebrate endocrinology and physiology. Offered on a satisfactory/unsatisfactory basis. Mr. Licht, Mr. Nicoll, Mr. Bern (F, W, Sp)

250. Tropical Biology—An Ecological Approach. (12) Ten 1-hour lectures and 30 hours of laboratory and 12 hours of field work per week. Prerequisite: biology majoring in functional biology or environmental science, and one substantial paper under the general guidance of an instructor. Open to biology majors only. Mr. Baker, Mr. Colwell (F, W)

201A–301B. Professional Preparation: Teaching of Biology. (1–1) One hour of lecture per week.
Molecular Biology 10. Introduction to Molecular Biology. (3) See Molecular Biology for the complete description of this course.

Medical Physics 10. Atomic Radiation and Life. (4) See Medical Physics for the complete description of this course.

Nutritional Sciences 10. Survey of Nutritional Sciences. (5) See Nutritional Sciences for the complete description of this course.

Interdepartmental Studies 10A-10B-10C. Mann and His Environment—Crisis and Conflict. (5-5-5) See Interdepartmental Studies for the complete description of this course.

Botany 431. Techniques of Electron Microscopy for Biologists. (3) See Botany for the complete description of this course.

Anatomy 495. Freeze-Etch Electron Microscopy. (2) See Physiology-Anatomy for the complete description of this course.

Biophysics

Division Office, 103 Donner Laboratory; Graduate Group Office, 101 Donner Laboratory

Courses in biophysics are described under Medical Physics. Undergraduate degree programs in Biophysics and in Biophysics: Medical Physics Option are offered under a major; see Medical Physics for further information.

Graduate degree programs in Biophysics (Ph.D. and M.A.), Bioremediology (M.Biored.), and Medical Physics (Ph.D.) are administered by the Graduate Group in Biophysics.

Biostatistics

Group Major Office, 101 Haviland Hall (Mailing Address: 140 Warren Hall)

Professors:
- David R. Brillinger, Ph.D.
- Chen Long Chang, Ph.D. (Co-chairman)
- Everett R. Dempster, Ph.D.
- Kirill A. Doksum, Ph.D.
- Joseph L. Hodges, Ph.D.
- Lucien LeCam, Ph.D.
- Richard J. Brand, Ph.D.
- Herbert L. Mason, Ph.D.
- William Z. Cande, Ph.D.

Associate Professors:
- William C. Reeves, Ph.D.
- Michael E. Tarter, Ph.D.
- Herbert R. Fishbein, Ph.D.
- David A. B. Miller, Ph.D.
- Barbara J. van den Berg, M.D., Dr. Ph. (Adjunct)

Lecturer:
- Carol A. Langhauer, M.A.

Graduate Advisers: Miss Scott, Mr. Selvin, Mr. Tarter.

Group Major in Biostatistics

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

Graduate Programs and Degrees

The Group in Biostatistics offers two graduate programs: M.A. and Ph.D. These programs are appropriate for students who have either a strong mathematical and statistical background with a great interest in the biomedical sciences, or degrees in the biological sciences with a major interest in mathematics and statistics. For further information, consult the graduate advisers, Miss Scott, Mr. Selvin, Mr. Tarter.

The M.A. degree can be obtained under Plan I or Plan II; but students may proceed directly to the Ph.D. program without obtaining the M.A. degree. The Ph.D. dissertation is administrated according to Plan B; one foreign language is required.

Preparation for Graduate Study

It is realized that few of the entering students will be prepared in mathematics, statistics, and the subject matter areas. Most prerequisites, however, can be made up during the first year of graduate study. Minimum entrance requirements consist of two full-year courses in calculus, and one-year courses in mathematical statistics or biostatistics, and in biology, zoology, or physiology.

Research Facilities

Graduate students in the group have direct access to a small electronic computer and also have available to them the services of the University Computer Center. A unique facility available to group members is the Child Health and Development Studies conducted by the Group in Biostatistics of the School of Public Health. Financed by the National Institutes of Health, this facility provides opportunities for both practical experience and individual research.

Research in the Statistical Laboratory and cooperation with other departments and the possibility of unusual broad and effective training in both the theoretical and applied directions. Research activity in the Statistical Laboratory presently includes stochastic models and applications in carcinogenesis, competition of species, theory of epidemics, and population dynamics.

Courses of Instruction

A wide variety of appropriate courses from a number of departments is available to candidates for either the M.A. or the Ph.D. degrees, giving both programs considerable flexibility. Such flexibility allows students in consultation with the major professor and graduate adviser, to arrange their own program. See Public Health and Statistics for some of the course listings.

Botany

Department Office, 2017 Life Sciences Building

Professors:
- Herbert L. Mason, Ph.D.
- Donald H. Kaplan, Ph.D.
- Robert Onduff, Ph.D.
- Russell L. Jones, Ph.D.
- Herbert L. Mason, Ph.D.
- Russell L. Jones, Ph.D.
- Donald H. Kaplan, Ph.D.
- Robert Onduff, Ph.D.
- William A. Jensen, Ph.D.
- Herbert R. Fishbein, Ph.D.

Graduate Program

Graduate training leading to the M.A. and Ph.D. is offered in the field of botany as represented by the experience, interests, and competence of the faculty. Students should have had or must complete the required, or equivalent, courses which compose the undergraduate major. They must demonstrate a reading knowledge of one foreign language (see above) in their first year of graduate study.
GRADUATE COURSES

101. Biology of the Lower Fungi. (5) Three 1-hour lectures and two 3-hour laboratories per week. Prerequisite: course 101. Phycycomycetes, Ascomycetes, and Hyphomycetes (in part). Given in alternate years. Mr. Emerson (Sp)

202. Biology of the slime molds and Higher Fungi. (5) Three 1-hour lectures and two 3-hour laboratories per week. Prerequisite: course 101. Phycycomycetes, Ascomycetes, and Deuteromycetes (in part), and Basidomycetes. Given in alternate years. Mr. Collins (Sp)

204. Experimental Phylogeny. (5) Two 1-hour lectures and one 2-hour laboratory per week. Prerequisite: course 102. Emphasizes experimental studies in the field and laboratory on a wide variety of organisms. Given in alternate years.

210. Pteridology. (4) Two hours of lecture and two 3-hour laboratory sessions per week. Prerequisite: course 120. A survey of the literature basic to classification of flowering plants. Given every two or three years.

220. Advanced Taxonomy. (3) Two 1-hour lectures per week. Prerequisite: course 120. A survey of the structure and morphology of flowering plants. A review of the literature and current research in interactions between plants. Relationship between plant interactions and community dynamics. Given in alternate years. Mr. Baker (Sp)

226. Plant Interactions. (4) Two 1-hour lectures and two 3-hour laboratory sessions per week. Prerequisite: course 120. A survey of the literature basic to classification of flowering plants. A review of the literature and current research in interactions between plants. Relationship between plant interactions and community dynamics. Given in alternate years. Mr. Park (W)

249A–249B–249C. Advanced Plant Physiology. (4–4–4) Meetings with the faculty for an evening of discussion every two to three weeks. Prerequisite: Consent of the instructor. No course of 249A is prerequisite to another.

249A. Intensive reading and analysis of the literature in ways other than that described in the notes of 249B. Emphasis on the use of plant physiology and the development and maintenance of ecological adaptations in communities and communities and communities. Given every alternate year, beginning Fall 1976. Mr. Park (Sp)

249B. Intensive reading and analysis of the literature in ways other than that described in the notes of 249A. Emphasis on plant physiology and the development and maintenance of ecological adaptations in communities and communities. Given every sixth quarter, beginning Fall 1976. Mr. Park (Sp)

249C. Intensive reading and analysis of the literature in ways other than that described in the notes of 249A and 249B. Emphasis on plant physiology and the development and maintenance of ecological adaptations in communities and communities. Given every alternate year, beginning Spring 1977.
given every sixth quarter, beginning Fall 1977.

Mr. Jones, Mr. Jacobson (Sp)

*259. Advanced Plant Ecology. (3) Three hours of discussion per week. Prerequisite: an upper division course in plant ecology and consent of instructor. In intensive reading and analysis of the literature in the field of plant ecology. Designed for candidates for the Ph.D. in the area of plant ecology.

290. Seminar. (2) One 1-hour meeting per week. Prerequisite: consent of instructor. Advanced study in various fields of botany. Topics will be announced in advance of each quarter. Enrollment in more than one section permitted. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

299. Research. (1-12) Graduate student research. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

*295. Botanical Teaching. (2) One 1-hour lecture per week. Prerequisite: open to all graduate students in the Department of Botany. The course will cover the aims and methods of teaching botany at the college and university level. All new Teaching Assistants in the department are expected to enroll. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

431. Techniques of Electron Microscopy for Biologists. (2) Two 1-hour lectures per week. Prerequisite: graduate standing, approval of major professor, and consent of instructor. The purpose of this course is to familiarize students with the principles and theory of electron microscopy. May be taken without Botany 431L.(W)

431L. Laboratory on Techniques of Electron Microscopy for Biologists. (3) Three 3-hour laboratories per week. Prerequisite: graduate standing, approval of major professor, and consent of instructor. Botany 431L must be taken concurrently with Botany 431L. The purpose of this course is to prepare graduate students in the biological sciences to use electron microscopy in their research. (W)

602. Individual Study for Doctoral Students. (1-8) Individual study in consultation with the major field adviser, intended to provide a suitable preparatory experience for students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit or resident requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

Botany Colloquium. (0) One 1-hour meeting per week. Meetings for the presentation of original work by the faculty, visiting lecturers, and graduate students. The Staff (F, W, Sp)

Field Major in Physical Sciences
Students interested in this major please see Physical Sciences for the description of the major program.

California Teaching Credential
For information concerning the California Teaching Credential (Single or Multiple Subject), see the Announcement of the School of Education.

Graduate Study in Chemistry
Students interested in graduate study are referred to the Chairman of the Department of Chemistry, 419 Lathimer Hall, for information.

Classics
Department Office, 5303 Dwinelle Hall

Professors:
John K. Anderson, M.A. (Graduate Adviser)
(Classical Archaeology)
William S. Anderson, Ph.D.
Peter R. L. Brown, B.A.
John M. Dillon, Ph.D.
(Chairman)
Charles E. Murphy, Ph.D.
Thomas G. Rosenweig, Ph.D.
Ronald S. Stroud, Ph.D.

Associate Professors:
Crawford H. Greenewalt, Ph.D.
Mark Griffith, Ph.D.
Stephen G. Miller, Ph.D.
Michael N. Nagler, Ph.D.

Assistant Professors:
Anthony W. Bulloch, Ph.D.
Florence V. Goldsmit, Ph.D.
Robert C. Knapp, Ph.D.

Visiting Professors:
J. Frank Gillam, Ph.D. (Sather Professor of Classical Literature)
Walach Johnson, Ph.D. (Cornell University)

Departmental Major Advisers: (Greek, Latin, Classical Languages) Mr. Threet, Mr. Nagler, Mr. Griffith.

Departmental Graduate Advisers: (Classics) Mr. Rodgers; (Classical Archaeology) Mr. J. K. Anderson.

The Department of Classics offers a complete undergraduate and graduate program in Greek and Latin languages, literature, and civilizations. It groups its courses of instruction under the headings of Greek, Latin, and Classics. The offering of Greek and Latin courses is to teach students how to read the great works of ancient literature in the original languages, and to acquaint students with the achievements of classical civilization. The purpose of the undergraduate courses called Classics is to give the student instruction in Greek and Roman civilization in all its phases—literature (read in translation), mythology, religion, government, 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.

L&S: Classics / 115

Buddhist Studies

Group Major Office, 4115 Dwinelle Hall

Professors:
Robert N. Bellah, Ph.D. (Sociology and Comparative Studies)
James Callihan, Ph.D. (History of Art)
Padmanabha S. Jain1, Ph.D. (South and Southeast Asian Studies)
Lewis R. Lancaster, M.Th., Ph.D. (Oriental Languages)
John H. Stokes, Ph.D. (Philosophy and South and Southeast Asian Studies)

Assistant Professors:
Leslie L. Threatte, Mr. Nagler, Mr. Griffith.

Chairman: to be appointed

Graduate Adviser: Lewis R. Lancaster

Group Major in Buddhist Studies

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

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

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

212. Advanced Seminar in Buddhist Studies. (4) Three hours of lecture per week. Prerequisite: consent of instructor. Specialized topics in Buddhist Studies, involving the use of Sanskrit, Tibetan, and Chinese materials. May be repeated for credit with consent of instructor. Mr. Lancaster (in charge) (F, W, Sp)

Chemistry

Staff and courses are listed under the College of Chemistry.

Choice of College

A student can complete a major in chemistry in either the College of Letters and Science (A.B. degree) or the College of Chemistry (B.S. degree). Both curricula are approved by the American Chemical Society, and either is a satisfactory foundation for a career in chemical industry, for teaching of chemistry, or, if completed with high academic standing, for graduate work in chemistry.

Chemistry Major in the College of Letters and Science

Major Office, 420 Latimer Hall

Major Adviser: Mr. Rasmussen

Major Requirements

Mathematics: 1A, 1B, 1C.
Physics: 5A, 5B, 5C, 5D, 5E.
Chemistry: 1A, 1B, 1C, 5 (or 4A, 4B, 4C); 12A, 12B, 14A, 14B, 109A, 110A, 111A, 112, and a choice of 105, 106, 107, or 111A—111B.

Enough additional units in upper division chemistry and allied subjects to make a total of 30.

Honors Program. In addition to completing the requirements for the major in chemistry, a student in the honors program must (a) earn a grade-point average of at least 3.3 in upper division courses in the major and overall in the University; and (b) be recommended by the major adviser—this would normally be based upon passing H114, H117, or 127 with a grade of B+ or higher or receiving a B+ or higher in at least 3 units of H194. Students interested in the honors program should consult with their major adviser during the junior year.

Field Major in Physical Sciences

Students interested in this major please see Physical Sciences for the description of the major program.

California Teaching Credential

For information concerning the California Teaching Credential (Single or Multiple Subject), see the Announcement of the School of Education.

Graduate Study in Chemistry

Students interested in graduate study are referred to the Chairman of the Department of Chemistry, 419 Lathimer Hall, for information.

Classics

Department Office, 5303 Dwinelle Hall

Professors:
John K. Anderson, M.A. (Graduate Adviser)
(Classical Archaeology)
William S. Anderson, Ph.D.
Peter R. L. Brown, B.A.
John M. Dillon, Ph.D.
(Chairman)

Associate Professors:
Crawford H. Greenewalt, Ph.D.
Mark Griffith, Ph.D.

Assistant Professors:
Anthony W. Bulloch, Ph.D.
Florence V. Goldsmit, Ph.D.
Robert C. Knapp, Ph.D.

Visiting Professors:
J. Frank Gillam, Ph.D. (Sather Professor of Classical Literature)
Walach Johnson, Ph.D. (Cornell University)

Departmental Major Advisers: (Greek, Latin, Classical Languages) Mr. Threet, Mr. Nagler, Mr. Griffith.

Departmental Graduate Advisers: (Classics) Mr. Rodgers; (Classical Archaeology) Mr. J. K. Anderson.

The Department of Classics offers a complete undergraduate and graduate program in Greek and Latin languages, literature, and civilizations. It groups its courses of instruction under the headings of Greek, Latin, and Classics. The offering of Greek and Latin courses is to teach students how to read the great works of ancient literature in the original languages, and to acquaint students with the achievements of classical civilization. The purpose of the undergraduate courses called Classics is to give the student instruction in Greek and Roman civilization in all its phases—literature (read in translation), mythology, religion, government, 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 three undergraduate majors: Greek, Latin, and Classical Languages.

NOTE: For key to symbols, see page 36.
The Graduate Major

The Master of Arts degree may be taken in Greek, Latin, Classics (each under Plan B: a program of 36 units comprising lecture and advanced undergraduate courses, and a series of examinations), or Classical Archaeology (under Plan A: a program of 30 units of graduate and advanced undergraduate courses, and a dissertation).

The Doctor of Philosophy degree may be taken in Classics or Classical Archaeology. Whatever the graduate students' principal interest—literature, history, archaeology, or other subjects—they should take a broad program and acquaint themselves with every field of Classical studies. They must write a dissertation on a subject chosen from Greek and Latin authors and in Greek and Roman history, since both M.A. and Ph.D. qualifying examinations require an extensive knowledge of literature and history. They are especially advised to enter courses in epigraphy, paleography, comparative grammar, and Greek dialects when they are offered, since the interval between offerings of each is at least three years. The graduate program varies from year to year so that in a normal period of graduate study students may take courses in several fields and periods. For details of the M.A. and Ph.D. programs consult the graduate adviser.

Classes

Courses that do not require a knowledge of Greek or Latin. Courses in this group are designated Classics 10A, Classics 10B, Classics 10C, and Classics 10D.

10A-10B. The Golden Age of Greece, (4-4) Three 1-hour lectures per week. The greatest period of Greek civilization (480-323 B.C.) and the reasons for its greatness. Translations of Latin classics studied in their political and social setting will illustrate the achievements of the Greeks in literature, philosophy, history, and art. (Art and Literature) (art). 10A is not prerequisite to 10B.

11A-11B. The Golden Age of Rome, (4-4) Three 1-hour lectures per week. Roman civilization in its greatest age (133 B.C.-14 A.D.) as revealed in the works of its statesmen, poets, and historians. Translations of Latin classics studied in their historical and social setting, will illustrate the formation of the Roman state and its emerging as a world capital. 11A is not prerequisite to 11B. Mr. Johnson (F, W)

17A. Elementary Course in Classical Archaeology. (4) Three 1-hour lectures and one hour of discussion per week. The development of Greek Civilization from the late Bronze Age to 700 B.C. as illustrated by the monuments. Mr. Greenewalt (W)

28. The Classic Myths. (4-4) Two 1 1/2-hour class meetings per week. Study of ancient Greek myths. Investigations into the significance of myth, based upon Greek mythology and the content of major Greek myths. Investigations into the role of myth in the cultural setting of ancient Greek life. Mr. Rosenmeyer (W)

34. Epic Poetry: Homer and Vergil. (4) Three 1-hour lectures per week. Lectures on the Greek and Roman epics with reading of Iliad, Odyssey, and Aeneid. Mr. Bulloch (Sp)

35. Greek Tragedy. (4) Three 1-hour lectures per week. Lectures on Greek tragic drama with readings of Aeschylus, Sophocles, and Euripides. Mr. Wightman (F)

36. Plato: Selected Dialogues. (4) Three 1-hour lectures per week. Lectures on the form and content of Plato's Dialogues. Mr. Rodgers (Sp)

UPPER DIVISION COURSES

100A–100B–100C. Greek and Latin Literature in Translation. (4-4-4) Three 1-hour lectures per week. Enrollment limited: 100B or 100C may be taken only with permission of the instructor. 100A. Greek literature to 300 B.C. (4) Translations in Greek and Latin literature and literature of the Roman Republic. 100C. Latin literature under the Roman Empire. Mr. Rodgers (Sp)

110A–110B. Greek and Latin Literature. (2) Greek and Latin literature. (W) One and 1/2 hours of lecture per week. Prerequisite: Greek 1-2, 1A-1B or 1C or equivalent. Two quarter courses (2 units each quarter), IP grade for first quarter. Second quarter conditional on attendance in first quarter except in unusual circumstances. This course is intended to give a thorough grounding in the principles of all major types of meter, through exposition and theoretical principles, analysis of specific texts, and some practice at actual composition. Mr. Bulloch (W, Sp)

133. Ancient Comedy. (4) Three 1-hour lectures per week. A study of individual plays and of the concept of the comic genre in the works of Aristophanes, Menander, Plautus, and Terence. Mr. Wightman (F)

136. Socrates and the Socratic Tradition. (4) Formerly 136A–136B. Three 1-hour lectures per week. Study of what Socrates meant to his times, as seen through the works of Plato, Xenophon, and Aristophanes. Analysis of the way later Greek thinkers expanded and altered Socrates' original significance. Mr. Dillon (Sp)

137. The Ancient Novel. (4) Three 1-hour lectures per week. A discussion of the ancient romances (origins, development, form) including Apuleius' Metamorphoses, Longus' Daphnis and Chloe, a Hellenistic Egyptian Tale. Mr. Rosenmeyer (W)

138. The Greek and Roman Historians. (4) Three 1-hour lectures per week. The five historians Herodotus, Thucydides, Polybius, Livy, and Tacitus, in English translation; their intellectual background, documentary sources, and philosophy of history. Mr. Stroud (Sp)

141. Ancient Literature and Criticism. (4) Three one-hour lectures per week. A study of Greek and Roman views of literature, its purpose, conventions, style, and value. Readings (in English) from Hesiod, Aristophanes, Plato, Aristotle, Plutarch, Jocic, Cicero, Horace, Dionysius, Quintilian "Longinus", Plutarch, and others. Mr. Griffith (Sp)

155A. Society and the Supernatural from Marcus Aurelius to Syme's Stylells. (4) Three 1-hour lectures per week. Social and religious change in the last centuries of the Roman Empire. Mr. Brown (F)

155B. The Strains of Empire. (4) Three 1-hour lectures per week. Decline and renewal in the Roman world from 200 to 850 A.D.

170A–170B–170C–170D–170E–170F–170G. Classical Archaeology. (4-4-4-4-4-4-4) Three 1-hour lectures and discussion sessions per week. Social and religious change in the last centuries of the Roman Empire. The latter parts may be taken before the earlier. Mr. Wightman (W)

170A. Greek Vase-Painting from 700 B.C. to Etruscan. Mr. Wightman (W)

170B. Greek Red-figured Vase Painting. Mr. Wightman (W)

170C. Greek Sculpture in the Sixth and Fifth Centuries B.C. Mr. Wightman (W)

170D. Greek Sculpture in the Fourth Century B.C. and Hellenistic Period. Mr. J. K. Anderson (F)

170E. Survey of Greek Architecture. Mr. Wightman (W)

175A–175B–175C–175D. Greek and Roman Cities and Sanctuaries. (4-4-4-4-4-4) Three 1-hour lectures per week. Mr. Wightman (W)

175A. Ancient Greek Sanctuaries. Mr. Miller (F)

175B. Topography and Monuments of Athens. Mr. Wightman (W)

175C. Topography and Monuments of Rome and Ancient Italy. Mr. Wightman (W)

175D. Topography and Monuments of Asia Minor. Mr. Wightman (W)

176A–176B. Ancient Greek and Roman Religion. (4) Three 1-hour lectures and discussion sessions per week. The work of the gods in ancient Greece and Rome; cults and religious practices. Mr. Wightman (W)

176A. Greece. Mr. Wightman (W)

176B. Rome. Mr. Wightman (W)

178. Mythology. (4) Two 1 1/2-hour class meetings per week. Prerequisite: course work in myth, religion, or ancient philosophy, or equivalent; basic knowledge of content and principal major Greek myths. Investigations into the significance of myth, based upon Greek mythology and selected Near-Eastern and Indo-European parallels. Mr. Wightman (W)

180. Ancient Athletics. (4) Three 1-hour meetings per week. Study of ancient athletics and athletics including athletic training, facilities, competitions, and the role of athletics in Greek and Roman society. Mr. Miller (F)
Greek

LOWER DIVISION COURSES

(Courses in this group are designated Greek 1, Greek 2, etc.)

1. Greek for Beginners. (6) Five 1-hour class meetings per week. First part of two-part course in elementary Greek. (W)

2. Greek for Beginners. (6) Five 1-hour class meetings per week. Second part of two-part course in elementary Greek.

1A–1B–1C. Greek for Beginners. (4–4–4) Three 1-hour class meetings per week. Three-part course in elementary Greek equivalent to Greek 1. Mr. Rabinowitz (F), Mr. Rabinowitz, Mr. Stroud (W), Mr. Rabinowitz (Sp)

40A–40B–40C. Intermediate Greek: Composition, Grammar, and Reading. (4–4–4) Three 1-hour class meetings per week. Prerequisite: courses 1-2 or 1A-1B-1C. Development of skills in writing of Attic prose and sight reading, review of grammar. (F, W, Sp)

UPPER DIVISION COURSES

100. Xenophon. Anabasis. (4) Three 1-hour class meetings per week. Prerequisite: courses 1-2 or 1A-1B. Mr. Bulloch (F)

101. Homer. (4) Three 1-hour class meetings per week. Prerequisite: course 100. Mr. Nagler (W)

102. Plato. (4) Three 1-hour class meetings per week. Prerequisite: course 100. Mr. Rabinowitz (W)

103. Drama: Euripides (4) Three 1-hour class meetings per week. Prerequisite: course 100. (Sp)

115. Senior Course in Greek Poetry. (4) Three 1-hour class meetings per week. Prerequisite: course 103.

• 115A. Aristophanes.
• 115B. Sophocles. Mr. Rosenmeyer (Sp)
• 115C. Aeschylus.
• 115D. Lyric Poets.

115E. Hellenistic Poets. Mr. Bulloch (W)

• 115F. Epic Poets.

115G. Euripides. Mr. Griffith (F)

120. Senior Course in Greek Prose Authors. (4) Three 1-hour class meetings per week. Prerequisite: course 103.

• 120A. Demosthenes.

• 120B. Herodotus.

120C. Thucydides. Mr. Stroud (F)

120D. Aristotle. Mr. Dillon (W)

120E. Plato’s Republic. (sp)

• 120F. Attic Orators.

• 125. The Greek New Testament. (4) Two 1 1/2-hour class meetings per week. Prerequisite: course 100. Readings in the gospels and epistles in Greek.

• 139B. Greek Political Institutions. (4) Three 1-hour lectures per week. Study of Greek texts which elucidate the development of Greek political institutions.

150A–150B. Advanced Greek Prose Composition. (4–4) Three 1-hour class meetings per week. Prerequisite: course 40B–40C–40D. Writing of a thesis, concentrating on outstanding periods such as the Carthaginian Revival and the twelfth century, with reference to the classical tradition and its influence.

LOWER DIVISION COURSES

178. Readings in Mythology. (1) One hour of laboratory per week. Prerequisite: course 100. Must be taken concurrently with course 178, for students prepared to read relevant texts in Greek. Mr. Nagler (F)

H195A–H195B–H195C. Honors Course in Greek. (3–3–3) Prerequisite: appropriate linguistic preparation and eligibility for admission to the honors program. Largely independent study over three quarters, terminating in the writing of a thesis, which will be evaluated by an Honors Committee of three members. The written thesis is to be submitted to all three members of the committee. Prerequisite: three lectures of upper division Greek prose per week. Credit and grade awarded upon completion of the sequence. Staff (F, W, Sp)

Greek

UPPER DIVISION COURSES

104. Vergil. (4) Three 1-hour class meetings per week. Prerequisite: course 10 or 20. (F, W, Sp)

Latin

LOWER DIVISION COURSES

(Courses in this group are designated Latin 1, 2, 20, 30, etc.)

1. Latin for Beginners. (4) Three 1-hour class meetings per week plus one additional hour every other week. (F, W, Sp)

2. Latin for Beginners. (4) Three 1-hour class meetings per week plus one additional hour every other week. Prerequisite: Latin 1 or equivalent. (F, W, Sp)

• 10. Latin Workshop. (12) Formerly 12. Intensive elementary instruction in Latin, the equivalent of Latin 1, 2 and 3 in two quarters. Staff (F, W, Sp)

101. Roman Political Institutions. (4) Three 1-hour class meetings per week. Prerequisite: course 107. Staff (F, W, Sp)

115F. Epic Poets. Mr. Johnson (Sp)

139B. Latin Political Institutions. (4) Three 1-hour class meetings per week. Prerequisite: course 107. Mr. Johnson (Sp)

145C. Elegaic Poets. Mr. Bulloch (F)

145D. Juvenal.

145E. Horace: Satires and Epistles.

145F. Epic Poets. Mr. Johnson (Sp)

150A. Sallust. Ms. Goldstine (Sp)

150B. Seneca. Mr. Johnson (W)

150C. Cicero.

150D. Tacitus.

150E. Livy.

150F. St. Augustine.

155A. Prudentius. (4) Three 1-hour class meetings per week. Prerequisite: course 107. Reading of Prudentius.

155B. Poets of the Myth of Rome. (4) Three 1-hour class meetings per week. Prerequisite: course 107. Reading of the poets of the myth of Rome.

155C. Ammianus Marcellinus. (4) Three 1-hour class meetings per week. Prerequisite: course 107. Reading of Ammianus Marcellinus.

160A–160B. Advanced Latin Prose Composition. (4–4) Formerly 160A–160B. Three 1-hour class meetings per week. Advanced instruction in the writing of Latin prose. Mr. Griffith (W); Mr. Griffith (Sp)

166. Latin Verse Composition. (4) Two 1 1/2-hour class meetings per week. Prerequisite: Latin 160. Advanced instruction in the writing of Latin verse in various meters.

177. Ovid, The Fasti. (4) Three 1-hour class meetings per week. Prerequisite: course 104 and 106. Combing reading in the Fasti with a study of Roman monuments, religion, calendar and astronomy, and history.

188. Sources for Roman History. (4) Three 1-hour class meetings per week. The reading of texts for which students in the graduate program in ancient history and archaeology are held responsible. Mr. J. K. Anderson (F)

H195A–H195B–H195C. Honors Course in Latin. (3–3–3) Prerequisite: appropriate linguistic preparation and eligibility for admission to the honors program. Largely independent study over three quarters, terminating in the writing of a thesis, which will be evaluated by an Honors Committee of three members. The written thesis is to be submitted to all three members of the committee no later than three weeks before the end of the final quarter, and the committee shall agree upon the level of Honors and grade no later than the Monday of examination week of the final quarter.

NOTE: For key to symbols, see page 36.
212. Greek Lyric Poets. (4) Two 1 1/2-hour class meetings per week.
   *212A. Earlier. Mr. Griffith (W)
   *212B. Later. Mr. Griffith (W)

213. Greek Dramatists. (4) Two 1 1/2-hour class meetings per week.
   *213A. Aeschylus. Mr. Rosenmeyer (F)
   *213B. Sophocles. Mr. Bulloch (W)
   *213C. Euripides. Mr. Bulloch (W)

213D. Aristophanes. Mr. Rosenmeyer (F)
213E. Menander. Mr. Bulloch (W)

*214. Greek Epigraphy. (4) Two 1 1/2-hour class meetings per week.

215. Greek Historians. (4) Two 1 1/2-hour class meetings per week.
   *215A. Herodotus. Mr. Stroud (Sp)
   *215C. Aristotle's Constitution of Athens.
   *215D. Polybius. Mr. Stroud (Sp)
   *215E. Plutarch.

215F. Xenophon. Mr. J. K. Anderson (W)

216. Greek Philosophers. (4) Two 1 1/2-hour class meetings per week.
   *216A. Plato. Mr. Dillon (F)
   *216B. Aristotle.
   216D. Post-Aristotelian Philosophy. Mr. Dillon (F)

*217. Greek Orators. (4) Two 1 1/2-hour class meetings per week.
   *218. Greek and Latin Romance. (4) Two 1 1/2-hour class meetings per week.
   *220. Hellenistic Poetry. (4) Three one-hour meetings per week. A study of the major writers of one of the most important periods in Greek literature (amongst whom Callimachus, Theocritus, Apollonius Rhodius, the Greek anthropologists).

221. Introduction to Papyrology. (4) Two 1 1/2-hour class meetings per week. An introduction to reading and editing Greek and Latin papyri, seeking to evoke an appreciation for the historical, legal, social, and literary contributions of papyrology to the knowledge of the classical world. Staff (Sp)

222. Greek and Latin Linguistics. (4) Two 1 1/2-hour class meetings per week.
   *222A. Greek Dialects.
   222B. Comparative Grammar. Mr. Threete (F)

230. Roman Dramatists. (4) Two 1 1/2-hour class meetings per week.
   *230A. Plautus. Mr. Johnson (F)
   *230B. Terence.
   *230C. Seneca.

231. Roman Epic Poets. (4) Two 1 1/2-hour class meetings per week.
   *231A. Lucretius.
   231B. Vergil.
   231C. Post-Vergilian. Mr. W. S. Anderson (Sp)

*232. Roman Philosophers and Rhetoricians. (4) Two 1 1/2-hour class meetings per week.

234. Roman Lyric Poets. (4) Two 1 1/2-hour class meetings per week.
   *234A. Catullus. Mr. Bulloch (W)
   *234B. Horace.

235. Roman Pastoral and Elegiac Poets. (4) Two 1 1/2-hour class meetings per week.
   *235A. Vergil.
   *235B. Tibullus, Propertius and Ovid.

236. Roman Satirists. (4) Two 1 1/2-hour class meetings per week.
   *236A. Horace.
   *236B. Persius and Juvenal.
   *236C. Petronius.

237. Roman Historians. (4) Two 1 1/2-hour class meetings per week.
   *237A. Sallust.
   *237B. Caesar.
   *237C. Livy.

237D. Tacitus. Mr. Rodgers (W)
   *237E. Suetonius.
   *237F. Pliny.

*240. Introduction to Latin Epigraphy. (4) Three hours per week. Prerequisite: Classics 200B. With emphasis on its philological and historical value.

245A–245B. Latin Literature of the Middle Ages. (4–4) One 2- to 3-hour class meeting per week.

245A. Latin Literature of the Early Middle Ages, 500-900 A.D. Special attention will be given to the classical tradition and its influence.

*245B. Latin Literature of the High Middle Ages, 900-1200 A.D. Study of the evolution of mediaeval style with special attention to lyrical and satirical poetry.

*246. Roman Society and Roman Law. (4) Two 1 1/2-hour class meetings per week. The social, legal, and administrative background to the literary sources for the Roman Empire.

*247. Roman Politics and Administration. (4) Two 1 1/2-hour class meetings per week. Select problems in Roman Imperial history from 69–235 A.D.

255. Topics in Late Antiquity and Byzantine Literature. (4) Two 1 1/2-hour class meetings per week. Investigation of a topic in late antique or Byzantine literature.

270A–270B–270C. Seminar in Classical Archaeology. (4–4–4) Two 1 1/2-hour class meetings per week. Advanced study of ancient Greek art objects and sites.

270A. Mr. Greenewalt (F)
270B. Mr. K. Anderson (W)
270C. Mr. J. K. Anderson (Sp)

271. Pan-Hellenism and Nearer. (4) One 3-hour meeting per week. In addition to providing an opportunity to study in detail the types of monuments, artifacts, dedications, etc., relevant to the Pan-Hellenic centers, the seminar will investigate the place and significance of the Pan-Hellenic festival in Greek society, especially as exemplified by the discoveries at Nemea.

289. Special Study. (2-8) Prerequisite: completion of qualifying examination for the Ph.D. degree. This course is normally reserved for students writing the doctoral dissertation. Staff (F, W, Sp)

299. Special Study. (1–5) Special individual study for qualified graduate students. Staff (F, W, Sp)

601. Individual Study for Master’s Candidates. (1–8) Individual study for comprehensive or language requirements in consultation with the field adviser. Units may not be used to meet either unit or residence requirements for a master's degree. Must be taken on a satisfactory/unsatisfactory basis. Staff (F, W, Sp)

602. Individual Study for Doctoral Candidates. (1–8) 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. Must be taken on a satisfactory/unsatisfactory basis. Staff (F, W, Sp)

RELATED COURSES IN OTHER DEPARTMENTS

For courses in Sanskrit see Department of South and Southeast Asian Studies.

Readings in Medieval Latin (English 210A–210B). (5–5)

Reading in Renaissance Latin (English 210C). (5)

Indo-European Comparative Linguistics (Linguistics 165). (4)

Advanced Indo-European Comparative Linguistics (Linguistics 244). (4)

Medieval Studies. Students who are interested in specializing in medieval studies should consult Medieval Studies in the Index of this catalog.
Comparative Literature

Department Office, 4401 Dwinelle Hall

Professors: Robert Alter, Ph.D. (Hebrew)
William S. Anderson, Ph.D. (Latin)
Civit Birch, Ph.D. (Chinese)
Louise D. DeWitt, Ph.D. (Italian)
John S. Goldberg, Ph.D. (English)
Phillip R. Damon, Ph.D. (African)
Joseph J. Duggan, Ph.D. (Italian)

Louise George Ctubb, Ph.D.
Joseph J. Duggan, Ph.D.
Paul M. Bertrand Augst, Ph.D.
Robert P. Hughes, Ph.D.
Florence Goldstine, Ph.D.
P. S. Diehl, Ph.D.
Elaine Hoover, Ph.D.

The undergraduate major in the Department of Comparative Literature aims and interests. (3) to acquire a broader sense of at least one other in areas immediately relevant to their fundamental approaches to literature and to encourage them to formulate their own critical standards. The to undertake a research project involving the comparison of the Department of Comparative Literature at their earliest opportunity.

The Graduate Program

The M.A. program normally prepares students for doctoral work at Berkeley or, when taken in conjunction with the appropriate teaching credential, leads to teaching at the high school or junior college level. The Ph.D. program is designed to introduce students to a variety of fundamental approaches to literature and to encourage them to formulate their own critical standards. The senior course (CL 180) is designed to permit students to apply the principles studied in the junior course and to undertake a research project involving the comparative examination of one author from each of the literatures which they studied separately in the preceding quarters. The specific requirements for the A.B. with a major in comparative literature are listed below.

The Major

Lower Division. There are no specific lower division requirements beyond completion of the Letters and Science reading and composition requirement and of sufficient work in at least one foreign language to qualify for admission to upper-division literature courses in that language. Two quarters from the Comparative Literature 41 series and two other literature courses are required but not limited. Students potentially interested in the A.B. with honors should note the requirement for upper-division work in both a vernacular foreign language and either classical Latin or classical Greek.

Upper Division. A minimum of 45 approved upper-division literature courses, including (1) CL 100 in the junior year and a section of CL 190 in the senior year, (2) at least four courses totaling not fewer than 16 units in one literature read in the original language and with emphasis on the classic works of that literature, (3) at least two courses totaling not fewer than 8 units in another literature read in the original language, and (4) at least two courses in upper division classical Greek and Latin in translation to be selected from the offerings of the Department of Classics, or one upper-division course in Greek (courses numbered 101 or higher) or Latin. Note that, although only two literatures (for example, English–French) are required for the A.B. degree, an adequately prepared student may find it advantageous to work in three literatures (for example, English–French–Latin). or Latin. Note that, although only two literatures (for example, English–French) are required for the A.B. degree, an adequately prepared student may find it advantageous to work in three literatures (for example, English–French–Latin).

Honors Program. Students who have attained junior status may be admitted to the honors program if (1) they have accumulated at least an overall 3.0 grade-point average and at least a 3.3 grade-point average in courses in the major, (2) have completed at least 16 upper division units in literature, including Comparative Literature 100 or the equivalent, and (3) are prepared to do upper division work in both one vernacular foreign language and either classical Greek or Latin before graduation. Attention is called to the special honors course (H196), which is designed to allow students who have completed H1A–H1B with distinction to prepare for honors throughout their entire undergraduate career. In addition to the requirements for the regular program outlined above, candidates for the A.B. with honors in Comparative Literature must (1) accumulate at least a 3.8 grade-point average in the junior year and all courses completed in the University by the time of their graduation, (2) do upper division work in both a vernacular foreign language and either classical Latin or classical Greek including two courses beyond CL 100, (3) demonstrate, through either examination or course work, a sense of the historical development of their principal literature, (4) earn a grade of B or higher for the writing of an honors thesis in Comparative Literature. Students interested in the honors program are urged to consult an adviser in the Department of Comparative Literature at their earliest opportunity.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

The Graduate Program

The M.A. program normally prepares students for doctoral work at Berkeley or, when taken in conjunction with the appropriate teaching credential, leads to teaching at the high school or junior college level. The Ph.D. program is designed to introduce students to a variety of fundamental approaches to literature and to encourage them to formulate their own critical standards. The senior course (CL 180) is designed to permit students to apply the principles studied in the junior course and to undertake a research project involving the comparative examination of one author from each of the literatures which they studied separately in the preceding quarters. The specific requirements for the A.B. with a major in comparative literature are listed below.

Requirements for the Ph.D. Degree. While only one graduate seminar is formally required beyond the M.A., students have the responsibility of preparing themselves, through course work and reading, for the written and oral doctoral qualifying examination on (1) the development of one literature with heavy emphasis on one period of specialization or one major genre and (2) two additional literatures in only one period each. After consultation with the adviser, students may request to be examined only on two literatures if the examination covers the development of both in addition to the period or periods of specialization. In either case, the second examination, which is limited to the period or periods of specialization, and all the texts presented must have been read in their original linguistic form. The doctoral qualifying examination may not be taken until all four foreign-language reading requirements have been satisfied. There is a final oral examination on the dissertation and its immediate area.

LOWER DIVISION COURSES

1A–1B. English Composition in Connection with the Reading of World Literature. (4-4) Three 1-hour lectures and discussion periods and one tutorial meeting per week. Prerequisite: one (a) Subject A examination or course, 1A or equivalent course is prerequisite to 1B. Expository writing based on analysis of selected masterpieces of ancient and modern literature.

H1A–H1B. English Composition in Connection with the Reading of World Literature: Honors Section. (4–4) Three 1-hour lectures and discussion periods and one tutorial meeting per week. Prerequisite: one (a) Subject A examination or course, 1A or equivalent course is prerequisite to 1B. Expository writing based on analysis of selected masterpieces of ancient and modern literature.

1A–2B–2C. Composition in Connection with the Reading of World and French Literature. (5–5–5) Three 1 1/2-hour lectures per week. Prerequisite: one (a) Subject A examination or course, 1A or equivalent course is prerequisite to 1B. Expository writing based on analysis of selected masterpieces of ancient and modern literature and study of selected French texts read in the original language.

Group I: Unrestricted Courses

(Open to all students in the upper division; enrollment not limited.)

120. The Biblical Tradition in Western Literature. (4) Three 1-hour lectures per week. Examination of selected aspects of the Bible and their relevance to the study of later literature. Mr. Cooledge (F).

125. The Mystical Tradition in Literature. (4) Two 1 1/2-hour lectures and one 1-hour meeting per week. A survey of the major concepts in the philosophy of

NOTE: For key to symbols, see page 36.
mysticism and their expression in literary form. Examples of many genres drawn from at least one Western and one Eastern tradition, with emphasis on key problems such as love and sex, social justice and individual fulfillment. Mr. Nagler (W)

114A*—114SB. Byzantine Literature. (4—4) Three 1-hour lectures and discussion periods per week. Survey of the major literary genres. 145A: early Byzantine literature from the fourth to the ninth century. 145B: later Byzantine literature from the mid-ninth to the fifteenth century. The Period Courses, 151—155 Prerequisite: upper division standing or permission of the instructor: In addition, graduate students in Comparative Literature wishing to enroll in one of these courses must know at least one foreign language relevant to the primary materials studied therein. Lectures and discussion in relation to one period of literary history in related literatures.

151A*—151B—151C. The Ancient Mediterranean World. (4—4—4) Three 1-hour lectures and discussion periods per week. Mr. Alter, Mr. Rosenmeyer (Sp)

152A*—152B—152C. The Middle Ages. (4—4—4) Three 1-hour lectures and discussion periods per week. Mr. Alter, Mr. Rosenmeyer (Sp)

153A—153B—153C. The Renaissance. (4—4—4) Three 1-hour lectures and discussion periods per week. Miss Hoover (F), Mr. Larson (W)

154A*—154B—154C. Enlightenment and Romanticism. (4—4—4) Three 1-hour lectures and discussion periods per week. Mr. Johnson (Sp)

155A—155B—155C. The Modern Period. (4—4—4) Three 1-hour lectures and discussion periods per week. Mr. Johannesson (F); Mr. Bernstein (W)

159A—159B. Modern Literature and the Arts. (4—4) Three 1-hour lecture and discussion and three 1-hour laboratory periods per week. Prerequisite: at least four quarters of upper division literature and at least two quarters in lower division literature. Comparative investigation of the interrelationships between modern and classical art and of works of literature. Emphasis on principles of literary comparison and analysis. Miss Masiello (Sp)

160. Western Literary Crosscurrents in Twentieth Century China. (4) Three 1-hour lectures per week. The impact of western literature on modern China and China’s response in literary, theory, movements, and creation. When not given see Oriental Languages 206. Mr. Birch

165. Myth and Literature. (4) Two 1 1/2-hour lectures and discussion periods per week. Study of early Greek and Semitic creation myths and the progressive development of literature out of this which has continued to the present day. Mr. and Mrs. Nagler. Preparation and writing of an honors thesis is required. Mr. Nagler

170. Milton in the European Tradition. (4) Three 1-hour lectures and discussion periods per week. Milton’s work studied in the context of classical and Christian tradition. Mr. Coolidge (Sp)

180. Manirerism in Art and Literature. (4) Two 1 1/2-hour lectures and discussion periods per week. The phenomenon of manirerism, both as a literary and artistic constant as well as an historical developmental period, will be studied from the point of view of its origins drawn from the art and literature of Italy, France, and Germany. An attempt will be made to define and illustrate modern manirerist structures. Mr. Spahr (W)

185. Women’s Perspective in Literature. (4) Three one-hour lectures plus one hour of discussion (to be arranged) per week. Comparative study of women writers or the portrayal of women in the literature of various national cultures. Topics vary from year to year. May be repeated for credit with consent of instructor. Mr. Alter, Mrs. Clubb, Mrs. Goldstone

Group II: Restricted Courses

(Designated primarily for students whose major subject is Comparative Literature; sections limited to fifteen students each.)

100. Introduction to Comparative Literature. (4) Three 1-hour lectures and one tutorial meeting per week. Prerequisite: one upper-division literature course in a foreign language or consent of the instructor. Selection of critical and literary texts from classical antiquity to the present, roots in English and one foreign language. Emphasis on principles of literary comparison and analysis. The Staff (F, W, Sp)

112A—112B. Introduction to Modern Greek. (5—5) Three 1 1/2-hour metting per week. Prerequisite: two years of classical Greek at college, including a course on Homer and a course either on Plato or a dramatist. Modern Greek pronunciation, morphology, and syntax studied in comparison with Attic Greek; reading of selections of progressive length and complexity. (W, Sp)

The Senior Courses

190A. Comparison of Authors: English, French, German. (4) Three 1-hour lectures and discussion periods per week. Prerequisite: course 100 or equivalent, and at least four quarters in upper division literature, including at least one quarter in French or German. Comparison of three important authors, English, French, German; one foreign author must be read in the original language; examination and substantial comparative paper required. Mr. Weisinger (F)

190B. Comparison of Authors: English, French, Latin. (4) Three 1-hour lectures and discussion periods per week. Prerequisite: course 100 or equivalent, and at least four quarters in upper division literature, including at least one quarter in French or Spanish. Comparison of three important authors, English, French, Spanish; one foreign author must be read in the original language; examination and substantial comparative paper required. Mr. Johnson (Sp)

190C. Comparison of Authors: English, French, Spanish. (4) Three 1-hour lectures and discussion periods per week. Prerequisite: course 100 or equivalent, and at least four quarters in upper division literature, including at least one quarter in Spanish or Italian. Comparison of three important authors, English, French, Italian; one foreign author must be read in the original language; examination and substantial comparative paper required. Mr. Johnson (Sp)

*190D. Comparison of Authors: English, Spanish, Italian. (4) Three 1-hour lectures and discussion periods per week. Prerequisite: course 100 or equivalent, and at least four quarters in upper division literature, including at least one quarter in Spanish or Italian. Comparison of three important authors, English, Spanish, Italian; one foreign author must be read in the original language; examination and substantial comparative paper required. Mr. Johnson (Sp)

190E. Comparison of Authors: English, Latin, Greek. (4) Three 1-hour lectures and discussion periods per week. Prerequisite: course 100 or equivalent, and at least four quarters in upper division literature, including at least one quarter in Latin or Greek. Comparison of three important authors, English, Latin, Greek; one foreign author must be read in the original language; examination and substantial comparative paper required. Mr. Johnson (Sp)

190U. Comparison of Authors: Unlisted Literatures. (4) Individual conferences to be arranged. Prerequisite: one upper-division literature course in each of two or three important authors, including at least one belonging to a literature unlisted in the other 190 courses. The works belonging to the literatures unlisted in the other 190 courses must be read in the original languages. Substantial comparative paper required. The Staff (Miss Richardson in charge) (F, W, Sp)

*1911—191F. Literary Methodology/Comparison of Authors. (4) Three 1-hour lectures and one hour of lab per week. Prerequisite: reading knowledge of one of the following: Hebrew, Latin, Italian, or French and knowledge of classical and medieval literatures; course 100 and completion of the sequence. Two quarter combination of CL 100 and CL 190, introduction to comparative methodology and practice of literary comparison and analysis of narration and evolution of the idea of the hero examined in the Old Testament, Ovid, Tasso, Fielding, and Laclos. Mr. Alter, Mrs. Clubb, Mrs. Goldstone

Tutorial Courses

H196. Special Honors. (1) Prerequisite: course H1A—H1B with a grade of B or higher, and permission of the instructor in charge of the course. One-hour tutorial per week. Weekly tutorial meetings including oral and written reports on a reading list designed to lead to the writing of an honors thesis in Comparative Literature H196. May be repeated each quarter until the senior year.

The Staff (Mr. Larson in charge) (F, W, Sp)

H198. Honors Course. (1—4) Prerequisite: honors standing, 12 units in upper division literature courses including course 100 or the equivalent, and a knowledge of vernacular foreign language or Latin. Preparation and writing of an honors thesis under the supervision of a member of the faculty. Mr. Larson (W)

198. Directed Group Study for Upper Division Students. (1—4) One to four hours lecture per week. Tutorial instruction in areas not covered by regularly scheduled course work. The Staff (Mr. Larson in charge) (F, W, Sp)

199. Supervised Independent Study and Research. (1—5) Enrollment is restricted to regulations stated on page 36. Must be taken on a passed/not passed basis. The Staff (Mr. Larson in charge) (F, W, Sp)

GRADUATE COURSES

Introductory Graduate Courses

200. Methods of Study in Comparative Literature. (4) Three 1-hour lectures and discussion periods per week. Prerequisite: admission to graduate standing in Comparative Literature. Required of all candidates for the M.A. degree, normally taken during the first year of residence. Lectures on such general topics as bibliography, comparative methods of study, and the scope and direction of comparative literary studies in the U.S. and abroad. Readings and discussions on representative novels, plays, and poems, and major critical treatments of each. The Staff (W, Sp)

202A—202B. Approaches to Epic Poetry. (4) Two 1 1/2-hour lectures and discussion periods per week. Prerequisite: admission to graduate standing in Comparative Literature; advanced undergraduates may be admitted with consent of instructor. Application of the methods of Comparative Literature to the study of epic poetry. Mr. Dieth (W)

202C. Approaches to the Novel. (4) Two 1 1/2-hour lectures and discussion periods per week. Prerequisite: admission to graduate standing in Comparative Literature; advanced undergraduates may be admitted with consent of instructor. Application of the methods of Comparative Literature to the study of the novel. Mr. Dieth (W)

202D. Approaches to Dramatic Literature. (4) Two 1 1/2-hour lectures and discussion periods per week. Prerequisite: admission to graduate standing in Comparative Literature; advanced undergraduates may be admitted with consent of instructor. Application of the methods of Comparative Literature to the study of dramatic literature. Mr. Rosenmeyer (F)

Graduate Seminars

204A*—204B. Studies in Relations Between Classical and Modern Literatures. (4—4) One 3-hour lecture and discussion period per week. Prerequisite: preparation in two foreign languages, at least one of which must be other than English; course 100 or the equivalent, and permission of the instructor in charge of the course. Comparative investigation of a topic in Western literature involving the study of classical and postclassical literatures. May be repeated for credit with consent of instructor. Mr. Anderson (F)

210A—210B. Studies in Medieval Literature. (4—4) One 3-hour lecture and discussion period per week. Prerequisite: preparation in two foreign languages. 210A is not prerequisite to 210B. Comparative investigation of a topic in Western literature in the medieval century and the fourteenth. Mr. Duggan (W); Mr. Damon (Sp)

215A—215B. Studies in Renaissance Literature. (4—4) One 3-hour lecture and discussion period per week. Prerequisite: preparation in two foreign languages. 215A is not prerequisite to 215B. Comparative investigation of a topic in Western literature in the Renaissance period. Mrs. Clubb (F)

220A—220B. Studies in Neoclassical Literature. (4—4) One 3-hour lecture and discussion period per week. Prerequisite: preparation in two foreign languages. 220A is not prerequisite to 220B. Comparative investigation of a topic in Western literature between
the end of the Renaissance and the beginning of the
nineteenth century.
Mr. Larson (Sp)
225A-**225B. Studies in Symbolist and Modern
Literature. (4-4) One 3-hour lecture and discussion
period per week. Prerequisite: preparation in two
foreign languages. 225B is not prerequisite to 225A.
Comparative investigation of a topic in Western litera-
ture between the end of the Neoclassical period and
the beginning of the contemporary period.
Mr. Bernstein (F)
**230A-**230B. Studies in Oriental-Western Lit-
erary Relations. (4-4) One 3-hour lecture and discus-
sion period per week. Prerequisite: preparation in an
Oriental and one other language. 230A is not
prerequisite to 230B. Comparative investigation of a
literary topic requiring the study of both Oriental and
Western documents. Topics and texts will vary from
year to year. May be repeated for credit.
231A-**231B. Studies in Relations Between Near
Eastern and Western Literatures. (4-4) One 3-hour
lecture and discussion period per week. Prerequisite:
preparation in one Near Eastern or European language.
Undergraduates may be admitted upon consent of the
instructor. 231A is not prerequisite to 231B. Compara-
tive investigation of a literary topic requiring the investi-
gation of both Near Eastern and Western documents.
Since topics and texts vary from year to year, the
course may be repeated for credit.
(F)
**235A-**235B. The Experience of Tragedy. (4-
4) One 3-hour lecture and discussion period per week.
Prerequisite: preparation in 245A or 245B. Study of the
sense of the tragic in Greek, Elizabethan, and 20th century
literature. Focus on the philosophical beliefs underlying
the concept of the tragic vision, from Aristotle to
Hegel, Nietzsche, and to the existentialist and sociological
schools.
*240A-**240B-**240C. Problems in Compara-
tive Literature. (4-4-4) One 3-hour lecture and dis-
cussion period per week. Prerequisite: preparation in
two foreign languages. Investigation of a problem in the
compartmental study of literature.
Mr. Alter
245A-245B, Studies in Contemporary Litera-
ture. (4-4) One 3-hour lecture and discussion period
per week. Prerequisite: preparation in two foreign lan-
guages. 245A is not prerequisite to 245B. Comparative
investigation of a topic in contemporary Western litera-
ture. Mr. Augst (W)
250A-250B. Studies in Critical Theory. (4-
4) One 3-hour lecture and discussion period per week.
Prerequisite: preparation in two foreign lan-
guages. 250A is not prerequisite to 250B. Comparative
investigation of a topic in the theory of literary criticism.
(F), (Mr. Johannesson (Sp)
**255A-**255B-**255C. Comparative Byzantine
Studies. (4-4-4) One 3-hour lecture and discussion
period per week. Prerequisite: preparation in Greek and
one other foreign language. Comparative investiga-
tion of a topic in Byzantine literature. When the
course is offered outside of winter quarter, it will count
for a full quarter, i.e., a 3 unit course, and grade will be
assigned upon completion of sequence.
270-274. Continuing Seminars. (2) One 2-hour
meetings a week for six weeks. Prerequisite: admission
by those students who have received the M.A. and are studying for their
qualifying examinations in Comparative Literature. Dis-
cussions to focus on specific problems of the literature
of the period. Must be taken on a satisfactory/unsat-
sactory basis.
270. Classical World
271. Medieval Period.
272. Renaissance
273. Enlightenment and Romanticism.
274. Modern Period.
The Staff (F, W, Sp)

Computer Science

Computer Science Division Office, 573 Evans Hall

Choice of College

Undergraduates who wish to major in computer science may do so either through the College of Letters and Science (department of the College of Engineering (B.S. degree). Details of the computer science and engineering program in the Department of Electrical Engineering and Computer Sciences may be found in the Engineering section of the Catalog.

Computer Science Major in the College of Letters and Science

Major Advisers: Ms. Graham, Mr. Mont-Reynaud

The major in computer science offers the undergrad-
uate a background in software, computer architecture,
and theoretical computer science suitable either for
employment or for further study in computer science.

Any student in the College of Letters and Science who
(1) has a grade-point average of at least 2.0, (2) has completed 90 units, and (3) has passed all lower divi-
sion requirements (see below). An increasing number of students are coming to Berke-
ley with junior standing. While the College of Letters
and Science requires them to declare a major during
their first quarter, those wishing to major in computer
science may need at least two quarters to fulfill condi-
tion (3) above. To ease the situation of such students,
the College will accept an Intent to Major form, avail-
able in the Computer Science Office, provided that the
student makes maximum progress toward fulfilling (3)
and formally declaring a major in computer science.

Requirements for the Major

602. Individual Study for Doctoral Students. (1-9)

Individual study in consultation with the major field ad-
viser, intended to provide opportunity for qualified stu-
dents to prepare themselves for the various require-
ments initiated for candidates for the Ph.D. May not be
used for unit or residence requirements for the doctoral
degree. Must be taken on a satisfactory/unsatisfactory
basis.

The Staff (F, W, Sp)

603. Individual Study for Master's Students. (1-8)

Individual study for the comprehensive or language
requirements in consultation with the field adviser.
Units may not be used to meet either unit or residence
requirements for a master's degree. Must be taken on a
satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

604. Individual Study for Undergraduate Students. (1-8)

Individual study for the comprehensive or language
requirements in consultation with the field adviser.
Units may not be used to meet either unit or residence
requirements for an undergraduate degree. Must be taken on a
satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

605. Individual Study for Graduate Students. (1-8)

Individual study for the comprehensive or language
requirements in consultation with the field adviser.
Units may not be used to meet either unit or residence
requirements for a graduate degree. Must be taken on a
satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

606. Individual Study for Advanced Undergraduates. (2-5)

Individual study for advanced undergraduate course
work.

The Staff (F, W, Sp)

607. Individual Study for Advanced Graduate Students. (2-5)

Individual study for advanced graduate course
work.

The Staff (F, W, Sp)

608. Individual Study for PhD Students. (2-5)

Individual study for advanced graduate course
work.

The Staff (F, W, Sp)

609. Individual Study for Research Students. (1-5)

Individual study for research purposes.

The Staff (F, W, Sp)

Graduate Program

Graduate degree programs are available as prepara-
tory work for a research and academic (Master of Science and
Doctor of Philosophy in Computer Science and Engineering) and for careers in design, development and
management (Master of Engineering and Doctor of Engi-
neering). For details on graduate programs and pro-
cedures see the Engineering section of this catalog.

Computer Science Courses

Computer Science course descriptions can be found under Electrical Engineering and Computer Sciences.

1. Introduction to Programming for Engineering and
Physical Sciences. (4)
15. Self-Paced Introduction to Programming for
Engineering and Physical Sciences. (1-4)
2. The Art and Science of Computing. (2)
3. Introduction to Programming (H198).
35. Self-Paced Introduction to Programming. (1-4)
40. Programming Style. (3)
41. Machine Structures. (4)
95. Topics in Computer Science. (1)
99. Individual Study and Research for
Undergraduates. (1-2)
101. Introduction to Computing for Engineering and
Physical Sciences. (4)
103. Self-Paced Introduction to Computing for
Engineering and Physical Sciences. (1-4)
103. Introduction to Computing. (4)
105. Self-Paced Introduction to Computing. (1-4)
107. System Architecture. (3)
111. System Simulation. (3)
118. Introduction to Theoretical Computer Science. (3)
121. Introduction to Information Processing. (3)
149. Information Processing Techniques and Natural
Language Understanding. (3)
150. Logic Design and Components of
Digital Systems. (4)
1505. Electronic Logic Circuits. (1)
151A. Computer Memory and Storage Devices. (4)
151B. Input-Output Devices and Microprocessors. (4)
152A. Introduction to Computer Organization and
Design. (4)
152B. Computer Organization. (3)
153. Data Structures. (4)
154. Programming Languages and Compilers. (4)
163. Finite State Machines and Context Free
Languages. (3)
164. Models of Computation. (3)
167. Graph Theory. (3)
169. Introduction to Combinatorics. (3)
171. Introduction to Computational Algorithms. (3)
198. Directed Group Studies for Advanced
Undergraduates. (2-5)

H198. Special Topics in Computer Science for Honor
Undergraduates. (3)

NOTE: For key to symbols, see page 36.
Development Studies

Group Major Office, Institute of International Studies, 209 Moses Hall

Major Advisers: Mr. Jyotirindra Das Gupta (Political Science), Head Adviser, Mr. P. K. Berdhan (Economics); Mr. Alfredo Gallegos-Estrada (Political Science); Mr. John J. Gumpertz (Anthropology); Mr. Elbakian Hamsi (Sociology); Mr. Lovell Jarvis (Economics); Mr. David Leonard (Political Science); Mr. Thomas R. Metcalf (History); Mr. Robert R. Reed (Geography); Mr. Carl G. Rosengberg (Director, IS).

Group Major in Development Studies

The program in development studies offers an opportunity for a systematic study of the problems, processes and prospects of the development of human and material resources in the developing areas of the world. The problems of development are urgent, massive, and enormously complex, and they transcend the boundaries of conventional academic disciplines. To study development problems adequately requires an analysis which draws upon and integrates disciplines and includes a balanced understanding of historical and contemporary perspectives. The study of development as social transformation further necessitates a blending of knowledge and skills from political science, economics, sociology, psychology, anthropology, geography, history, and the resource and environmental sciences.

Through the program in development studies, a coordinated and comprehensive plan for interdisciplinary study of political, economic, and social development issues can be devised by setting up a schedule of relevant courses from the various academic departments and programs on the Berkeley campus. The courses available are listed and described briefly in a brochure available at the Group Major Office. From the rich variety of offerings within and across departments, there is a wide range of potential programs of study to suit the interests of students within terms of appropriately selected criteria. Students are aided in combining courses in a systematic way by members of the faculty committee, consisting of representatives from several academic departments, and, on a more regular basis, by the major adviser, also a member of the faculty committee. The program is under the supervision of the interdepartmental committee of faculty members organized through the Institute of International Studies.

Students participating in the program follow a plan of study organized as an interdisciplinary group major leading to a Bachelor of Arts degree in development studies. They are required to take courses in two or more disciplines and to pursue detailed study of at least one specific area. In the procedural aspects of organizing an undergraduate plan of study, students in the program are assisted by the staff in the Group Major Office, participating faculty members, the students' faculty adviser, and teaching associates working in the program.

Lower Division Courses

Anthropology 3; Political Science 2; Economics 1.

Recommended Courses: Sociology 1A–1B; Conservation and Resource Studies 23; Geography 4, 18; Environmental Design 4; Sociology 20; Statistics 2.

Upper Division Courses

A total of 46 units of upper division (1) core courses, (2) research methods, and (3) area courses are required.

Core Courses: Twenty-three (23) units in two or more disciplines: Sociology 100, 135; Economics 171, 172; Political Science 140A, 140C; Geography 111, 130, 131; Anthropology 144; Conservation and Resource Studies 161; Political Economy of Natural Resources 100A–100B; Public Policy 184; City and Regional Planning 110.

Research Methods. Ten (10) units: Sociology 105A–105B; Political Science 131A–131B or 132A–132B; Anthropology 167A–167B, 190A–190B; History 101A–101B; Economics 141. Note: Those students wishing to complete the research methods in the Department of Economics must also take Economics 100A–100B and Statistics 2 before enrolling in Economics 141, thus in effect turning the research methods requirement into a 20-unit series. Note: Anthropology 167A or 167B is prerequisite to Anthropology 190A–190B. Anthropology 190A–190B must be taken concurrently with Anthropology 190A–190B.

Area Courses. Fifteen (15) units. These are to be selected with the approval of the major adviser. For the entire course list and descriptions, please obtain a development studies brochure available in the Group Major Office. (Students will be encouraged to take area courses in more than one discipline. Related language training will be recommended but not required.)

A maximum of three courses or 15 upper division units outside the College of Letters and Science may be included in the major, e.g., courses in Forestry, Visual Design, Entomology, Genetics, Engineering, Journalism, Social Welfare, Public Health, City and Regional Planning.

Honors Program. Admission to the honors program is contingent upon the student's attaining senior standing with a grade-point average of 3.3 or higher both in the group major and for all work undertaken in the University. In addition to completing the normal requirements for the major, the honors student is required to write a thesis on research performed in Development Studies H195. The thesis will be reviewed by a member of the faculty committee and approved by a selected group from the same committee.

COURSE

H195. Honors in Development Studies. (5) Prerequisite: Senior standing with a grade-point average of 3.3 or higher both in the group major and for all work completed at the University. The honors student is required to write a thesis on research performed in the H195 course. The thesis will be reviewed by a member of the faculty committee and approved by a selected group of the same committee.

Dramatic Art

Department Office, 101 Dwinelle Annex


Associate Professors: George S. House, Ph.D. Dunbar H. Ogden, II, Ph.D.

Assistant Professor: Marc A. Roth, Ph.D.

Lecturers: George Ulrich, B.A. Mami Wood, B.A.

The Majors

Dramatic Art


Upper Division. Forty-five units of upper division courses in the Department of Dramatic Art including 120, 121, 129 and 10 units chosen from courses 122, 123A, 123B, 124, 125, 126, 127, 151A, 151B, 151C; at least 2 and not more than 5 units of 170, 171, or 190. See also Tryout Regulations, below.

Dramatic Art—Dance

(Students are required to take a dance technique course each quarter.)


Upper Division. Forty-five units of upper division courses in the Department of Dramatic Art including 121, 141A–141B–141C, 142A–142B–142C, 143A–143B–143C, 144A–144B, 145, 146A, 150A–150B, five units chosen from courses 122, 123A, 123B, 124, 125, 126, 127, 151A, 151B, 151C; at least 2 and not more than 5 units of 170, 171 or 190. See also Tryout Regulations, below.

Honors Programs. Majors in the Department of Dramatic Art with an overall grade-point average of 3.3 in the University and in the major may, with the approval of the Department, apply for admission to the honors program. Application should be made through a departmental major adviser not later than the end of the student's junior year. Students accepted in the honors program will include in their programs course H195A, intensive critical study of problems of dramatic literature, acting, playwriting, directing, or designing; and H195B, development of studies begun in H195A, either under circumstances of actual theatrical production or as a senior thesis.

No course in Dramatic Art offered in satisfaction of undergraduate major requirements may be taken on a pass/fail basis except Dramatic Art 40A–40B–40C, 141A–141B–141C, 142A–142B–142C, 143A–143B–143C, 170, 171, and 190.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Graduate Programs

Preparation for Graduate Study. The background of a student undertaking work toward an advanced degree should approximate that of an undergraduate major student 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 for two or three quarter sessions limited to 20 students. Students in limited status in the College of Letters and Science, or for course work in the Graduate Division. In some instances a one-year course of study for a second bachelor’s degree may be in order.

Advising and Evaluation of Student Program. Graduate students will be assigned to a team of two instructors or advisers, with whom they will develop their program from year to year. In addition to the regular comments of their instructors and advisers, students will receive at regular intervals, made by the entire departmental staff, of their general progress toward their degree and objectives. The intention of these evaluations is to ensure, insofar as such assurance is possible, that students are working at maximum capacity toward a professional goal.

Requirements for the M.A. Degree. Students enrolled in the graduate program in Dramatic Art are generally assumed to be training as stage directors and working toward the Ph.D. degree. They will become eligible for the M.A. degree upon completion of the Ph.D. qualifying examination. In exceptional cases, students interested in acting, design, playwriting, and dance may be accepted for work toward the M.A. degree. Admission is at the discretion of the department, including, in the cases of actors and dancers, an audition, and in the cases of designers and playwrights, submission of portfolios of designs or manuscripts of original work.

Requirements for the Ph.D. Degree. Graduate study including graduate and upper division work in the Department is limited to 45 units. Students are required to complete the following: During the first year, the year-long course in Directing (226-220-220); one of the twenty-week seminars, (222A-222B, 223A-223B, 224A-224B, 225A-225B); the seminar in Critical Approaches to Theatre (226); fulfillment of the performance requirement, including six credits of performance in either French or German. During the second year, performance work as assigned; two 2-unit courses of Directed Group Study (286), and the M.A. Comprehensive Examination.

Requirements for the Ph.D. Degree. Graduate study including graduate and upper division work in the Department is limited to 45 units. Students are required to complete the following: During the first year, the year-long course in Directing (226-220-220); one of the twenty-week seminars, (222A-222B, 223A-223B, 224A-224B, 225A-225B); the seminar in Critical Approaches to Theatre (226); fulfillment of the performance requirement; and a language examination in either French or German. During the second year, the year-long course in Directed Group Study (226-220-220); two 5-unit courses in Directed Group Study (286); the seminar in Theatre Research (227); fulfillment of the performance requirement; and the second language examination. During the third year, course work as developed in conference with advisers; the Ph.D. Written Preliminary Examination; the Ph.D. Oral Qualifying Examination. During the fourth year, completion of the Ph.D. dissertation.

For further details on the requirements for advanced degrees, consult the Graduate Division section of this catalog, and the department office in 101 Dwinelle Annex.

The University Theatre

Under the direction of the Department of Dramatic Art, the University Theatre offers a major and workshop series of play productions, extending into the laboratory of stage practice, the theories of dramatic literature, criticism, and production as studied in the departmental curriculum. These programs are selected to present to the University community distinguished dramas of various periods and cultures. Participation is open to all registered students, majors and nonmajors, interested in acting, design, or stagecraft.

The University Dance Theatre presents an annual concert of works choreographed by the faculty and performed by the students. Student works are presented at quarterly choreographic workshops. The Bay Area Repertory Dance Company, an in-residence dance group, gives concerts and demonstrations throughout the year in schools and community centers on the West Coast. Unit credit may be earned for work in drama and dance production.

The Faculty

For further information inquire at the office of the Department of Dramatic Art.

Tryout Regulations

General Tryouts for faculty-directed productions, and for student-directed productions under course 293 and course 295 (when scheduled) are held each quarter. All student-directed productions are required to try out at the General Tryouts in the fall quarter and if cast, to perform in a given production. Those not cast in the fall are required to participate in subsequently scheduled General Tryouts during the academic year and to perform if cast. Special Tryouts for a student-directed production under courses 293 and 295 are scheduled at intervals throughout the academic year and are announced on the department bulletin boards. In addition to attending General Tryouts, students enrolled in an acting class, with the exception of course 10, are required each quarter to attend until cast all Special Tryouts and to perform if cast.

Dramatic Art

LOWER DIVISION COURSES

10. Introduction to Acting. (5) Five 1-hour sessions per week.

Team Teaching: Ms. Evans, Mr. Berman, Ms. Sussel (F)

11A–11B. Beginning Scene Study and Voice Work. (5–5) Five 1 1/2-hour sessions per week.

Prerequisite: consent of instructor. Courses to be taken consecutively, beginning winter quarter. Consent of instructor. Courses to be taken consecutively, beginning fall quarter. Readings and conversation in connection with the study of dramatic literature.

*39. Introduction to Playwriting. (5) Three 1 1/2-hour sessions per week.

Prerequisite: Subject A, examination or course. Course 25A is prerequisite to 25B. Courses to be taken consecutively, beginning fall quarter. Readings and conversation in connection with the study of dramatic literature.

Dramatic Art-Dance

Students intending to complete the major in Dramatic Art-Dance and students proposing to include dance as part of a multi-subject major must consult with Mr. Wood prior to enrollment.

UPPER DIVISION COURSES

Acting

110A–110B–110C. Intermediate Acting. (3–3–3) Two 4-hour sessions per week.

Prerequisite: course 10 with a grade of B or better and consent of instructor. Must be taken concurrently with 112A–112B–112C. Courses to be taken consecutively, beginning fall quarter. May be repeated for credit; however, repeated units may not be used to fulfill major requirements.

Team Teaching: Ms. Evans, Mr. Berman, Ms. Sussel (W, Sp)

111A–111B–111C. Advanced Acting. (5–5–5) Two 4-hour sessions per week.

Prerequisite: two years of undergraduate work in acting instruction or equivalent, including voice and speech training, and consent of instructor. Courses to be taken consecutively, beginning fall quarter. May be repeated for credit; however, repeated units may not be used to fulfill major requirements.

Mr. Berman (F), Ms. Sussel (W), Ms. Evans (Sp)

LITERATURE

120. Dramatic Theory. (5) Five 1-hour lectures per week.

Prerequisite: junior standing or successful completion of Dramatic Art 226C and consent of instructor. A critical study of the dramatic event in the light of basic theatrical concepts and documents.

Mr. Bogard (F)

121. Survey of Dramatic Literature. (Formerly 226C) Five 1-hour lectures per week.

Prerequisite: completion of 225A–225B or the equivalent. Examination of selected major works of dramatic literature from Ancient Greece through the present.

*122. Dramatic Literature of Western Civilization: The Ancient Greek and Roman Drama. (5) Five 1-hour lectures per week.

123A–123B. Dramatic Literature of Western Civilization: British Drama to 1700. (5) Five 1-hour lectures per week.

123C. Medieval Drama to 1600. Mr. Bogard (W)

123B. The Seventeenth Century Drama. Mr. Bogard (Sp)

*124. Dramatic Literature of Western Civilization: Continental Drama, 1500–1700. (5) Five 1-hour lectures per week.

125. Dramatic Literature of Western Civilization: European Drama, 1700–1850. (5) Five 1-hour lectures per week.

126. Dramatic Literature of Western Civilization: European Drama, 1850–1918. (5) Five 1-hour lectures per week. Mr. Rosenberg (W)

127. Dramatic Literature of Western Civilization: European and American Drama, 1918 to Present. (5) Five 1-hour lectures per week. Mr. Rosenberg (Sp)

129. Senior Proseminar. (5) Five 1-hour lectures per week. Prerequisite: course 120, senior standing. Sections limited to 20 students. Students in a single playwright or mode of theatre. Not for practice of acting or playwriting. Designed primarily for senior students majoring in Dramatic Art.

Mr. Bogard (W); Mr. Roth (Sp)

Playwriting

139A–139B–139C. Playwriting. (5–5–5) Three 1 1/2-hour lectures per week.

Prerequisite: course 39 or consent of instructor. Students may take 139A–139B with credit and grade assigned upon completion of the sequence or they may take 139A–139B–139C with credit and grade assigned upon completion of the full sequence. Practice in the fundamentals of dramatic composition. Group readings and discussion of written work. Any year that course is not given, qualified students may apply to the instructor for permission to take course 239A–239B–239C.

Mr. Rosenberg (Sp)

Dramatic Art-Dance

Students intending to complete the major in Dramatic Art-Dance and students proposing to include dance as part of a multi-subject major must consult with Mr. Wood prior to enrollment.

LOWER DIVISION COURSES

40A–40B–40C. Beginning Modern Dance Technique. (1–1–1) Five 1 1/2-hour studios per week.

Prerequisite: consent of instructor. Study in elementary body alignment and basic locomotor patterns, utilizing the body and extremities as a totality. Must be taken on a passed/not passed basis.

Mr. Egan, Ms. Murata (F, W, Sp)

41. Rhythmic Analysis for Dancers. (3) Two 1 1/2-hour courses.

Prerequisite: 10 with grade of B or better and consent of instructor. Study in elementary body alignment and basic locomotor patterns, utilizing the body and extremities as a totality. Must be taken on a passed/not passed basis.

Mr. Egan, Ms. Murata (F, W, Sp)

42. Analysis of Human Movement. (3) Three 1-hour lectures per week.

Prerequisite: 10 with grade of B or better and consent of instructor. Study in elementary body alignment and basic locomotor patterns, utilizing the body and extremities as a totality. Must be taken on a passed/not passed basis.

Mr. Egan, Ms. Murata (F, W, Sp)

43. Analytical Dance Techniques for Dancers. (3) Three 1-hour laboratory periods per week.

Prerequisite: 10 with grade of B or better and consent of instructor. Study in elementary body alignment and basic locomotor patterns, utilizing the body and extremities as a totality. Must be taken on a passed/not passed basis.

Mr. Egan, Ms. Murata (F, W, Sp)
structure with emphasis placed on note values, rhythmic patterns and dictation, score reading and phrasing. All work will be activated through studio improvisation. Mrs. Marcus (W, Sp)

UPPER DIVISION COURSES

141A–141B–141C. Intermediate Modern Dance Techniques. (1–1–1) Five 1 1/2-hour studio sessions per week. Prerequisite: 140A–140B–140C or consent of instructor. Development of physical control through off-center movement and its utilization in spatial exploration. Must be taken on a pass/no-pass basis. May be repeated for credit. Mrs. Wood (W, Sp)

142A–142B–142C. Advanced Modern Dance Techniques. (1–1–1) Five 1 1/2-hour studio sessions per week. Prerequisite: courses 141A–141B–141C or consent of instructor. Refinement of movement techniques and qualitative and quantitative analysis of movement with regard to rhythm, dynamics, and style. Must be taken on a pass/no-pass basis. May be repeated for credit. Mrs. Wood (W, Sp)

143A–143B–143C. Company Class. (1–1–1) Five 1 1/2-hour studio sessions per week. Prerequisite: courses 142A–142B–142C or consent of instructor. Exploration of group styles and forms. Mr. Wood (W, Sp)

144A–144B. Sources of Movement. (3–3) One 1 1/2-hour lecture and two 1 1/2-hour studio sessions per week. Prerequisite: courses 40A–40B–40C or equivalent. Beginning application of dance technique as a means of communication in the theatre. Use of basic technical fundamentals as a means of extending the potential of the creative and communicative abilities of the individual in the theatre. Mrs. Marcus (W, Sp)

145. Music Resources for Dancers. (3) Two 1 1/2-hour studio and 1 1/2-hour laboratory per week. Prerequisite: courses 144A–144B or concurrent enrollment. An historical overview of dance and its relation to music. Comparative study of the development of the two arts through historical and contemporary examples. Mrs. Marcus (W, Sp)

146A–146B–146C. Choreography. (5–5–5) Two 1 1/2-hour lectures and three 1 1/2-hour studio sessions per week. Prerequisite: courses 144A–144B. Analysis of theories of form and structure and their application in relation to content. Course 146A directed towards solos; 146B towards duets and trios; 146C towards group direction. Mr. Wood (W, Sp)

147A–147B. Dance Analyses. (5–5) One 1 1/2-hour seminar and two 1 1/2-hour studio sessions per week. Prerequisite: courses 142A–142B–142C, 144A–144B, and consent of instructor. Instruction in the analysis and principles of concept construction with emphasis placed on movement and development. Mr. Wood (W, Sp)

148A–148B–148C. Introduction to Dance Techniques for the Theatre. (3–1–3) Three 1-hour lectures and two 1-hour studio sessions per week. Prerequisite: course 110 and consent of instructor. Must be taken on a pass/no-pass basis. May be repeated for credit, however, repeated units may not be used to fulfill major requirements. Ms. Egan (F, W, Sp)

149. Repertory and Production. (5) Five 1 1/2-hour studio sessions per week. Prerequisite: 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 the study of those already created. May be repeated for credit. Mrs. Wood (F); Mr. Wood (W, Sp)

150A–150B. Dance History. (5–5) Three 1-hour lectures and two 1-hour studio sessions per week. Prerequisite: consent of instructor. Mrs. Wood (F); Mr. Wood (W, Sp)

150A–150B. Dance History. (5–5) Three 1-hour lectures and two 1-hour studio sessions per week. Prerequisite: consent of instructor. Mrs. Wood (F); Mr. Wood (W, Sp)

150A–150B. Dance History. (5–5) Three 1-hour lectures and two 1-hour studio sessions per week. Prerequisite: consent of instructor. Mrs. Wood (F); Mr. Wood (W, Sp)

150A–150B. Dance History. (5–5) Three 1-hour lectures and two 1-hour studio sessions per week. Prerequisite: consent of instructor. Mrs. Wood (F); Mr. Wood (W, Sp)

Histories, History of the Theatre

151A–151B–151C. History of the Theatre. (5–5–5) Five 1-hour lectures per week. Prerequisite: consent of instructor. The development of theatrical production in its cultural background, including theatre architecture, the stage, scenery and scene design, costume, acting, and directing. Mrs. Marcus (W, Sp)

15A. The beginning to 1800. Mr. Ogden (F)

15B. 1600 to 1800. Mr. Ogden (W)
Special Courses

Performance — University Theatre

270. Theatre Laboratory. (1-5) To be arranged. Prerequisite: graduate standing and consent of instructor. Practice in theatre design, lighting, and stage production in faculty-directed productions. May be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

271. Theatre Performance. (1-5) To be arranged. Prerequisite: graduate standing and consent of instructor. Practice in acting in faculty-directed productions. May be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

280. University Theatre. (1-5) To be arranged. Prerequisite: graduate standing. Advanced practice in theatre design, lighting, playwriting, and acting in student-directed productions. May be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

293. Theatre Laboratory. (1-6) To be arranged. Prerequisite: consent of instructor. Advanced practice in play direction. May be repeated for credit. The Staff (F, W, Sp)

295. Special Studies. (6) Prerequisite: consent of instructor. Advanced directional practice for third and fourth year graduate students in the Department of Dramatic Art, Berkeley. The Staff (F, W, Sp)

298. Directed Group Study. (1-8) To be arranged. Prerequisite: advancement to doctoral candidacy. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

299. Special Studies. (1-10). To be arranged. Prerequisite: consent of instructor. Open to graduate students enrolled in the Department of Dramatic Art, Berkeley. Topics to be announced at beginning of each quarter. The Staff (F, W, Sp)

601. Individual Study for Master's Students. (1-8) Prerequisite: may be taken by students who have completed the 45-unit course requirement for the M.A. degree. Individual study for the comprehensive or language requirements in consultation with the field adviser. Units may not be used to meet either unit or residence requirements for a master's degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

602. Individual Study for Doctoral Students. (1-8) Individual study in consultation with the major field adviser and in consultation with the department. May be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

RELATED COURSES IN OTHER DEPARTMENTS

Form in Drawing (Art 2A).
The Classic Myths (Classics 28).
Theatre of the Greeks (Classics 103).
Greek Comedy (English 117A–117B).
Greek Tragedy (English 117A–117B).
Greek Drama for Non-majors (English 117E).
The English Drama to 1603 (English 114A).
The English Drama, 1603–1700 (English 114B).
The English Drama, 1700–1800 (English 114C).
The Nineteenth Century German Drama (German 130A).
The German Drama (French 117A–117B–117C).
The Theory of the Eighteenth Century (Italian 114).
Italian Literature of the Eighteenth Century (Italian 114B).
Italian Literature of the Eighteenth Century (Italian 114C).
Nineteenth-Century German Drama (German 130A).
The German Drama (French 117A–117B–117C).
The Theory and Practice of Staged Combat (Physical Education 30).
The Rhetoric of Drama (Rhetoric 122A–122B–122C).
The History of Scandinavian Drama up to 1900 (Scandinavian 106).
The Plays of Ibsen (Scandinavian 107).
The Strindberg Plays up to 1889 (Scandinavian 108).
The Scandinavian Drama of the Twentieth Century (Scandinavian 109).
The Polish Theater (Stievic 156C).

Modern Peninsular Drama: from the Romantic Period to the Present (Spanish 119).
The Spanish Drama of the Sixteenth and Seventeenth Centuries (Spanish 109).

Dutch Studies

Group Major Office, 5329 Dwinnelle Hall

Professors:
Svetlana Alpern, Ph.D. (History of Art)
William J. Bouwema, Ph.D. (History of Art)
Blake Lee, Ph.D. (German and Comparative Literature)

Associate Professor:
Joan P. Snapper, Ph.D. (German, Princess Beatrix Professor of Dutch)

Adviser: Mr. Snapper.

Group Major in Dutch Studies

The group major in Dutch studies is designed to present a balanced curriculum of the languages, history, and culture of The Netherlands. Since the program is both specialized (in dealing with one country) and broad (in its many-sided approach to the subject), it is recommended that the student also prepare a strong related discipline so that the group major in Dutch studies may constitute the focal point to a larger area of interest. Suggested related fields of concentration include: Comparative Literature, German, History, History of Art, Linguistics, and South and Southeast Asian Studies (e.g., Indonesian).

See Department of German for a detailed listing of courses.

The Major

Lower Division. Dutch 1–2–3 or equivalent.
Upper Division. The student is expected to complete a minimum of 45 upper division units, but no more than 54, from those courses listed below. Of these the following are required:

Language courses: Dutch 110 and 130.
Literature courses: Dutch 150 plus 4 units in either History of Art course (170B, 174, 175). History course: History 142.

Honors Program. Students accepted in the honors program will enroll in Dutch 190 (Dutch 190) with distinction.

Modern Peninsular Drama: from the Romantic Period to the Present (Spanish 119).
The Spanish Drama of the Sixteenth and Seventeenth Centuries (Spanish 109).

East European Studies

Office, Slavic Languages and Literatures, 5416 Dwinnelle Hall

The Department of Slavic Languages and Literatures offers courses in several non-Slavic languages and literatures as the opportunity arises both for those pursuing the Department's own degree and for interested students from other departments. There is no undergraduate major or graduate program in East European Studies. Languages frequently taught include Hungarian and Romanian. For further information, see East European Studies course listings following Slavic Languages and Literatures.

Economics

Department Office, 250 Barrows Hall

Professors:
George A. Akert, Ph.D.
Prenah B. Bardhan, Ph.D.
George F. Breake, Ph.D.
Carlo M. Cipolla, Laurea cum laude
Rudolph Detref, D.Sc.
David Gale, Ph.D.
Gregory Grossman, Ph.D.
Bent Hansen, Ph.D.

Associate Professors:
John C. Harris, Ph.D.
Simon S. Hooy, Ph.D.
George M. Kuenn, Ph.D.
John M. Lott, Ph.D.
Daniel McFadden, Ph.D.
James L. Pierce, Ph.D.
Roy Radner, Ph.D.
Thomas J. Romorenberg, Ph.D.
Stephan Smale, Ph.D.
Richard C. Sutch, Ph.D.
Lloyd Uman, Ph.D.

Assistant Professors:
Benjamin N. Ward, Ph.D.
Jane S. Bair, Ph.D.

Lecturers:
Margaret S. Gordon, Ph.D.

The Major

Lower Division. Dutch 1–2–3 or equivalent.
Upper Division. The student is expected to complete a minimum of 45 upper division units, but no more than 54, from those courses listed below. Of these the following are required:

Language courses: Dutch 110 and 130.
Literature courses: Dutch 150 plus 4 units in either History of Art course (170B, 174, 175). History course: History 142.

Honors Program. Students accepted in the honors program will enroll in Dutch 190 (Dutch 190) with distinction.

Additional courses are to be selected from the following list to complete the major: Dutch (see German Department for complete description of these courses) 110, 120, 130, 140, 150, 160, 170, 180, 183, 199; German 104, 105, 106; Comparative Literature 180, 190U, 210A; Linguistics 165, History 128A, 128, 130B, 142; History of Art 190B, 194, 175.

For additional information, consult the adviser for the major group in Dutch studies, 5329 Dwinnelle Hall.

NOTE: For key to symbols, see page 38.
Plan A: recommended for students interested in a broad liberal arts approach to economics.

Plan B: recommended for students interested in a more formal, theoretical approach to economics.

**Plan A. Prerequisites for admission to the major under Plan A are: Economics 1 or 103; two additional courses (4 units each) chosen from the lower division offerings in Anthropology, Economics, History, Philosophy, Political Science, Psychology, and Sociology; and two of the three courses from the mathematics-statistics requirement specified in the next paragraph.

Requirements for the major are: completion of one course in statistics (such as Statistics 2, or 20, or 130A); two courses in calculus (such as Mathematics 16A–16B or 1A–1B); 36 quarter units in upper division or graduate economics courses. The 36 units must include Economics 100A–100B, at least one course applied economics chosen from the following: 121, 131, 136, 151, 161, 171, 181; and at least one course in economic history or history of thought from the following: 105, 106, 108, 111, 113, 115, 116. Of the remaining 18 units, no more than five units may be courses numbered 197, 198, and 199.

Students graduating under Plan A are strongly recommended to take:
1) Economics 100A–100B in the sophomore year.
2) Upper division electives in other social sciences.
4) An undergraduate seminar course in the senior year.

**Plan B. Prerequisites for admission to the major under Plan B are: Mathematics 1A–1B, 2A–2B, or 16A–16B, and one additional course (4 units) chosen from among the lower division offerings in Economics, History, Mathematics, and Statistics.

The requirements for the major include 36 quarter units in upper division or graduate economics courses. The 36 units must include Economics 101A–101B; either Economics 141 (prerequisite: Statistics 2, 20, or 130A) or Economics 240 (prerequisite: Statistics 131 or equivalent); and either Economics 102 or 136. No more than five units from courses 197, 199, and 199 may be included in the required 36.

Students graduating under Plan B are strongly recommended to take:
1) A specialization within the major by taking a two-course sequence in a core field of economics. Typically such a sequence would include one lecture course and one seminar course.
2) A statistics course such as 20, 131, or 135A–135B.
3) Mathematics 111 or equivalent.
5) Upper division electives in other social sciences.

Students may switch plans during the course of their studies. For this purpose, the sequence 100A–100B–100C will be treated as equivalent to 101A–101B in satisfying the theory requirement.

**Pre-Law Program. Students intending to go to law school after graduation may elect to major in economics under either Plan A or Plan B. The following courses are strongly recommended as electives for such students:
1) Business Administration 120 or 125.
2) Economics 121 and 123.
3) Two out of the following: Economics 131, 151, 155, 157 and 181.

**Pre-M.B.A. Program. Students intending to do graduate work in business administration may major in economics under either Plan A or Plan B. The following courses are strongly recommended as electives for such students:
1) Business Administration 110, 111, and 120.
2) Mathematics 1A–1B or 16A–16B.
3) Courses in proper other science.

**Departmental Honors. Students who are interested in graduating with honors in economics and who have a grade-point average of 3.3 or higher both over all and in the major should consult the faculty adviser no later than the first quarter of the senior year. The Department recommends a student for graduation with honors on the basis of (a) evidence of superior performance provided by a thesis written in the senior year, and (b) the student's course grade record in the major. The senior thesis may be an extension of a seminar topic or under the supervision and guidance of a faculty member through enrollment in Economics 199.

Advising. Students planning to do graduate work in economics should consult with faculty advisers regarding appropriate programs. These students would typically elect to be Plan A economics majors, and be advised to consult with a faculty adviser frequently in planning their program.

**Letters and Science List of Courses: 126 units from the List must be included in the 180 required for graduation. See the Annunciation of the College of Letters and Science for courses on the List.

**Graduate Study.**

The graduate program is designed for doctoral students interested in pursuing advanced study and conducting original research in economics. Detailed information concerning admission, financial aid, and degree requirements is given in the brochure, Ph.D. Program in Economics, which is available from the Graduate Secretary, Department of Economics.

The program is oriented toward the doctorate, and new admissions are restricted to candidates for the Ph.D. However, students enrolled in the School of Law or in other doctoral programs on the Berkeley campus may take a Master of Arts degree in economics if approval is given by both departments. The requirements for an M.A. are: (1) a background in economic theory equivalent to that provided in Economics 101A–101B or 200A–200B; (2) completion of 36 units of approved course work, of which 18 units must be in graduate economics courses numbered 201 or greater; (3) satisfactory performance in two written qualifying examinations. Each student's program must be approved by the economics graduate adviser and must include a balanced mixture of applied and theoretical courses. Students in other graduate programs at Berkeley who are interested in receiving an M.A. in economics should see the Department's Graduate Secretary for further details.

**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 the law degree and also complete the requirements for the Ph.D.

Information about the program can be obtained from the Chair of the Graduate Committee of the Department of Economics.

**LOWER DIVISION COURSES.**

1. Introduction to Economics. (5) Three hours of lecture and two hours of section meeting per week. A survey of economics, designed to give an overview of the field: supply and demand, resource allocation in a market economy, national economic policy.

Sarch (F); Hansen (W, Sp)

M08. Critique of Modern Economic Theory. (4) Three hours of lecture and two hours of section meeting per week. An introductory course in economics involving the relationship between power and the economy with more intensive analysis of selected topics.

M11A. Economic History of the Medieval and Renaissance Economy. (4) Formerly 111. Three hours of lecture per week. A survey of the economic and social developments in Western Europe from the eleventh century to the sixteenth century that paved the way for the Industrial Revolution.

M11B. Economic History of the Agricultural and Industrial Revolutions. (4) Formerly 115. Three hours of lecture per week. A survey of the economic and social developments in the eighteenth and early nineteenth centuries. The impact of capitalist organization, the nation state, colonial expansion, and trade.

M11C. World Industrialization in an Age of Imperialism. (4) Three hours of lecture per week. Pre-
requisite: course 1 or 103. The rise of the European economy to world dominance in the period 1815-1914.

111D. Economic History of the World Economy in the 20th Century. (4) Three hours of lecture per week. Prerequisite: course 1 or 103. Development and crises of the advanced economies with particular emphasis on their trading relations and their relationship with colonies and third world countries.

112. World Economic History Seminar. (5) Three hours of seminar per week. Prerequisite: of the following: course 111A, 111B, 111C or 111D, as announced. Enrollment will be limited. A seminar paper will be required.

113. American Economic History. (5) Three hours of lecture and two hours of section meeting per week. Prerequisite: course 1 or 103. A survey of trends in the American economy; competitive behavior, price policy, and market performance.

121. Industrial Organization. (4) Three hours of lecture per week. Prerequisite: course 100A or 101A. A theoretical analysis of the sources of economic variables. Models of economic systems, studies of actual economies.

*122. Government Regulation of Industry. (4) Three hours of lecture per week. Prerequisite: course 121. Problems of public policy in the field of industrial organization. The maintenance of competition, antitrust, and the regulation of public utilities.

123. Economics of Transportation. (4) Three hours of lecture per week. Offered in alternate years. Prerequisite: course 100A or 101A. Principles of pricing in the domestic transportation industries, with emphasis on policy problems such as regulation of transport firms and public investment in transportation facilities.

125. Economics of the Environment. (4) Three hours of lecture per week. Prerequisite: course 100A or 101A. A theoretical analysis of the sources of environmental degradation and of public policy measures designed to preserve and improve human environments. A number of case studies will be examined.

131. Public Finance. (4) Three hours of lecture per week. Prerequisite: course 100A–100B or 101A–101B. An analysis of the incidence and effects of taxation, government expenditure programs, and public debt operations.

132. Public Finance Seminar. (5) Three hours of seminar per week. Prerequisite: course 131 and consent of instructor. Enrollment will be limited. A seminar paper will be required.

133. Economics of State and Local Governments. (4) Three hours of lecture per week. Prerequisite: course 100A–100B or 101A–101B. Offered in alternate years. Revenue and expenditure policies of state and local governments, problems of metropolitan administration, revenue sharing.

134. Cost-Benefit Analysis. (4) Three hours of lecture per week. Prerequisite: course 100A or 101A. Methods of project evaluation, program budgeting, and governmental enterprise.

136. Monetary Theory and the Banking System. (4) Three hours of lecture per week. Prerequisite: course 100B or 101B. Survey of money, interest and income theories. Commercial banks, financial intermediaries, the Federal Reserve System, and the supply of money.

137. Aggregative Economics Seminar. (5) Three hours of seminar per week. Prerequisite: course 102 or 136 and consent of instructor. Enrollment will be limited. A seminar paper will be required.

141. Economic Statistics and Econometrics. (5) Three hours of lecture and one hour of laboratory per week. Prerequisite: course 100A–100B or 101A–101B; and an introductory statistics course such as Statistics 202 or 202A. Analysis of 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 econometric research and exercises in applied econometrics.

151. Labor Economics. (4) Three hours of lecture per week. Prerequisite: course 100A–100B or 101A–101B. Theory of labor markets and of underemployment; historical aspects, policies for achieving development in poor countries, favorable conditions for development in rich countries.


153. Labor Economics Seminar. (5) Three hours of seminar per week. Prerequisite: course 151 or 152 and consent of instructor. Enrollment will be limited. A seminar paper will be required.

154. Women in the Labor Force. (4) Three hours of lecture per week. Prerequisite: course 100A–100B or 101A–101B. Offered in alternate years. An analysis of the changing patterns of labor force participation of women with particular reference to the delineation and measurement of discrimination.

155. Urban Economics. (4) Three hours of lecture per week. Prerequisite: course 100A or 101A. An analysis of the economic principles of the city, with particular attention to location theory, housing, transportation, labor markets and selected problems in local government finance.

156. Urban Economics Seminar. (5) Three hours of seminar per week. Prerequisite: course 155 and consent of instructor. Enrollment will be limited. A seminar paper will be required.


158. Health, Education and Welfare Seminar. (5) Three hours of seminar per week. Prerequisite: course 157 and consent of instructor. Enrollment will be limited. A seminar paper will be required.

159. Economics of the Black Ghetto. (4) Three hours of lecture per week. Prerequisite: consent of instructor. An analysis of the forces which give rise to the ghetto, the forces for change within and without. Unionization, employment patterns, housing, education, and governmental programs. Requires student involvement outside the classroom.

161. International Economics. (4) Three hours of lecture per week. Prerequisite: course 1 or 103. Economic organization and institutions, and their impact on economic variables. Models of economic systems, studies of actual economies.

162. Economics of the Soviet Union. (4) Three hours of lecture per week. Prerequisite: course 1 or 103. The Soviet economy, its growth, institutions, and problems.

163. Economics of the Communist World. (4) Three hours of lecture per week. Prerequisite: consent of instructor. The communist economies other than the Soviet Union (Eastern Europe, China, etc.). Advanced topics on the Soviet economy: Relations between communist economies and between them and the rest of the world.

164. Economic Systems Seminar. (5) Three hours of seminar per week. Prerequisite: course 161 or 162 or 163 and consent of instructor. Enrollment will be limited. A seminar paper will be required.

171. Case Studies in Economic Development. (4) Three hours of lecture per week. A detailed study of the problems of development in a selected geographic area. The specific regions to be studied will be announced annually. May be repeated for credit with the permission of instructor.

172. Economic Development Seminar. (5) Three hours of seminar per week. Prerequisite: course 177 or consent of instructor. Enrollment will be limited. A seminar paper will be required.

175. Economic Demography. (4) Three hours of lecture per week. A general introduction to demo Prerequisite: course 1 or 103. Introduction to economic demography emphasizing the economic determinants of mortality, fertility, and labor force participation. Special attention is given to the relationship of population growth to economic development, and the "neo-Malthusian" literature on resource limitations.

176. Demography Seminar. (5) Three hours of seminar per week. Prerequisite: course 175 and consent of instructor. Enrollment will be limited. A seminar paper will be required.

177. International Economic Relations. (4) Three hours of lecture per week. Prerequisite: Economics 100A–100B or Economics 101A–101B. The theory of international trade and of the mechanism of international adjustment.

182. International Economic Policy. (4) Three hours of lecture per week. Prerequisite: course 181 or 136 or 102. International monetary institutions, common markets, tariffs, foreign exchange controls. The relations between trade, growth, and development.

183. International Economics Seminar. (5) Three hours of seminar per week. Prerequisite: course 181 or 182 and consent of instructor. Enrollment will be limited. A seminar paper will be required.

NOTE: For key to symbols, see page 36.
19. Analysis of money market, inflation, and unemployment; monetary policy and its impact on economic growth.

20. Business cycle theory; macroeconomic indicators and their relationships.

21. Aggregate demand and supply analysis; long-run economic growth.

22. Monetary and fiscal policy; implementation and effectiveness.

23. Financial markets and institutions; money and banking.

24. Financial systems and international capital flows.

25. Portfolio theory and asset pricing models; efficient market hypothesis.


27. International trade and finance; theory of international trade.

28. International monetary systems; exchange rate determination.

29. Monetary policy and economic growth; the role of monetary policy in managing inflation.

30. Central banking and monetary policy instruments; monetary policy in practice.

31. Economic growth and development; theories of economic growth.

32. Development economics; policies for economic development.

33. Economic development and poverty; strategies for reducing poverty.

34. Economic development in different regions; case studies of successful and failed development programs.

35. Economic development and the environment; sustainable development.

36. Economic development and democracy; the role of democracy in development.

37. Economic development and social progress; the impact of development on social issues.

38. Economic development and inequality; strategies for reducing income inequality.

39. Economic development and global governance; international cooperation in development.

40. Economic development and the future; future trends and challenges in economic development.
English

Department Office, 322 Wheeler Hall

University Professor:
John Kinkaid, M.A., Ph.D., Lit.D., Emeritus

Professors:
Paul J. Alpers,* Ph.D.
Jonas A. Banfield, Ph.D.
Richard Bloch, Ph.D.
Stephen Booth, Ph.D.
Richard Bridgman,* Ph.D.
Jackson L. Burgis, M.A.
John S. Coolidge, Ph.D.
Frederick C. Crews, Ph.D.
Phyllis W. Damon, Ph.D.
Thomas B. Flanagan, Ph.D.
Donald C. Friedman, Ph.D.
Howard E. Hugo, Ph.D.
John E. Jordan, Ph.D.
Ulfyyke Komppa, Ph.D.
Leonard Michaels, Ph.D.
Masao Mouko, Ph.D.
Charles Muscatorne, Ph.D.
Brenda Nye, Ph.D.
Morton D. Paley, Ph.D.
Thomas F. Parkinson, Ph.D.
John M. Robinson, Ph.D.
Norman Raskin, Ph.D.
Ralph W. Rader, Ph.D.
John H. Reighle, Ph.D.
Alan Renoir, Ph.D.

Associate Professors:
Janet Adelman, Ph.D.
Joel Atlas, Ph.D.
John D. Asson, Ph.D.
Julian C. Boyd, Ph.D.
Carol Christ, Ph.D.
Michael A. Brunnstein, Ph.D.
Frances Ferguson, Ph.D.
Richard Ford, Ph.D.
Stephen J. Greenblatt, Ph.D.
Andrew L. Griffin, Ph.D.

Assistant Professors:
Julia Bader,* Ph.D.
Ann Banfield, Ph.D.
Michael A. Brunnstein, D. Phil.
Diane Buzek, Ph.D.
Patricia Daix, Ph.D.
Joel Fineman, Ph.D.
Ruth A. Fox, Ph.D.
Michael Harper, Ph.D.

Acting Assistant Professor:
Steven M. Knapp

Lecturers:
Thorn Guinn, M.A.
Ismahil Reed

Departmental Major Advisers: Consult Departmental Office.

The Department of English offers undergaduates considerable flexibility in shaping a program of studies in British and American literature around a core of basic courses. English 1A–1B grounds students in the fundamentals of composition and literary analysis; English 147A–147B–147C provides an intensive survey of major authors in English from Chaucer through Yeats; the survey is supplemented by courses in American literature and in the classical and biblical backgrounds of English literature. The senior seminar, allows students to bring to bear on the work of a single major author the critical techniques and learning acquired in previous years. Beyond these courses, students are largely free to construct their own programs in consultation with their advisors. College writing in art, history, literature, philosophy, and language is recommended but not specifically required.

Subject A. Students must have fulfilled the requirement in Subject A before taking any course in the Department of English. For further information, see Subject A listing in Index.

Major Program

The English major consists of not fewer than fourteen five-unit courses in English, of which at least nine must be upper division courses. Students are required to include the following six items in their programs: (1) English 1A–1B; (2) one course in American literature (English 30 is strongly recommended, but with the consent of a major adviser this requirement may also be fulfilled by completion of one upper division course in American literature, selected from the following: English 130A; 130B; 130C; 130D; 131; 132; 125C); (3) one course in the classical and/or the biblical backgrounds of English literature (English 44A or 44B is strongly recommended); (4) a course which may also be fulfilled by completion of any one of the following: English 116; English 190C; Classics 34, Comparative Literature 41A; Comparative Literature 41B; (4) English 147A–147B–147C (which should be taken in their historical sequence); (5) an upper division course in Shakespeare (but not English 117E); and (6) English 151 (a period or type course appropriate as background for the major to be studied at 151 is strongly recommended).

Honors Program

Students with an overall grade-point average of 3.5, a grade-point average of 3.0 or higher in courses in the major may apply for admission to the honors program not later than the second quarter of their senior year. Candidates for the A.B. with honors in English are required to write a bachelor’s thesis (for which 5 units of credit are given under English H19B) in their senior year. The thesis may be an extension of the students’ work in English 151 or may deal with another area already familiar to them. A faculty member of the Department must agree to direct the thesis. Interested students may obtain application forms for the program in the Department of English Office.

Please Note: The quarter in which a particular course will be given, and the instructor who will give it, as specified in this catalog, may be changed during the academic year. Students should consult the Department’s Announcement of Courses for the current academic year (available from the Department Office, Room 322 Wheeler Hall) for current listings of courses and instructors for each quarter. Specific offerings in the following staff courses vary from year to year: English 108, 109, 151, 170, 171, 172, 173, 174, 175, 176, 177, 203, 208, 250, and 270; offerings and instructors for each quarter of the current academic year are listed in the Department’s Announcement of Courses.

Many of the courses listed below have limited enrollments.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Preparation for Graduate Studies

Those interested in graduate studies in English at Berkeley should familiarize themselves with the regulations of the Graduate Division. The prospective graduate student is strongly advised to gain a solid background in foreign languages; the Department of English requires candidates for the Ph.D. to pass examinations in a minimum of two foreign languages.

Graduate Study

The Ph.D. Program

Students are admitted to graduate study only in the fall quarter. The program requires successful completion of twelve letter-graded courses, including one introductory seminar in literary scholarship (208), normally taken in the first quarter of graduate study, and a two-quarter seminar (250), before advancement to candidacy. The first two years of study are devoted to acquiring and demonstrating comprehensive knowledge of five fields of study: Old and Middle English; Renaissance and Shakespeare; the Restoration and Eighteenth Century; Nineteenth- and Twentieth-Century British Literature; and American Literature. Comprehensive knowledge may be demonstrated by a series of oral examinations or successful completion of a wide-reading course in each period arranged in consultation with graduate advisers. The balance of the graduate program requires passage of an oral qualifying examination of two to three hours, and the writing of a dissertation. Additional details on requirements for the doctorate in English, including language requirements, are available from the English Graduate Office, Room 319 Wheeler Hall.

The M.A. Program

The M.A. program in English is separate from the Ph.D. program and provides students with a broad range of applications, including older students, from a variety of academic and cultural backgrounds. It is designed to serve students who wish to undertake one year’s intensive graduate study in the general field of English and/or American literature, or who wish to pursue a special interest that lies within or cuts across the traditional fields. A student’s course of study will be determined individually at the beginning of the year with the adviser, and may or may not include a short thesis or approved special project. In special cases, study for the M.A. degree may be extended into a second year. The M.A. program requires successful completion of (a) eight letter-graded units, at least one of which is taken in the graduate division, at least three of these in English; (b) a final examination, the nature of which is to be decided in consultation with the adviser and the Graduate Chairman, and which may vary from a written comprehensive examination to an oral examination in the general area of an approved project or thesis. There is no general language requirement for M.A. students.

Teacher Training

The Department of English offers an Ameren and California Commission on Teacher Preparation and Licensing. For further information contact the departmental teacher training advisers or the Student Personnel Office, School of Education, 1615 Tolman Hall.
Courses in Writing

LOWER DIVISION

1A–1B. First-Year Reading and Composition. (5–8) Four to 4 1/2 hours of lecture per week. Prerequisite: a passing grade in Subject A (examination or course) for prerequisite for the English major. Training in writing exposition prose. Students may enroll in 1A–1B sequence with credit and grade to be assigned upon completion of the sequence.

1A. Instruction in writing and reading of exposition prose.

1B. Further instruction in expository writings in conjunction with reading literature. The Staff (F, W, Sp)

40. Intermediate Expository Writing. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: course 1A–1B or equivalent, and consent of instructor. Mr. Cagnacci (F), Mr. Oliver (W), Mr. Portales (Sp)

42. Writing in Connection with the Reading of Important Books of the Nineteenth and Twentieth Centuries. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: course 1A–1B or equivalent, and consent of instructor. Mr. Paterson (Sp)

43B. Introduction to the Writing of Verse. (5) Four to four and one-half hours of lecture per week. A workshop course intended for students who have recently begun to write verse or who have not previously taken a course in creative writing. Mr. Loewinebohn (W)

UPPER DIVISION

141. Modes of Writing. (Exposition, Fiction, Verse, etc.) (5) Four to 4 1/2 hours of lecture per week. Prerequisite: course 1A–1B or equivalent, and consent of instructor. Writing in connection with readings in recent English literature and its continental background. Course may be repeated once for credit with a different instructor. Mr. Gunn (W), Mr. Levine (Sp)

142A. Advanced Composition for Potential Teachers of English in Secondary Schools. (5) Four to four and one-half hours of lecture per week. Advanced composition and methods of teaching composition; emphasis on writing about literature with reading of major American ethnic groups suitable for young people. Primarily for students who wish to pursue English as their single subject teaching field. Mr. Gray (W)

142D. Advanced Composition for Potential College Teachers. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: consent of instructor. Special section in advanced prose for teaching assistants, readers, and honors students in departments other than English. Mr. Jordan (W)

142E. Advanced Composition for Potential Teachers in Secondary and Elementary Schools. (5) Four to 4 1/2 hours of lecture per week. Primarily for students seeking the secondary school teaching credential whose teaching major or minor is not English. Mr. Stroud (Sp)

Admission to all courses numbered 143 is by consent of the instructor. Since instructors often wish to see samples of a student's writing before making a decision, students should see the instructor well before the beginning of the term in which the course is offered. Any of these courses may be repeated for credit, but students normally enroll for only one at a time.

143A. Short Fiction. (5) Four to 4 1/2 hours of lecture per week. Mr. Reed (F), Mr. Michaels (W)

143B. Verse. (5) Four to 4 1/2 hours of lecture per week. Mr. Scott, Mr. Paley (F), Mr. Gunn (W), Mr. Levine (Sp)

143C. Long Narrative. (5) Four to 4 1/2 hours of lecture per week. The student will work throughout the quarter on a single project, either fiction (novel) or nonfiction (biography, history). Mr. Reed (W)

143D. Expository and Critical Writing. (5) Four to 4 1/2 hours of lecture per week. Mr. Krattin (W)

143E. Advanced Expository Prose: Report Writing. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: permission of the instructor. Designed for students whose major is not English. intensive practice and instruction in prose composition, with attention to questions of style and documentation appropriate to a variety of professional and academic disciplines. Mr. Stroud (W)

143F. Playwriting. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: consent of instructor.

Courses in Language

LOWER DIVISION

25. Language. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: Designed for sophomores, but open to students in the upper division. The origins and symbols of human speech; pattern, change, and growth in language with emphasis on English; interrelations of language and thought. Emphasis on English as spoken in America: particular attention given to social and regional dialects. Mr. Boyd (Sp)

UPPER DIVISION

110A–110B. The English Language. (5–5) Four to 4 1/2 hours of lecture per week. Prerequisite: 110B: either 110A or a course including English materials composed before 1400 or instructor’s permission.

110A. Structure of the English language. Mr. Boyd (F)

110B. History of the English language. Mr. Niles (Sp)

Courses in Literature

LOWER DIVISION

*110. Methods and Materials of Literary Study. (5) Four to 4 1/2 hours of lecture per week. Study of literary and critical texts, and of critical methods and theories.

*120. Modern British and American Literature. (5) Four to 4 1/2 hours of lecture per week.

26. Introduction to the Study of Poetry. (5) Four to 4 1/2 hours of lecture per week. Lectures and discussion on poetry intended to develop the student’s ability to understand, and evaluate a poem. Designed primarily for students whose major is not English, but majors and prospective majors are welcome. Mr. Boyd (Sp)

27. Introduction to the Study of Fiction. (5) Four to 4 1/2 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. Mr. Boyd (Sp)

28. Introduction to the Study of Drama. (5) Four to 4 1/2 hours of lecture per week. Lectures and discussion intended to develop the students’ ability to read, understand and evaluate plays. Designed primarily for students whose major is not English, but majors and prospective majors are welcome. Mr. Richmond (Sp)

30. Introduction to American Literature. (5) Four to 4 1/2 hours of lecture per week. Mr. Michaels (W)

44A–44B–44C. Masterpieces of Literature. (5–5–5) Four to 4 1/2 hours of lecture per week. Lectures on the prose saga-cycles, satire, classical lyric poetry, and bardic poetry, developing the mythological and traditional background of modern Irish literature.

44A. 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.

44B. Medieval and Renaissance Literature. (5) Four to 4 1/2 hours of lecture per week. Lectures on the literature of the Middle Ages, mainly in English, including the Nibelungenlied and Dante's Divine Comedy.

44C. Renaissance and Baroque Literature. (5) Four to 4 1/2 hours of lecture per week. Lectures on the literature of the 16th to 18th centuries, mainly in English, including the Elizabethan plays and stage practices. Mr. Stroud (W)

UPPER DIVISION

100. Methods and Materials of Literary Criticism. (5) Four to 4 1/2 hours of lecture per week. (Sections limited to 20 students.) Designed primarily for English majors and open to juniors from year to year. May be repeated for credit, on a different topic. Students should consult the department’s Announcements of Courses for offerings in the current academic year.

104A. The Native Tradition in English 1800-present: focussing on the continuance of older Irish traditions in Yeats, Synge, Joyce, Beckett, Behan, Flann O’Brien, the modern poets, with attention to their nineteenth-century precursors, Carleton, Maria Edgeworth, Moore, the Nation writers. Mr. Tracy (Sp)

108. Special Topics. (5) Four to 4 1/2 hours of lecture per week. (Sections limited to 20 students.) Designed primarily for English majors and open to juniors from year to year. May be repeated for credit, on a different topic. Students should consult the department’s Announcements of Courses for offerings in the current academic year.

114A–114B–114C. English Drama. (5–5–5) Four to 4 1/2 hours of lecture per week. Mr. Peterson (Sp)

114A. English drama to 1660. Mr. Nelson (F)

*114B. English drama 1660-1700. Mr. Stroud (W)

*114C. British and American drama from 1660 to the present. Mr. Jordan (W)

116. The English Bible as Literature. (5) Four to 4 1/2 hours of lecture per week. Mr. Jordan (W)

117A–117B. Shakespeare. (5–5) Four to 4 1/2 hours of lecture per week. A chronological survey of Shakespeare’s career, with an emphasis on the dramaturgical and theatrical techniques; relationship of film techniques to interpretation of dramatic texts. The course will be offered in conjunction with the Shakespeare Theatre, and Shakespearean performances, and enrollment will be limited to students currently enrolled in the lecture course.

117J. Shakespeare. (5) Four to 4 1/2 hours of lecture per week. Limited to 25 students. 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.

Mr. Friedman (F), Mr. Richmond (W), Mr. Fineeman, Mr. Nestrick (Sp)

117E. Shakespeare for Nonmajors. (5) Four to 4 1/2 hours of lecture per week. Ms. Fox (F)

*117F. Shakespeare and Film. (2.5) Two hours of lecture per week. Studies in filmed versions of Shakespeare’s plays. Discussions of the interrelation of the two media; relationship of film techniques to interpretation of dramatic texts. The course will be offered in conjunction with the Shakespeare Theatre, and Shakespearean performances, and enrollment will be limited to students currently enrolled in the lecture course.

117K. Shakespeare in the Theater. (2.5) Two to 2 1/2 hours of lecture per week. Prerequisite: offered in conjunction with—or as a sequel to—117J or 117B. Admission by instructor’s consent. The interrelation of Elizabethan plays and stage practices. Classroom exercises, written assignments, and a final examination.

Mr. Richmond (W)

117U. Shakespeare in the Theater. (2.5) Two to 4 hours of workshop and discussion per week. Prerequisite: enrollment with—or as a sequel to—117J or 117B. Admission by instructor’s consent. The interrelation of Elizabethan plays and stage practices. Classroom exercises, written assignments, and a final examination.

Mr. Richmond (W)

*118. The Augustan Age. (5) Four to 4 1/2 hours of lecture per week.

119. The Age of Johnson. (5) Four to 4 1/2 hours of lecture per week. Mr. Bridgman (W)

120A–120B. Medieval Literature. (5–5) Four to 4 1/2 hours of lecture per week. Students may receive credit for 120A without taking 120B.

*120A. Development of literary form and idiom throughout the Christian West from the first to the fifteenth centuries.

120B. Close study of selected classics in translation, including the Nibelungenlied and Dante’s Divine Comedy.

Mr. Stroud (W)

121A–121B. Romantic Period. (5–5) Four to 4 1/2 hours of lecture per week. Ms. Ferguson (F)

121B. Blake, Wordsworth, Coleridge and contemporaries.

Ms. Ferguson (W)
122A–122B. Victorian Period. (5–5) Four to 4 1/2 hours of lecture per week.

122A. British literature from about 1840 to 1870. Ms. Banfield (F)
122B. British literature from about 1870 to 1901 Mr. Miyoshi (W)

*1123. Nineteenth-Century British Prose. (5) Four to 4 1/2 hours of lecture per week.

124. Short Story. (5) Four to 4 1/2 hours of lecture per week. Mr. Miyoshi (Sp)
125A–125B. The English Novel. (5–5) Four to 4 1/2 hours of lecture per week. 125A is not prerequisite to 125B. Defoe through Scott Ms. Doody (F)
125B. Dickens through Conrad. Ms. Banfield (W)

125C. The American Novel. (5) Four to 4 1/2 hours of lecture per week. Mr. Raleigh (W)
125D. The European Novel. (5) Four to 4 1/2 hours of lecture per week. Mr. Hugo (F)

*1125E. The 20th Century Novel. (5) Four to 4 1/2 hours of lecture per week.

128. Regional Literature. (5) Four to four and 1/2 hours of lecture per week. Studies in literature and culture of American regional districts of the Deep South, California and the West, and New England. May be repeated for credit with a different topic and permission of the instructor. Ms. Bader (W)
130A. American Literature Before 1800. (5) Four to 4 1/2 hours of lecture per week. Mr. Hutson (W)
130B. The American Renaissance. (5) Four to 4 1/2 hours of lecture per week. Mr. Hutson (F)

*1130C. American Literature: 1865–1900. (5) Four to 4 1/2 hours of lecture per week. Ms. Casten (W)
130D. American Literature: 1900 to Present. (5) Four to 4 1/2 hours of lecture per week. Mr. Harper (W)

131. American Poetry. (5) Four to 4 1/2 hours of lecture per week. Studies in American poetry and its background from Puritan times until the present. The special emphasis of the course will be historical, with particular attention to such poets as Bradstreet, Taylor, Frenaye, Bryant, Emerson, Longfellow, Poe, Whitman, Dickinson, Frost, Pound, Eliot, and Stevens. Mr. Breslin (Sp)

132. American Autobiography. (5) Four to four and one-half hours of lecture per week. A study of autobiography as a genre and the history of its development in America from puritan times to the present. Mr. Powers (W)

*1133. Black Writers in America. (5) Four to 4 1/2 hours of lecture per week. Black writers in the American cultural context.

137B. Major American Writers: The American Renaissance. (5) Four to 4 1/2 hours of lecture per week. Enrollment limited to 25 students. Students who have completed course 130B cannot take 1378 without instructor's permission. Mr. Loewinsohn (W)

*1137C. Major American Writers: American Literature: 1865–1900. (5) Four to 4 1/2 hours of lecture per week. Enrollment limited to 25 students. Students who have completed course 130B cannot take 1378 without instructor's permission.

137D. Major American Writers: American Literature: 1900 to Present. (5) Four to 4 1/2 hours of lecture per week. Enrollment limited to 25 students. Students who have completed course 130D cannot take 137D without instructor's permission.

147A–147B–147C. Major British Writers. (5–5–5) Four to 4 1/2 hours of lecture per week. Prerequisite: course 1A–1B. Majors and prospective majors should plan to take 1A–1B, 147C–147D as a sequence. It is strongly recommended that students enroll in the 147A–C sequence or 148A–C sequence with credit and grade to be assigned upon completion of the sequence or of two contiguous segments of it. Students who have completed 147A prior to Fall, 1974, may not enroll in 147A.) Close study of typical works of major authors from Chaucer through the twentieth century, with consequent focus on the major themes and important aspects of the English literary history. 147A, Chaucer through the sixteenth century, 147B, Milton through the eighteenth century, 147C, nineteenth and twentieth centuries. The Staff (F, W, Sp)

*1149. The English Lyric. (5) Four to 4 1/2 hours of lecture per week. Studies of the English traditions of structure and style in lyric poetry.

151. The Senior Course. (5) Sections limited to 20 students each. A period or type course appropriate as background for the major. Conducted under the guidance of the major professor. May be repeated for credit with a different topic and permission of the instructor. Mr. Hutson (Sp), Mr. Sisson (F), Mr. Beilin (Sp)

*1177. Literature and Philosophy. (5) Four to 4 1/2 hours of lecture per week. Topics will vary from quarter to quarter. May be repeated for credit with a different topic and permission of the instructor. Ms. Bader (W), Mr. Sisson (Sp), Mr. Beilin (Sp)

180A. Autobiography. (5) Four to 4 1/2 hours of lecture per week. Mr. Michaels (F)
180C. Comedy. (5) Four to 4 1/2 hours of lecture per week. Study of representative comic forms, techniques, and points of view. Mr. Traugott (W)
180E. The Epic. (5) Four to 4 1/2 hours of lecture per week. Reading and discussions of epics, considering their cultural and historical contexts, the nature of their composition, and the development of the form. Mr. Kratins (W)
180R. The Romance. (5) Four to 4 1/2 hours of lecture per week. Study of the romance as a literary genre. Topics may vary from quarter to quarter; focus may be historical or restricted to a particular period (e.g., medieval, modern). May be repeated for credit with permission of the instructor. Mr. Kratins (Sp)

*1180S. Satire. (5) Four to 4 1/2 hours of lecture per week. A study of representative satiric forms, techniques, and points of view.

191A. Anglo-American Folklore. (5) Four to 4 1/2 hours of lecture per week. Readings and discussions in some of the major forms of folklore as illustrated by English, Scottish, Irish, and North American examples. Particular attention to Anglo-American balladry, secondary attention to the folktale, folk legends, folk drama, and related forms. Designed for majors and non-majors. To be offered 1978/79 only. Mr. Travis (F)

191B. Literature and the Supernatural. (5) Four to 4 1/2 hours of lecture per week. A study of the literary treatment of the supernatural, with special reference to the work of M.R. James, Bram Stoker, Henry James, Sheridan LeFanu and other selected writers. To be offered 1978/79 only.

191L. Science Fiction. (5) Four to 4 1/2 hours of lecture per week. Science fiction since the late 19th century, its history, favorite themes, and major writers, such as Wells, Stappton, Dick, and LeGuin. Questions of reader expectations, generic definition, and inherent possibilities or limitations will be considered. To be offered 1978/79 only.

Honors and Tutorial Courses

LOWER DIVISION

96. Sophomore Seminar: Great Books of the Western Tradition. (5) Four to 4 1/2 hours per week. Intensive study of major works, for example: Orestesia: The Greek Tragedies; Animal Comedy; King Lear; Montaigne, Essays; The Prince; Don Quixote; Paradise Lost; Brothers Karamazov; The Interpretation of Dreams. Limited to 15 students. Normally open only to sophomores with a grade-point average of 3.5 or better. Not limited to English majors.) Admissions by faculty nomination and selection by the seminar staff.

The Staff (Sp)

99. Independent Study. (1–5) Meetings to be arranged. Prerequisite: open to sophomore honors students who have completed 15 units or more of English and average of not less than 3.3. Normally open only to freshmen with a grade-point average of 3.5 or better. Not limited to English majors.) Admissions by faculty nomination and selection by the seminar staff.

The Staff (Sp)

UPPER DIVISION

H195. Honors Courses. (5) Prerequisite: open only to honors program students. H195 entails the writing of a bachelor’s thesis, which may develop from work begun in a section of 151. The subject of the thesis will be proposed at the end of the junior year and approved by the faculty committee. Students who have completed the 147A–C sequence with that of any regular course and shall be specific in nature. The Staff (F, W, Sp)

NOTE: For key to symbols, see page 36.
must be approved by the instructor in charge and by the Chairman of the Major Advisers. The completed thesis will be read by the instructor in charge and two other faculty members. The thesis must be proposed and its subject approved in a regular quarter. It may be completed in one quarter, in two consecutive quarters, or in one quarter and a consecutive summer session. If the thesis is completed in one quarter, an IP grade will be assigned and five units of credit will be granted when the thesis has been completed and has been approved by the three faculty readers.

The Staff (F, W, Sp)

196A. Junior Seminar: Great Books of English and American Literature. (5) Four to 4 1/2 hours per week. Introduces students to the English and American tradition through a variety of projects: Canterbury Tales; King Lear; Hamlet; Paradise Lost; Gulliver's Travels; Prelude; Midsummer Night's Dream; Oedipus the King; Moby Dick. Normally open only to junior students with a grade-point average of 3.5 or better. (Not limited to English majors.) Admission by consent of instructor. Mr. Parkinson (Sp)

196B. Senior Seminar: Special Topics. (5) Four to 4 1/2 hours per week. The topics will fall within one of the following general areas: (1) "Critical and Methodological Problems in the Study of Literature." Sample topics: Comedy, Symbolism, Genres, Modes of Literary Analysis, Psychoanalytic Criticism, Dramatic Literature and Problems in Staging, Literature and Sociology, Literary and Social Problems. (2) "Literary Modes and Eras." Sample topics: English Literature in the 18th Century, England; The Social Context of the British Novel of the 1840's; American Culture in the 1890's; Women in Literature and in Society. Normally open only to senior students with a grade-point average of 3.5 or better. (Not limited to English majors.) Admission by consent of instructor. The Staff (W)

199. Supervised Independent Study for Advanced Undergraduates. (1–5) Meetings to be arranged. Enrollment is restricted by regulations listed on page 36. Open to students who have completed 15 or more units of upper division English with an average grade of not less than B. Requires the consent of the instructor and the approval of the chairman of majors advisors. Reading and conference with the instructor in a field that shall not coincide with that of any regular course and shall be specific enough to enable the student to write an essay based upon his study. Must be taken on a passed/not passed basis. The Staff (F, W, Sp)

Teacher's Courses

301. Problems in the Teaching of Literature. (3) Students will serve as readers and discussion section leaders in an undergraduate lecture course, and must have completed at least one seminar, a seminar, or equivalent course in the area of the undergraduate course. Weekly meetings, preparation and evaluation of student exercises, and a term project report required. Mr. Burgess (F)

**302. The Teaching of Composition. (2) Three hours of lecture per week. Discussion of course aims, instructional methods, grading standards, and special problems, with practice in handling sample essays. When given for Teaching Assistants and in the English 1A–1B program, the course will include class visitation. May be repeated for credit with permission of instructor. The grading will be on a Satisfactory/Unsatisfactory basis only.**

**303. Teaching of English In Open Admission Programs. (2) Three hours of lecture per week. Discussion of course aims, instructional methods, grading standards. Enrichment activities for students on campus. The focus is on students whose levels of skills may disqualify them from regular freshman programs.**

Graduate Courses

For admission to some seminars, special competence in a foreign language may be required, at the instructor's discretion.

**202. History of Literary Criticism. (5) Three 1 1/2-2 hour lecture meetings per week.**

203. Graduate Readings. (5) Four to 4 1/2 hours of meetings per week. Graduate lecture courses surveying broad areas and periods of literary history, and directing students in advanced areas of specialization. Open to advanced undergraduates, with the instructor's consent. May be repeated for credit, in a different area. Offerings vary from year to year.

The Staff (F, W, Sp)

**204. Celtic Studies. (5) Four to 4 1/2 hours of lecture per week. This course may be repeated for credit.**

205A–205B. The English Language. (5–5) Four to 4 1/2 hours of lecture per week. Prerequisites: 205B—A knowledge of the structure of English, of Old English, and of Latin.

205A. Structure of English. The structure of present-day English—pronunciation, grammar, vocabulary, dialects. Mr. Bond (W)

205B. History of English. Mr. Renoir (Sp)

208. Problems in the Study of Literature. (5) Four to 4 1/2 hours of lecture per week. Approaches to literary study, including textual analysis, scholarly methodology and bibliography, criticism, theory and practice. The Staff (F)

210. Readings in Medieval Latin. (5) Four to 4 1/2 hours per week. Prerequisite: Latin 2 or equivalent. An introduction to the central language and literature of the Middle Ages. May be repeated with consent of instructor. Mr. Dieth (Sp)

**210C. Readings in Renaissance Latin. (5) Four to 4 1/2 hours of lecture per week.**

211A. Introduction to Old English. (5) Four to 4 1/2 hours of lecture per week. Open to seniors with consent of the instructor. Readings in Old English texts. Mr. Renoir (F), Mr. Niles (W)

211B. Beowulf. (5) Four to 4 1/2 hours of lecture per week. Open to qualified undergraduates, with the instructor's consent. Mr. Renoir (W), Mr. Niles (Sp)

**212. Readings in Middle English. (5) Four to 4 1/2 hours of lecture per week.**

246A–246B. Medieval English Literature. (5–5) One 4-hour meeting per week. Extends to consecutive quarters; normally in progress for two quarters on a practical environmental problem. The technical, economic, and political background is studied thoroughly, and its subject approved in a regular quarter. It may be completed in one quarter, in two consecutive quarters, or in one quarter and a consecutive summer session. If the thesis is completed in one quarter, an IP grade will be assigned and five units of credit will be granted when the thesis has been completed and has been approved by the three faculty readers. The Staff (F, W, Sp)

250A–250B. English Seminars. (5–5) One 2–3-hour meeting per week. Required of all graduate students. Extends to consecutive quarters; normally in-progress grades will be assigned for the first quarter. A student may take a second 250 course for credit with the permission of his advisor and the instructor. Offerings vary from year to year. Students should consult the department's Announcement of Courses for offerings in the current academic year. The Staff (F, W, Sp)

251A–251B. Colloquium for Students in the English A. Major, (5–5) One 2-hour meeting per week. Open only to students in the M.A. Program. Extends to consecutive quarters; normally in-progress grades will be assigned for the first quarter. Qualified students should consult their advisors and the Department's Announcement of Courses for offerings in the current academic year. The Staff (F, W, Sp)

270. Research Seminars. (5) One 2–3-hour meeting per week. Intended for specially qualified Ph.D. candidates; will not satisfy the seminar requirement. May be repeated for credit. Offerings vary from year to year. Students should consult the department's Announcement of Courses for offerings in the current academic year. The Staff (F, W, Sp)

271. Editing. (3) Two to 3 hours of lecture per week. Investigation of the methods of editing with specific examples from various sources. Offerings vary from year to year. Students should consult the department's Announcement of Courses for offerings in the current academic year. Mr. Parkinson (Sp)

298. Special Studies. (5–10) Normally reserved for students directly engaged upon the doctoral dissertation. The Staff (F, W, Sp)

299. Special Study. (1–5) 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. The Staff (F, W, Sp)

601. Individual Study. (1–8) Prerequisite: graduate standing. Individual study, in consultation with the graduate adviser, intended for qualified students to do necessary work to prepare themselves for language examinations and the comprehensive examination. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

602. Individual Study for Doctoral Studies. (1–8) Individual study in consultation with the major field adviser; intended to provide an opportunity for qualified students to prepare for the preliminary examinations and to supplement offerings required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

Environmental Studies

Group Major Office, Division of Special Programs, 301 Campbell Hall

Lecturer: Doris Sloan

Major Advisers: Mr. Clyde Wahntaft, Head Adviser; Area I, Physical Science: Mr. James Cason, Jr.; Area II, Biological Science: Mr. Herbert G. Baker; Area III, Social Science: to be appointed (F, W); Mr. Orman Granger (Sp).

Group Major in Environmental Studies

The group major program is administered through the Division of Special Programs. Students are referred to this office for all administrative matters, and this is where major students will file their study lists.

A student may elect to follow one of three distinct areas in the group major in environmental studies, namely physical science, biological science, or social science. Details of course listings appear below. In each of these areas, there is a substantial amount of common ground, so that students will be able to talk with one another and to work together. Each program emphasizes broad and comprehensive training in the elementary fundamentals of mathematics, physics, chemistry, and biology, and in those areas of social science directly related to environmental questions. Such training is regarded as 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.

While many environmental problems have an urban focus (especially air pollution), this field does not include all urban problems. It is concerned with the interaction of urban people with the physical and biological environments created by cities but stops short of the problems stemming from the interaction of people with other people in cities; such matters must be left to the fields of urban and of ethnic studies.

The senior seminar (Environmental Studies 196A–196B) is an important feature of the group major in environmental studies. Typically, a group of twenty-five or fewer seniors, including students from each of the three groups, works under faculty guidance intensively for two quarters on a practical environmental problem. The technical, economic, and political background is studied thoroughly, and then detailed model solutions are worked out.
Area I: Physical Science

Lower Division Courses. Mathematics 1A–1B, 1C or Mathematics 16A–16B; Computer Science 1; Physics 5A–5B or Physics 6A–6B–6C; Chemistry 1A–1B, 8A–8B; Biology 11A–11B; Economics 1; Geology 5; Recommended electives: Mathematics 51C, Physics 5C, 6C, 80D.

Upper Division Courses. Biology 150; a suitable course in demography recommended by the adviser; Environmental Studies 196A–196B, Senior Seminar in Environmental Studies; Chemistry 109A–109B; Geology 130.

20 units from the following list of courses: Anthropology 111, 112, 167, Environmental Studies 102, 123, 124, 125; Geography 131, 144, 148, 188; Economics 100A; Geology 117, 144, 150; Physics 124; Public Health 150; Soil Science 100, 101, 103.

Area II: Biological Science

Lower Division Courses. Mathematics 16A–16B; Physics 6A–6B–6C; Biology 1A–1B; Chemistry 1A–1B; Economics 1. Strongly recommended: Chemistry 8A, 8B; Computer Science 3.

Upper Division Courses. Anthropology 148 or Geography 103 or Sociology 160; Biology 150; a suitable course in demography recommended by the adviser; Environmental Studies 196A–196B, Senior Seminar in Environmental Studies.

Seventeen units (28 units to be selected with the Adviser’s concurrence from the following list: Anthropology 110, 111; Biology 151, 167; Botany 115, 124, 125, 154; Civil Engineering 143, 144; Entomological Science 103 and 103L, 105, 106, 110, 113, 130; Environmental Studies 102, 125; Forestry 122, 123A–123B–123C, 144, 170, 173, 175, 177, 178; Geography 130, 131, 139, 148, 188; Nutritional Science 160; Physical Education 105A–105B; Physiology 132; Pest Management 151; Plant Pathology 20B; Public Health 150, 156 and 156L; Soil Science 100, 101, 103; Zoology 107A–107B, 131 and 133, 139, 140, 141, 142.

Recommended electives: Economics 100A; Environmental Studies 123, 124; Geography 132; Geology 5 or 10, 105; Biology 100, Interdepartmental Studies 180.

Area III: Social Science

Lower Division Courses. Mathematics 16A–16B or Mathematics 1A–1B–1C–51C; Computer Science 3; Physics 6A–6B–6C; Chemistry 1A–1B; Biology 11A–11B; Economics 1.

Upper Division Courses. Biology 150; a suitable course in demography recommended by the adviser; Sociology 140; Geography 130; Environmental Studies 196A–196B (Senior Seminar in Environmental Studies); Economics 100A.

Fifteen units from the following list of courses: Anthropology 110, 111, 112, 114, 148; Environmental Studies 102, 123, 124, 125; Geography 131, 144, 148, 188; Physical Education 105A–105B; Physiology 132; Pest Management 151; Plant Pathology 20B; Public Health 150, 156 and 156L; Soil Science 100, 101, 103; Zoology 107A–107B, 131 and 133, 139, 140, 141, 142.

Recommended electives: Economics 100A; Environmental Studies 123, 124; Geography 132; Geology 5 or 10, 105; Biology 100, Interdepartmental Studies 180.

Impact of human activities on climate, measures of complexity and of stability in lightly and heavily exploited ecological systems. Mr. Holdren (W)

The Bay Area Environment: Physical Problems. (3) Three hours of lecture per week with field trips. Prerequisite: enrollment limited to 25 students. Selected topics concerning geological hazards, water management and air pollution. Ms. Sloan (F)

Land Use Problems of the Bay Area. (3) Three hours of lecture per week with field trips. Prerequisite: enrollment limited to 25 students. Selected topics concerning geological hazards, water management and air pollution. Ms. Sloan (F)

124. Land Use Problems of the Bay Area. (3) Three hours of lecture per week with field trips. Prerequisite: enrollment limited to 25 students. Selected topics concerning geological hazards, water management and air pollution. Ms. Sloan (F)

125. The Bay Area Environment: Biological Problems. (3) Either two hours of lecture or six hours of field trips per week. Prerequisite: enrollment limited to 20 students. The study of Bay Area biota stemming from population and industrial growth; from federal, state and local decision on land use and from conservation. Ms. Sloan (W)

196A–196B, Senior Seminar in Environmental Studies. (3–3) Field work plus one 2-hour meeting per week. Prerequisite: Enrollment limited to students majoring in Environmental Studies. Joint seminar for majors representing the physical, biological and social science areas. A detailed consideration of a specific environmental problem. Credit and grade must be awarded upon completion of the sequence. Ms. Sloan (W, Sp)

199. Supervised Independent Study and Research. (1) Enrollment is restricted by regulations listed on page 36.

Film

Group Major Office, Division of Special Programs, 301 Campbell Hall

Major Advisers: Mr. William Nestrick, Head Adviser (English), Mr. Bertrand Augst (Comparative Literature), Dr. Seymour Chatman (Rhetoric), Dr. Nuel Moses (Italian).

Group Major in Film

The group major in film is administered by the Division of Special Programs. It has been designed to place the history and theory of film in the larger context of humanistic studies. In the lower division, students will take 45 units of course work. Most of these requirements can be satisfied by courses of equivalent. 125A– The Silent Film, 125B– The Classical Film: 1929–1960, 125C– Contemporary Film (1960 to present).

151. Auteur Theory. (5) Four to four and a half hours of lecture and discussion and two to four hours of viewing per week. Prerequisite: European art or film history. Mr. Nestrick in charge (F, W, Sp)

152A–1125B–125C. The History of Film. (5–5–5) Four to four and a half hours of laboratory per week. Prerequisite: Film 1 or equivalent. 125A– The Silent Film, 125B– The Classical Film: 1929–1960, 125C– Contemporary Film (1960 to present).

198. Directed Group Study. (1–5) One to five hours of lecture per week. Prerequisites: Consent of the instructor and Film 100 or equivalent. Group studies of selected topics which vary from year to year. Field shall not coincide with that of any regular course and shall be specific enough to allow students to write an essay based on the study. Mr. Nestrick in charge (F, W, Sp)

H195A–H195B. Honors Thesis. (4–4) Prerequisites: Open to senior majors in Film with a grade-point average of 3.3 or higher on all University work and a 3.3 grade-point average or higher in courses in the major. Students will take four hours of independent study in Film H195A, with credit and grade awarded upon completion of the sequence, to complete an honors thesis for the major program. Although the production of a film may be part of the preparation of the thesis, the thesis will be a substantial piece of writing on film criticism or film history. Mr. Nestrick in charge (F, W, Sp)

196. Directed Group Study. (1–5) One to five hours of lecture per week. Prerequisites: Consent of the instructor and Film 100 or equivalent. Group studies of selected topics which vary from year to year. Field shall not coincide with that of any regular course and shall be specific enough to allow students to write an essay based on his/her study. Must be taken on a passed/not passed basis.

Mr. Nestrick in charge (F, W, Sp)

UPPER DIVISION COURSES

1100. Theory of Film. (5) Four to four and a half hours of lecture and two to four hours of laboratory per week. Prerequisite: Film 1 or equivalent. The study of major theorists of film such as Eisenstein, Bazin, Krakauer, semiotists, structuralists. Mr. Nestrick

108. Special Topics in Film Genre. (5) Four to four and a half hours of lecture and discussion and two to four hours of viewing per week. Prerequisite: Film 100 or equivalent. (4 quarters of foreign language relevant to the particular director). May be repeated if topic changes. The study of a particular genre such as the documentary, the western, the animated film, film noir, the musical. Focus on a particular director such as the work of the west, the animated film, film noir, the musical.
Folklore

**Professors:**
William R. Bascom, Ph.D.  (Chairman)
Alain Dunes, Ph.D.

**Associate Professors:**
John F. Lindsay, Ph.D.
Michael N. Nagler, Ph.D.

**Assistant Professor:**
Daniel F. Meila, Ph.D.

**The Folklore Program**

This program is designed to provide graduate students with a competent knowledge of both the materials of folklore and the various methods of studying these materials. The program is an interdisciplinary one in which faculty members from both the humanities and the social sciences participate. The scope of the courses is international. However, students may specialize in a particular genre, e.g., folklore, or in a particular area, such as Russian folklore.

**The Major**

There is no undergraduate major in folklore.

**Preparation for Graduate Study**

The best preparation for the graduate program in folklore is a strong undergraduate record in one of the broad fields with which folklore is closely affiliated. Since it is a study of the humanist expression which is handed down by tradition rather than by writing, it is related to all those departments that deal with literature, art, music. Since folklore also deals with the entire traditional culture of mankind as manifested in customs and beliefs, it has close affiliations with anthropology, design, history, linguistics, philosophy, psychology, sociology, and anthropology. Consequently, a good undergraduate record in any of these disciplines is highly desirable though not necessarily required.

**The Graduate Major**

The requirements for the M.A. in folklore include 30 units of which at least 12 must be graduate level (200 number) in folklore, and an M.A. thesis based upon fieldwork or some other research project. (No course credits are allowed for the thesis.) Students must take at least one course in two of the following three areas: folk narrative, folklore, or present evidence of having taken equivalent courses at other institutions. In addition, all students are required to take the interdisciplinary Folklore 250A-250B, Narrative Folklore, or present evidence of fieldwork with a competent knowledge of both the materials of folklore and the various methods of studying these materials.

**French**

**Department Office, 4125 Dwinelle Hall**

**Professors:**
Leo Bersani, Ph.D.  (Chairman)
Alexandre E. Calame, *
Docteur de Lettres
Joseph J. Duggan, Ph.D.
Alvin A. Estes, Jr., Ph.D.
Basil Guy, Ph.D.
Ivor Purdue, Ph.D.
Walter E. Rex, Ph.D.
Clifford H. Bissell, Ph.D.
Francis J. Carmody, Ph.D.
Jacqueline de La Harpe, Docteur de Lettres (Emeritus)
Edward F. Meylan, Ph.D.
Manfred G. Sandmann, M.D.
Norval H. Walpole, Ph.D. (Emeritus)

**Associate Professors:**
Bertrand P. Augst, Ph.D.
R. Howard Bloch, Ph.D.
Denis Hollier, Doctorat de 3eme cycle
Leonard W. Johnson, Ph.D.  (Vice Chairman)
Arlene A. Smock, Ph.D.

**Lecturers:**
Esther Alder, Ph.D.
Tom Conley, Ph.D.  (Visiting)
Olyse Dubot, Licence de Pedagogique Melanges d'Arts
Gerard Jan, M.A.
Anne-Marie Lassoglia, Ph.D.
Francisce Sorgan, Doilune eudes suenres
Tatadjov Todorev, Doctorat d'Etat

**The Department places primary emphasis on instruction in French at all levels, and the majority of its upper division courses are conducted entirely in that language. Non-majors, however, may write in English in any upper division course.**

**Please Note:**

- Courses in which topics vary from year to year, students should consult the departmental Announcement of Courses.
- The majors courses 1, 2, 3, 4, 5, 6, and 35 or their equivalents; 44 upper division units in French (of which 18 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 (Literature) offers, in addition, a strong concentration in literature and is especially suitable as preparation for further literary study. Option B (Civilization) aims to include literature in the broader study of French civilization in its historical, social, and artistic dimensions; it is especially suitable for those who desire a background for careers other than the teaching of French literature.

**Option A:** Two courses from the 103 series; at least one must be from 103A--103B--103C. Five courses in the series 120--122 covering three centuries, and one additional course from 121A--121B--121C, 122, 126A--126B--126C, or H198A--H198B. Four elective upper division French courses. Courses 140 and 145 do not count for the major.

**Option B:** Two courses from the 163 series; at least one must be from 103D--103E--103F. Five courses from 150--169, including two from the series 180A--180B--180C. Four elective upper division courses, two of which may be taken in departments other than French in related fields such as History or History of Art.

**Honors Program:** Students may enroll in the honors program only with the consent of their major adviser. It is open to students with an overall grade-point average of at least 3.3 and a grade-point average of at least 3.5. The majors in the honors program must complete two quarters of H198A--B as seniors. Option A majors will write an essay on a topic relating to French literature; Option B majors will choose a subject relating to other aspects of French culture. This essay will be written under the supervision of a member of the faculty. Credit and grade will be awarded upon completion of the H198A--B course.

**Letters and Science List of Courses:** 162 units from the list must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the list.

**Graduate Study**

The M.A. Program. A minimum of 36 units in French is required, including at least 18 units of graduate courses. With permission of the graduate adviser a maximum of 8 units of upper division or graduate work in other departments may be substituted for work in French, but the minimum of 18 units of graduate French courses remains the same. The aim of the program is to provide a comprehensive knowledge of French literature; to that end, candidates will be asked to familiarize themselves with the works on a departmental reading list. For purposes of study and testing, French literature is divided chronologically as follows (1) 1515--1600; (2) 1600--1789; (3) 1789--1885; (4) 1885 to present. The M.A. Program. A minimum of 36 units in French is required, including at least 18 units of graduate courses. With permission of the graduate adviser a maximum of 8 units of upper division or graduate work in other departments may be substituted for work in French, but the minimum of 18 units of graduate French courses remains the same. The aim of the program is to provide a comprehensive knowledge of French literature; to that end, candidates will be asked to familiarize themselves with the works on a departmental reading list. For purposes of study and testing, French literature is divided chronologically as follows (1) 1515--1600; (2) 1600--1789; (3) 1789--1885; (4) 1885 to present. The Department offers two plans of study for the M.A. In Plan I, 32 of the required 36 units are divided equally among four of the chronological periods. From the remaining period the student will choose an upper division course, or genre of special interest to be the subject of a thesis, written in French, or of about 50 pages. In Plan II the student will demonstrate competence in three of the above chronological periods by a written examination. A fourth period may be tested either by written examination or by the completion of two courses of course work; the fifth period is tested by independent work in a 290 course.

The M.A.T. Program. A program leading to the Master of Arts in Teaching (French) degree. Course work will consist of twenty-four units in French and twenty-four units in Education and includes a written project involving field work, to be completed during the second year. For a complete description please refer to the Announcement of the School of Education.

The Ph.D. Program. Language requirements: a reading knowledge of two foreign languages other than French is required. The program asks students to choose three defined areas of study within French literature, or the additional choice of an adjacent field germane to these studies: (1) the work of a single major author; (2) a historical period in French literature; (3) the development of a form or genre. The candidates will take at least two courses in the required field and the third course in the remaining period. For further information, consult the graduate adviser and the Department guide to higher degrees.

---

*NOTE: *The above information was extracted from the UC Berkeley Catalog for the year 1969-1970.
112A—112B. Medieval Literature: from the Chanson de Roland to the Roman de la Rose. (4-4) Three hours of lecture per week. Prerequisite: two courses from 103A, 103B or 103C, or the equivalent. Ms. Bloch (W; Sp)

114. Late Medieval Literature: Johnville to Villon. (F) Formerly 112C. Three hours of lecture per week. Prerequisite: two courses from 103A, 103B or 103C, or the equivalent. Mr. Bloch (W, Sp)

116A—116B—116C. Sixteenth Century Literature: The 16th Century in Writing. Three hours of lecture per week. Prerequisite: two courses from 103A, 103B or 103C, or the equivalent. Mr. Bloch (W, Sp)

117A—117B—117C. Seventeenth Century Literature. (4—4—4) Three hours of lecture per week. Prerequisite: two courses from 103A, 103B or 103C, or the equivalent. Mr. Eustis (W, Sp)

117A. The Baroque and Corneille. (F, W, Sp)
117B. Classicalism: Moliere and the Observers of Society. (W)
117C. Classicalism: Racine and the Metaphysical Artists. (W)

118A—118B—118C. Eighteenth Century Literature: Free Thought, Enlightenment, Revolution. (4—4—4) Three hours of lecture per week. Prerequisite: two courses from 103A, 103B or 103C, or the equivalent. Mr. Bloch (W, Sp); Mr. Calame (F)

119A—119B. The Nineteenth Century. (4—4) Three hours of lecture per week. Prerequisite: two courses from 103A, 103B or 103C, or the equivalent. Ms. Lasocki (W); Mr. Eustis (Sp)

120. Twentieth Century Literature: Tradition, Renewal and Revolt. (4—4) Three hours of lecture per week. Prerequisite: two courses from 103A, 103B or 103C, or the equivalent. Topics vary from year to year. Course may be repeated for credit. (W, Sp)

124A—124B. Modern Theater. (4—4) Three hours of lecture per week. Prerequisite: Two courses from 103, one of which must be 103A, 103B or 103C or the equivalent. Studies in 20th century theater, including cinema. Ms. Lasocki (W)

126A—126B—126C. Senior Seminar. (4—4—4) Three hours of lecture per week. Prerequisite: Two courses from 103, one of which must be 103A, 103B or 103C, or the equivalent. Intensive study of a major author. Mr. Calame (F); Ms. Smock (Sp)

130. Writing in French. (4—4) Three hours of lecture per week. Prerequisite: 103A or 103B or the equivalent. Development of a good prose style and an extended vocabulary. Ms. Sorgen (F); Mr. Dutoit (Sp)

131A—131B. French and English: Translation and Translation Studies. (4—4) Three hours of lecture per week. Prerequisite: two quarters of 103, or the equivalent. Ms. Lasocki (W)

132A—132B. History of the Language. (4—4) Three hours of lecture per week. Prerequisite: two quarters of 103, or the equivalent. Ms. Smock (Sp)

133. Introduction to French Linguistics. (4—4) Three hours of lecture per week. Prerequisite: two quarters of 103, or the equivalent. Ms. Feischman (F)

135. French Dialectology. (4—4) Three hours of lecture per week. Prerequisite: two quarters of 103, or the equivalent. Ms. Feischman (F)

140. Readings in French Literature. (4) Three hours of lecture per week. Readings in French, class discussions and exercises in English. Topics offered will vary from year to year.
175. Literature and the Visual Arts. (4) Three 1-hour lectures per week. Prerequisite: Two courses from the 103 series, one of which must be D or E, or the equivalent. Using various works from the arts and the human sciences, this course will be an investigation into the relations between images and written texts.

180A–180B–180C. French Civilization. (4–4–4) Three one-hour lectures per week. Prerequisites: Two courses from the 103 series, one of which must be D or E, or the equivalent. A survey of French civilization: History, Arts and Society. 180A: Medieval and Renaissance. 180B: The seventeenth and eighteenth centuries. 180C: France since the Revolution.

Mr. Guy, Ms. Huet (F, W, Sp)

183. Configurations of Crisis. (4) Three 1-hour lectures per week. Prerequisite: two courses from 103 series, one of which must be D or E, or the equivalent. A study of the pressures on artistic, political and economic structures at moments of crisis in French history. Problems of continuity and discontinuity in artistic and social history.

Mr. Calame (W)

185. Literature and Colonialism. (4) Three hours of lecture per week. Prerequisite: two quarters of 103, one of which must be 103C, 103E or 103F or the equivalent. Studies in the literature developed in France at the height of the colonial era. The themes of travel, exoticism, neo-civilization; the reaction of European countries to the discovery of Africa.

Ms. Huet (F)

H198A–H198B. Honors Sequence. (2-4; 2-4) Prerequisite: overall GPA of 3.3 and GPA in French major of 3.3. Open to seniors with consent of major advisor. Students will write an essay on a topic relating to French literature or culture under the supervision of a member of the faculty, during two consecutive quarters of their senior year. Credit and grade awarded on completion of the sequence.

The Staff (F, W, Sp)

199. Supervised Independent Study and Research for Advanced Undergraduates. (2–5) Enrollment is restricted by regulations listed on page 36. Additional restriction: restricted to seniors with an overall 3.0 average and at least a 3.0 average in French. Individual instruction only in areas not covered by regularly scheduled courses. A grade of passed/not passed will be assigned.

The Staff (F, W, Sp)

GRADUATE COURSES

201A–201B–201C. Historical Grammar. (4–4–4) One 2-hour class and one 1-hour class per week.

Ms. Fleschman (F, W)

*203A–203B. French Syntax. (4–4) One 2-hour class per week.

*204. Oral Argumentation in French. (4) Formerly 236. Three hours of lecture per week. Study of narrative structures and theories of rhetoric in the French language through close analysis of texts.

205A–205B. Literary Criticism and Literary Scholarship. (4–4) 205A: A study of various critical approaches to literature. 205B: Training in the most recent techniques of the traditional branches of literary history: bibliography, historiography, biography, stylistics, explication de textes, critical editions; preparation of essays, articles, monographs and books.

205B: Mr. Calame (W); 205A: Mr. Todorov (Sp)


Mr. Jan (F)

210A–210B–210C. Studies in Medieval Literature. (4–4–4) Three hours of lecture per week. Offerings vary from year to year. Students should consult the department's Announcement of Courses for offerings in the current academic year.

Mr. Bloch (Sp)

211A–211B. Reading and Interpretation of Old French Texts. (4–4) Formerly 206A–206B. Three hours of lecture per week. Offerings vary from year to year. Students should consult the department's Announcement of Courses for offerings in the current academic year.

Mr. Bloch (F); Mr. Duggan (W)

*212A–212B–212C. Old Provencal Literature. (4–4–4) Three hours of lecture per week. Reading and analysis of twelfth and thirteenth century texts written in the langue d’oc with special emphasis on troubadour lyric poetry.

*218A–218B. Studies in Late Medieval Literature. (4–4–4) Three hours of lecture per week, offerings vary from year to year. Students should consult the department's Announcement of Courses for offerings in the current year.

Mr. Johnson (Sp)

220A–220B–220C. Studies in Sixteenth Century Literature. (4–4–4) Two hours of lecture per week. Offerings vary from year to year. Students should consult the department's Announcement of Courses for offerings in the current academic year.

Mr. Johnson (Sp)


Mr. Calame (F)


Mr. Eustis (W)

240A–240B–240C. Studies in Eighteenth Century Literature. (4–4–4) Two hours of lecture per week. Offerings vary from year to year. Students should consult the department's Announcement of Courses for offerings in the current academic year.

Mr. Rex (Sp)

243A–243B. The Eighteenth Century Novel. (4–4) Two hours of lecture per week. Offerings vary from year to year. Students should consult the department's Announcement of Courses for offerings in the current year.

Mr. Huet (W)

250A–250B–250C. Studies in Nineteenth Century Literature. (4–4–4) Two hours of lecture per week. Offerings vary from year to year. Students should consult the department's Announcement of Courses for offerings in the current academic year.

Mr. Bersani (Sp)

*254A–254B–254C. Nineteenth Century Poetry. (4–4–4) Two hours of lecture per week. Offerings vary from year to year. Students should consult the department's Announcement of Courses for offerings in the current academic year.

Mr. Conley (F)

265A–265B. Modern Theatre and Cinema. (4–4) Two hours of lecture and 2 hours of laboratory (film showings) per week. Offerings vary from year to year. Students should consult the department's Announcement of Courses for offerings in the current academic year.

Mr. Augat (Sp)

268. French Literary and Cultural History. (4) Three hours of lecture per week. An analysis of patterns and trends in the literature and culture of France, considered in relationship to their counterparts in the United States and elsewhere. Primarily for M.A.T. candidates, but open to all graduate students.

298. Special Study. (1–5) Variable hours of meeting. Designed for students engaged in exploration of a restricted field, involving the writing of a report. May not be substituted for available seminars or graduate courses.

The Staff (F, W, Sp)


The Staff (F, W, Sp)

601. Special Study for Graduate Students. (1–8) Individual study for the comprehensive in consultation with the field adviser. Units may not be used to meet either unit or residence requirements for a master's
degree. Must be taken on a satisfactory/unsatisfactory basis.

602. Individual Study. (1–8) Prerequisite: an M.A. or completion of at least 24 units beyond the B.A. Individual study with the major adviser, intended to provide an opportunity for qualified students to prepare for the various examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (Graduate Advisers in charge) (F, W, Sp)

1G. French for Graduate Students, Beginning. (0)
Three hours of lecture per week. Course must be taken on a satisfactory/unsatisfactory basis. (A) Preparation for graduate reading examinations in field of English. (B) Preparation for graduate reading examinations in all other disciplines.

2G. French for Graduate Students, Advanced. (0)
Three hours of lecture per week. Prerequisite: French 1G or equivalent. Must be taken on a satisfactory/unsatisfactory basis. (A) Preparation for graduate reading examination in field of English, (B) Preparation for graduate reading examinations in all other disciplines.

301A–301B–301C. Teaching French in College. (2–2–2) Three hours of lecture and one hour of laboratory per week. Prerequisite: for graduate students teaching at the college level. Required for all new Teaching Assistants. Must be taken on a satisfactory/unsatisfactory basis. Bi-weekly lectures on methodology, grading, and testing, demonstration class with required attendance three times a week; language laboratory observations; supervised classroom practice. Additional seminars and discussion sessions on methodology.

Mr. Jan (F)

IDS 117. Music and the Philosophers. (4) See Inter-departmental Studies for complete description of this course.

Genetics

Group Major Office, Division of Special Programs, 301 Campbell Hall

Undergraduate Major Advisers: Mr. Kelly, Ms. St. Lawrence

Honors Program Adviser: Mr. Kelly

Choice of College

A student can complete the group major in genetics in the College of Letters and Science (A.B. degree) or can elect genetics as an emphasis in the biology of natural resources major in the College of Natural Resources (B.S. degree).

Staff, graduate programs, and courses are listed under the College of Natural Resources.

Group Major in Genetics

The group major program is administered through the Division of Special Programs. Students are referred to this office for all administrative matters, and this is where major students will file their study lists.

The group major in genetics is designed to provide a broad foundation in biology, centered around a core of emphasis on genetics. The field of genetics encompasses many areas of biological research. Major requirements range from molecular to population levels; they are designed to take advantage of the diversity of course offerings at Berkeley so as to allow students with interests as varied as bacterial genetics, human genetics or population biology to fulfill the requirements in a manner suited to their personal interests. The intent of the program is to be rigorous in the breadth of its requirements and flexible in the means of fulfilling them.

Lower Division Courses. Required: Biology 1A, 1B; Chemistry 1A, 1B, 1C; Chemistry 8A–8B (or 12A–12B-112); Physics 6A–6B; Mathematics 16A–165. Recommended: Physics 6C.

Upper Division Courses. A minimum of 40 units of upper division (or graduate) course work is required. The courses must be in genetics, statistics, or from the list in Part II below and must meet the minimum requirements of Parts I and II below.

Part I. Required courses: Genetics 100 (5) (or equivalent), 100L (4), 101 (3), and one of the following: Genetics 130 (4), or 154 (5), or 159 (4). Note: Genetics 100L may be waived by the adviser for Honors Students who have had substantial laboratory work elsewhere.

Part II. A minimum of one course in each of the following five categories is required:

- Biochemistry
- Biotechnology
- Cell Biology and Physiology
- Ecology
- Evolution

- Microbiology

Note: Either Botany 124 or Zoology 143 may be used to fulfill simultaneously the Organismal Diversity and Form requirement and the Ecology requirement.

Honors Program. The program consists of a minimum four-term sequence taken in addition to requirements for the major. The sequence commences spring term with Genetics H180, and terminates the following spring with Genetics H185 and terminates the following spring with Genetics H186, during which an honors thesis is written and submitted for review by a committee of three faculty members. A student in the program may elect to leave the program at any time prior to taking Genetics H187.

Students with an overall grade-point average of 3.0 and an average of 3.3 within the major are eligible to enter the honors program. Only students with an overall grade-point average of at least 3.3 at the time of graduation are eligible to be awarded honors.

Eligible students who complete the program may be awarded Honors, High Honors, or Highest Honors. Awarding of honors is made by the thesis review committee and the honors adviser and is based solely upon the merits of the honors thesis.

Professors:

David J. M. Hooson, Ph.D.
James J. Parsons, Ph.D.
Clarence J. Glacken, Ph.D.

(Chairman)

Alan Pred, Ph.D.
Hilgard O'R. Sterling, Ph.D.

John E. Kessell, Ph.D.

(Chairman)

James E. Vance, Jr., Ph.D.

John E. Kessell, Ph.D., LL.D., Sc.D. (Emeritus)

Associate Professors:

Bernard Nietschmann, Ph.D.
Theo E. Osterlander, Ph.D.

Joseph E. Spencer, Ph.D.

Lecturer:

Douglas Powell, M.A.

Departmental Undergraduate Advisers: Mr. Nietschmann, Mr. Walker.

Departmental Graduate Advisers: Mr. Pred, Mr. Reed.

Advisance concerning requirements for undergraduate and graduate students is offered by the departmental advisers: guidance in the student's special field of interest is administered by the appropriate member of the staff. New students entering the Department at any level must consult with the departmental advisers until a specialty adviser has been selected or assigned to them.

The Geography Department aims to provide a broad-ranging perspective on man as an inhabitant and transformer of the face of the earth. The search for this kind of understanding involves through study of (a) the interlocking systems of the natural environment (climate, landforms, biota) and the evaluation of natural resources; (b) those diverse historical, cultural, social, economic, and political 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 geography major, the emphasis depending on the student's particular interests.

The Major

Lower Division. Geography 1, 4, and 7. (Transfer students should consult with the Departmental Undergraduate Adviser in order to avoid repeating lower division work.)

Upper Division. A minimum of 40 units. The student must select one of four options. The order in which the courses are listed in each option does not imply a sequence.

Option I (Cultural-Environmental): Two courses from Geography 100–110, two courses from Geography 130–139 and 149; Geography 180, Geography 183 or 187.

Option II (Urban-Economic): Five courses from Geography 111–125; Geography 187.

Option III (Physical): Four courses from Geography 140–149 including Geography 140, 144 and 148; Geography 180; Geography 187.

Option IV (General): One course from each of the following groups: Geography 100–104; Geography 110–112; Geography 130–137; Geography 140–149: Also Geography 180 and 183 or 187.

All geography majors must take Geography 189 and

NOTE: For key to symbols, see page 36.
two regional courses numbered 150–171. Seniors with a grade-point average of at least 3.0 in the major may take graduate courses. Courses numbered 190–199 do not count toward completion of the major.

Honors Program. With the consent of the major adviser, a student may enter 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 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 H195, in which a thesis is required, and may take graduate seminars.

Letters and Science List of Courses: 162 units or the list must be included. 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Graduate Study

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. Students entering the graduate program from fields other than geography should expect to take at least one upper division course in physical geography, and to complete a major in physical geography, and a major in cultural geography, and may take graduate courses. Courses numbered 190-199 are open for credit to students who have taken course 145.

Graduate Study

LOWER DIVISION COURSES

1. Introduction to Physical Geography. (5) Three 1-hour lectures per week, and three 2-hour laboratory periods per week. Origin of the Earth's major geological and climatic patterns and their influence upon the characteristics of landforms, and regional patterns of temperature, rainfall, and vegetation patterns; the shaping of patterns of settlements and economy by transportation innovation; the role of transportation in regional development in Britain, Europe, Asia, and North America. Jr. Vance (W)

11. Systems of Cities and Regional Development. (5) Three hours of lecture per week. Processes relating to the localization of human settlement; cities as expressions of varying cultural traditions. Mr. Reed (W)

103. The Relations between Nature and Culture. (5) Three hours lecture per week. A history of the great ideas in Western thought concerning the relationship of human culture to the natural environment. Mr. Glacken (Sp)

104. The City in the Third World. (5) Three hours of lecture and one hour of discussion 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. Mr. Reed (Sp)

110. Location Theory. (4) Three hours lecture per week. A review of theories pertaining to the locational patterns of agricultural activities, manufacturing, and business and service activities. The impact of non-optimal locational decision-making on real-world patterns.

111. Information Circulation and Innovation Diffusion. (4) Three hours lecture per week. The geographic spread of information under different technologies and stages of economic development. Processes that generate the diffusion of cultural and economic innovation into society. Mr. Pred (Sp)

112. Historical Geography of Transportation. (4) Three hours lecture per week. The influence of geographical factors in the creation, transformation, and diversification of human transportation networks over time; the patterns; the shaping of patterns of settlements and economy by transportation innovation; the role of transportation in regional development in Britain, Europe, Asia, and North America. Mr. Vance (W)

113. Agricultural Geography. (4) Three hours of lecture per week. Agricultural production and exchange. Comparative agricultural systems; their historical development, present characteristics, performance, and role in national and world economies. To be offered 1976-79 only. Ms. Pallot (F)

120. Morphogenesis of the Western City: Pre-Industrial Urban Geography. (5) Four hours of lecture per week. Historical and geographical structure of western cities and urban morphology theory from the Middle Ages to the Industrial Revolution. Special emphasis on the physical and social structure of cities in pre-industrial society. Mr. Vance (F)

121. Morphogenesis of the Western City: Urban Geography in the Industrial Age. (5) Four hours of lecture per week. Historical development of the physical and social structure of western cities and the shaping of urban morphology during and since the Industrial Revolution. Specific attention is given to the location of retailing, wholesaling, and housing. Mr. Vance (W)

125. Social Geography. (4) Three hours lecture per week. The interrelationships of social and physical space, with particular reference to diffusion processes and environmental perception, attitudes, and behavior. Structure and process at the intrametropolitan and "urban field" scales of inquiry. Mr. Faden (F)

130. Natural Resources and Population. (5) A study of the interactions of population growth, technological, and natural resources, with emphasis on the demographic and environmental implications. Mr. Pred (F)

134. Population Geography. (4) Three hours of lecture per week. Distribution of world population; differential growth and migration as influenced by cultural, environmental, and political-economic factors. Mr. Walker (W)

135. Energy as a Resource. (3) Three hours of lecture and one hour of discussion per week. The development of the understanding and application of the technology of its use. Distribution of use in relation to (a) nature, magnitude, and location of the resource, (b) development and the technology of its application, transport, storage, and conversion. Estimates of future conditions.

139. Urban Environments. (5) Three hours of lecture and one hour of discussion per week. Population, environment, and urbanization; religious geography and humanitas cities; as expressions of varying cultural traditions. Mr. Reed (W)

141. Topographic Map Interpretation. (5) Six hours of lecture per week. Prerequisites: courses 140, which may be taken concurrently. The recognition and analysis of landforms portrayed on standard topographic maps. Mr. Oberlander (W)

142. Physiography of North America. (4) Three hours of lecture per week. Prerequisites: Geography 140, or 101 or 117, or the equivalent. Comparative survey of the landforms and physiographic regions of North America. Mr. Oberlander (W)

144. Principles of Meteorology. (4) Three hours lecture and one hour of discussion per week. Weather development and interaction with different scales of atmospheric circulation, with examples from the Northeastern Pacific-Western North America area. (W)

145. Applied Micro- and Bio-Climatology. (4) Three hours of lecture per week. Prerequisites: Geography 144 or consent of instructor. Not open to students who have taken Geography 146. Interrelationships between atmospheric, biotic, and edaphic processes over short time periods; atmospheric interactions with plants, animals and man. Mr. Granger (Sp)

147A-147B. Climatic Change. (4) Three hours of lecture per week. A study of the patterns of climatic change characteristic of the Pleistocene and Holocene. 147B: Fluctuations in climate during the period of Quaternary research. Theories of causes and consequences. 147A: Changes in temperature, precipitation, sea level, vegetation, and the nature of ancient human societies. Mr. Oberlander (W)

149. Man and Vegetation Change. (4) Three hours of lecture per week. Principles of vegetation change; causes and consequences. Mr. Byrne (W)

150. Principles of Cultural Geography: Culture and Rural Environments. (5) Three hours of lecture and one hour of discussion per week. Historical and contemporary interpretations of the role of agriculture, and the development of human settlement and land use in different cultural contexts. Mr. Reed (F)

151. Principles of Cultural Geography: and Urban Environments. (5) Three hours of lecture and one hour of discussion per week. Population, environment, and urbanization; religious geography and humanitas cities; as expressions of varying cultural traditions. Mr. Reed (W)

152. Open Space as a Resource. (5) Three hours of lecture and one hour of discussion per week. Changing ideas and practices concerning the use of nature from the industrial revolution to the present, including the conservation movement, parks, wilderness and wildlife preservation, the rural ideal, and the land ethic. Mr. Walker (W)


159. Endangered Species and Habitats. (4) Three hours of lecture per week. An historical inquiry into the patterns of animal extinction and habitat simplification and decimation during the last centuries of expanding human population and technology. The current situation and prospects, regionally and worldwide. Part II. Mr. Nietschmann (F)

160. Analysis of Landforms. (4) Three or one-half hours of lecture per week. Prerequisites: courses 140, or one or more courses in geography. Origin of landforms in various physiographic environments. Review of alternative interpretations of processes involving physiography on recent views. Mr. Oberlander (F)

163. Physical Geography of the Polar Regions. (5) Three hours of lecture per week. Prerequisite: Geography 140 or equivalent. Study of the polar regions of the earth. Mr. Oberlander (F)

166. Agricultural Geography. (4) Three hours of lecture per week. Historical development of agricultural regions and patterns of agricultural production and exchange. Comparative agricultural systems; their historical development, present characteristics, performance, and role in national and world economies. Mr. Pred (F)


173. Applied Physical Climatology. (4) Two hours of lecture per week and four days fieldwork per quarter. Part I. Development and its Environmental Impact. Mr. Development and its Environmental Impact. Mr. Reed (Sp)

187. Biogeography. (4) Junior or senior standing; consent of instructor. Course is intended for students who are interested in the study of the distribution of organisms in natural habitats. Mr. Byrne (F)

190. Principles of Cultural Geography: Cultural and Economic Geography. (5) Three hours of lecture and one hour of discussion per week. Principles of cultural geography. Major themes concerning the relation of culture to environment; cultural attitudes toward nature, processes in the formation of cultural landscapes. Mr. Nietschmann (F)

191. Principles of Cultural Geography: Culture and Urban Environments. (5) Three hours of lecture and one hour of discussion per week. Population, environment, and urbanization; religious geography and humanitas cities; as expressions of varying cultural traditions. Mr. Reed (W)

192. Principles of Cultural Geography: Cultural and Economic Geography. (5) Three hours of lecture and one hour of discussion per week. Principles of cultural geography. Major themes concerning the relation of culture to environment; cultural attitudes toward nature, processes in the formation of cultural landscapes. Mr. Nietschmann (F)

193. Principles of Cultural Geography: Cultural and Economic Geography. (5) Three hours of lecture and one hour of discussion per week. Principles of cultural geography. Major themes concerning the relation of culture to environment; cultural attitudes toward nature, processes in the formation of cultural landscapes. Mr. Nietschmann (F)
Three hours of lecture per week. An historical review of man's role as an agent in vegetation change with special emphasis on North American examples.

150. California. (5) Four hours lecture per week. Geographic regions of the state; agricultural, urban, and industrial expansion as related to population growth and changing technology. Ecological evolution of present environments. Mr. Parsons (Sp)

151. Western United States. (4) Three hours lecture per week. Mr. Parsons (Sp)

152. Historical Geography of the United States. (5) Three hours of lecture and one hour of discussion per week. An evolutionary view of the regional economics and cultures of the United States as it is related to the spread of the human landscape and its response to various physical conditions. Mr. Vance (W)

153. Geography of Canada. (4) Three hours lecture per week. Mr. Vance (F)

154. Middle America. (4) Three hours lecture per week. Mexico, Central America, and the West Indies. Mr. Nietschmann (W)

155. Spanish South America. (4) Three hours lecture per week. The Andean and La Plata countries. Mr. Parsons (F)

156. Brazil. (5) Four hours of lecture per week. Selected environmental and cultural themes in the contemporary landscape of Portuguese America, including a brief general survey of the problems that challenge the people of Brazil's major geographic regions. Mr. Snyder (F)

157A. The Nordeste. (3) Formerly 157B. Two hours lecture and one hour consultation per week. Pre-requisite: course 156 or consent of instructor. Problem-oriented themes in a regional context. Traditional and recent approaches to environmental problems of a diversified region, with emphasis on the "drought polygon"; water as a critical factor and its use in agriculture and industry. Mr. Sternberg (W)

157B. Agricultural Frontiers in Brazil. (3) Formerly 157C. Two hours lecture per week. Pre-requisite: course 156 or consent of instructor. Problem-oriented themes in a regional context. Mr. Schmalenbach (F)

158. Environment and Man in the Amazon Basin. (5) Four hours of lecture per week. A review of physical, biotic, and cultural processes in the domain of the greatest fluvial network on earth. Vulnerability of complex ecosystems currently subjected to a large-scale disturbance.

159. Africa. (5) Three hours of lecture and one hour of discussion per week. Pre-requisite: upper division standing. Mr. Powell (Sp)

160. Mother Lode Country. (3) Two hours of lecture per week; field trips. Pre-requisite Geographical 150 or consent of instructor. Man's impact on the landscape of the mountain counties of California; patterns of settlement and economic activity; the nature of recent land and land development schemes; changing values relating to rural life. Mr. Parsons (F)

161A–162B. Soviet Union. (5–6) Three hours of lecture and one hour of discussion per week.

162A. A systematic survey.

162B. Specialized course 162A or consent of the instructor. Special problems in Soviet regional geography. Mr. Hooson (W)

163. Southeast Asia. (5) Four hours of lecture per week. Mr. Redding (W)

164. China, Japan, and Korea. (4) Three hours of lecture per week.

165. The Middle East. (4) Three hours lecture per week. The human geography of the Middle East, from Egypt to Afghanistan. Physical, historical, and cultural background to current social and economic problems of individual countries and the area as a whole. Mr. Oberlander (Sp)

166. Southwestern Pacific. (5) Three hours of lecture and one hour of discussion per week. Australia, New Zealand, and the South Pacific islands. Mr. Hooson (W)

167. The Arid Lands. (4) Three hours of lecture per week. A survey of the ecological environments and resulting human problems in the arid regions of the world. Mr. Oberlander (Sp)

168. The Humid Tropics. (4) Five hours of lecture per week. An analysis of the resources of the warm and wet lands of the equatorial regions; the economic potentials of the tropics and the obstacles to their exploitation inherent in the physical and cultural environments. Mr. Sternberg (F)

169. 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 adjustment to natural hazards such as floods, droughts, earthquakes, hurricanes, tornadoes, and volcanic eruptions. Mr. Granger (Sp)

170. Field Geography. (5) One hour of lecture per week and nine hours of field work every Saturday. Pre-requisite: senior standing. A geographical survey of selected natural and cultural environments in the Bay Area and adjacent parts of Northern California. Mr. Powell (F, Sp)

171. Urban Field Geography. (4) One hour of lecture per week and nine hours of field work every Saturday. Pre-requisite: course 121 or 125 or consent of instructor. A study of the structural components of the urban environment of the San Francisco-Oakland Metropolitan Area. Mr. Walker (Sp)

172. Cartographic Representation. (5) Two hours of lecture and six hours of laboratory per week. Problems in the representation of quantitative and qualitative data on the map. Mr. Granger (F, W)

173. Intermediate Cartography. (4) Two hours of lecture and 6 hours of laboratory per week. Pre-requisite: Geography 183 or consent of instructor.

174. Introduction to Quantitative Methods in Geography. (4 and 5) Three hours of lecture per week. Pre-requisite: Statistics 2 or equivalent. Application of some elementary concepts of scaling and measurement to problems in geography. Topics to be considered may include areal classification, spatial interaction, analysis of networks.

175. Geography of Human Health and Disease. (4 and 5) Three hours of lecture per week. Principles of medical geography and landscape epidemiology including changing patterns of human health and disease in the context of physical, biotic and sociocultural environments and in relation to human settlement. Mr. Walker (F, W). Term research paper required for 5 units credit.

176. Geography of Transportation. (4) Three hours of lecture per week. Mr. Sternberg and Staff in cooperation with Staff of Dept. of International Health - Hopkins Foundation, UCSF (F)

177. Geographic Thought. (5) Three hours lecture and one hour of discussion per week. Pre-requisite: upper division standing.

178. Honors Course. (1–5) Pre-requisite: admission to the Honors Program and consent of instructor. Students will write a thesis. The Staff (F, W, Sp)

179. Field Study in Geography. (1–5) Pre-requisites: consent of instructor. Supervised experience in application of the geographic approach to a wide variety of organizations. Regular individual meetings with faculty sponsor and written reports required. Must be taken on a passed/not passed basis. The Staff (F, W, Sp)

180. Directed Group Study. (1–5) One hour of lecture and 3–6 hours of laboratory per week. Pre-requisite: consent of instructor.

181. Supervised Independent Study and Research. (1–5) Pre-requisite: Geographical 150 or consent of instructor. Additional limitations. Students must have senior standing and have an overall grade-point average of at least 3.0. The course may be taken on a pass or not passed basis. The Staff (F, W, Sp)

182. Advanced Cultural Geography. (4) Formerly course 200. Three hours of lecture per week. Mr. Redding (W)

183. Advanced Field Study in Geography. (4) Three hours of lecture per week. Mr. Vance (W)

184. Directed Dissertation Research. (1–8) Open to qualified students who have already satisfied the Ph.D. degree requirements. Open to qualified students who have been advanced to candidacy for the Ph.D. degree and are directly engaged upon the doctoral dissertation. May be taken satisfactorily/unsatisfactorily. May be repeated for credit.

185. Directed Field Studies. (1–8) Open to qualified students who have already satisfied the Ph.D. degree requirements. May be taken satisfactorily/unsatisfactorily. May be repeated for credit.

186. Directed Field Studies. (1–8) Open to qualified students who have already satisfied the Ph.D. degree requirements. May be taken satisfactorily/unsatisfactorily. May be repeated for credit.

187. Directed Dissertation Research. (1–8) Open to qualified students who have already satisfied the Ph.D. degree requirements. May be taken satisfactorily/unsatisfactorily. May be repeated for credit.

188. Directed Dissertation Research. (1–8) Open to qualified students who have already satisfied the Ph.D. degree requirements. May be taken satisfactorily/unsatisfactorily. May be repeated for credit.

189. Directed Dissertation Research. (1–8) Open to qualified students who have already satisfied the Ph.D. degree requirements. May be taken satisfactorily/unsatisfactorily. May be repeated for credit.

190. Directed Dissertation Research. (1–8) Open to qualified students who have already satisfied the Ph.D. degree requirements. May be taken satisfactorily/unsatisfactorily. May be repeated for credit.

191. Directed Dissertation Research. (1–8) Open to qualified students who have already satisfied the Ph.D. degree requirements. May be taken satisfactorily/unsatisfactorily. May be repeated for credit.

192. Directed Dissertation Research. (1–8) Open to qualified students who have already satisfied the Ph.D. degree requirements. May be taken satisfactorily/unsatisfactorily. May be repeated for credit.

193. Directed Dissertation Research. (1–8) Open to qualified students who have already satisfied the Ph.D. degree requirements. May be taken satisfactorily/unsatisfactorily. May be repeated for credit.

194. Directed Dissertation Research. (1–8) Open to qualified students who have already satisfied the Ph.D. degree requirements. May be taken satisfactorily/unsatisfactorily. May be repeated for credit.

195. Directed Dissertation Research. (1–8) Open to qualified students who have already satisfied the Ph.D. degree requirements. May be taken satisfactorily/unsatisfactorily. May be repeated for credit.
Geology and Geophysics

Department Office, 301 Earth Sciences

Professors:
Bruce A. Boat, Ph.D., D.Sc.
Ian S. E. Cameron, Ph.D.
Gian H. Curtis, Ph.D.
Perry B. Brey, Ph.D., LL.D.
Charles Gilbert, Ph.D.
Adolf Pabst, Ph.D. (Emeritus)
Francis J. Turner, Sc.D. (Emeritus)
Howell Williams, Sc.D., LL.D. (Emeritus)

Associate Professor:
Chuyi Wang, Ph.D.

Assistant Professor:
George H. Birmihi, Ph.D.

The Department of Geology and Geophysics offers the student excellent opportunities to acquire a broad background of knowledge and experience in the study of the structure and evolution of the earth. Three undergraduate degree programs are offered, each leading to the A.B. degree in the College of Letters and Science.

Letters and Science List of Courses: 162 units from the list must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the list.

The Major in Earth Science

The major in earth science includes a broad spectrum of courses in natural science and is designed for students who desire a general background in the field of earth science. The upper division requirements are sufficiently flexible to serve a variety of special interests in the general field.

Lower Division Courses.
Geology 5 or 10; Biology 11A–11B or 1A; Chemistry 1A–1B; Mathematics 16A–16B; Physics 8A–8B–8C; Anthropology 1 or Astronomy 2.

Upper Division Courses.
Six upper division courses in geology or geophysics, including Geology 101 (unless Geology 5 has been completed), 119, and 150 (Geology 151 is strongly recommended); Paleontology 111, 112; three courses selected from the following list: Anthropology 100, 108; Biology 150, 160A, 160B, 167; Botany 125–125L; Computer Science 101; Forestry and Conservation 123A, 123B, 123C; Geography 130, 132, 135, 136, 137, 140; Interdepartmental Studies 211; Soil Science 100, 101, 102, 103, 110 (with Chemistry 1C).

Honors Program. Students with an overall grade-point average of 3.3 in the University, including 3.3 in the major, may apply for admission to the honors program. Application should be made through the student’s major adviser not later than the end of the student’s junior year. Candidates for graduation with honors in earth science are required to take, in addition to the regular program, 4 units of Geology 199 and must pass a comprehensive examination.

The Major in Geology

The major in geology includes the most rigorous basic courses in physical science and mathematics. It provides the background necessary for graduate study in geology and also satisfies the minimum academic requirement for registration as a geologist in the State of California.

Lower Division Courses.
Geology 5; Chemistry 1A–1B and 14 (or Geology 131); Physics 5A–5B–5C–5D; Mathematics 1A–1B–1C, 51A–51B–51C; Statistics 20 or 25 (recommended).

On recommendation of the major adviser, students who have already taken an elementary physical geology course may satisfy the lower division requirement of Geology 5 by taking Geology 101.

Upper Division Courses.
Geology 131 (or Chemistry 14), 102, 160 (or 103 or 104), 116, 118, 151; Computer Science 101; Paleontology 111 and 112; eight additional units in upper division courses in geology, geophysics, paleontology, chemistry, physics, mathematics or engineering as approved by the major adviser.

Honors Program. Students with an overall grade-point average of 3.3 in the University, including 3.3 in the major, may apply for admission to the honors program. Application should be made through the student’s major adviser not later than the end of the student’s junior year. Candidates for graduation with honors in geology are required to take, in addition to the regular program, 6 units of Geology H195.

The Major in Geophysics

The major in geophysics is designed for students with facility in mathematics and an interest in geology; it provides a general background in the physical sciences, with emphasis on the physics of the earth.

Lower Division Courses.
Chemistry 1A; Physics 5A–5B–5C–5D; Geology 5; Mathematics 1A–1B–1C, 51A–51B–51C.

Upper Division Courses.

Honors Program. Students with an overall grade-point average of 3.3 in the University, including 3.3 in the major, may apply for admission to the honors program. Application should be made through the student’s major adviser not later than the end of the student’s junior year. Candidates for graduation with honors in geophysics are required to take Geophysics 199 in addition to the regular program, and either write a research paper or take a comprehensive examination.

The Major in Engineering Geoscience

The College of Engineering with the cooperation of the Department of Geology and Geophysics offers a curriculum in 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. The student’s major adviser will be the student’s graduate advisor.

Student Background. The student is expected to have as a background:

1. Two years of college mathematics including at least one year of calculus at the level of Mathematics 51A, 51B, 51C and an introductory course in computer programming.

2. One year each of college chemistry and physics at the level of Chemistry 14 and Physics 5A–5B–5C.

3. For geology students, broad undergraduate training in geology, including paleontology, geophysics, and geochemistry.

4. For geophysics students, additional mathematics and physics at the upper division level.

Students may be admitted with deficiencies in their prior training, but they are expected to correct these during their first year of graduate work.

Geology. Students should plan to cover a broad spectrum of advanced courses, selected with the approval of the Graduate Adviser. Each program includes a minimum of eight formal upper division or graduate courses in geology, geophysics, paleontology, chemistry, physics, mathematics, or engineering as approved by the major adviser.

Honors Program. Students with an overall grade-point average of 3.3 in the University, including 3.3 in the major, may apply for admission to the honors program. Application should be made through the student’s major adviser not later than the end of the student’s junior year. Candidates for graduation with honors in geology are required to take, in addition to the regular program, 6 units of Geology H195.
Geology

LOWER DIVISION COURSES

Lower division courses in geology are designed to serve both general and specific interests in earth science, and they can be taken in any order. Credit is not allowed for both 5 and 10, which are alternative presentations of classical geology; enrollment is limited in 5.

5. General Geology. (3) Three hours of lecture and eight hours of laboratory per week. Prerequisite: Chemistry 1A and consent of instructor. Introduction to geology through field mapping with supplementary laboratory study. Minerals, rocks, geologic structures and processes. Mr. Curtis, Mr. Wahrhaftig (F)

10. Introductory Geology. (4) Two 1 1/2-hour lectures per week and one 3-hour laboratory per week. Prerequisite: not open to geology majors. Introductory geology through laboratory study with at least one field trip. Minerals, rocks and structure of the earth. Internal and surface processes which change the earth. Mr. Leopold (F); Mr. Weiss (Sp)

UPPER DIVISION COURSES

Courses 106 and 110 are general interest courses with minimum prerequisites and are appropriate for non-science majors in the College of Letters and Science.

101. Field Geology. (4) Two 4-hour field trips and one 1-hour discussion period per week. Prerequisite: introductory course. Geology of the Berkeley Hills and vicinity. Not open to students who have completed course 5 at Berkeley. Mr. Brinhill (F); Mr. Wenk (Sp)

102. Mineralogy. (5) Two 1 1/2-hour lectures and two 3-hour laboratory periods per week. Basic crystallography, crystal symmetry, optical mineralogy and use of the petrographic microscope. Systematic mineralogy and crystal chemistry. Laboratory in mineralogy. Mr. Wahrhaftig (F)

103. Igneous Petrology. (4) Two hours of lecture and two 3-hour laboratory sessions per week. Prerequisite: courses 150, and 102. Introduction to problems of origin and evolution of igneous rocks. Study of igneous rocks using petrographic microscope. Mr. Carmichael (F)

104. Metamorphic Petrology. (4) Two hours of lecture and two 3-hour laboratory periods per week. Prerequisite: course 150 and 102. Introduction to problems of origin of metamorphic rocks. Study of metamorphic rocks using the petrographic microscope. (W)

105A–105B. Sedimentary Rocks. (3–3) Two hours of lecture and three hours of laboratory per week. Prerequisite: 105A, 105B: course 150 or 160 and 102. 105A is not prerequisite to 105B. 105A: Physical processes in sedimentation; sedimentary textures and structures. 105B: Chemical processes in the formation of sedimentary rocks; petrography. Mr. Hay (Sp)

106. Mineral Resources. (4) Four hours of lecture per week, plus one 1-day field trip. Prerequisite: a college course in geology or consent of instructor. Non-renewable resources. Geologic environments, economic minerals, general deposits, and fossil fuels. Some impacts of these factors on history and human affairs. Mr. Meyer (Sp)

107. Plate Tectonics. (4) Two 2-hour lectures per week. Prerequisite: senior standing. Kinematics, dynamics and geological consequences of global tectonics. Mr. Wahrhaftig (Sp)

110. California. (4) Three hours of lecture and discussion per week and one 3-hour field trip per week. Prerequisite: a college course in geology. Geologic framework and history of California; the geology of California in relation to man. Mr. Wahrhaftig (Sp)

112. Stratigraphy and Structure. (4) Two two-hour lectures per week. Prerequisite: consent of instructor. Interpretation of the stratigraphic record of the earth; pre-Cambrian and Cambrian periods; unconsolidated deposits; sedimentary rocks; unconformities; unconformity belts; folding; uplift and erosion; and development of landscape. Glacial geology and Pleistocene history. Interpretation of topographic maps and development of economic geology. Mr. Wahrhaftig (W)

118. Senior Field Course. (12) Prerequisite: Geology 5 or 150, 160, or 116. A detailed investigation of one or more selected field areas with up to 8 weeks in the field and a final report presentation in Berkeley. Mr. Wahrhaftig (Sp)

119. Geologic Field Studies. (2) One to four week-end field trips to localities of geological interest. Prerequisite: courses 101, 150, or consent of instructor. Can be repeated for credit. (F) Mr. Wahrhaftig (Sp)

124. Geochronology. (3) Three one-hour lecture and discussion periods per week. Prerequisite: consent of instructor. Principles of thermodynamics in a geological context. Interpretation of the stratigraphic record of various aspects of earth history. Mr. Wahrhaftig (W)

131. Introduction to Geochemistry. (4) Two 2-hour lectures per week. Prerequisite: Chemistry 1A, 1B, 1C. Principles of thermodynamics in a geological context. Mr. Wahrhaftig (W)

135L. X-Ray Crystallography Laboratory. (2) Formerly 135. Three 1-hour lab per week plus independent lab projects. Introduction to laboratory methods in X-ray crystallography. Use of X-ray equipment. Examination of X-ray analyses with emphasis on the powder method to identify crystalline substances and lattice parameters. Mr. Wahrhaftig (W)

144. Fluvial Processes in Geomorphology. (4) Three hours of lecture and one hour of laboratory per week. Prerequisite: consent of instructor. Hydrology of river systems, hillslope development, river morphology and pattern, hydraulic geometry, concept of entropy, sediment transport theory and measurement, river mechanics. Mr. Wahrhaftig (W)

150. Minerals and Rocks. (4) Two 1-hour lectures and two 3-hour laboratory periods per week. Prerequisite: Chemistry 1A, Geology 5 or 10 or equivalent. Laboratory study of minerals and rocks. Mr. Curtis (Sp)

151. The Earth. (4) Three 1-hour lectures and one 2-hour discussion period per week. Prerequisite: one year each of college calculus and physics, course 5, or evolution. Mr. Wahrhaftig (W)

160. Petrography. (2) Two one-hour lectures and two 3-hour laboratory periods per week. Prerequisite: consent of instructor. Mr. Wahrhaftig (W)

195. Supervised Independent Study and Research. (1–5) Enrollment is restricted by regulations and will be limited to students who have failed to do field work in Pleistocene rocks. Mr. Wahrhaftig (W)

225. Current Literature in Geomorphology. (3) Three hours of lecture per week. Prerequisite: consent of instructor. Review and discussion of current literature in geomorphology, fluvial processes, sediment transport, hillside development, and environmental geology. Written and oral presentations. Mr. Wahrhaftig (W)

231. Mineral-Solution Equilibria. (3) Three hours of lecture per week. Prerequisite: consent of instructor. High temperature solution chemistry, theoretical predictions, equilibrium, activity coefficients at high temperatures and pressures, computation and estimation of thermodynamic properties of minerals, phase relations in geologic systems, etc., with emphasis on computer applications and independent study. Mr. Helgeson (F)

232. Mass Transfer and Kinetics in Geochemical Processes. (3) Three hours of lecture per week. Prerequisite: 230 and 1 or equivalent. Theoretical modeling of geochemical processes including large numbers of components, phases and reactions with emphasis on mass transfer resulting from weathering, diagenesis, metamorphism, adiabatic expansion of gases, hydrothermal metasomatism, etc. Mr. Helgeson (Sp)

235L. X-Ray Crystallography Laboratory. (3) Formerly 235L. Three 1-hour lecture and two 3-hour laboratory periods per week. Prerequisite: consent of instructor. Mr. Wahrhaftig (W)

260. Research. (1–12) The Staff (F, W, Sp)

290. Seminar. (variable) Topics will be announced each quarter. The Staff (F, W, Sp)

410. The Use of the Electron-Microprobe. (3) Eight hours of laboratory per week. Prerequisite: consent of instructor. Graduate standing and consent of instructor. The operation of an electronprobe, and ancillary equipment, for the analysis of a range of specimens, including microsamples. May be taken on a satisfactory/unsatisfactory basis. Mr. Carmichael (F, W, Sp)

411. Individual Study for Master's Students. (1–8) Individual study for master's students in consultation with the field adviser. Units may not be used to meet either unit or residence requirements for a master's degree. May be taken on a satisfactory/unsatisfactory basis. Mr. Carmichael (F, W, Sp)

NOTE: For key to symbols, see page 38.

L&S: Geology and Geophysics / 141
Geophysics

UPPER DIVISION COURSES

104A. Mathematical Methods in Geophysics. (4) Three hours of lecture and computer laboratory per week. Prerequisite: Mathematics 5A-5B-5C. Linear inverse problems in the Earth sciences. Determination of model parameters from data. Solution of forward and inverse problems using numerical methods. Applications to geophysical inverse problems. May not be used for unit or residence requirement for the doctoral degree.

104B. Mathematical Methods in Geophysics. (4) Three hours of lecture and computer laboratory per week. Prerequisite: Mathematics 5A-5B-5C. Fourier and time-series analysis; spherical harmonics; transforms, fast-Fourier transform computations, and the interpretation of differential equations of geophysics. Examples from seismology, geomagnetism, gravity, heat flow, and tidal theory.

120. Mechanics of Earthquakes and Faulting. (3) Three 1-hour lectures per week and one 3-hour laboratory period per week. Prerequisite: Physics 110A-110B, and either course 104B or a course in partial differential equations. The earth's gravitational field; density distribution; internal constitution; heat transfer and temperature distribution. Mr. Bolt (W)

222A. Physics of the Earth. (4) Three hours of lecture plus discussion periods per week. Prerequisite: either course 110A-110B, or both course 104B or a course in partial differential equations. The earth's gravitational field; density distribution; internal constitution; heat transfer and temperature distribution. Mr. Wang (W)

222B. Physics of the Earth. (4) Three hours of lecture plus discussion periods per week. Prerequisite: Physics 110A-110B, and either course 104B or a course in partial differential equations. The earth's gravitational field; density distribution; internal constitution; heat transfer and temperature distribution. Mr. Wang (W)

230. Strong Motion Seismology. (3) Three 1-hour lectures per week. Prerequisite: Mathematics 51C or equivalent and consent of instructor. Generation and propagation of seismic waves. Instrumentation to measure strong motion. Estimation of seismic motion at a site. Mr. McEvilly (F)

240. Geophysical Fluid Mechanics of the Earth's Interior. (4) Four hours of lecture and discussion per week. Prerequisite: Geophysics 140 or equivalent. Topics in the dynamics of the mantle and core. Free convection, rotating systems, differential heating, motion of a conducting fluid in a magnetic field. (F)

285. Research. (2-12) The Staff (F, W, Sp, Su)Research in appropriate areas of geophysics. Approval of the instructor required. May not be used for unit or residence requirement for the doctoral degree.

602. Individual Study for Doctoral Students. (1-8) The Staff (F, W, Sp, Su)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 be used for unit or residence requirement for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

602. Individual Study for Master's Students. (1-8) The Staff (F, W, Sp, Su)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 requirement for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

602. Individual Study for Graduate Students. (1-8) The Staff (F, W, Sp, Su)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 requirement for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

602. Individual Study for Master's Students. (1-8) The Staff (F, W, Sp, Su)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 requirement for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

IDS 145, Physical Problems about the Earth. (4) See Interdepartmental Studies for the complete description of this course. Mr. Chamberlin (Sp)

German

Department Office, 5317 Dwinnell Hall

Professors: Hans Brinkmann, Dr. phil. Gerd Ehlers, Dr. phil. Andrew D. Jasi, Ph.D. Heinz Kudszus, Ph.D. Heinrich Sebe, Dr. phil. (Chairman) Blaue Lee Span, Ph.D. (Chairman)

Associate Professors: Nathan Bower, Ph.D. Bluma Goldstein, Ph.D. Kenneth D. Weisinger, Ph.D.

Graduate Study

Aims of the Graduate Program. The graduate program of the Department of German is designed for future scholars and teachers in the fields of German literature and linguistics. It aims at a comprehensive historical knowledge of German literature and linguistics and is designed to encourage the student to develop intellectual independence and creative initiative. The program leads to the Master of Arts and Doctor of Philosophy degrees in the area of Germanic linguistics and to the Master of Arts in Teaching (M.A.T.). Graduate students in German may wish to pursue Dutch studies as their secondary field of study.

Degree Programs:

M.A.T. Students learn to teach German at the high school level through advanced studies in German language and literature, along with theoretical studies and practical training in the field of education.
M.A. The study of essential aspects of German literature and culture or linguistics is stressed. In addition, students focus on related methodology, the tools for research, and on teaching methods.

Ph.D. in Literature. Various directions of study are explored, including literary history, literary theory, methodology, genres, periods and related disciplines such as other literatures, aesthetics, sociology, linguistics, psychology and folklore.

Ph.D. in Linguistics. The study of language, especially of modern German and its earlier phases, is emphasized. Areas of specialization include linguistic theory and method, diachronology, sociolinguistics, textual linguistics (linguistics and literature), applied linguistics and German philology.

Prerequisite for admission to full graduate standing. A Bachelor of Arts degree (or its equivalent) with an undergraduate major in German. Students admitted on the basis of their overall scholarship records, but with deficiencies in their preparation in German, are expected to make these up by additional course work. All graduate students are expected to enroll in at least three graduate courses or seminars per academic year.

Master of Arts: Literature

Requirements: Nine courses (36 units) with a B grade or better. Five of these courses (20 units) must be on the graduate plane; four of these live must be in literature (16 units), and one in linguistics (4 units). The student is expected to do work in three periods of German literature (Middle Ages, 1500–1750, 1950–present), and to carry a normal course load of 8–12 units per quarter.

Required Courses:
1. at least one seminar in literature
2. at least one seminar in linguistics
3. one additional graduate course in linguistics, or 103A and 103B
4. Middle High German (203).

Recommended Courses:
1. the proseminar (200)
2. major periods in German literature (201A, 201B, 201C)
3. oral German (202).

Examinations:
1. a test of the candidate's proficiency in the German language or successful completion of course 202
2. M.A. examination.

This will be given after the completion of four quarters of graduate study. Time extensions may be granted by the Graduate Committee in exceptional cases. The examination will be based upon the student's work in literature courses.

An M.A. reading list must be submitted to the Graduate Adviser during the fourth quarter of study. This should include the required texts of the literature courses taken, as well as some titles reflecting each of the major literary periods.

The examination will be administered by a committee of three. Candidates may choose one of the following formats:
1. a three-hour written examination
2. a two-hour oral examination
3. a two-hour written and a one-hour oral examination.

In order to complete the degree, the student must fulfill the language requirement before he/she can be admitted to the Ph.D. Qualifying Examination. There are two options (see Foreign Language Requirement in Index):

1. Demonstration of a useful reading knowledge of two European languages other than German or English. The languages chosen in consultation with the graduate adviser, should contribute to the study of German literature in general and/or to the individual research project. The requirements may be fulfilled by passing an examination administered by the Graduate Department. The examination will be based upon the student's work in the appropriate department, or the student may satisfy this requirement by successful completion of an entire course in Latin or the Latin Workshop. If French is chosen, the requirement can be satisfied in either of two ways: by passing the examination administered by the Graduate Department (dictionnaire allowed) or by successful completion of an upper division course in French.

2. Demonstration of an exceptionally thorough knowledge of some major period in German literature other than that of German or English. The proficiency will be tested under the direction of the Graduate Council (Option II). The student is urged to satisfy the language requirement as early as possible.

The Examination. The Ph.D. qualifying examination emphasizes the newly acquired (and amended) program of study and consists of:
1. a written examination in two three-hour periods, to be taken within two weeks; each period may be extended by three hours for revisions;
2. a three-hour oral examination which is to be taken within one month of the written examination and which will emphasize, in addition to the approved program of study, the preliminatory work done on the dissertation.

Doctor of Philosophy: Linguistics

An M.A. in German linguistics or its equivalent is a prerequisite for admission to the program. There are no required courses. However, the student is expected to consult with the graduate adviser regarding the best sequence of courses to be taken. A limited program of study in the area of German literature can be included. The student must demonstrate fluency in at least one European language, or a useful reading knowledge of two European languages, other than German and English. (For details see requirements for the Ph.D. in Literature.)

The Ph.D. Qualifying Examination for students specializing in German linguistics consists of a written examination in two three-hour periods each and an oral examination (three hours). The examination will deal primarily with the descriptive (synchronic) and historical (diachronic) aspects of German, its dialects and periods, and of the Germanic language family; one complementary field can be selected by the students.

Waiver Program in German (for future teachers of German)

Adviser: Klaus A. Mueller

Successful completion of the Waiver Program in German exempts the student from taking the examination required for the single subject credential with a teaching authorization in German.

The program is based on requirements for the German major at Berkeley as modified for additional work in special areas. The Waiver Program in German requires completion of a minimum of sixty-five (65) units of course work as listed below:
1. German 1–5 (25 units)
2. 36 units from Group II (as listed herein) including:

NOTE: For key to symbols, see page 36.
German (3), 101 (6), 102 (6), 103 (4), 104 (4), 112 (4)
9 units taken from literature courses
3. German 300 (4)

Dutch Studies
For a description of the group major in Dutch studies see alphabetical listing under College of Letters and Science. Descriptions of the courses presenting the language, literature, history, in the language of the Netherlands, offered by the Department of German, follow German courses.

Cultural History. (4) Three hours of lecture and a 1 to 2-hour discussion section per week. May be repeated for credit when topic changes.

*160A. Brecht I. (4) Ms. Goldstein (W)
*160B. Brecht II. (4) Ms. Goldstein (Sp)
*160C. Hermann Hesse. Man and Anist. (4) Mr. Mileck (F)

160D. Freud and Beyond: Psychological-Approaches to Modern German Literature. Mr. Wijzen (W)

*M161. The Historical Folk-Narrative of Europe. (4) Three hours of lecture per week. Prerequisite: reading knowledge of one of the European languages. Various methods (geographic-historical, sociological, mythological, psychological, structural) will be applied to the analysis of European folk-narratives. Mr. Tubach

162. Contemporary German Culture and Political Institutions. (4) Three hours of lecture-discussion per week. Main trends in the cultural history of Germany since World War II, with particular emphasis on the political division of Germany and its impact on cultural and literary development in the Federal Republic of Germany and the German Democratic Republic. Mr. Tubach

*M164. Yiddish Literature in Translation: Culture of the Old Country and the New World. (4) Three hours of lecture and one 2-hour discussion section per week. Literary works will be studied as aesthetic, social and historical documents to illuminate the nature of societies and cultures in which they were created and enjoyed. Films by Jewish communities in Eastern Europe and America will supplement the readings. Ms. Goldstein

Group II
Prerequisite: unless otherwise stated, lower division German language courses (25 units), or their equivalent

100. Introduction to German Literature. (4) Three hours of lecture per week. The study of various major genres, including bibliographical tools. Recommended for all German majors, prior to taking any other literature courses. Ms. Tennant (F, Sp)

A. Language/Linguistic Courses

101A–101B. Advanced German Grammar and Composition. (4–4) Three hours of lecture/discussion per week. Not open to native speakers, except with consent of instructor. Required for all majors. 101A: Staff (F, Sp) 101B: Staff (W, Sp)

102. Introduction to Descriptive German Grammar. (2–2) Two hours of lecture/discussion per week. Credit and grade will be given after completion of the sequence.

103A. Phonetics and Phonology. Staff (F)
103B. Morphology and Syntax. Staff (W)

*104. Introduction to the Linguistic Study of German. (4) Four hours of lecture per week. Ms. Tennant (F, Sp)

105. Middle High German for Undergraduates. (4) Formerly 105A, Section 1. Three hours of lecture per week. Basic grammar and selected readings in Middle High German. Excerpts from the Nibelungenlied. Ms. Tennant (F)

106. Readings in Middle High German. (4) Formerly 1056. Three hours of lecture per week. Designed to impart a thorough reading knowledge of Middle High German. Ms. Tennant (W)

B. Cultural History Courses

110. From 800–1500. (4) Three hours of lecture per week. The social, political and historical background to Medieval literature from the Age of Charlemagne to the Empire of Charles V. Mr. Tubach (F)

*111. From 1500–1600. (4) Three hours of lecture per week. The political and historical background to German literature from the Reformation to the Age of Reason. Mr. Spahr

112. From 1800 to the Present. (4) Three hours of lecture per week. The social, political and historical background to German literature since the Enlightenment. Staff (W)

C. Literary History Courses

120. The Literature of the Middle Ages. (4) Three hours of lecture per week. The key literary works of the Hohenstaufen period.

121. Renaissance, Reformation, and Baroque. (4) Three hours of lecture/discussion per week. Major authors and their works from the 15th through the 17th century. Ms. Spahr

*122. Enlightenment and Sturm und Drang. (4) Three hours of lecture/discussion per week. Major authors and their works from the 18th century including philosophical tenets. Mr. Weisinger

123. Classicism. (4) Three hours of lecture per week. Major authors and their work from the German Classical Period. Mr. Weisinger (F)

*124. Romanticism. (4) Three hours of lecture per week. Major authors and their work from the Romantic period, including philosophical influence. Ms. Goldstein

*125. Realism. (4) Three hours of lecture per week. Study of the political and social, aesthetic and literary implications of representative texts by Dostoevsky-Hüls, Grillparzer, Stifter, Keller, Storm, Fontane and Raabe.

126. Modern Literature. (4) Three hours of lecture/discussion per week. A study of major 20th century writers prior to World War II. Mr. Brinkmann (F)

127. Contemporary Trends. (4) Three hours of lecture per week. Major trends in German Literature since 1945. Staff (W)

D. Genre Courses

*130. Studies in the German Drama. (4) Four hours of lecture per week. Topic will vary from year to year. May be repeated for credit when topic changes.

132. Studies in German Prose. (4) Three hours of lecture per week. Topic will vary from year to year. May be repeated for credit when topic changes. Topic for 1978/79: 19th Century Prose Writers: Dostoevsky-Hüls, Heine, Grillparzer, Keller and Storm. Ms. Bonwil (Sp)

*134. Studies in German Poetry. (4) Three hours of lecture/discussion per week. Topic will vary from year to year. May be repeated for credit when topic changes. Topic for 1978/79: Transformations of Language in Poetry from the Middle Ages to the Present. Mr. Jąszli (W)

E. Author Courses

140A. Goethe. To 1800. (4) Three hours of lecture per week. Ms. Bowit (F)

*140B. Goethe. 1800 to 1832. (4) Three hours of lecture per week. Mr. Brinkmann (W)

*142. Schiller. (4) Formerly 140D. Three hours of lecture per week. Analysis of Schiller’s ballads, major dramas and philosophical writings.

*143. Heinrich Heine. (4) Formerly 140C. Three hours of lecture per week.

145. The Poetry of Rilke and Hofmannsth. (4) Formerly 145F. Three hours of lecture per week. Ms. Jąszli (Sp)

*147. Thomas Mann. (4) Formerly 140G. Three hours of lecture per week.

F. Special Topics Courses

*150. Literature of the DDR. (4) Formerly 128. Three hours of lecture per week.

G. Method Courses

155. Psychological Approaches to German Literature. (4) Three hours of lecture per week. Prerequisite: German 100 and at least one course each from Groups C, D, E. Staff (Sp)

156. Sociological Approaches to German Literature. (4) Three hours of lecture per week. Prerequisite: German 100 and at least one literature course each from Groups C, D, E. Mr. Brinkmann (W)

*157. Psychological Approaches to German Literature. (4) Three hours of lecture per week. Prerequisite: German 100 and at least one literature course each from Groups C, D, E. Mr. Kudzus

H. Honors and Special Studies Courses

H195A–H195B. Honors Seminars for Undergraduates. (4–4) Three hours of seminar per week. Pre-requisite: 5 GPA in at least 20 units of upper division German. 3.3 overall GPA. Course normally open only to students participating in the Honors program; however, if enrollment warrants and instructor consents,
other students may be admitted. Topics vary from year to year.

H195A. Mr. Jässzi (F)

H195B. Mr. Hillen (W)

H196. Honors Studies in German. (2) Supervised independent study and research for honors students who are writing their thesis for completion of the requirements for the Honors Program. Prerequisite: H195A—H195B. Mr. Hillen (charge in Sp).

198. Directed Group Study. (2—4) Group studies of selected topics which will vary from quarter to quarter. Staff (F, W, Sp).

199. Supervised Independent Study and Research. (2—4) Enrollment is restricted by regulations. Three to six hours of seminar per week. Topics vary from quarter to quarter. Staff (F, W, Sp).

GRADUATE COURSES

200. Proseminar in German Literature. (5) Three hours of seminar and one hour of tutorial per week. Introduction to the bibliography, history, and methods of German studies (Germanistik). Strongly recommended for all M.A. candidates. Mr. Seeba (F).

201A—201B—201C. Major Periods in German Literature. (4—4—4) Formerly 210A—210B—210C. Three hours of lecture/discussion per week. Strongly recommended for all M.A. candidates. Mr. Seeba (F), Mr. Mueller (Sp).

201A. Middle Ages  Mr. Tubach (W)

201B. From Luther to Lessing  Mr. Hillen (Sp)

201C. 19th Century  Mr. Brinkmann (F)

202. German Oral Style. (Formerly 237. Four hours of lecture/discussion per week. Conducted entirely in German with intensive practice in speaking and understanding the language. Required for all M.A.T. candidates; strongly recommended for all M.A. candidates. Mr. Penzl (W)."

203. Middle High German for Graduates. (Formerly 105A. Section 2. Three hours of lecture/discussion per week. Required preparation for 205. This course is not a continuation of 106. Basic grammar, extensive readings in Middle High German. Mr. Spahr (Sp).

204. Goethe. (Formerly 215. Three hours of seminar per week. Prerequisite: German 106 or 203. Topics include Leibniz, Parzell, Tristan, and Minnesang. May be repeated for credit when topic changes. Mr. Penzl (F), Mr. Mueller (Sp).

205. German Literature of the Renaissance and Reformation. (4) Three hours of seminar per week.

206. German Literature of the Seventeenth Century. (4) Three hours of seminar per week. Topics include von Gross, Lohenstein, Grimme, and Baroque poetry. Mr. Spahr (Sp).

212. Lessing. (4) Three hours of seminar per week. Mr. Hillen (F).

*215A—215B. Goethe. (4—4) Three hours of seminar per week. Mr. Hillen (F), Mr. Mueller (Sp).

215A. Goethe to 1808. Formerly 215B.

215B. Goethe’s 1808 to 1832. Formerly 215.

224. Schiller. (4) Three hours of seminar per week. Mr. Weisinger (Sp).

225. German Romanticism. (4) Three hours of seminar per week. Mr. Brinkmann (W).

230. Heinrich von Kleist. (4) Three hours of seminar per week. Mr. Jaszi (F).

*236. German Realism. (Formerly 236A—236B. Three hours of seminar per week. Changing topics include: Keler, Meyer, Fontane, Storm, Ramm, and Spahr (Sp).

239. German Naturalism. (4) Three hours of seminar per week.

240A—240B. Bildungsmroman. (Formerly 261A—261B. Three hours of seminar per week. Credit and grade to be given upon completion of the sequence. Mr. Brinkmann (F, W).

*245. Interpretation and Criticism of German Poetry. (4) Three hours of seminar per week. Mr. Kudszus.

*247. Hermann Hesse. (Formerly 248A. Three hours of seminar per week. Mr. Miclek (W).

248. Thomas Mann. (4) Formerly 248B. Three hours of seminar per week. Mr. Miclek (W).

*249. Franz Kafka. (Formerly 248C. Three hours of seminar per week.

250. Aspects of German Literary and Cultural History. (4) Three hours of seminar per week. Hours to be arranged. A comparison of literary and cultural developments in Germany and the United States. Emphasis is placed on individual research designed to develop teaching materials. Required for M.A.T. candidates.

260. Seminar in German Literature. (2) Two to three hours of seminar per week. May be repeated for credit when topic changes. Topics for 1978/79.

260A. Value Judgments in Literary Criticism. Mr. Brinkmann (F).

260B. Story and History: Historicity in Literature and Literary Criticism. Mr. Seeba (W).

260C. From Hauptmann to Handke: Major Trends in Modern German Drama. Mr. Miclek (Sp).

Graduate Courses in Linguistics

270. Introduction to the History of the German Language. (4) Three hours of seminar per week. Mr. Penzl (F).

271. Historical Phonology and Morphology of German. (4) Three hours of seminar per week. Recommended for all candidates for the M.A. with linguistic emphasis. Mr. Penzl (W).

273. German. (4) Three hours of seminar per week. Mr. Penzl (W).

276. Old Saxon. (4) Three hours of seminar per week. Mr. Penzl (W).

285. Descriptive German Grammar. (4) Three hours of seminar per week. Prerequisite: course 103A and 103B. Deals with the grammatical structure and the sounds of Modern German in contrast to the corresponding features of American English. Required of all M.A.T. candidates. Mr. Spahr (Sp).

290. Seminar in Germanic Linguistics. (4) Three hours of seminar per week. Prerequisite: consent of instructor. Topics will vary from year to year. May be repeated for credit when topic changes. Topics for 1978/79.

290A. Early New High German. Study of Lexion and Morphology Based on Texts of the Period. Mr. Penzl (F).

290B. Modern Linguistic Theory in the German Language. Staff (W).

290C. History and Structure of the Germanic Languages: The English Language. Mr. Penzl (Sp).

299. Individual Study for Graduate Students in Literature and Linguistics. (2—8) Primarily for post-M.A. students engaged in exploration of a restricted field, involving the writing of a report. May be taken only one hour per school year; more than 4 units can be earned only by students after advancement to candidacy. Staff (F, W, Sp).

602. Individual Study for Doctoral Students. (Prerequisite: M.A. in German, independent study in consultation with graduate adviser to provide an opportunity for Ph.D. candidates to prepare for the qualifying examination. Must be taken on a satisfactory/unsatisfactory basis. May not be used for unit or residence requirements for the doctoral degree.) Staff (F, W, Sp).

Dutch

For a description of the group major in Dutch studies, see alphabetical listing under College of Letters and Science.

1. Elementary Dutch. (5) Five hours of lecture and one hour of language laboratory per week. Mr. Snapper in charge (F).

2. Elementary Dutch. (5) Five hours of lecture and one hour of language laboratory per week. Pre-requisite: course 1 or equivalent. Staff (W).

3. Intermediate Dutch. (5) Five hours of lecture and one hour of language laboratory per week. Pre-requisite: course 2 or equivalent. Staff (Sp).

110. Advanced Dutch. (4) Three hours of lecture per week. Prerequisite: course 3 or consent of instructor. A thorough review of the grammar and an introduction to Dutch literature. Mr. Wijzen (F).

120A—120B. Advanced Dutch Conversation. (2—2) Two hours of lecture per week. Prerequisite: course 110 and consent of instructor. An intensive course in the development of oral language style. Mr. Wijzen (W).

130A. Advanced Grammar and Composition. (4) Three hours of lecture per week. Prerequisite: course 110 or consent of instructor. An intensive course in Dutch grammar and written style. Mr. Wijzen (Sp).

140. Readings in Dutch Literature. (3) Two hours of lecture/discussion per week. Prerequisite: course 110 or consent of instructor. This course is designed to

NOTE: For key to symbols, see page 36.
**150. Introduction to the Literature of the Netherlands.** (4) Three hours of lecture and one hour tutorial per week or consent of instructor. A literary-historical survey of Dutch literature from the Middle Ages to the present. Selective readings in poetry, prose, and drama. Given in Dutch.

**160. Literature of the Lowlands in English Translation.** (4) Three hours of lecture per week. A historical study of the major contemporary Dutch and Flemish writers and their works. Mr. Snapper (W, Sp)

**170. The Netherlands: Culture and Institutions.** (4) Three hours of lecture per week. A historical study of the cultural contributions of the Netherlands and an analysis of the political system. Special emphasis on the social and political aspects of the contemporary scene. Lectures in English. Mr. Wijnen (Sp)

**180. Middle Dutch.** (3) Three hours of lecture per week. Prerequisite: reading knowledge of either German or Dutch. An linguistic analysis of Middle Dutch and reading of selected medieval Dutch texts. Mr. Snapper (F)

**190. Senior Thesis.** (4) Two hours of meeting per week. Prerequisite: courses 150 or 180. A major research paper in the areas of Dutch literature, culture, or the area of linguistics. Required of all students who have Dutch as their major course of study. Staff (F, W, Sp)

**195. Neighborhood Studies in Dutch.** (1-6) Supervised independent study and research course for honors students which may be repeated up to a maximum of six units.

**196. Directed Group Study.** (1-4) One to four hours of meeting per week. Staff (F, W, Sp)

**199. Special Studies in Dutch.** (1-4) Enrollment is restricted by regulations listed on page 36. Additional limitations: all grade point average of at least 3.0. Must be taken on a pass or not passed basis.

Mr. Snapper (F, W, Sp)

**RELATED COURSES IN OTHER DEPARTMENTS**


---

**History**

Department Office, 3229 Dwinelle Hall

**Professors:**

Richard M. Abrams, Ph.D.
Thomas G. Barnes,® D.Phil.
James A. Barker, Ph.D.
Thomas G. Barnes,® D.Phil.
Lawrence Kinnaird, Ph.D.
Engel Stiilfer, Ph.D. (Emeritus)
Hans W. Rosenberg, Ph.D. (Shepard Professor, Emeritus)
Martin E. Fisch, Ph.D. (Emeritus)
Josef Seiger, Ph.D. (Emeritus)
Lawrence A. Harper, J.D., Ph.D. (Emeritus)
Robert L. Miodalkauk, Ph.D. (Chairman)

**Associate Professors:**

Gerard E. Caspary, Ph.D.
Diane S. Clemons, Ph.D.
Samuel Hafer, Ph.D.

**Assistant Professors:**

Thomas W. Laqueur, Ph.D.
John E. Lesch, Ph.D.
Walter A. McDougall, Ph.D.

**Professor:**

John T. Noonan, Jr., Ph.D., Litt.D.

**Departmental Major Advisers:** Consult Undergraduate Office.

---

**The Major**

The major program in history shall total at least 60 quarter units or the equivalent (usually 12 courses), and shall include the following:

1. By the end of the sophomore year: (a) two courses in European history, at least one of which must be in a period before 1600. One at least must be from the following: 4A, 4B, 4C, or 4D (by permission of the major advisor). History 5 may be substituted for one of these courses, but it should be noted that History 4D and 4F cannot both be taken for credit (History 4D may be a seminar (History 39) in European history; (b) two additional quarter courses in a non-European field, at least one of which must be from the following: History 17C, 17D, 18A, 18B, 19A, 19B, 49A, 49B; one may be a seminar (History 39) in American, Latin American, African, or Asian history.

2. In the junior and senior years: (a) four upper division lecture courses to be selected from the following—all upper division lecture courses offered by the Department of History, Economics 111A—111B—111C—111D and Economics 113. In addition, (b) two sections of History 103 (Proseminar) in two different fields of history (Ancient, Europe to 1600, Europe since 1600, Britain, U.S., Latin America, Asia, Africa, History of Science), and History 101A—101B (Introduction to Historical Method, a research seminar) in one of the fields selected for History 101. History 101A—101B and 103 are not recommended for the first quarter of upper division work or the first quarter at Berkeley; preparation through upper division lecture courses in history is often assumed by instructors.

**Upper Division Honors Program.** A departmental honors committee will charge of the honors program. The program is intended for students of high ability in history who have the necessary grade-point averages (at least 3.3 in the major and 3.0 overall) who will profit from individual work with a member of the faculty and discussions with students of similar interests. It is a one-year program for senior majors, but certain prerequisites should be fulfilled in the junior year. Junior majors should notify the head of the Committee of their interest in the program. They must take History 101A—101B in their junior year if they are on campus.

Seniors will take History H102 without exemption by the Committee. Students will also spend two quarters writing a senior honors essay, which is normally the product of original research into a historical question under the supervision of a member of the Department who has consented to direct it. For this purpose students will take History 119B or, with consent of instructor, a two-quarter graduate research seminar, History 285. After submitting their essays, they will receive a grade for these courses from the faculty supervisor. The Honors Committee will determine if the essay and record in history courses fulfill the requirements for Honors, High Honors, or Highest Honors in the honors program. The result will be noted on the student's diploma.

---

**Letters and Science List of Courses:** 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

---

**Teaching Training.** See the Announcement of the School of Education.

---

**Higher Degrees.** Students planning to work toward the degrees of M.A. and Ph.D. should address inquiries to the Graduate Admissions Secretary, Department of History.

---

February 1 is the deadline for receipt of applications for graduate admissions. For applications and supplementary materials (transcripts, letters of recommendation from two professors who have instructed the applicant in history, results of the Aptitude Test in the Graduate Record Examination). Candidates will be admitted for the fall quarter only. The deadline, however, for applications for graduate admissions from applicants applying also for fellowships is December 1—for both applications and supplementary materials. (Three letters of recommendation are required for fellowship/ admission candidates.)

Further Information. The Schedule of Classes issued prior to each quarter and the Department course descriptions issued at the beginning of each quarter 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. European Civilization.** Two 1-hour lectures and two 1-hour section meetings per week. Introductory course on periods of major historical significance in the course of European history. Emphasis on class discussions, readings in the sources, and writing of essays. 4A. Ancient. (5) Mr. Sealey (Sp)

4B. Medieval. (5) Mr. Caspary (F)

4C. Renaissance and Reformation. (5) Mr. Brucker (W)

4D. Enlightenment and Revolutions. (5) Mr. Herr (Sp)

**5. Modern Europe.** Three hours of lecture and one 1-hour section meeting per week. A survey of modern Europe primarily for students not going on in history. Mr. Rothbiatt (F)

**17. Introduction to the History of the United States with Emphasis on Society and Culture.**

**117A. From Colonial Settlement to the Civil War.** (3) Three hours of lecture per week.

**117B. From the Civil War to the Present.** (3) Three hours of lecture per week.

**17C. From Colonial Settlement to the Civil War.** (5) Three hours of lecture and two hours of discussion per week.

**17D. From the Civil War to the Present.** (5) Three hours of lecture and two hours of discussion per week.

**18A—18B. Latin-American History.** (6-8) Three hours of lecture and one 1-hour section meeting per week. Prerequisite: sophomore standing.

18A: Mr. King (F)

18B: Mr. King (W)

**19A—19B. Asian History.** (5—5) Two 1-hour lectures and one 2-hour section per week. Prerequisite: sophomore standing. Students will enroll in sections conducted by faculty members and limited to 20, all sections conducted together for weekly lectures by one professor. Work in sections includes reading, discussion, reports on historical problems. Grading based on participation and essay. Department of History. Mr. Inoue (F)

19A: Mr. Inoue (F)

19B: Mr. Inoue (Sp)

---

**39. Seminars for Lower Division Students.** (6) 3-hour meeting per week. Seminars in the various fields of history designed to introduce beginning undergraduate students to problems of historical significance. Work in the course will include research and a research paper. Limited to fifteen students per section. May be repeated with the instructor. Section is indicated on the title of each section to be seen the department catalog at the beginning of the quarter.

---

**149A—49B. Studies in American History.** (5—5) Four hours of meeting per week. Intended to introduce students to the problems and methods of studying
American history. Relies almost completely on the use of primary materials. Mr. Levine (Sp)

UPPER DIVISION COURSES

Group I—Unrestricted Courses

(Open to all students in the upper division, prerequisites as noted. Unless specified, courses need not section per week. Christianity as an institutional, so and cultural needs from antiquity to the present. 108A: beginnings to ca. 1000 A.D., 108B: 1000 to ca. 1650, 108C: ca. 1650 to the present. Mr. Bouwsma (W)

110A—110B—110C. Ancient Greece. (5—5—5) Three hours of lecture and one hour of optional discussion per week.

110A. Bronze Age — ca. 500 B.C. Mr. Sealey (F)

110B. Ca. 500 B.C. — 338 B.C. Mr. Gruen (W)

110C. 338 B.C. — 30 B.C. Mr. Gruen (W)

114A—1111B. Ancient Rome. (5—5—5) Three hours of lecture and one hour of consultation per week.

114A. 100 B.C.-A.D. 285. Mr. Brown (Sp)

115A—115B. Medieval Europe. (5—5—5) Three hours of lecture and one hour of consultation per week.

117A—117B. Medieval European Intellectual History. (5—5—5) Three hours of lecture and one hour of consultation per week.

119. Society and the Sexes in Early Modern Europe. (5) Three hours of lecture and one hour of discussion per week. Mr. Caspar (Sp)

122. Age of Absolutism and Enlightenment. (5) Three hours of lecture and one hour of consultation per week.

123. Modern Europe (1789—1870). (5) Three hours of lecture and one hour of consultation per week. Mr. Hunt, Mr. Laqueur

124. Modern Europe (1870—1914). (5) Three hours of lecture and one hour of consultation per week. (W)

125. Modern Europe (1914—Present). (5) Three hours of lecture and one hour of consultation per week. Mr. Webster (Sp)

126A. Economic History of the Medieval and Renaissance Economy. (5) Three hours of lecture and one hour of discussion per week. Survey of the economic and social developments in Europe from the eleventh to the sixteenth century that laid the foundations for modern economic growth.

126B. The Agricultural and the Industrial Revolution. (5) Three hours of lecture and one hour of discussion per week. The rise of the European economy to world dominance in the period 1815—1914, emphasizing the diffusion of the industrial system and its consequences, the world trading system, the rise of modern imperialism. Mr. DeVries (F)


127A—127B. European Diplomatic History. (5—5) Three hours of lecture and one hour of discussion per week. Prerequisite: knowledge of the history of Western Europe.

130A—130B—130C. Development of Scientific Thought and Technique. (4—6—6) Three hours of lecture per week. Those enrolled for five units must participate in a one-hour section meeting each week, which will require additional reading and written work.

130A. Ancient and Medieval Science. Mr. Hahn (F)

130B. Scientific Revolution. 1450—1700. Mr. Hahn (W)

131. Topics in the History of the Physical Sciences. (4—5) Three hours of lecture per week. Pre-requisite: Physics at the level of Physics 2. Those enrolled for five units must participate in a one-hour section meeting each week, which will require additional reading and written work.

132. Topics in the History of Biology. (4—5) Three hours of lecture per week. Those enrolled for five units must participate in a one-hour section discussion each week, which will require additional reading and written work.

133. Astronomy and Astrology in Medieval and Early Modern Europe. (4—5) Three hours of lecture per week. Prerequisite: Physics at the level of Physics 2. Mr. Heilbrun (W)

135A—135B. European Jewish History Since 1750. (5—5) Three hours of lecture and one optional hour of discussion per week.

135A. From 1750 to 1880. Mr. Zelnik (W)

135B. Since 1880. Mr. Zelnik (W)

136. Russia. Three hours of lecture and one hour of consultation per week.

136A. Russia to 1613. (5) Mr. Riasanovsky (F)

136B. Russia 1613—1801. (5) Mr. Riasanovsky (W)

136C. Russia 1801—1917. (5) Mr. Zelnik (W)

136D. Russia 1917 to Present. (5) Mr. Zelnik (Sp)

137A—137B. Russian Intellectual History. (5—5) Two 1 1/2-hour discussion group meetings one hour of consultation per week. A two-quarter pro-seminar course in social and political thought, with attention also to literature and philosophy, eighteenth century to 1917. Open to qualified undergraduates. Limited to 30 students.

140A—140B. Hapsburg Monarchy and Succession States. (5—5) Three hours of lecture and one hour of consultation per week. Mr. Stoltzman (W)

141A. Medieval France. (5—5) Three hours of lecture and one hour of consultation per week. (Sp)

141B—141C. Modern France. (5—5) Three hours of lecture and one optional hour of discussion per week. Mr. Sauer (W), Mr. Feldman (Sp)

147A—147B. Spain and Portugal. (5—5) Three hours of lecture and one hour of consultation per week.
GRADUATE COURSES

Group I. Bibliography and Historiography Courses

280. Advanced Studies in the Sources and General Literature of the Several Fields of History. (5) One 2-3 hour meeting per week. For precise schedule of offerings see departmental catalog during preenrollment week each quarter. 280A, Ancient; 280B, Europe; 280C, England; 280D, United States; 280E, Latin America; 280F, Asia (for M.A. candidates); 280G, Asia (for Ph.D. candidates); 280H, Africa; 280K, Caribbean; 280L, Legal History; 280S, History of Science; 280T, Economic History; 280U, Studies in Comparative History.

281A-281B. Paleography and Other Auxiliary Sciences. (5-5) One 2-3 hour meeting per week. For precise schedule of offerings see departmental catalog during preenrollment week each quarter. 281A. Quantitative Approaches to History and Demographical History. (5-5) One 2-3 hour meeting per week. 281B. Demographical History: The use of population materials for the study of social history.

284. Laboratory Section. (1) One 1-hour laboratory per week. Introduction to Computing. This course teaches the use and application of packaged statistical and text-editing programs, emphasizing special routines of particular interest to historians. The course can be taken concurrently either with History 284A or 284B, but is offered independently of other departmental courses.

Group II. Research Seminars

285. Research Seminars. (5-5) One 2-3 hour meeting per week. The following research seminars extend over two consecutive quarters. A final grade will be assigned upon completion of both quarters' work. For precise schedule of offerings see departmental catalog during preenrollment week each quarter. 285A. An introduction to the use of archival materials for the study of social history. 285B. Intellectual History of the United States; 285C. Intellectual History of Europe; 285D. Intellectual History of China; 285E. Intellectual History of Japan; 285F. Intellectual History of India.

Group III. Individual Research and Study

299. Independent Study for Graduate Students in History. (5) One 2-3 hour meeting per week. The use of archival materials for the study of social history.

283. Proseminar: Problems In Interpretation and Research In the Several Fields of History. (5-5) One 2-3 hour meeting per week. Designed primarily to give majors in history elementary training in historical criticism and research. This course teaches the use and application of archival materials for the study of social history. 284. Historical Method and Theory. (5) One 2-3 hour meeting per week.

281. Quantitative Approaches to History. (5-5) One 2-3 hour meeting per week. The use of coins as an historical source; modernization, nationalism and communism on Inner Asia. 188A not prerequisite to 188B.

Group IV. Individual Research and Study

H198A-H198B. Senior Honors. (5-5) Limited to seniors, honors candidates. Directed study centering upon the preparation of an honors thesis. Supervisors will be assigned to each student after consultation with the honors committee. Credit and grade will be assigned upon completion of the full sequence.

Special Individual Study

199. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations see departmental catalog during preenrollment week each quarter. The Staff (F, W, Sp).

History of Science

The following courses are acceptable for major credit.
in history and most of them are acceptable for major credit in philosophy as well. (For details see the cross listings in the philosophy and history sections of this catalog): 103S, 130A, 130B, 130C, 131, 132, 133, 280S, 285S. Students interested in graduate programs in the history of science should consult the adviser.

RELATED COURSES

Economic History. The following courses are acceptable for major credit in history. (For details see the listing in Economics. Students interested in graduate programs in economic history should consult the adviser.)


Economic History of the United States (Economics 113). (5).


Medieval Studies. See Index for further information on Medieval Studies.

Special Programs 44A–44B–44C. Topics in Western Civilization. (8–8–8) See Special Programs for the complete description of this course.

IDS 213. Renewal Ideas and Movements from the Age of the Barbarian Invasions to the Carolingian Age. (See Interdepartmental Studies for the complete description of this course.)

IDS 137. The High Renaissance under Pope Julius II, 1503–1513. (6) See Interdepartmental Studies for the complete description of this course.

IDS 138. Michelangelo and His Age, 1475–1564. (8) See Interdepartmental Studies for the complete description of this course.

IDS 160. Philosophies of China. (3) See Interdepartmental Studies for the complete description of this course.

Humanities

Field Major Office, Division of Special Programs, 301 Campbell Hall

Humanities Field Major

The field major in the humanities provides students with an opportunity to acquire a broad background in the study of the achievements of human beings as artists and creators of values through the ages. The major is especially designed to combine such breadth by means of an interdisciplinary approach with an individual program tailored to each student's interests and educational needs. Students are primarily responsible for developing their own program of study, but this should be done with the advice of a member of the faculty who agrees to act as the student's adviser in the major.

Lower Division Requirements. I: one year of Western Civilization (Special Programs 44) or its equivalent; II: one year of an ancient or modern language appropriate to the individual program and in addition to the graduation requirement.

Upper Division Requirements. At least 45 units distributed among: eight courses in three of the following fields or disciplines (two courses in the social sciences or the natural sciences may be substituted whenever they are appropriate): art, classics, comparative literature, dramatic art, film, history, history of art, languages and literature, music, philosophy, religious studies, rhetoric; I: a senior thesis to be researched and written in a two-quarter sequence of courses, Humanities 198A–198B, under the guidance of the student's adviser; II: each individual program should emphasize one of the following: (1) the history, literature, thought and art of a chronological or stylistic period, (2) the culture of a major geographical area, or (3) a recognizable theme that brings together a number of methodologies and disciplines.

Honors. Upper division students with an overall grade-point average of 3.3 and a 3.3 in the major may, upon approval of the head adviser, enroll in the honors program at any time up to the first quarter of their senior year. Requirements for graduation in the honors program include: (1) 3.5 grade-point average in the courses taken in the major and in all work completed in the University and (2) a recommendation for honors based upon the high quality of the senior thesis.

COURSE

198A–198B. Directed Group Study for Upper Division Students. (4–4) Meetings to be arranged. Prerequisite: consent of instructor. Directed group study on special topics approved by the Division.

Italian

Department Office, 5125 Dwintelle Hall

Professors: Louise George Clabat, Ph.D. Gustavo Costa, Dottore in Filosofia Arnulfo F. Ferruolo, Dottore in Lettere (Chairman)

Assistant Professor: Nicolás J. Perrella, Ph.D. Ruggero Stefani, Dottore in Filosofia Enrico De Negri, Dottore in Filosofia (Emeritus)

Acting Assistant Professor: Teodolinda L. Barolini, M.A.

Lecturers: Catherine Feucht, B.A. Cecilia Ross, Ph.D.

Major Adviser: Mr. Perrella.

Graduate Adviser: Mr. Costa.

The Department offers courses designed to lead to proficiency in the Italian language as well as to a critical appreciation of the literature of Italy from its beginnings to the present. It also provides courses on Italian civilization at the lower division level, and upper division courses of Italian literature in English translation. At the graduate level, students will find the opportunity for advanced work in philology as well as in literature.

The Major

Lower Division. 1, 2, 3, 4, 5, or their equivalents.

Upper Division. 40 units of upper division courses of which 20 units must be taken in residence) including: 101A–101B and 103A–103B or their equivalent.

Honors Program. Students may enroll in the honors program only with the consent of the major adviser. It is open to students with an overall grade-point average of at least 3.3 and a grade-point average of at least 3.3 in the major. Students in the honors program must complete two quarters of Italian H195 and take a comprehensive examination.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Graduate Study

Master of Arts in Italian. Requirements: 36 units of upper division and graduate courses in Italian of which at least 18 units must be in the 200 series. Italian 200 and Italian 203 are required. With the consent of the graduate adviser, a maximum of 4 units of course work outside the Department may be counted towards the over-all unit requirement. In the final quarter of residence candidates must pass the comprehensive written and oral examination. Further information may be obtained from the departmental office.

Doctor of Philosophy in Italian. The program for the Ph.D. degree in Italian is open to students holding an M.A. in Italian or in a program in which Italian was the major field of study. The student admitted to the program undertakes study and course work in preparation for: (1) a preliminary examination on Italian literature from the origins to the 19th century; (2) a comprehensive examination on the major period of Italian literature and a minor in a related humanistic discipline. Before the qualifying examination can be taken, the student must also prove to have a reading knowledge of Latin and of a modern foreign language other than Italian (e.g., French, German, Spanish, Russian), For further information please contact the Department.

Doctor of Philosophy in Romance Languages and Literature. (For this program, consult the publication issued by the Graduat Division on Languages and Literatures and the Fine Arts.)

LOWER DIVISION COURSES

The first year of work in a foreign language in secondary school is considered to be equivalent to one quarter in college; each successive year in the same foreign language in secondary school is equivalent to the additional course in a sequence of four quarter courses in college.

1. Elementary Italian. (5) Five 1-hour meetings and one to two laboratory sessions per week.

2. Intermediate Italian. (5) Five 1-hour meetings and one to two laboratory sessions per week. Prerequisite: course 1 or the equivalent.

3. Intermediate Italian. (5) Five 1-hour meetings per week. Prerequisite: course 2 or the equivalent.

4. Intermediate Italian. (5) Five 1-hour meetings per week. Prerequisite: course 3 or the equivalent.

5. Advanced Italian. (5) Five 1-hour meetings per week. Prerequisite: course 4 or the equivalent. Reading, composition, and conversation.

LOWER DIVISION COURSES IN ENGLISH

40A–40B. Italian Civilization in English. (4–4)

Three 1-hour meetings. The salient aspects of the Italian civilization from the Middle Ages to the present. Lectures, readings, and discussion sessions on history, society, literature, the arts, and the cinema. 40A. Medieval and Renaissance Italy; 40B. Modern and Contemporary Italy.

Mr. Ferruolo (F, W)

UPPER DIVISION COURSES

101A–101B. Advanced Studies in Italian Language. (4–4) Three hours of lecture per week. Prerequisite: course 5 or the equivalent. Advanced grammar, composition, and reading. Required for majors.

101A: Miss Barolini (F); 101B: Mr. Moses (W)

102. Advanced Conversation. (4) Three hours of lecture per week. Prerequisite: course 5 or the equivalent. Conversation and discussion on topics of current interest. Course material will be adapted to train students on various levels of verbal expression.

Mr. Moses (Sp)

103A–103B. Introduction to Italian Literature. (4–4) Three 1-hour meetings per week. Designed primarily for juniors majoring in Italian. An introduction to the

NOTE: For key to symbols, see page 36.
Latin American Studies

Group Major Office, 4309 Dwinelle Hall
Advisers: Mr. G. Arnold Chapman (Department of Spanish and Portuguese), Head Adviser and Coordinator; Mr. Stanley H. Brandes (Department of Anthropology); Mr. James J. Parsons (Department of Geography); Mr. Edmond W. Shaw (Department of History); Mr. S. R. Cheesman (Department of Spanish and Portuguese).

Group Major in Latin American Studies

The major group in Latin American Studies is designed to present a balanced curriculum of the history, culture, and environment of Latin America for students wishing a broader perspective of the area than is usually available through a departmental major. The program may be of particular interest to students desiring a general education focused on the Latin American cultural regions; (2) students planning to enter business, government, or international agency service; and (3) students preparing to teach social science or language.

Lower-Division: Spanish 1, 2, 3, 4, 5, 25 (or the equivalents), History 180B.

Upper-Division. A minimum of 45 upper-division units, but not more than 54, distributed as follows: Portuguese 101 (or the equivalent); Spanish 104A-104B or Portuguese 151A-151B; History 156A-156B; seven upper-division courses divided among a maximum of four areas, as appearing on the List of Approved Courses (given below), selected in consultation with a major group adviser (with a minimum of two in the chosen fields) from anthropology, economics, geography, history, political science, and Portuguese language and literatures, and sociology.

List of Approved Courses: Anthropology 124, 125, 126, 127, 178, 179, 180; Geography 141, 154, 155, 156, 157A, 157B, 158, 171; History 103E, 160A, 160B, 162A, 162B, 163A, 163B, 164; Political Science 148A, 148B; Portuguese 102, 114, 123A and 123B (if not included in requirements), 135 (when topic is appropriate), 150; Sociology 135, Spanish 100, 101, 102, 104A and 104B (if not included in requirements), 113, 114, 129, 130, 131, 192 (when topic is appropriate); 193; in any department, any special topic course other than 199 when the subject matter is appropriate.

Honors Program. With consent of a group major adviser, a student with an overall grade-point average of 3.5 or higher and a grade-point average of 3.3 or higher in courses completed in the major may apply for admission to the honors program. Students accepted into the honors program will enroll in Latin American Studies H195 for the preparation of a senior thesis.

COURSE

H195. Honors in Latin American Studies. (5) Prerequisite: senior standing with a grade-point average of 3.5 or higher and a grade-point average of 3.3 or higher in courses completed in the major. This course will be offered for credit when topic changes. May be repeated for credit when topic changes.

Legal Studies

Program Office, 2224 Piedmont Avenue
Program Coordinator: Charles J. McClain, Jr.
The undergraduate program in Legal Studies adds a
new dimension to Berkeley's liberal arts curriculum. Its premise is that, as part of a liberal education, students should learn something about legal ideas, legal institutions and the legal process. The Legal Studies courses will be taught by members of the School of Law faculty, principally by the core faculty of the Jurisprudence and Social Policy program. It should be stressed that these are liberal, rather than pre-professional, courses. Their purpose is to make the study of law a vital option in liberal education and is not to prepare students to enter law school. Interested students should check the Schedule of Classes for up-to-date information on which courses are being offered each quarter.

**COURSES**

100A-100B-100C. Foundations of Law and Society. (4-4-4) Three hours of lecture and one hour of discussion section per week. First quarter is prerequisite to second; second quarter is prerequisite to third. Introduces students to the legal 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. Approved for 1978/79 only.

107. Theories of Justice. (4) Three hours of lecture, one hour of discussion per week. Major perspectives in social and economic thought, e.g., natural law, natural right, laissez faire, "possession individualism," contractarianism, pluralism, and social equality. As they affect contemporary discussions of "higher law," fairness, civic competence, and distributive justice. Appro- 
vved for 1978/79 only.

170. Society and the Criminal Sanction. (4) Three hours of lecture, one hour of discussion section per week. The theory and application of formal sanctions; the deterrent effect of sanctions; the borderland of criminal law—marijuana, homosexuality, prostitution, gambling; the decriminalization and regulation of deviant language and behavior. Under the direction of a faculty member, students carry out an approved program of independent study in which they attain a reasonable mastery of an appropriate linguistic topic. As evidence of each quarter's work, they must submit an acceptable term paper summarizing critically the material they have covered.

**LINGUISTICS**

Department Office, 2337 Dwinelle Hall


Assistant Professors: Leanne H. Hinton, Ph.D.; Carol F. Justus, Ph.D.;

Senior Lecturer: Jesse O. Savater, Ph.D.

Department Major Advisers: Mr. Sawyer, Ms. Lakoff, Mr. Wang

Graduate Advisers: Mr. Fillmore, Mr. Lakoff, Mr. Mati- isoff.

The Major

Required: Linguistics 20, 110, 120, 145, plus 26 additional units at least 22 must be upper division. The following combinations of courses are suggested as ways of pursuing specialized interests. They are meant to be suggestive rather than restrictive, and are by no means mutually exclusive. Other combin-
224. Advanced Grammatical Analysis. (4) Two 1/2-hour lectures per week. Prerequisite: course 120. Mr. Ohala (W)

225. Advanced Phonological Analysis. (4) Two 1/2-hour lectures per week. Prerequisite: course 108. Mr. Malkiel (W)

226. Workshop in Syntax and Semantics. (4) Two 1/2-hour section meetings per week. Prerequisite: course 121 or its equivalent. Practice in constructing examples and counter-examples to verify or disprove hypotheses in the theory of grammar. Both classical and current hypotheses will be considered.

229. Linguistic Implications of Lexicography and Lexicology. (4) Two 1/2-hour lectures per week. An investigation of selected problems in derivation and compounding and their relevance to grammatical theory.

230. Structure of a Particular Language. (4) Two 1/2-hour lectures per week. Mr. Sawyer (F)

231. Topics in Linguistic Pragmatics. (4) Two 1/2-hour lectures per week. Prerequisite: course 123 or consent of instructor. Current research in pragmatics, with topics to be announced on the basis of the interests of instructor and students.

232. Word Formation. (4) Two 1/2-hour lectures per week. An investigation of selected problems in derivation and compounding and their relevance to grammatical theory.

233. Germanic Linguistics. (4) Two 1/2-hour lectures per week. Prerequisite: at least one of the older Germanic languages. Phonology, morphology, and lexicography of the Germanic languages, the reconstruction of Proto-Germanic; Proto-Germanic and Indo-European.

234. Problems of Reconstruction in Romance Linguistics. (4) Two 1/2-hour lectures per week. Prerequisite: consent of instructor. Proposals of new and critique of older analyses of Romance historical data. Mr. Chafe (W)

235. Roman History and Phonology. (4) Two 1/2-hour lectures per week. Prerequisite: graduate standing and consent of instructor. The key problems of Roman diachrony and comparative inflection, with full attention to their methodological applications.

236. Roman History and Inflection. (4) Two 1/2-hour lectures per week. Prerequisite: graduate standing and consent of instructor. The key problems of Roman diachrony and comparative inflection, with full attention to their methodological applications.

237. Romance History and Derivation. (4) Two 1/2-hour lectures per week. Prerequisite: graduate standing and consent of instructor. The key problems of Romance historical and comparative inflection, with full attention to their methodological applications.

238. Comparative Grammar of Latin. (4) Two 1/2-hour lecture per week. Prerequisite: at least an elementary knowledge of Latin or permission of instructor.

239. Comparative Grammar of Greek. (4) Two 1/2-hour lecture per week. Prerequisite: at least an elementary knowledge of Greek or permission of instructor.

240. Advanced Diachronic Linguistics. (4) Two 1/2-hour lectures per week. Ms. Hinton (F)

241. Historical Semantics. (4) Two 1/2-hour lectures per week. Synchronic variation and diachronic change in the realm of meaning. Mr. Malkiel (F)

242. Advanced Indo-European Comparative Linguistics. (4) Two 1/2-hour lectures per week. Mr. Fillmore (W)

243. Linguistics of Southeast Asia. (4) Two 1/2-hour lectures per week. Mr. Matlowski (W)

244. Tibeto-Burman Linguistics. (4) Two 1/2-hour lectures per week. Mr. Matlowski (W)

247A-247B. Theoretical Topics in Chinese Linguistics. (4) Two 1/2-hour lectures per week. Prerequisite: courses 135 and 145 or consent of instructor. Credit and grade will be awarded upon completion of sequence. Mr. Wang (F)

249. Topics in Language and Cognition. (4) Two 1/2-hour lectures per week. Prerequisite: course 154 or consent of instructor. Mr. Chafe (Sp)

250. Applied Linguistics. (4) Two 1/2-hour lectures per week. Mr. Sawyer (Sp)

251. Problems in Diachronic Analysis. (4) Two 1/2-hour lectures per week. Mr. Ohala (W)

252. Applied Linguistics. (4) Two 1/2-hour lectures per week. Mr. Sawyer (Sp)

253. Solutions to methodological problems and in inventorying, through dictionaries, a whole lexical stock, with illustrations from different languages.

254. Applied Linguistics. (4) Two 1/2-hour lectures per week. Mr. Wang (Sp)

255. History of Linguistics. (4) Two 1/2-hour section meetings per week. Mr. Malkiel (Sp)

256. Major Schools of Structural Linguistics. (4) Two 1/2-hour lectures per week. The linguistic theories of Saussure, the Prague School, Glossematists, and American Structuralists.

257. History of Generative Grammar. (4) Two 1/2-hour lectures per week. Prerequisite: course 120. The development of generative grammar from 1956 to the present. Topics: early and classical transformational grammar, abstract syntax, lexicalism, generative semantics.

258. Special Group Study. (2-8) Prerequisite: one full year of graduate work at Berkeley or consent of graduate adviser.

259. Special Individual Study. (2-8) The Staff (F, W, Sp)

601. Individual Study for Master's Students. (1-8) Individual study for the comprehensive or language requirement in consultation with the field adviser. Units may not be used to meet either unit or residence requirements for a master's degree. Must be taken on a satisfactory/unsatisfactory basis.

602. Individual Study for Doctoral Students. (1-8) Prerequisite: one full year of graduate work at Berkeley or consent of graduate adviser. Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

1IDS 272. Neurobiology of Language. (4) See interdisciplinary Studies for the complete description of this course. Mr. Wang (Sp)
Graduate Adviser: Mr. Sluga.

The Group in Logic and the Methodology of Science offers an interdisciplinary program of study and research leading to the Ph.D. degree. Although the Department of Mathematics and the Department of Philosophy each offers a Ph.D. degree toward which a student may write a dissertation in logic, the interdisciplinary program is designed for those 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 sciences by logical and mathematical means. The program is administered by an interdepartmental group which cooperates closely with both the Department of Mathematics and the Department of Philosophy.

Preparation. For admission to the graduate program, students shall have completed an undergraduate major in philosophy, or in mathematics, or a joint major in both, including at least one full-year upper division course in logic. In addition, they shall have completed (a) at least one upper division course in some science, and (b) at least one full-year upper division course in mathematics (other than logic) if the undergraduate major was philosophy, or in philosophy (other than logic) if the undergraduate major was mathematics. Exceptions to these requirements are permitted only at the discretion of the graduate adviser. Before advancement to candidacy, and preferably early in the doctoral career, written examinations in two foreign languages must be passed; students may choose from the following: French, German, or Russian. Students should prepare themselves for the language requirement in 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 departments of Mathematics and Philosophy, attention is especially directed to courses in the various science departments, in statistics, and in linguistics.

Logico Colloquium. (No credit) Reports on current research and scholarly work by members of the staff, visitors, and graduate students. The Staff (F, W, Sp, Su)

OTHER DEPARTMENTS WITH RELATED PROGRAMS

Department of Mathematics and Department of Philosophy.

Mathematics

Professors:
- John W. Addison, Jr., Ph.D.
- William S. Arveson, Ph.D.
- William G. Bade, Ph.D.
- George M. Bergman, Ph.D.
- D. E. Bryan, Ph.D.
- David Blackwell, Ph.D.
- Robert E. Bowen, Ph.D.
- Hans J. E. Crawford, Ph.D.
- Paul L. Chambré, Ph.D.
- David M. Chinn, Ph.D.
- Alexandre J. Chorin, Ph.D.
- Helio Cordes, Ph.D.
- D. E. Gersh, Ph.D.
- Rene J. De Vore, Ph.D.
- Stephen P. Diliberto, Ph.D.
- Lister E. Dubins, Ph.D.
- Irvin Fary, Ph.D.
- Jacob Feldman, Ph.D.
- David A. Freedman, Ph.D.
- David G. Geltman, Ph.D.
- Robert C. Hershorne, Ph.D.
- Henry Helson, Ph.D.
- Leon A. Henkin, Ph.D.
- Morris W. Hirsch, Ph.D.

Graduate Program:

Maxwell A. Rosenlicht, Ph.D.
Rainer K. Sachs, Ph.D.
Donald E. Sarason, Ph.D.
I. Chih Chuan, Ph.D.
Abraham Seidenberg, Ph.D.
Jack H. Silver, Ph.D.
Stephen Smale, Ph.D.
Robert M. Solovay, Ph.D.
Edward H. Spanier, Ph.D.
John R. Stallings, Jr., Ph.D.
R. Earley Thayer, Ph.D.
Robert L. Vaught, Ph.D.
John B. Wagoner, Ph.D.
Alan D. Weinstein, Ph.D.
Joseph A. Wolf, Ph.D.
Huei-Hsi Wu, Ph.D.
Alfred L. Foster, Ph.D. (Emeritus)
Robert L. Vaught, Ph.D. (Emeritus)
Derrick H. Lehmer, Ph.D. (Emeritus)

Associate Professors:
- Paul R. Chernoff, Ph.D.
- David M. Goldschmidt, Ph.D.
- F. Alberto Grunbaum, Ph.D.
- Olof H. Hald, Ph.D.
- Leo A. Harrington, Ph.D.

Assistant Professor:
- Marina Rainher, Ph.D.

Visiting Professor:
- Isadore Singer, Ph.D.

Lecturers:
- Richard K. Niles, Ph.D.
- Jeanette E. Nelson, Ph.D.
- Abraham Neyman, Ph.D.
- Rodolfo R. Rosales, Ph.D.

Graduate Program:

The Department offers the graduate student a choice of three programs leading to the A.B. degree. The basic major in mathematics gives the student the opportunity to obtain a strong, well-rounded mathematical background. The faculty of the Department is strongly oriented toward research, and courses required for the major are oriented toward theory. Students may choose from the various applied mathematics, a special major program in applied mathematics is available. For prospective school teachers of mathematics there is a small, selective major program in mathematics for teachers.

General Major Requirements. Each of the three major programs requires a minimum of 36 upper division units in the major in addition to a lower division base of 1A–1B–1C, 51A–51B–51C. Courses 111, 190A, 190B, 190C, and 190D are not accepted toward the upper division requirements. Additional requirements for these programs are as follows:

Major in Mathematics. 113A–113B; 104A; 104B or 185; 130 or 140 or 142; 133; three additional upper division mathematics courses. Only one of courses 120A and 185 can be offered as part of the major.

The attention of students interested in logic is directed to Philosophy 12A–12B and Mathematics 125A–125B. Courses in computer science, physics and statistics 100A–100B–100C are of interest to mathematics majors.

With the approval of the major adviser, students may count not more than two mathematics theoretically courses in computer science, statistics, astronomy, physics, or other sciences toward their requirements for the major in mathematics.

Major in Applied Mathematics. Either 120A–120B–120C or three courses from 104A, 104B, 185, 105; both 113A and 112; at least one course from 128A, 128B; three additional upper division courses of which at least two are applications (designated area) (all subject to the approval of the major adviser). All or none of these three electives may be in the Mathematics Department.

Major in Mathematics for Teachers. Philosophy 12A or Statistics 20; Mathematics 113A–113B, 115A, 130, 132, 134, and 160; two additional upper division mathematics courses.

The major adviser must certify in writing that the student has the ability to write simple programs in BASIC, ALGOL, or FORTRAN. This certification will be given automatically if the student has passed a course which requires the student to write and run programs and which carries at least two units of credit. Current examples of such courses are Mathematics 128A–128B, Computer Science 1 or 101. With the approval of the major adviser, students may count not more than two mathematically theoretical courses in computer science, mathematics, astronomy, physics, mathematical economics, or other sciences toward their requirements for the major in mathematics for teachers.

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 3.3 in upper division and graduate courses in mathematics and in all courses taken with the department of mathematics; (b) pass a graduate mathematics course with a grade of at least A; (c) complete the course H196 in which they will write a senior thesis, or pass a second graduate course with a grade of at least A; (d) receive the recommendation of the major adviser. Students interested in the honors program should consult with their major adviser at least two quarters before graduation.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

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. This proficiency is required for most Ph.D. programs, but graduate programs do not leave much time for language study. There is usually no language requirement for an M.A. degree.

Course H117, designed to challenge the student's ability to do creative thinking, is useful for students preparing for graduate work. It is also desirable for such students to take some graduate courses while still in undergraduate status; courses 202A–202B–202C, 214, 250A–250B are recommended.

Graduate Programs

The Department offers the M.A. degree in mathematics, covering both pure and applied fields. It also offers the Cand. Phil. and Ph.D. degrees in pure mathematics and applied mathematics. Detailed information concerning these degrees, teaching assistancies and fellowships, and degree requirements is given in the Graduate Announcement of the Department of Mathematics, which is available upon request from the Graduate Secretary, Department of Mathematics.

Courses and Seminars

Courses and seminars are listed below. Statements of instructors commenting on their methods of teaching, emphasis in presenting material, and other characteristics of their courses are available from the Department Office, 970 Evans Hall, at the beginning of each quarter. Detailed descriptions of seminars and names of instructors offering them are also available.

LOWER DIVISION COURSES

P. Algebra and Trigonometry. (2) Units recordable credit, but recognized as four units of work load in computing study list. Four hours of lecture per week. Designed for students who lack the prerequisites. A placement exam will be given during the pre-enrollment period. After receiving credit for PS, 1A, 5A, 6A, 16A, or 16B, students will not receive credit for course P. Review of algebra, graphs, functions, polynomials, exponential and logarithmic functions, trigonometric functions and their properties.

Mr. Fary (F, W, Sp)

PS. Self-Paced Study in Algebra and Trigonometry.
nometry. (1-2) One or two units recorded credit, but recognized as two or four units of work load in computing study list. Covers the same subject matter as course P. Individualized assistance available six hours per week. The point in the material at which a student begins is determined by a diagnostic exam, and can range from more basic to more advanced than the starting-point of course P. Students who complete the course for one unit may re-enroll for a second unit. Grades are based on mastery of the material completed, not quantity, as long as quantity is sufficient to assign at least one unit. Students will not receive credit for PS after receiving credit for any one of the following or its equivalent: P, 1A, 5A, 6, 16A. Students must preenroll and attend the first class meeting as for other courses. Mr. Bergman (F, W, Sp)

A–1B–1C. Calculus. (4–4–4) Two hours of lecture and two hours of discussion section per week. Prerequisites: at least three and one-half years of high school mathematics including algebra, geometry, trigonometric and other elementary functions, and some coordinate geometry; students lacking the prerequisites may enroll after completing course P, PS, or 6A. A placement test will be given during the pre-enrollment period. This is the usual sequence for students who plan additional study of mathematics. Students who have received credit for 16A or 190A will receive one unit of credit for 1A; students who have received credit for 16B will receive two units of credit for 1B. Introduction to differential and integral calculus of functions of one variable with applications, transcendental functions, techniques of integration, introduction to differential equations and infinite series of several variables. Mr. Sachs (each part offered each quarter)

1A–5, 1B–5, 1C–5. Self-Paced Study of Calculus (1–4, 1–4, 1–4). Formerly 13. Twelve to eighteen hours of discussion per week. Prerequisites: at least three and one-half years of high school mathematics including algebra, geometry, trigonometric and other elementary functions, and some coordinate geometry; students lacking the prerequisites may enroll after completing course P, PS, or 6A. Self-paced instruction covering the material of course 1A–1B–1C. Units of credit can be adjusted upward at the end of the quarter to reflect the amount of material completed. Simultaneous enrollment in several parts is possible. The option of one unit total credit must be approved by the instructor. Mr. McKenzie (in charge) (F, W, Sp)

16A–16B. Analytic Geometry and Calculus. (4–4) Two hours of lecture and 2 hours of discussion section per week. Prerequisites: two years of high school algebra plus plane trigonometry; pre-requisites may enroll after completing course P, PS, or 6. A placement test will be given during the pre-enrollment period. For students in physical sciences. Course 16A–16B is a terminal course for lower division students whose program does not require more than two quarters of mathematics. Students receive no credit for 16A for 1A or 190A, two units credit for 16B following 1B or 190B. Inequalities, absolute value; graphs of simple functions, the derivative; maxima and minima; rates of change and differentials; increasing and decreasing functions; basic properties of log, exp, sin, cos. Introduction to integration; fundamental theorem of calculus, properties of the integral; integration by substitution and by parts; volumes of solids of revolution and applications. Mr. Ogus, Mr. Goldschmidt, Ms. Charney, Mr. Wagoner (each part offered each quarter)

16S. Self-Paced Study in Analytic Geometry and Calculus. (1–6) Three to twelve hours of discussion per week. Prerequisites: high school algebra plus plane trigonometry; students lacking the prerequisites may enroll after completing course P, PS, or 6. Self-paced instruction covering the material of course 16A–16B. May be repeated for credit up to a total of 8 units. Reduced credit for students who have taken part(s) of course 1A–1B–1C or 16A–16B. Unit credit and grades assigned at the end of each quarter, depending on the number of study units completed. The option of one unit total credit must be approved by the instructor. Mr. Spanier (F, W, Sp)

41. Introduction to Linear Algebra and Vector Analysis. (4) Four hours of lecture per week. Prerequisites: two years of high school mathematics. Honors course corresponding to SIA-5A–5B. May not be taken for credit after courses 51A–51B, 2A–2B. May not replace 51A or 51B as part of the Mathematics Major. Determinants, linear equations, n-dimensional Euclidean space, matrices, linear transformations, review of partial differentiation, application of partial differentiation to maximum and minimum problems, multiple integrals and applications, surface and line integrals, Green's theorem, divergence theorem, Stokes' theorem. Ms. Nelson.

51A. Introduction to Linear Algebra. (4) Two hours of lecture and 2 hours of discussion per week. Prerequisite: course 1C. Students may not receive credit for both 51A and 111. Matrix algebra, simultaneous linear equations, vector spaces, determinants. Mr. Henkin, Mr. Berlekamp, Mr. Protter, Mr. Kirby, Mr. Cordes (F, W, Sp)

51B. Calculus of Vector Functions. (4) Two hours of lecture and 2 hours of discussion per week. Prerequisite: course 51A. Review of partial differentiation and multiple integration. Vector differential and integral calculus, including theorems of Green, Gauss and Stokes. Mr. Diliberto (F, W, Sp)

51C. Differential Equations and Related Topics. (4) Two hours of lecture and 2 hours of discussion per week. Prerequisites: courses 1A–1B–1C. Ordinary differential equations of first and second order, series solutions and higher order equations. Introduction to Fourier series and separation of variables in simple partial differential equations with some applications. Mr. Bowen, Mr. Sarases, Mr. Valencia, Mr. Bremermann (F, W, Sp)

55. Discrete Mathematics. (4) Three hours of lecture and one hour of discussion section per week. Prerequisite: course 1C or 16B. Introduction to: combinatory logic, mathematical induction; finite sets, relations, and functions; introduction to: trees, combinatorics, algebraic structures, probability. Emphasis on topics of interest to students of computer science. Mr. Gale (W)
160. History of Mathematics. (4) Three hours of lecture per week. Prerequisite: course 104A. Motivation. Development of the notion of a function as a relation and as an object of study in applied mathematics and those students in the physical sciences who are likely to pursue more advanced work. No credit for 160 following 185.

163. Tutorial in Upper Division Mathematics. (4) Three hours of lecture per week. Prerequisite: course 104A. Tutorial for prospective teachers. Systems of natural numbers, integers, rational numbers, and real numbers developed both axiomatically and through set-theoretical constructions. Proof by induction and analysis by recursion. Mr. Stallings (Sp).

134. Number Systems. (4) Three hours of lecture per week. Prerequisite: course 112. Especially recommended for prospective teachers. Natural numbers, integers, rational numbers, and real numbers developed both axiomatically and through set-theoretical constructions. Proof by induction and analysis by recursion. Mr. Stallings (Sp).

135. Introduction to the Theory of Sets. (4) Three hours of lecture per week. Prerequisite: courses 113A and 104A. Set-theoretical means of avoiding them. Sets, relations, functions, order and well-order. Proof by transfinite induction and definitions of infinite recursion, natural numbers, and their arithmetic. Construction of the real numbers. Axiom of choice and its consequences. Mr. Henkin (F), Ms. Arthaud (W, Sp).

136. Combinatorial Analysis. (4) Three hours of lecture per week. Prerequisite: courses 112, 128A, or permission of instructor. Emphasis is placed on the individual's experience in finding and using combinatorial methods, especially recursion. Mr. Stallings (Sp).

137. Axiomatic Set Theory. (4) Three hours of lecture per week. Prerequisite: may only be taken concurrently with course 115A. Interactive computation relating to quadratic forms, including class numbers, continued fraction expansion and applications to the factorization of large numbers, multiprecision operations and application to tests for primality. Mr. Neyman (F).

138. Mathematical Models Seminar. (4) Three hours of lecture per week. Prerequisite: consent of the instructor. Emphasis is on the study of those mathematical models, which can be described by simple partial differential equations. Practice on the computer. Mr. Grunbaum (W), Mr. DeVogelaere (Sp).

139. Topics in Geometry. (4) Three hours of lecture per week. Prerequisite: course 113A and consent of instructor. Topics selected from such areas as classical projective geometry, inverese geometry, symplectic geometry, geometric algebra, integral geometry, convexity, and elementary topology. Mr. Seidenberg (W).

140. Metric Differential Geometry. (4) Three hours of lecture per week. Prerequisites: courses 104A and 120B. Frenet formulas, isoperimetric inequality, local theory of surfaces in Euclidean space, first and second fundamental forms. Gaussian and mean curvatures, isoperimetric inequalities, geodesics, parallelism, the Gauss-Bonnet-Von Dyck Theorem. Mr. Chern (W).

142. Elementary Algebraic Topology. (4) Three hours of lecture and four hours of laboratory per week. Prerequisites: courses 104A and 113A. The topology of one and two dimensional spaces: manifolds and triangulation, classification of surfaces, Euler characteristic, fundamental groups, plus further topics at the discretion of the instructor. Mr. Goldschmidt (Sp).

144. Algebraic Geometry. (4) Three hours of lecture per week. Prerequisite: course 113A. Chapters on projective and nonprojective algebraic curves and surfaces. Mr. Grunbaum (W), Mr. DeVogelaere (Sp).

145. Boolean Algebras. (4) Three hours of lecture per week. Prerequisite: course 112A. Postulates, relations to lattices and rings; relation to sentential calculus and calculus of classes; infinite operations, atoms, subalgebras, ideals, direct products; representation theorems. Mr. Seidenberg (W).


160. History of Mathematics. (4) Three hours of lecture per week. Prerequisites: courses 51B, 51C, and 113A. History of algebra, geometry, analytic geometry, and calculus from ancient times through the seventeenth century and selected topics from more recent mathematical history. Mr. Stallings (W).

163. Tutorial in Upper Division Mathematics. (4) Four hours per week. Prerequisite: consent of instructor. Emphasis is placed on the individual's experience in finding and using combinatorial methods, especially recursion. Mr. Stallings (Sp).

136. Tutorial in Upper Division Mathematics. (4) Four hours per week. Prerequisite: consent of instructor. Emphasis is placed on the individual's experience in finding and using combinatorial methods, especially recursion. Mr. Stallings (Sp).
in discovering and explaining mathematics. Examples of subjects which may be covered are game theory, category theory, differential topology, mathematical foundations of quantum mechanics, global theory of ordinary differential equations, and classical linear groups. Content varies; may be repeated for credit with consent of instructor. (Sp)

175. Calculus of Variations. (4) Three hours of lecture per week. Prerequisite: course 159. This course begins following 150B. Elements of the calculus of variations; Euler equations for variational problems; differential equations of mathematical physics derived from integral principles; solutions of variational problems by direct methods. Mr. Rossales (F)

185. Introduction to the Theory of Functions of a Complex Variable. (4) Three hours of lecture per week. Prerequisite: course 110B and 185. Designed primarily for mathematics majors with little or no background in physical sciences. Study of the relationship between mathematics and physics; function of a complex variable, Cauchy's integral formula, Laurent series, singularities of analytic functions, the residue theorem with application to definite integrals. Some additional topics such as conformal mapping. Mr. Og (F, W, Sp)

H185. Introduction to the Theory of Functions of a Complex Variable. (4) Three hours of lecture per week. Prerequisite: course 104A. Honors section corresponding to course 185 for exceptional students with strong mathematical inclination and motivation. Emphasis is on rigor, depth, and hard proofs. Mr. Bade (W)

186. Mathematical Models in Physics and Engineering. (4) Three hours of lecture per week. Prerequisite: courses 110B and 185. Designed primarily for mathematics majors with little or no background in physical sciences. Study of the relationship between mathematics and physical sciences. Students receive no credit for 190A following 1A or 16A, 190B following 51A or 111. Course 190A may replace courses 5B-5C as prerequisites for more advanced mathematics courses. Mr. Grunbaum (Sp)

190A–190B–190C. Survey of Algebra and Analysis. (4–4–4) Three hours of lecture per week. Prerequisite: one year of calculus outside mathematics and physics. Students receive no credit for 190A following 1A or 16A, 190B following 51A or 111. Course 190A may replace courses 5B-5C as prerequisites for more advanced mathematics courses. Mr. Nelson (F, W, Sp)

191A–191B–191C. Introduction to Topology and Analysis. (4–4–4) Three hours of lecture per week. Prerequisite: course 104A; also linear algebra for 191B and 191C. Study of the topology of metric spaces, continuity, compactness, completeness, connectedness, and the theory of functions. Mr. Bade (F, W, Sp)

202A–202B–202C. Advanced Topics in Analysis. (4–4–4) Three hours of lecture per week. Prerequisites: courses 104A and 105, and 185 or 2020. Further topics selected by the instructor. Mr. Bade (F, W, Sp)

207. Differential Operators. (4) Three hours of lecture per week. Prerequisite: course 206B. Differential operators, unbounded symmetric operators, perturbation theory, additional topics selected by the instructor. Mr. M. K. Viswanath (F)

208. Functional Analysis. (4) Three hours of lecture per week. Prerequisite: course 206B. Differential operators, unbounded symmetric operators, perturbation theory, additional topics selected by the instructor. Mr. M. K. Viswanath (F)

209A–209B. Operator Algebras. (4–4) Three hours of lecture per week. Prerequisite: course 206A. Locally convex linear topological spaces, distributions, further topics selected by the instructor. Mr. J. Wolf (Sp)

210. Advanced Topology and Analysis. (4–4–4) Three hours of lecture per week. Prerequisite: courses 105 or 2020; and 185. The theory of initial value and boundary value problems for hyperbolic, parabolic, and elliptic partial differential equations, with emphasis on linear systems. Monsen; closing lemma, structural stability, flows and bifurcations; special topics. Mr. Pugh (W, Sp)

212A–212B. Theory of Recursive Functions. (4–4) Three hours of lecture per week. Prerequisite: course 187A. Correct functions, recursive functions, and recursive relations. Mr. Rhodes (W)

215A–215B–215C. Algebraic Topology. (4–4–4) Three hours of lecture per week. Prerequisites: courses 113B and 2020. Fundamental group, covering spaces, simplicial complexes, homology theory and applications, homotopy and homology, obstruction theory, classification theory, spectral sequences and applications. Mr. Farv, Mr. Stallings 215A, (F, Sp); 215B, (W); 215C, (Sp)

219A–219B–219C. Ordinary Differential Equations. (4–4–4) Three hours of lecture per week. Prerequisites: courses 112 or 133, and 165 or 219D. (which may be taken concurrently). Ordinary differential equations in the real and complex domains, existence and uniqueness theorems, linear and nonlinear systems with constant and periodic coefficients, analysis of singular points, Poincare-Bendixson theorem, perturbation theory, regular and singular perturbations, Frobenius method, and asymptotic expansions. Mr. M. R. Spivak (F)

220A–220B–220C. Applied Mathematics for Physical Sciences. (4-4-4) Three hours of lecture per week. Prerequisites: courses 110A-110B, 120, or 144 and 185, or equivalent. Mr. Buslaev (W, Sp)

222A–222B–222C. Partial Differential Equations. (4–4–4) Three hours of lecture per week. Prerequisite: course 187A or 202A or 185. The theory of initial value and boundary value problems for hyperbolic, parabolic, and elliptic partial differential equations, with emphasis on linear systems. Regular types of equations and systems of equations. Mr. Cordes (Sequence beginning F)

224A–224B–224C. Mathematical Methods for the Physical Sciences. (4–4–4) Three hours of lecture per week. Prerequisites: courses 112 or 133C, and 104A and 185, or 121A–B, or 120A-B. Fourier series, integral transforms, vector and tensor algebra, and ordinary differential equations. Mr. Buslaev (W, Sp)

226. Functions and Abstract Machines. (4) Three hours of lecture per week. Prerequisite: courses 113B and 135 or consent of instructor. Functions computed by finite state devices, algebraic characterizations, regular sets. Turing machines, recursive functions, decision problems. Mr. Rhodes (W)

228B. Power Series and Languages. (4) Three hours of lecture per week. Prerequisites: courses 223A and 230A. Power series in non-commuting variables, rational and algebraic power series, applications to context-free languages and grammars, regular languages. Mr. Sipser (W, Sp)

229C. Semigroups and Machines. (4) Three hours of lecture per week. Prerequisites: courses 226A and 250A. Finite semigroups, wreath products, prime decomposition. Mr. Sipser (W, Sp)

227A–227B. Theory of Recursive Functions. (4–4)
Three hours of lecture per week. Prerequisite: course 225C. This course essentially enumerates properties of natural numbers: characterization, significance, and classification. Relativization, degrees of unsolvability. The recursion theorem. Classification of arithmetic, decidability, constructive ordinals, the hierarchy of sets. Analysis of Diophantine equations; zeros of polynomials, basic algebraic geometry. The real line, the Cantor set, the Baire category theorem. Algebraic closure. Separable and purely inseparable field extensions. Algebraic numbers and functions. The basic properties of Fourier series, convergence and summability, conjugate functions, Hardy spaces, and additional topics at the discretion of the instructor.

260A. Banach algebras, convolution algebras, group representations. Mr. Chernoff (W)

261A–261B–261C. Lie Groups. (4–4–4) Three hours of lecture per week. Prerequisite: course 214. Lie groups and Lie algebras, general structure theory, compact, solvable, semisimple, and simple groups; classification of simple groups, representation theory, further topics such as the theory of symmetric spaces. Mr. Hirsch (Sp)

265. Differential Topology. (4) Three hours of lectures per week. Prerequisite: course 214. Vector bundles, tubular neighborhoods, approximation theorems, Morse theory, handlebodies, cobordism, and surgery.

271. Topics in Foundations. (4) Three hours of lectures per week. Advanced topics chosen by the instructor. The content of this course changes as in the case of seminars. Hence it may be repeated for credit.

272. Topics in Differential Topology. (4) Three hours of lectures per week. Advanced topics chosen by the instructor. The content of this course changes as in the case of seminars. Hence it may be repeated for credit.

273. Boundary Value Problems. Mr. Robinson (W)

274. Topics in Algebra. (4) Three hours of lectures per week. Advanced topics chosen by the instructor. The content of this course changes as in the case of seminars. Hence it may be repeated for credit.

275. Topics in Applied Mathematics. (4) Three hours of lectures per week. Advanced topics chosen by the instructor. The content of this course changes as in the case of seminars. Hence it may be repeated for credit.

276. Topics in Topology. (4) Three hours of lectures per week. Advanced topics chosen by the instructor. The content of this course changes as in the case of seminars. Hence it may be repeated for credit.

277. Topics in Differential Geometry. (4) Three hours of lectures per week. Advanced topics chosen by the instructor. The content of this course changes as in the case of seminars. Hence it may be repeated for credit.

278. Topics in Analysis. (4) Three hours of lectures per week. Advanced topics chosen by the instructor. The content of this course changes as in the case of seminars. Hence it may be repeated for credit.

279. Topics in Partial Differential Equations. (4–4–4) Three hours of lectures per week. Advanced topics chosen by the instructor. The content of this course changes as in the case of seminars. Hence it may be repeated for credit.

280A–280B–280C. Mathematical Theory of Relativity. (4–4–4) Three hours of lectures per week. Prerequisite: course 140 or consent of instructor. Topics of current interest in mathematical theory of relativity, including: Lorentz transformations, the equivalence of mass and energy, general relativity, black holes, singularities, and additional topics as time permits. Mr. Feldman (F); Mr. Bowen (Sp)

290. Seminars. (2–8) Topics in foundations of mathematics, theory of numbers, numerical calculations, analysis, geometry, topology, algebra, and their applications. The content of each course may be repeated for credit. Ms. Kellogg (Sp)
Graduate degrees available under the supervision of faculty of the division are the Ph.D. in biophysics, the Ph.D. in medical physics, and master's degrees in biophysics and biomedicine. These degrees are administered under the Graduate Group in Biophysics and Medical Physics. Further information is available from the Group Office, 101 Donner Laboratory.

LOWER DIVISION COURSES

10. Atomic Radiation and Life. (4) Three hours of lecture and two and one half hours of laboratory per week. Prerequisite: Physics 6C or SE, Chemistry 1B, Biology 1B, or equivalent with consent of instructor. An introductory course in the mathematical theory of radioactive interactions with matter; radiation detection, radioactive isotopes and their role in evaluation of treatment, distribution and turnover of metabolites; introductory theory of tracer kinetics. Mr. Nichols (F).

10B. Radiation Biology. (4) Three hours of lectures and four hours of laboratory per week. Prerequisite: Physics 6C or SE, Chemistry 1B, Biology 1B, or equivalent with consent of instructor. An introductory course in the mathematical theory of radioactive interactions with matter; radiation detection, radioactive isotopes and their role in evaluation of treatment, distribution and turnover of metabolites; introductory theory of tracer kinetics. Mr. Nichols (F).

**103. Human Biology. (4) Three hours of lecture and one and one half hours of discussion per week. Prerequisite: Biology 1A–1B or Biology 1A–1B, or consent of instructor. A presentation of the human body in the context of the biological, medical, and social sciences. Topics explaining structure, function and development of the body, the nature and origin of disease, aging, con- cepts, reproductive biology and demographic and dynamic aspects of human populations. (Sp)

111. Biophysical Laboratory. (4) Two hours of lecture and 6 hours of laboratory per week. Prerequisite: Junior or senior standing in biophysics or biophysics: medical physics option, or consent of instructor. Advanced laboratory in biophysics emphasizing the applications of physics and physical methods to problems in quantitative biology. Experiments are drawn from a wide range of biophysical phenomena. Mr. Bearden, Mr. Glaeser, Mr. Nichols. (W).
methods and spectroscopic methods of structure determination. Mr. Glaeser (W)

122. Mechanisms of Energy Flow and Transduction. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: Biology 1B, Physics 5C, Chemistry 21A, Mathematics 11A or equivalent with the consent of the instructor. Molecular mechanisms of bioenergetic phenomena; photosynthesis, oxidative phosphorylation, active transport, the utilization of chemical energy in biological processes and the conversion of other forms of energy to biochemical energy in cells. Mr. Bearden (Sp)

140. Electron Microscopy: Physical Principles for Biologists. (3) Three hours of lecture per week. Prerequisite: Biology 104A, 115 or equivalent. Use of the electron microscope for high resolution studies with biological specimens is discussed from the viewpoints of the physical and optical principles involved. Topics include image formation, image analysis, radiation damage, and related topics in electron optics. Mr. Glaeser (Sp)

H195A-H195B. Senior Honors Thesis Research. (3-3) Prerequisite: open only to students in the Honors Program. Independent research and preparation of a thesis under the supervision of a faculty member. To receive the credit student must, at the end of two quarters, submit a satisfactory thesis. Participation in Honors Journal Club (1 1/2-hour discussion per week) is required for at least one quarter. Credit and grade will be awarded on completion of the full sequence. The Staff (F, W, Sp)

199. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations listed under the major of 36. Additional limitation: overall grade point average of at least 2.5. Must be taken on a passed or not passed basis. The Staff (F, W, Sp)

GRADUATE COURSES

Cellular Biophysics

201. Membrane and Lipoprotein Structure. (3) Three hours of lecture per week. Prerequisite: upper division courses in mathematics and physical sciences (e.g., course 121) and in physical chemistry, or consent of instructor. Characterization of cell membranes and lipoproteins in macromolecules by physical techniques. Emphasis is placed on the theoretical foundations for each of the physical methods. Topics include nerve myelin, plasma membrane, membrane junctions and fusions, energy transducing membranes, and serum lipoproteins. Mr. Glaeser (F)

202. Electrical and Transport Properties of Membranes. (3) Two 1 1/2-hour lectures per week. Properties of membrane functions and properties; capacitance and conductance; electro-diffusion and ion movement; propagation of nerve impulses; models and theories. Mr. Tobias (W)

204A-204B-204C. Advanced Laboratory in Biophysical Research. (4-4-4) Two hours of lecture and two 1 1/2-hour laboratory periods per week. Properties of biological systems at the atomic, molecular, cellular, and organellar level. Emrollment limited: 204A is not prerequisite for 204B. 204B is not prerequisite for 204C. The Staff (F, W, Sp)

Radiation Biophysics

211. Molecular Radiation Biology. (3) Two 1 1/2-hours lectures per week. Analysis of the action of ionizing, ultraviolet and visible radiation on cells and viruses in relation to their effects on molecules of biologic interest, radiomimetic chemicals, intracellular repair of radiation damage in nucleic acids. Mr. Tobias (F)

212. Mutagenesis and Radiation Genetics. (3) Two 1 1/2-hours lectures per week. Effects of radiation and chemical mutagens. Mutagenic mechanisms, induced genetic recombination, chromosome breakage and rearrangement. Mr. Alpen (W)

213. Mammalian Radiation Biology. (3) Two 1 1/2-hours lectures per week. Prerequisite: course 211 or permission of instructor. Analysis of the actions of ionizing, ultraviolet, and visible radiation on mammalian cells and mammalian organ systems. Cell life cycles; normal and abnormal cell kinetics; recovery phenomena; tissue effects; environmental and public health aspects. Mr. Alpen (W)

214. Radiobiological Physics. (3) Two 1 1/2-hours lectures per week. Prerequisite: course 101A and Physics 124. Interaction of electromagnetic and particulate radiation with matter, dosimetry, health physics, shielding, measurement of environmental radiation. Mr. Tobias (Sp)

Theoretical Biophysics

221. Mathematical Models and Methods in Biophysics. (4) Three hours of lecture per week. Prerequisite: Mathematics 104A or 121A or equivalent; Biology 1A-1B or consent of instructor. The representation of complex biological systems by differential equations and automata models. Dynamical systems. Chemical dynamics. Epidemiological and ecological models. Optimal control. Stochastic models and medical applications. Survey of mathematical methods. Mr. Mr. Bremermann (F)

222. Biocybernetic Systems, Nerve Nuts, Artificial Intelligence. (4) Three hours of lecture per week. Prerequisite: Mathematics 104A or 121A or equivalent; Biology 1A-1B or consent of instructor. Organisms as behavior. Pattern recognition. Optimization and control. Mathematical, biological and genetic complexity. Natural and machine intelligence. Mr. Mr. Bremermann (Sp)

223. Bioenergetics and Non-Equilibrium Thermal Physics. (3) Three hours of lecture per week. Prerequisite: physical chemistry or consent of instructor. Thermal physics applied to bioenergetics, nonequilibrium thermodynamics, and ecological processes. Mr. Mr. Bremermann (Sp)

Medical Physics

IDS 210. Physical Basis of Radiology and Nuclear Medicine. (2) See Interdepartmental Studies for the complete description of this course.

232A-232B. Medical Physics of Pathologic Processes. (2-2) Two hours of lecture per week. 232A. Carcinogenesis. Evaluation of current status of evidence concerning the processes of carcinogenesis and an attempt to integrate such evidence into a consistent picture. Leading concepts concerning development of malignancy will be considered in detail. Mr. Alpen (F)

232B. Atherosclerosis. Examination of factors and processes associated with increased atherosclerosis in arterial tissues. Emphasis on atherogenic aspects of abnormal metabolic states at molecular, cellular and tissue levels; review of risk factors in human atherosclerosis, with emphasis on blood lipoproteins. Mr. Nichols (Sp)

285A-285B-285C. Biophysics Group Proseminar. (1-1-1) One hour per week. Current topics in the biological and medical physics of particular interest to students of the Biophysics Group. Credit is not permitted for 285A or 285B. Credit is not permitted for 285C. Faculty of the Graduate Group in Biophysics and Medical Physics. (F, W, Sp)

285L Biophysics Group Proseminar Laboratory. (2) Eight hours of laboratory per week. Introduction to research programs that are actively in progress in laboratories of Faculty of the Graduate Group in Biophysics and Medical Physics. Credit is not permitted for 285L. Must be taken on a satisfactory/unsatisfactory basis. Faculty of the Graduate Group in Biophysics and Medical Physics. (F, W, Sp)

290. Seminar. (1-3) One and one-half hours of seminar per week. Graduate student seminars in biophysical areas including cellular, radiation, medical and theoretical biophysics. Seminars will offer several sections covering different topics; topics will be announced each quarter. Enrollment in more than one section is permitted. The Staff (F, W, Sp)

285. Special Topics in Biophysics and Medical Physics. (1-3) One to three hours of lecture per week. Prerequisite: same as for other Medical Physics graduate courses. Lecture courses at advanced level offered in fall and spring quarters to graduate students. Recent topics have included: electron spin resonance of biomolecules, tumor biology—diagnosis therapy, biochemical energy conversion processes, scanning electron microscope in biology, chemotaxis, three dimensional image reconstruction, views of cancer. The Staff (F, W, Sp)

299. Individual Research: Medical Physics and Biophysics. (1-12) Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

602. Individual Study for Doctoral Students. (1-8) 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. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

Medieval Studies

Program Office, 474 Boalt Hall

Distinguished Visiting Professor (Sp 1979) Joachim Burnke (University of Cologne)

Chairman: John T. Noonan
Graduate Adviser: John D. Niles

Medieval studies are currently undertaken in a joint-degree program designed to preserve the established standards of training in a major subject, while broadening the student’s experience in other aspects of the field. The program grants the joint degree, which is not prerequisite for 2048. 2048 is not prerequisite for 2049. 2049 is not prerequisite for 2040. The Staff (F, W, Sp)

The Staff (F, W, Sp)

Molecular Biology

Program Office, 229 Stanley Hall

NOTE: For key to symbols, see page 36.
The Undergraduate Major

The Department administers a program leading to the A.B. degree with a major in molecular biology. The main focus of this program is the description and analysis of biological phenomena at the molecular level.

The Major Program

Lower Division.

Chemistry IA-IB: 1-1B; Chemistry 8A-8B; Mathematics 16A-16B; Biology IA-IB; Molecular Biology 1; Psychics 8A-66-6C.

Upper Division.

Molecular Biology 110A-110B; Molecular Biology 120; Chemistry 109A-109B; Biochemistry 100A-100B-100C.

Recommended: Additional courses in the life sciences chosen in accordance with a plan approved by the departmental adviser; a reading knowledge of at least one foreign language (French, German, Japanese, or Russian).

Honors Program. With consent of the major adviser, students may enroll in the honors program no later than the beginning of the senior year. For enrollment in the program and for graduation with honors, a grade-point average of at least 3.7 is required, both in courses satisfying the requirements of the major and in all courses taken in the University. To complete the honors program, students must complete at least 4 units of course 199 and write a superior thesis based on research. Certain graduate courses in molecular biology will be open to honors students on approval of the instructor and adviser.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Graduate Study

The Department offers a program of graduate study leading to the Ph.D. degree. This program emphasizes training and performance in laboratory research. Current areas of research activity include: structure, function and metabolism of nucleic acids and proteins; chemical events in mutation and recombination; control mechanisms in the growth of viruses, bacteria and animal cells; and biological ultrastructure, development of neural connections, nucleocytoplasmic interactions in development.

Students interested in pursuing graduate work in molecular biology are advised to obtain a strong background in chemistry, physics and mathematics, and to be familiar with the basic concepts of biology. Biochemistry and genetics form the specific foundation for much of the instructional work in the Department. The common preparation required of all graduate students is essentially that outlined above for the undergraduate major program.

The Graduate Program. Students are expected to take Molecular Biology 200A and 200B and one additional graduate course offered by the Department. Other courses are chosen in consultation with the graduate adviser during the first year of residence and with the research adviser thereafter.

Each student serves as a teaching assistant for two quarters as a requirement for the Ph.D. degree. Demonstration of a reading knowledge of one foreign language chosen from French, German, Japanese, and Russian is required before the qualifying examination can be taken. In the qualifying examination the student must demonstrate proficiency in research as well as a general knowledge of different areas of molecular biology.Incoming students with adequate undergraduate preparation should plan on finishing their Ph.D. requirements, including the dissertation, within four years. Those with deficiencies may require a longer time; such deficiencies, however, should be made up during the first year of graduate work.

LOWER DIVISION COURSES

1. Molecules of Life, (4) Three 1-hour lectures plus one discussion per week. Prerequisite: Chemistry 1A and 1B. Recommended: Biology 1A and 1B, and Chemistry 8 or 12. For students planning to major in molecular and biological or physical sciences. Introduction to the molecular basis of metabolism and inheritance. Cell chemistry and division, bioenergetic pathways; enzyme function; gene structure, replication, mutation, recombination, and expression; protein synthesis. Mr. Stent, Mr. Gerhart (Sp).

10. Introduction to Molecular Biology, (3) Three 1-hour lectures per week. Open without prerequisite for all students and designed for those not specializing in science. The molecular basis of life. Contemporary description of genetics, mutation, evolution, growth, and reproduction, with emphasis on viruses and simple organisms. Extension to higher organisms and medical and social implications. Mr. Fraenkel-Conrat (W).

UPPER DIVISION COURSES

101. Molecular Biology Laboratory, (4) Two hours of lecture and two laboratory periods per week. Prerequisite: Molecular Biology 110A. The experimental approaches to molecular biology. Emphasis on the informational macromolecules of viruses, bacteria and cells of higher organisms. Mr. Duesberg, Ms. Daniell, Mr. Beckendorf (Sp).

110A. Molecular Basis of Heredity, (5) Three 1-hour lectures and two discussion sections per week. Prerequisite: satisfactory completion of Molecular Biology 1 or consent of instructor. An introduction to the molecular basis of the structure and function of the hereditary substance of living forms. Emphasis on prokaryotic and eukaryotic organisms and their viruses. Mr. Stent (W).

110B. Molecular Basis of Heredity, (5) Three 1-hour lectures and two 1-hour discussion sections per week. Prerequisite: Chemistry 8A-8B; Biology 1A-1B. Course 110B may be taken without course 110A with the consent of instructor. An introduction to the molecular basis of the structure and function of the hereditary substance of living forms. Emphasis on eukaryotic organisms and viruses. Mr. Stent (W).

120. Introduction to Molecular Virology, (4) Four 1-hour lectures per week in organismic chemistry and an elementary course in biology. Consideration of viruses as infectious particles having chemical, physical, and hereditary characteristics. Mr. Fraenkel-Conrat (F).

198. Current Topics in Molecular Biology, (5) Two 1-hour meetings per week. Prerequisite: consent of instructor. Group studies of selected topics. Mr. Echols (Sp).

199. Supervised Independent Study and Research, (1-5) Enrollment is restricted by regulations to page 36. Additional limitation: overall grade-point average of at least 3.0. Must be taken at least one hour per week. The Staff (F, W, Sp).

GRADUATE COURSES

200A–200B. Introduction to Molecular Biology, (5) 3-5 Threethree 1-hour discussions per week. Prerequisite: Biology 1A–1B or equivalent, or Bacteriology 100A; Biochemistry 100A or 100B (may be taken concurrently); one year of college mathematics. Structure, reproduction, mutation, and host-cell interactions of viruses. Mr. Rubin (F).

200C. Integrated behavior of cell populations in metazoan. Molecular mechanisms of growth control and cellular interactions. Mr. Gerash (F).

220A. Introduction to Research in Molecular Biology, (5) Three hours of lecture per week. Prerequisite: course 200A or 200B, or consent of instructor. A graduate seminar on current topics in molecular biology. Emphasis will be on recent advances in the genetics of bacteria, eukaryotic microbes, and cultured cells. Mr. Clark (F).

231. Microbial Genetics Laboratory, (5) Two hours of lecture and nine hours of laboratory per week. Prerequisite: course 230 or consent of instructor. Experimental techniques used in research on the genetics of bacteria. Mr. Clark (W).

210. Techniques in Animal Cell Culture, (4) One hour of lecture and seven hours of laboratory per week. Prerequisite: course 200A or 200B, or consent of instructor. Techniques used in research on the growth and function of animal cells in culture. Mr. Echols (Sp).

270. Research Seminar, (1) Prerequisite: 211 or 280 taken concurrently or consent of instructor. Seminar on presentation and evaluation of results in area of student’s individual research interests. The Staff (F, W, Sp).

280. Research, (1-12) Individual research under the supervision of a staff member. The Staff (F, W, Sp).

290. Seminar, (1) Recent topics in molecular biology. Topics will be announced in advance of each quarter. Enrollment in more than one section prohibited. The Staff (F, W, Sp).

602. Individual Study for Doctoral Students, (1-8) Meetings to be arranged. Reading and conferences under the direction of a staff member. The Staff (F, W, Sp).

603. Individual Study for Doctoral Students. (1-8) Individual study in consultation with the major field adviser, intended to provide an opportunity for qualified candidates to prepare themselves for the various examinations required of candidates for the Ph.D. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp).

Music

Department Office, 104 Morrison Hall

Professors: Philip Brett, Ph.D. Richard L. Crocker, Ph.D. Howard Pick, Ph.D. Alan Curtis, Ph.D. Vincent H. Duclaux, Ph.D. Michael Segal, Ph.D. Richard Feliciano, Ph.D. David Hecht, Ph.D. Amy W. Immire, M.A. Joseph Kerman, Ph.D. Lawrence Mos, Ph.D. (Chairman) Michael Sendur, A.B. (Chairman)

Assistant Professors: James E. Cunningham, M.M. Edwin Dugger, M.F.A. Anthony Newcomb, Ph.D. Bonnie Wade, Ph.D.

courses 140–149 but not courses in the 127 and 128 series). Interdepartmental Studies courses 104, 115, and 117 are acceptable for the major.

Honors Program. Adviser: Mr. Mo. Suitably qualified students majoring in music are invited to consult the adviser concerning studies which they may propose to undertake. Appropriate general fields include music history, analysis, musical composition, and performance. The Honors Seminar (H198) is required of seniors who wish to obtain departmental honors at graduation.

Teacher Training. Consult major advisers.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Higher Degrees

The M.A. and Ph.D. degrees are offered in musical history, analysis, musical composition, and performance. The M.A. degree may be completed in one year. The Ph.D. degree requires three years. The requirements for the M.A. degree include the following:

1. The completion of 24 units of coursework.
2. The completion of a 2-unit comprehensive examination.
3. The completion of a 2-unit thesis.

The requirements for the Ph.D. degree include the following:

1. The completion of 36 units of coursework.
2. The completion of a 2-unit comprehensive examination.
3. The completion of a 2-unit dissertation.

Graduate Advisers: Composition, Mr. Mugger (M.A. and Ph.D.); History and Literature, Mr. Newcomb (M.A.), Mr. Crocker (Ph.D.).

The Department of Music fosters the cultivation of music on campus through undergraduate and graduate programs of study, and also public concerts and lectures in Hertz Memorial Hall, Morrison Music Building, and elsewhere. For undergraduates the Department offers a major in music, as well as numerous non-major courses for the student with little or no previous experience in music. For graduate students the Department offers programs leading to the M.A. and Ph.D. degrees in musical composition and in research. The Theory courses provide an introduction to the materials of musical composition through ear training, harmony, counterpoint, and analysis. The History and Literature courses present a comprehensive survey of the evolution of music and detailed study of the chief periods of its development. Courses in Ethnomusicology provide study of specific areas of world music, both in survey and in depth, and also provide an introduction to the principles and methods of research. Courses in Performance (including orchestra, chorus, concert band, and various ensembles) offer the opportunity to perform standard repertoire as well as new or little-known works, and are open by audition to all students and to the public.

All students, including transfer students as well as new undergraduates, who wish to major in music or to take any of the courses for majors listed under Group II, must take the Department’s qualifying examination in musicianship and basic keyboard skill. This examination is given at the beginning of each quarter, during the pre-enrollment period, as announced in the Circular for New Undergraduates. Results of this examination determine admission to the major and assignment to sections of the courses in musicianship. Students wishing to qualify for advanced placement in harmony can take the Department’s special harmony examination; consult the Department Office.

All students who wish either to audit or to enroll in performance courses are requested to make appointments for auditions during the advance enrollment period.

The Major

First Year. Courses A-B-C; 1A-1B-1C. Recommended: Performance courses.


Third and Fourth Years. (a) Performance — Three courses from the group 140–149, preferably in sequence. (b) Additional courses to complete the minimum of 36 units in the series for majors 100–160 (including courses in the 130 series and performance

L&S: Music / 161

Ethnomusicology

*206A–208B. Folk Music of Europe and the Americas, 3–4. Three hours of lecture and one of discussion per week. Emphasis will be on those particular music cultures for which there are substantive materials in books, records, and films. Mr. Wade

130. Afro-American Music, 3–4. Three hours of lecture per week.American Black music from its African origins to the various forms in which it exists in America today, emphasizing social and development of contemporary American Black music in popular music as well as jazz and contributions to their white counterparts. Enrollment limited to 100 students. Mr. Wilson (Sp)

133A. Music of the South Asia Tradition, 3–4. Three hours of lecture per week. Prerequisite: a lower-division introductory course in music or consent of instructor. Musical concepts and systems in the cultures of Indic civilization. Classical musics in South and Southeast Asia, with emphasis on India, Indonesia, Thailand, Cambodia, and Laos. Mr. Wade

133B. Music of India, 3–4. Three class hours per week. Prerequisite: course 133A or consent of instructor. Concentration on the classical music of India. Mr. Wade

134A. Music of the East Asia Tradition 3–4. Three hours of lecture per week. Prerequisite: a lower-division introductory course in music or consent of instructor. Traditional classical music of Japan: Shinto rituals and court music, Chinese music of the martial arts, and kamato and nôh. Readings in music and pertinent Japanese literature in translation. Prerequisite: course 133A or consent of instructor. Mr. Wade

138B. Music of Japan, 3–4. Three hours of lecture per week. Prerequisite: course 134A or consent of instructor. Traditional classical music of Japan: Shinto ritual music, the imperial court orchestral music and dance, and traditional music of the Ainu. Mr. Wade

140. Javanese Gamelan, 2–3. Formerly 411. Two 2-hour rehearsals per week. Course should be taken in a three-quarter sequence. Mr. Diamond (F), Mr. Schmidt (W, Sp)

141. University Symphony Orchestra. 2–3. Two 2-hour rehearsals per week. Course should be taken in a three-quarter sequence. Mr. Senturia (F, W, Sp)

143. University Concert Band. 2–3. Two 1 1/2-hour rehearsals per week. Course should be taken in a three-quarter sequence. Mr. Brett (F, W, Sp)

144. University Chorus. 2. Two 1 1/2-hour rehearsals per week. Course should be taken in a three-quarter sequence. Mr. Senturia (F, W, Sp)

146. Chamber Music Ensemble. 2. Two hours per week. Chamber Music for strings, winds, piano, percussion, and voice. Mr. Brett (F, W, Sp)

147. Contemporary Chamber Music Ensemble. 2. Two 2-hour rehearsals per week. Performance in the music of the 20th century. Mr. Brett (F, W, Sp)

148. African Music Ensemble. 2. Two 2-hour rehearsals per week. Performance of West African music with particular emphasis on the music of Ghana. Practical instruction in traditional instrumental and vocal techniques. Course should be taken in a three-quarter sequence. Mr. Ladzekpo (F, W, Sp)

149. Collegium Musicum. 2. Two 2-hour rehearsals per week. Performance of baroque and 18th century music for voices and instruments. Course should be taken in a three-quarter sequence. Mr. Curtis (Sp)

NOTE: For key to symbols, see page 36.
be taken in a three-quarter sequence.

Mr. Brett (F, W, Sp)

Group II

Courses primarily for students whose major subject is music.

LOWER DIVISION COURSES

**Note:** Musicianship (A–B–C–D–E–F), Harmony (1A–B–C and 2A–B–C), and Elementary Piano (40A–B–C–D–E–F) are all prerequisite to the major and must be taken concurrently unless the requirement is satisfied by examination. A–B–C musicianship, (2–2–2) Three 1-hour classes per week for ear training, sight singing, and dictation. Sequence beginning (F).

The Staff (Mrs. Clerk in charge)

D–E–F. Musicianship. (2–2–2) A continuation of course A–B–C, which is prerequisite.

Sequence beginning (F).

The Staff (Mrs. Clerk in charge)

1A–1B–1C. Harmony. (4–4–4) Three 1-hour classes per week. Diatonic harmony, choral harmony, and analytical studies. Emphasis will be on written work. Sequence beginning (F).

The Staff (Mr. Limbr in charge)

2A–2B–2C. Harmony. (4–4–4) Three 1-hour classes per week. Prerequisite: 1A–B–C. Advanced diatonic, chromatic, and modal harmony. Emphasis will be on written work. Sequence beginning (F).

The Staff (Mr. Felciano in charge)

2A–2B–2C. Development of Western Musical Style. (4) Three hours of lecture and one discussion meeting per week. A study of the development of Western music from the Middle Ages to the present. Listening, technical analysis, and written reports. Sequence beginning (F).

Mr. Newcomb

UPPER DIVISION COURSES

Theory

100A. Advanced Musicianship. (2) Three class hours per week. Prerequisite: courses 2C, 2D, and consent of instructor.

Mr. Swakhamer (F)

100B. Keyboard Harmony. (2) Three class hours per week. Prerequisite: course 2C and consent of instructor.

Mr. Swakhamer (W)

100C. Score Reading. (2) Three class hours per week. Prerequisite: course 2C and consent of instructor.

Mr. Swakhamer (Sp)

101A–101B–101C. Tonal Counterpoint. (4–4–4) Three 1-hour classes per week. Prerequisite: course 2C.

Sequence beginning (F).

Mr. Cunningham (Sp)

105A–105B–105C. Composition. (4–4–4) Three class hours per week. Prerequisite: course 2C, 101A, and consent of instructor.

Sequence beginning (F).

Mr. Limbr

106A–106B. Canon and Fugue. (4–4) Three class hours per week. Prerequisite: course 101B.

Sequence beginning (W)

Mr. Lebrick

107A–107B. Studies in Musical Analysis. (4–4) Three class hours per week. Prerequisite: course 2C.

Sequence beginning (W). Mr. Senutira

109A–109B. Orchestration. (4–4) Three class hours per week. Prerequisite: courses 2C and 101B.

Mr. Sline (Sequence beginning F)

111A. Instrumental Conducting. (4) Formerly 112B.

Two 2-hour classes per week. Prerequisite: course 2C, 109A–109B and 107A–107B–107C are recommended. Open to students who have received credit for Music 112B or 112C prior to Fall 1977, with consent of instructor. Mr. Senutira (F)

111B. Advanced Instrumental Conducting. (4) Formerly 112C. Two 2-hour classes per week. Prerequisite: course 111A. Open to students who have received credit for Music 112B or 112C prior to Fall 1977, with consent of instructor. Continuation of 111A, which is prerequisite.

Mr. Senutira

112A. Choral Conducting. (4) Two 2-hour classes per week. Prerequisite: courses 2C, 109B or 100C, and consent of instructor.

Mr. Cunningham (W)

112B. Advanced Choral Conducting. (4) Two 2-hour classes per week. Prerequisite: course 112A. Open to students who have received credit for Music 112B or 112C prior to Fall 1977, with consent of instructor. Continuation of 112A, which is prerequisite.

Mr. Cunningham (Sp)

History and Literature

**1114. Music in the Fourteenth Century.** (4) Three hours of lecture per week. Prerequisite: course 2C and 21C, or consent of instructor. A study of sacred and secular polyphony from the motets of Philippe de Vitry through the song forms of Guillaume de Machaut, his contemporaries and successors, up to 1400.

Mr. Crocker

**1115. The Performance of Medieval and Renaissance Music.** (4) Three class hours per week. Prerequisite: courses 2C and 21C, or consent of instructor; experience in playing an instrument or in singing.

Mr. Crocker

**1116. The Performance of Baroque Music.** (4) Three class hours per week. Prerequisite: courses 2C and 21C, or consent of instructor; experience in playing an instrument or in singing.

Mr. Crocker

**1117. The Organ Music of J. S. Bach.** (4) Three class hours per week. Prerequisite: courses 2C and 21C, or consent of instructor. Mr. Moe

**1118. The Symphonies of Mozart.** (4) Three class hours per week. Prerequisite: courses 2C and 21C, or consent of instructor.

Mr. Curtz

**1119. The Symphonies of Beethoven.** (4) Three class hours per week. Prerequisite: courses 2C and 21C, or consent of instructor.

Mr. Moe

**1120. The String Quartets of Beethoven.** (4) Three class hours per week. Prerequisite: courses 2C and 21C, or consent of instructor.

Mr. Moe

**1121. The Symphonies of Brahms.** (4) Three class hours per week. Prerequisite: courses 2C and 21C, or consent of instructor.

Mr. Moe

**1122. The Vienna Symphony.** (4) Three class hours per week. Prerequisite: courses 2C and 21C, or consent of instructor.

Mr. Moe

**1123. The Harpsichord.** (4) Three hours of lecture per week. Prerequisite: courses 2C and 21C, or consent of instructor. History, construction, and literature for the instrument.

Mr. Curtis (Sp)

**1124. The 18th-century Fortepiano and its Music.** (4) Three hours of lecture per week. Prerequisite: course 2C and 21C or consent of instructor. A study of the development of the fortepiano, its early repertoire, and its setting in the time of Haydn and Mozart. To be offered 1978-79 only.

Mr. Curtis (W)

150. Instrumental and Vocal Instruction. (1) One-half hour of laboratory per week. Open only to majors in music. Advanced private instruction in keyboard, stringed, woodwind, brass, and percussion instruments and in voice. May be repeated for credit if an average grade of B is maintained.

The Staff (Mr. Senutira in charge) (F, W, Sp)

**160A–160B. Preseminar in Music History and Criticism.** (4–4) Three hours of lecture per week. Prerequisite: courses 2C and 21C and one course in the series 114–119 or consent of instructor. An introduction to advanced work in music history and criticism, building on the students' previous experience of musical literature, history, theory, and analysis. A limited number of selected topics will be studied by means of lectures, discussions, and reports.

Honors and Special Studies Courses

191B. Honors Seminar. (3) Three class hours per week. Prerequisite: consent of the student's advisor. Restricted to seniors with an average grade point of 3.0 or a grade-point average of 3.3 in the major.

Mr. Moe (W)

198 Group Special Study for Advanced Undergraduates. (2 or 4) Restricted to senior honors students. Not to serve in lieu of regular courses of instruction.

The Staff (Mr. Brett, Sp)

199 Supervised Independent Study and Research. (1–5) Enrollment is restricted by regulations listed on page 36. Additional limitation: overall grade-point average of at least 3.0. Must be taken on a passed or not passed basis.

The Staff (Mr. Brett in charge) (F, W, Sp)

GRADUATE COURSES

Consent of the instructor must be obtained before enrollment in any graduate course.

200A. Introduction to Musical Scholarship. (4) Three class hours per week. An introduction to music bibliography and historiography.

Mr. Duckles (F)

200B. Introduction to Musical Scholarship. (4) Three class hours per week. An introduction to handling primary sources, manuscripts, or early printed books.

Mr. Duckles (F)

201 Workshop in Electronic Music. (4) One 2-hour meeting per week, supplemented by a minimum of four hours of laboratory work. A consideration of compositional machine skills necessary to operate the analog electronic music studio; practical application of musical acoustics to the available equipment; compositional assignments.

Mr. Wilson (W)

202 Seminar Contemporary Music. (4) Three class hours per week. Prerequisite: consent of instructor.

Mr. Dugger (Sp)

203 Seminar in Composition. (4) One 3-hour meeting per week. Prerequisite: consent of instructor.

Mr. Winslow (F, W, Sp)

204 Studies in Musical Analysis. (4) One 3-hour
meeting per week. Prerequisite: consent of instructor. Mr. Dugger (F)

205. Studies in the History of Theory. (4) Three class hours per week. Prerequisite: consent of instructor.

208. Proséminar in Music History. (4) Three class hours per week. Studies in the history and literature of Western music, dealing with representative composers, music, and topics. The following courses will be given in rotation:

208A-208B. Medieval Polyphony and its Notation. Mr. Kerman (Sp)

208C. The Sixteenth Century. Mr. Kerman (Sp)

208D. The Seventeenth Century. Mr. Moe (F, W)

208E. The Eighteenth Century. Mr. Heartz (Sp)

208F. The Nineteenth Century. Mr. Crocker (F)

208G. The Twentieth Century. Mr. Dugger (W)

209. Field Methods in Ethnomusicology. (4) Three class hours per week. Prerequisite: courses 235 A-B. Techniques, equipment, research and data-collection, analysis, documentation, notation, transcription. Mr. Wade (Sp)

210A-210B. Seminar: Medieval Studies. (4-4) One 3-hour meeting per week. A final grade will be assigned upon completion of both quarters.

213A-213B. Seminar: Studies in the Sixteenth Century. (4-4) One 3-hour meeting per week. Mr. Kerman (F, W)

215A-215B. Seminar: Research in Music History. (4-4) Three class hours per week. Prerequisite: consent of instructor. A final grade will be assigned upon completion of both quarters. Mr. Newcomb (W, Sp)

216A-216B. Seminar: Studies in Baroque Music. (4-4) One 3-hour meeting per week. A final grade will be assigned upon completion of both quarters. Mr. Curtis (F, W)

217A-217B. The Classic Symphony. (4-4) One 3-hour meeting per week. A final grade will be assigned upon completion of both quarters. Mr. Heartz

218A-218B. Seminar: Studies in Classic and Romantic Music. (4-4) One 3-hour meeting per week. A final grade will be assigned upon completion of both quarters.

220A-220B. Seminar: Problems in Criticism. (4-4) One 3-hour meeting per week. Mr. Kerman

230. Topics in Asian Music. (4) One 3-hour meeting per week. Prerequisite: consent of instructor. Ms. Wade

235A. Theory and Methodology of Ethnomusicology. (4) Three class hours per week. Prerequisite: consent of instructor. An introduction to the ideas, methods, theories, themes, and work of historians, philosophers, musicologists, and other humanists in the field of ethnomusicology. (May be taken by undergraduates with permission of instructor.) Ms. Wade (F)

235B. Theory and Methodology of Ethnomusicology II. (4) Three class hours per week. Prerequisite: consent of instructor. An introduction to the ideas, methods, theories, themes, and work of anthropologists, sociologists, folklorists, linguists, and other social scientists in the field of ethnomusicology. (May be taken by undergraduates with permission of instructor.) Ms. Wade (W)

235C. Topics in Ethnomusicology. (4) Three class hours per week.

250. Seminar: Performance. (4) Three class hours per week. Prerequisite: by petition to the Graduate Committee. Limited to performance activity that can be directly supervised by the faculty. The Staff (Mr. Brett in charge) (F, W, Sp)

298. Group Special Studies. (2-8) Meetings as arranged. The Staff (Mr. Brett in charge) (F, W, Sp)

299. Special Studies. (2-8) Open to properly qualified graduate students for research or creative work. Such work shall not serve in lieu of regular courses of instruction. The Staff (Mr. Crocker in charge) (F, W, Sp)

601. Individual Study for Master's Students. (1-8) Preparation for the comprehensive or language requirements in consultation with the field adviser. May not be used for unit or residence requirements for a master's degree. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (Mr. Newcomb in charge) (F, W, Sp)

602. Individual Study for Doctoral Students. (1-8) 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. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (Mr. Dukles in charge) (F, W, Sp)

Professional Courses

405A-405B-405C. Elementary Piano. (1/2-1/2-1/2) One hour of laboratory per week. Open only to majors in music. Required of music majors who do not pass the entrance examination in piano. Graded on a passed/not passed basis only.

Mrs. Clark in charge. Sequence beginning (F)

429A. Stringed Instruments. (2) One 2-hour meeting per week. Open only to majors and teaching minors in music. May be repeated twice without duplication of credit. Mr. Sellin (F, W, Sp)

Interdepartmental Studies


*IDS 117. Music and the Philosophers. (4) See Interdepartmental Studies for the complete description of this course. Music: Mr. Heartz; French: Mr. Rex (F)


Near Eastern Studies

Department Office, 1229 Duwille Hall

Professors:

Hamid Algar, Ph.D.
Robert B. Alter,1 Ph.D.
Ariel A. Bloch, Ph.D.
William M. Brunner,1 Ph.D.
George F. Davies, Jr., Ph.D.
Mounah A. Khouri, Ph.D.
Victor R. Gold, Ph.D.
Michael D. Guinan, Ph.D.

Associate Professors:

Guilty Azarpay, Ph.D.
Wolfgang J. Hempel, Ph.D.

Assistant Professors:

Baruch M. Bokser, Ph.D.
Victor R. Gold, Ph.D.

Lecturers:

Daniel A. Foxvog, Ph.D.
Ariel A. Bloch, Ph.D.

NOTE: For key to symbols, see page 36.
Graduate Adviser: Mr. Kent R. Weeks

Instruction in the Department of Near Eastern Studies is concerned with the languages and civilizations of the ancient, medieval, and modern Near East. The Department offers specialized training in archaeology, art history, Assyriology, Egyptology, Hittitology, Iranian studies, Semitic, Syriac, and Arabic studies from other disciplines, the Department provides a wide variety of courses to supplement such related fields as linguistics, history, political science, comparative literature, and anthropology. The Department strongly recommends that graduate students take advantage of courses offered in these fields, provided that they are relevant to the student's field of study. Credit will be recognized by the Department, subject to approval of the graduate adviser. Many of the Department's courses are restricted to a small number of students, thus affording an opportunity for a high level of individual attention. To those not studying the languages, the lecture courses offer a comprehensive body of information on past and present Near Eastern civilizations. The Department is one of several participating in the recently formed Graduate Program in Ancient History and Mediterranean Archaeology (see Index for a full description of the program). The Department is also participating with the Graduate Theological Union in a joint doctoral degree program in Near Eastern Religions. In addition, the Department is co-sponsoring with the School of Library and Information Studies a concurrent degree program in Near Eastern Languages and Literatures, leading to the M.A. degree in Near Eastern Studies, and the M.L.S. with two possible specializations: 1) Islamic Bibliography, 2) Jewish Bibliography. For further information consult the Department office.

Cooperative arrangements between the University and the nearby relevant Theological Union enable students in the Department to use the extensive library holdings of the Union and to supplement their programs with selected courses in Palestinian archaeology, Biblical studies, Semitic epigraphy and philology.

The Majors

A. The Major in Near Eastern Studies

1. In Arabic, Hebrew, Persian and Turkish: Prerequisite: the elementary courses in the language, or their equivalents. It is recommended that these be taken in the freshman year.

The major requires 37 upper division language units plus 8 upper division lecture units, for a complete total of 45 units. Major guidelines for each discipline are available in the departmental office. With the consent of the Department, the requirement may be fulfilled by related courses in other departments.

2. Assyriology, Hittitology, Old Iranian Studies, and Egyptology: A basic reading knowledge of German is recommended. The major requires 36 upper division language units plus 8 upper division lecture units.

B. The Major in Ancient Near Eastern History and Archaeology

The major requires at least 68 quarter units. The required courses for the major shall include:


Honor's Program: With the consent of the major adviser, a student with an overall grade-point average of 3.0 or higher and a grade-point average of 3.0 or higher in the major may apply for admission to the honors program. The honors program consists of completion of the honors course H198, in which the student will prepare an honors thesis in the senior year.

Latter and School of Courses: List 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Graduate Study

Graduate programs leading to the M.A. and Ph.D. degrees are offered in the following languages and literatures: Arabic, Hebrew, Persian, and Turkish; and in the following special fields of the Near East: archaeology, art history, Ancient Studies, Assyriology, Biblical and Judaic studies, Old Iranian studies, comparative Semitics, Egyptology, Hittitology, and Islamic studies.

Degrees: Applicants for graduate study should have fulfilled the equivalent of the departmental requirement for the major in the department of their graduate program. All courses for these requirements must be completed before admission to candidacy. Both M.A. and Ph.D. degree programs include the study of one or more languages, and at least one minor language offered in the Department. If deemed necessary, another language may be taken outside the Department with the consent of the graduate adviser.

The M.A. degree is obtained according to Plan II (see Graduate Division). In addition to the plan's requirements, students must pass a reading examination in French or German or another language deemed pertinent by the graduate adviser. A written final examination is required of students to test (a) their working knowledge of the pertinent language—one major language and at least one minor language in the department—according to the field of concentration; (b) general knowledge of the relevant history and civilization of the area; and (c) knowledge of other subjects specified in their program. The examination may be taken independently or in connection with course work will also be required. Students must satisfactorily complete the requirements for the M.A. before proceeding to the Ph.D.

Admission to candidacy in the Ph.D. program depends on successful completion of the following requirements: (a) the above-mentioned languages that were not taken for the M.A. degree, or in any other European language (i.e., Italian, Spanish, etc.) germane to the student's main field of interest; (b) both the written and oral sections of the qualifying examination; and (c) submission of research or seminar reports written in the course of graduate work.

After admission to candidacy, the student completes the dissertation according to Plan A (see Graduate Division).

Special Programs:

The Concurrent Degree Program in Near Eastern Studies and Librarianship is open to qualified candidates with a B.A. degree in Near Eastern Studies who are majoring in either Arabic, Persian, Turkish, or Hebrew.

The Joint Doctoral Program in Near Eastern Religions is open only to students who intend to work toward the Ph.D. degree, but all students must first possess an M.A. (or equivalent) in one of the field of Near Eastern Studies or in a related field provided they have at least two ancient languages suitable to the proposed program. Applicants must be admitted into both the Graduate Theological Union and the University, and the degree is conferred jointly by both institutions.

For further details, consult the regulations of the Graduate Division and the Graduate Adviser in 1229 Dwinelle Hall.

Near Eastern Studies

LOWER DIVISION COURSES

*10. Languages and Cultures of the Near East. (4) Three-hour lecture per week. The growth, structure, and diffusion of ethnic, religious, and language groups in the Arab States, Israel, Turkey, and Iran.

Mr. Brinner (F)

115. Introduction to Near Eastern Art and Architecture. (4) Three hours of lecture per week. An ancient art and architecture of western and central Asia from the Neolithic through Achaemenid times.

*116. Introduction to Islamic Art. (4) Formerly course 15B. Three hours of lecture per week. The art and architecture of Islamic lands from the seventh to the seventeenth century.

Ms. Azarpay (W)

20A–20B–20C. History and Culture of Ancient Western Asia and Egypt. (5–5–5) Three hours of lecture and one hour of discussion per week. A survey of the civilizations of the Near East with special emphasis on ancient Egypt, Mesopotamia, Iran, Anatolia, from their origins until Hellenistic times.

Knapp (F, W, Sp)


Mr. Weeks (F, W)

30. Hebrew Literature in Israel Since 1945. (4) Three hours of lecture per week. A sampling, in translation, of some of the important Hebrew fiction and poetry, of the last three decades. Attention will be devoted both to the formal aspects of this writing and to the ways in which it reflects Israel's historical predicament.

*335. Introduction to Judaism. (4) Three hours of lecture per week. The classical nature of Jewish culture, its major cultural and intellectual expressions in the Middle Ages, and transformations in the modern era.

Mr. Bokser (F)

UPPER DIVISION COURSES

140A–140B–140C. Near Eastern Art. (4–4–4) Three hours of lecture per week. 140A: Arts of the Near East during the Neolithic Period and Bronze Age. 140B: Art & architecture from the Iran Age to Achaemenid times. 140C: Art & architecture of Western & Central Asia from the Achaemenid period to the Ottoman times.

Ms. Azarpay (W, Sp)

135. Biblical Israel in the Post-Exilic Period. (4) Three hours of class per week. The Sixth Century B.C.D.E. Eretz Israel after the destruction of the Temple and her local population; the exilic community in Babylon and Persia; the Jewish community in Egypt; the emergence of the Hellenistic Jewish community; the beginnings of Diaspora Judaism.

136. The Emergence and Development of Jewish Scepticism. (4) Three hours of lecture per week. A study of social and religious development in ancient Israel in the transition era from late Biblical to Mishnaic times. The Samaritans; The Covenanters from the Judaism: Early Rabbinic; Early Rabbinic; Conflict, the mechanism of Jewish sectarianism.

137. Selected Readings in the Qumran Scrolls. (4) Three hours of lecture per week. The beliefs, social structure and historical setting of the Qumran Cov-
Three hours of lecture per week. Special studies in tianity.
The medieval art of Western and Central Asia. Topics to
discuss include the history of the Jews in Europe and
the Near East from the rise of Islam to the eighteenth
century.

157. Hebrew Literature in Translation. (For-
merly 156A) Three hours of lecture per week.
Survey of Hebrew literature from the High Middle
Ages to the present. Topics to include:
medieval Jewish letters

discussions in the history of Judaism. Topics vary from
year to year. May be repeated for credit.
Mr. Bokser (Sp)

156A-156B. Medieval Jewish Civilization. (4-
4) Formerly 15A-15B. Three hours of lecture per week.
The sociocultural history of the Jews in Europe and
the Near East from the rise of Islam to the eighteenth
century.

158. Modern and Contemporary Jewish Thought.
(3) Two hours of lecture per week. Prerequisite: NES
25 or NES 146 recommended. Archaeological

143A-143B. Mesopotamian Archaeology. (4-
4) Three hours of lecture per week. Prerequisite: Anthro-

144A-144B. Islamic Painting. (4-
4) Three hours of lecture per week. Special studies in
Islam from the 8th through the 17th centuries. Topics of
include: Historiography, architecture, and calligraphy.

145A-145B. The Archaeology of Pales-
tine. (3-3-3) Formerly 151A-151B. Two hours of lecture
per week. Special studies in the archaeology of the
Palestinian area, including: (a) Archaeological

141A-141B. Biblical Religion. (4-
4) Formerly course 143A-143B. Three hours of lecture per
week. Special studies in the Bible.

142A-142B-142C. Ancient Egyptian Documents,
(3-3) Formerly 195A-195B-195C. Three hours of
lecture per week. Survey of Egyptian literature and

Other topics to be covered include:
- The rise of Islamic civilization
- The development of the Islamic Empire
- The caliphate
- The spread of Islamic culture
- The role of the Umayyads and the Abbasids

154A-154B. Judaism in Late Antiquity. (4-
4) Formerly course 153A. Three hours of lecture and
one hour of discussion per week. Special studies in
Judaism from the 3rd to the 6th centuries CE. Topics to
include:
- The development of rabbinic Judaism
- The Talmud
- The spread of rabbinic Judaism
- The place of mysticism, magic and art until the
rise of Islam

155. Problems in the History of Judaism. (4-
4) Three hours of lecture per week. Prerequisite: one of
the following: 10, 35, 158A, 158B, 150C. Special topics in-
cluding the use of literary and archaeological sources
in the study of the history of Judaism. Topics vary from

157A-157B-157C. Culture of Ancient Egypt.
(4-4-4) Three hours of lecture per week. Prerequisite: NES
20A or NES 20B. Survey of the arts and crafts of the
archaeological and textual materials available for the
reconstruction of Egyptian culture and society. Special
emphasis will be placed on the study of ancient Egypt's
recent archaeological discoveries. Any quarter of this
course may be taken independently, with different sub-
topic recommended. Mr. Algar (F, W)

180A. Islamic Institutions. (4-
4) Three hours of lecture per week. The political, legal,

150A-150B-150C. Ancient Near Eastern History. (4-
4-4) Three hours of lecture per week. Special studies in
the Near East from the beginning to the rise of Islam.

161A-161B. The Religions of Ancient Iran. (4-
4) Three hours of lecture per week. Principally devoted
to Zoroastrianism and Manicheanism but with some atten-
tion to Iranian religions. The relevance of Iranian
religion for the history of Hellenistic Gnosticism, Juda-
ism, and Islam.

161A-161B-161C. Ancient Near Eastern History. (4-
4-4) Three hours of lecture per week. Special studies in
the Near East from the beginning to the rise of Islam.

162A-162B. Introduction to the Comparative
Study of the Indian Languages. (3-3) Two hours of
lecture per week. Prerequisite: consent of instructor.
Survey of the languages of the Indian branch of the
Indo-European family. Sequence beginning (F). Mr. Schwarz (F, W)

163A-163B. History of Persian Literature. (4-
4) Three hours of lecture per week. 163A. Classical Per-

164A-164B. Civilization of Ancient Iran. (4-
4) Three hours of lecture per week. The civilization of
the ancient Iran from the period of earliest occupation
to the fall of the Sassanid empire.

165A-165B. Sufism. (4-4) Three hours of lecture per
week. A comprehensive examination of the
practices of Sufism, in all periods of its
development, in the Middle East, Central Asia, India
and Africa. No knowledge of Islamic literature
required.
Mr. Algar (W, Sp)

166. Turkish Sufi Literature. (4) Three hours of
lecture per week. An introduction to the study of Turk-

166A-166B. Islamic Philosophy. (4-4) Three hours of
lecture per week. A study of Islamic philosophy and

169A-169B. Later Byzantine History. (4-
4) Three hours of lecture per week. Special studies
in the later Byzantine period.

144A-144B. Islamic Civilization. (4-
4) Formerly course 152A-152B. Three hours of lecture
and one hour of discussion per week. Special studies in

160A-160B. Culture of Islam in Islamic Times. (4-
4) Three hours of lecture per week. A general survey of

161A-161B. Biblical Archaeology. (4-
4) Three hours of lecture per week. Special studies in
the Bible from the patriarchal age to the reign of
Solomon. The period 1500-520 B.C. will be studied.

145A. The History of Ancient Israel. (4-
4) Three hours of lecture per week. Special studies in
Israel from the patriarchal age to the reign of
Solomon.

151A-151B. Aspects of Biblical Religion. (4-
4) Formerly course 153A. Three hours of lecture per
week. Special studies in the Bible.

152. The Bible in Translation. (4) Formerly course
154C. Three hours of lecture per week. Intended for
students not majoring in Near Eastern Studies as an
introduction to the books of the Bible, their historical
development, and their place within the broader con-
text of ancient Near Eastern society.
Mr. Kidkawa (Sp)

153. Judaism and Heilinism. (3) Formerly course
157. Two hours of lecture per week. Prerequisite: NES
152A, 152B, 150C. The analysis of the impact of Hel-
linism on Judaism through a detailed study of various
apocryphal and pseudepigraphical Alexandrian writ-
ings. Special attention will be given to Wisdom Tradi-
tions and the near Eastern background of the Helleniz-
mation. Mr. Weeks (Sp)

154A-154B. Judaism in Late Antiquity. (4-
4) Formerly course 153A. Three hours of lecture and
one hour of discussion per week. Special studies in
Judaism from the 3rd to the 6th centuries CE. Topics to
include:
- The development of rabbinic Judaism
- The Talmud
- The spread of rabbinic Judaism
- The place of mysticism, magic and art until the
rise of Islam

154. Medieval History of the Jews. (4-
4) Three hours of lecture per week. A survey of medieval
Jewish history from the post-exilic period to the
rise of Islam.

155. Problems in the History of Judaism. (4-
4) Three hours of lecture per week. Prerequisite: one of
the following: 10, 35, 158A, 158B, 150C. Special topics in-
cluding the use of literary and archaeological sources
in the study of the history of Judaism. Topics vary from
year to year. May be repeated for credit.

Mr. Bokser (Sp)

156A-156B. Medieval Jewish Civilization. (4-
4) Formerly 15A-15B. Three hours of lecture per week.
The sociocultural history of the Jews in Europe and
the Near East from the rise of Islam to the eighteenth
century.

157. Hebrew Literature in Translation. (For-
merly 156A) Three hours of lecture per week.
Survey of Hebrew literature from the High Middle
Ages to the present. Topics to include:
medieval Jewish letters

discussions in the history of Judaism. Topics vary from
year to year. May be repeated for credit.
Mr. Bokser (Sp)

156A-156B. Medieval Jewish Civilization. (4-
4) Formerly 15A-15B. Three hours of lecture per week.
The sociocultural history of the Jews in Europe and
the Near East from the rise of Islam to the eighteenth
century.

157. Hebrew Literature in Translation. (For-
merly 156A) Three hours of lecture per week.
Survey of Hebrew literature from the High Middle
Ages to the present. Topics to include:
medieval Jewish letters

discussions in the history of Judaism. Topics vary from
year to year. May be repeated for credit.
Mr. Bokser (Sp)

156A-156B. Medieval Jewish Civilization. (4-
4) Formerly 15A-15B. Three hours of lecture per week.
The sociocultural history of the Jews in Europe and
the Near East from the rise of Islam to the eighteenth
century.

157. Hebrew Literature in Translation. (For-
merly 156A) Three hours of lecture per week.
Survey of Hebrew literature from the High Middle
Ages to the present. Topics to include:
medieval Jewish letters

discussions in the history of Judaism. Topics vary from
year to year. May be repeated for credit.
Mr. Bokser (Sp)

156A-156B. Medieval Jewish Civilization. (4-
4) Formerly 15A-15B. Three hours of lecture per week.
The sociocultural history of the Jews in Europe and
the Near East from the rise of Islam to the eighteenth
century.

157. Hebrew Literature in Translation. (For-
merly 156A) Three hours of lecture per week.
Survey of Hebrew literature from the High Middle
Ages to the present. Topics to include:
medieval Jewish letters

discussions in the history of Judaism. Topics vary from
year to year. May be repeated for credit.
Mr. Bokser (Sp)

156A-156B. Medieval Jewish Civilization. (4-
4) Formerly 15A-15B. Three hours of lecture per week.
The sociocultural history of the Jews in Europe and
the Near East from the rise of Islam to the eighteenth
century.
**Arabic**

**LOWER DIVISION COURSES**

1A—1B—1C. Elementary Arabic. (5—5—5) Five 1-hour recitation sessions and two 1-hour drills per week. Sequence beginning (F).

**UPPER DIVISION COURSES**

100A—100B—100C. Intermediate Arabic. (4—4—4) Five 1-hour recitation sessions and two 1-hour drills per session. Prerequisite: course 1A—1B—1C, or equivalent. Sequence beginning (F).

101A—101B—101C. Spoken Arabic. (4—4—4) Five hours of class per week. Prerequisite: Course 1A—1B—1C or equivalent. Focus on speaking an Arabic dialect. May be repeated for additional credit if a different dialect is offered. (F, W, Sp)

102A—102B—102C. Literary Arabic Usage. (4—4—4) Three hours of class per week. Prerequisite: Arabic 100A—100B—100C. 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. (F, W, Sp)

103A—103B—103C. Analysis of Grammar and Syntax. (4—4—4) Three hours of class per week. Prerequisite: Arabic 100A—100B—100C. Discussion of the grammar, syntax, semantics, and styles of Arabic, as reflected in literary texts. Mr. Bloch (F, W, Sp)

104A—104B—104C. Classical Arabic Poetry. (4—4—4) Three hours per week. Prerequisite: Arabic 103A—103B—103C or equivalent. Literary analysis of Arabic poetry from the pre-Islamic, Umayyid, Abbasid and Andalusian periods. May be repeated for additional credit when topics vary. Credit and grade to be assigned at the end of the sequence. (F, W, Sp)

105A—105B—105C. Modern Arabic Poetry and Prose. (4—4—4) Three hours of lecture per week. Prerequisite: course 103A—103B—103C or equivalent. Selected readings from modern literary Arabic, including fiction, poetry, and expository essays, intended to acquaint undergraduate majors not only with the structure of the language but also with the development of modern Arabic literary styles. May be repeated for credit when the readings vary. Mr. Khour (F, W, Sp)

H186. Senior Honors. (2) Prerequisite: limited to senior honors candidates. Directed study centering upon preparation of an honors thesis. The Staff (F, W, Sp)

198. Directed Group Study for Upper Division Students. (1—4) The Staff (F, W, Sp)

199. Supervised Independent Study and Research. (1—5) Enrollment is restricted by regulations shown on page 36. Must be taken on a passed/not passed basis. The Staff (F, W, Sp)

**GRADUATE COURSES**

201. Advanced Syntax. (4) Three hours of lecture per week. Prerequisite: course 103A—103B—103C. Major syntactic phenomena of classical and modern literary Arabic will be analyzed from the viewpoint of the indigenous tradition and of western Semitic linguistics. May be repeated for credit when subject matter varies. Mr. Bloch (F, W, Sp)

210. Arabic Dialectology. (4) Formerly 201A—201B—201C. Three hours of lecture per week. Prerequisite: 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. Mr. Bloch (F, W, Sp)

220A—220B—220C. Classical Arabic Poetry and Prose. (4—4—4) Formerly 203A—203B—203C. Three hours of lecture per week. Prerequisite: 104A—104B—104C or equivalent. Intensive study of major writers from the pre-Islamic to the end of the Abbasid periods. The Staff (F, W, Sp)

May be repeated for additional credit when subject matter differs. (F, W, Sp)

205A—205B—205C. Contemporary Arabic Literature. (4—4—4) Three hours per week. Prerequisite: 105A—105B—105C or equivalent. A study in depth of the major contemporary Arabic novelists, poets, novelists, short story writers, and literary critics with focus on selected readings in the various genres of modern Arabic literature. May be repeated for credit when topics vary.

*206A—206B. Judeo-Arabic. (4—4) Three hours of class per week. Prerequisite: At least two years of Arabic or equivalent, some knowledge of Hebrew recommended, or consent of instructor. A survey of literature, historical, and religious material in Judeo-Arabic. Introduction to paleography, grammatical aspects of Judeo-Arabic style from 9th-13th centuries. Readings will vary. May be repeated for additional credit.

Mr. Brinner (F, W)

**107A—107B—107C. Hispano-Arabic Literature. (4—4—4) Three hours of lecture per week. Prerequisite: Arabic 103A—103B—103C or equivalent. Significant writers of poetry and prose from the 10th and 11th centuries will be read and discussed. Credit and grades to be assigned at the end of the sequence. Mr. Monroe (F, W)

208. Readings in the Qur'an. (4) Three hours of lecture per week. Prerequisite: three years of Arabic or consent of instructor; open to qualified undergraduates. Selected readings in Arabic from the Qur'an, translated, with historical and religious material. May be repeated for additional credit when topics vary. Mr. Algar (F)

209. Introduction to Arabic Bibliography. (4) Formerly 108A—108B—108C. Four hours per week. Prerequisite: two years of Arabic or equivalent. Open to qualified undergraduates. An introduction to the major primary sources in various areas of Arabic studies, and to the major Arabic and Western bibliographical materials and reference works.

Mr. Bloch (F, W, Sp)

**210A—210B—210C. Advanced Sumerian. (4—4—4) Three 1-hour meetings per week. Prerequisite: course 103A—103B—103C or equivalent. Reading of Sumerian literary texts, and to the major Arabic and Western bibliographical materials and reference works. Mrs. Heimpel (F, W, Sp)

219. Supervised Independent Study and Research. (1—5) Enrollment is restricted by regulations shown on page 36. Must be taken on a passed/not passed basis. The Staff (F, W, Sp)

**Egyptian**

**UPPER DIVISION COURSES**

100A—100B—100C. Elementary Egyptian. (4—4—4) Three 1-hour meetings per week. Middle Egyptian grammar and texts. Ms. Gaskins (F, W, Sp)

101A—101B—101C. Intermediate Egyptian. (4—4—4) Three 1-hour meetings per week. Prerequisite: Egyptian 100A—100B—100C or equivalent. Reading of selected texts in Middle Egyptian hieroglyphic and hieratic texts. Introduction to Old Egyptian. May be repeated for additional credit.

Mr. Larkin (F, W, Sp)

102A—102B—102C. Elementary Coptic. (4—4—4) Three 1-hour meetings per week. Prerequisite: German and Greek recommended. 102A: Introduction to Sahidic dialect. 102B: Readings in Sahidic. 102C: Other dialects. Mr. Larkin (F, W, Sp)

198. Directed Group Study for Upper Division Students. (1—4) The Staff (F, W, Sp)

H198. Senior Honors. (2) Prerequisite: limited to senior honors candidates. Directed study centering upon preparation of an honors thesis. The Staff (F, W, Sp)

199. Supervised Independent Study and Research. (1—5) Enrollment is restricted by regulations shown on page 36. Must be taken on a passed/not passed basis. The Staff (F, W, Sp)

**GRADUATE COURSES**

*200A—200B—200C. Advanced Akkadian. (4—4—4) Three hours of lecture per week. Prerequisite: course 101A—101B—101C or consent of instructor. Major literary compositions (e.g., Akkadian epic and related flood myths), peripheral Akkadian texts (Nuzu Alalah, Ras Shamra, El Amarna), wisdom literature (Babylonian Job), etc. May be repeated for additional credit. Major literary compositions. Mr. Heimpel, Ms. Kilmer (F, W, Sp)

*202A—202B—202C. Advanced Hittite. (4—4—4) Three 1-hour meetings per week. Prerequisite: course 106A—106B—106C or consent of instructor. Reconstruction and critical reading of Hittite texts belonging to different literary genres (epics, mythology, annals, law codes, political treaties, rituals, etc.) or introduction to Hieroglyphic Luwian. May be repeated for additional credit. Mr. Stefanni (W, Sp)

*210A—210B—210C. Advanced Sumerian. (4—4—4) Three 1-hour meetings per week. Prerequisite: course 103A—103B—103C or equivalent. Reading of selected texts with the purpose of initiating students into the diverse genres of Sumerian literature. Mr. Heimpel (F, W)

298. Seminar. (2) Students may receive credit for more than one seminar in the same quarter. May be repeated for additional credit with consent of instructor. The Staff (F, W, Sp)
**Hebrew**

**LOWER DIVISION COURSES**

1A–1B–1C. Elementary Hebrew. (5–5–5) Five 1-hour recitation sessions per week. Sequence beginning (F). Ms. Grosman, Mr. Milgrim (F, W, Sp)

15A–15B–15C. Hebrew Conversation. (1–1–1) Two 1-hour recitation sessions per week. Sequence beginning (F). Mr. Milgrim (F, W, Sp)

20A–20B–20C. Intermediate Hebrew. (5–5–5) Five 1-hour recitation sessions per week. Prerequisite: course 1A–1B–1C or equivalent. Sequence beginning (F). (F, W, Sp)

**UPPER DIVISION COURSES**

100A–100B–100C. Advanced Hebrew. (4–4–4) Three hours of class per week. Prerequisite: Hebrew 20A–20B–20C 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. (F, W, Sp)

101A–101B–101C. Biblical Hebrew Texts. (4–4–4) Three 1-hour meetings per week. Prerequisite: course 100A–100B–100C or equivalent. The texts and procedures of biblical exegesis applied to simple narrative texts. May be repeated for additional credit. (F, W, Sp)

102A–102B–*102C. Postbiblical Hebrew Texts. (4–4–4) Three hours of lecture per week. Prerequisite: 20A–20B–20C or equivalent. Texts from the rabbinic period (Mishnah, Tosefta, Talmud, and Midrash) and an introduction to the language of rabbinic texts. May be repeated for additional credit with consent of instructor. (F, W, Sp)

103A–*103B–*103C. Later Rabbinic and Medieval Hebrew Texts. (4–4–4) Three hours of lecture per week. Prerequisite: course 20A–20B–20C or equivalent. Study of modern Hebrew, exegetical, halakhic, poetical, apocalyptic, magical, messianic, sectarian or historical texts. (W)

104A–104B–104C. Modern Hebrew Texts. (4–4–4) Three hours of lecture per week. Prerequisite: Hebrew 100A–100B–100C or equivalent. An introductory study of selected topics in Hebrew literature from the European Enlightenment to contemporary Jewish poetry and fiction. May be repeated for credit with consent of instructor when reading materials vary. (F, W, Sp)


*106. Introduction to Bibliography of Jewish Studies. (2) Two hours of lecture per week. An introduction to the methods, history, and scope of bibliographical work in Jewish studies; descriptive bibliography, indexes and reference tools for students of Jewish literature. Sample problems in bibliographical research.

Mr. Bokser (in charge) (F)

*107A–107B. The Structure of Modern Hebrew & Teaching of Hebrew to Speakers of English. (3–3) Three hours of lecture per week. Prerequisite: 6 quarters of Hebrew or the equivalent or permission of the instructor. Theoretical and applied analysis of the structure of modern Hebrew, its development and usage and its application to methods and techniques of teaching Hebrew. (F, W, Sp)

198. Directed Group Study for Upper Division Students. (1–4) The Staff (F, W, Sp)

H198. Senior Honors. (2) Prerequisite: limited to senior honors candidates. Directed study centering upon preparation of an honors thesis. The Staff (F, W, Sp)

199. Supervised Independent Study and Research. (1–5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis.

The Staff (F, W, Sp)

**GRADUATE COURSES**

201A–201B–201C. Advanced Biblical Hebrew Texts. (4–4–4) Three hours of lecture per week. Prerequisite: course 101A–101B–101C and 102A–102B–102C or 103A–103B–103C or equivalent. The exegesis of a biblical book in the light of its ancient Near Eastern background. May be repeated for credit when texts vary. Grades and units will be assigned at the completion of a course sequence. (F, W, Sp)

202A–202B–*202C. Advanced Rabbinic Hebrew Texts. (4–4–4) Three hours of lecture per week. Prerequisite: course 102A–102B–102C. Historical and literary study of Hebrew and Aramaic, including Midrash and Talmud. May be repeated for credit when texts vary. Mr. Bokser (F, W, Sp)

203A–203B–203C. Advanced Medieval Hebrew Texts. (4–4–4) Three hours per week. Prerequisite: 103A–103B–103C and 105A–105B–105C or equivalent. Literary analysis of biblical Hebrew texts, either prose and poetry of a given period or group of periods. Grades and units may be assigned at the completion of the sequence. (F, W, Sp)

204A–204B–204C. Advanced Modern Hebrew Literature. (4–4–4) Three 1-hour meetings per week. Prerequisite: Hebrew 100A–100B–100C or consent of instructor. Focus on biblical texts seen from a literary point of view, attempting to establish connections with later Hebrew literature. Mr. Alter (F, W, Sp)

206. Ancient and Modern Hebrew Literary Texts. (4–4–4) Three hours of lecture per week. Prerequisite: Hebrew 100A–100B–100C or consent of instructor. Comparative study of biblical, Talmudic, Midrashic, and the works in question. Mr. Javadi (Sp)

298. Seminar. (2) Students may receive credit for more than one seminar in the same quarter. May be repeated for additional credit with consent of the instructor. The Staff (F, W, Sp)

**Persian and Iranian**

**LOWER DIVISION COURSE**

1A–1B–1C. Elementary Modern Persian. (5–5–5) Five 1-hour recitation sessions per week. Sequence beginning (F).

15A–15B. Conversational Persian. (1–1–1) Two hours per week. Prerequisite: concurrent enrollment in elementary Persian or consent of instructor. Practice of spoken Persian as a supplement to elementary Persian.

**UPPER DIVISION COURSES**

100A–100B–100C. Intermediate Modern Persian. (5–5–5) Five 1-hour recitation sessions per week. Prerequisite: course 1A–1B–1C, or equivalent. Sequence beginning (F).

*101A–101B–101C. Selected Readings in Persian Literature. (4–4–4) Three hours per week. Prerequisite: course 100A–100B–100C or equivalent. Readings in both prose and poetry, drawn chiefly from modern Persian literature, designed to increase reading skills and vocabulary and to provide a transition to the study of more difficult texts. May be repeated for additional credit with consent of instructor. (F, W, Sp)

102A–102B–102C. Readings in Classical Persian Prose. (4–4–4) Three hours of lecture per week. Prerequisite: course 101A–101B–101C or equivalent. Systematic study of representative selections from all periods of classical Persian, chiefly from Qajar and Modern Persian. (F, W, Sp)

*103A–103B–103C. Classical Persian Poetry. (4–4–4) Three hours per week. Prerequisite: course 102A–102B–102C. Classical Persian poetry, with consideration of questions of prosody and style. (F, W, Sp)

104. Contemporary Persian Literature. (4) Three hours of class per week. Prerequisite: Persian 101A–101B–101C or consent of instructor. Selected readings from prose and poetry of the past two decades, with particular attention to the socio-political context of the works in question. Mr. Javadi (Sp)

198. Directed Group Study for Upper Division Students. (1–4) The Staff (F, W, Sp)

H198. Senior Honors. (2) Prerequisite: limited to senior honors candidates. Directed study centering upon preparation of an honors thesis. The Staff (F, W, Sp)

**GRADUATE COURSES**

*200A–200B–200C. Studies in Comparative Semitic. (4–4–4) Three hours of class per week. Prerequisite: 18 upper division units in Semitic languages or consent of instructor. Comparative Semitic phonetics, morphology and lexicography within the wider context of Afroasiatic linguistics. Late in the course, concentration on the evolution of one particular Semitic language. Sequence beginning Fall. Mr. Fulco (F, W, Sp)

**Semitics**

**UPPER DIVISION COURSES**

*100A–100B–100C. Aramaic. (4–4–4) Three hours per week. Prerequisite: Hebrew 100A–100B–100C or consent of instructor. Biblical and Aramaic civilization, including study of the major Semitic languages and their inscriptions and papyri from Syria, Egypt, Mesopotamia, and the Persian Empire. Mr. Bloch, Mr. Gold, Mr. Guinan (F, W, Sp)


186. Directed Group Study for Upper Division Students. (1–4) The Staff (F, W, Sp)

H198. Senior Honors. (2) Prerequisite: limited to senior honors candidates. Directed study centering upon preparation of an honors thesis. The Staff (F, W, Sp)

199. Supervised Independent Study and Research. (1–5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. The Staff (F, W, Sp)

**GRADUATE COURSES**

*200A–200B–200C. Studies In Comparative Semitic. (4–4–4) Three hours of class per week. Prerequisite: 18 upper division units in Semitic languages or consent of instructor. Comparative Semitic phonetics, morphology and lexicography within the wider context of Afroasiatic linguistics. Late in the course, concentration on the evolution of one particular Semitic language. Sequence beginning Fall. Mr. Fulco (F, W, Sp)

NOTE: For key to symbols, see page 36.
The group major program is administered through the C. Van Sluyters (l-R), Mr. Robert Zucker (S-Z) Group Major Office, Division of Special Neurobiology.

The neurobiology group major is intended for students seriously committed to the study of the nervous system. In order to understand what is known about the function of the nervous system, and to prepare for graduate study, a student must complete the 199 course. An additional 11 units of the course work in the very large field of relevant subjects. It may lead to graduate study in neurobiology, and might also be appropriate for those entering the health sciences who are already strongly biased towards later specialization in neurology, neuropathology, psychiatry, pharmacology, or mental health. It must be understood that the departmental majors in physiology, zoology, electrical engineering, and psychology also provide a starting point for graduate work in neurobiology and lead to a greater range of career choices.

The group major requires a basic background in physics, chemistry, and mathematics, and gives guidance on course work in the very large field of relevant subjects. It may lead to graduate study in neurobiology, and might also be appropriate for those entering the health sciences who are already strongly biased towards later specialization in neurology, neuropathology, psychiatry, pharmacology, or mental health. It must be understood that the departmental majors in physiology, zoology, electrical engineering, and psychology also provide a starting point for graduate work in neurobiology and lead to a greater range of career choices.

The honors program consists of the preparation of a written thesis on a topic in neurobiology. Ordinarily the thesis consists of a report on the results of independent study and research conducted under the supervision of a faculty sponsor. The student must enroll in at least 6 units of credit, including 199 course units, for the purpose of preparation of the thesis, but units for such courses will not count toward the 45 units of upper division courses required in the major. The thesis must be presented to the faculty sponsor before the ninth week of the quarter in which the student expects to graduate, and the sponsor will inform the major adviser whether the honors program has been satisfactorily completed. Then, if the student has satisfied the required grade-point stipulation, he or she will be recommended to the Dean for a degree with honors.

Graduate Program

The M.A. and Ph.D. degree programs in neurobiology are administered by the Graduate Group in Neurobiology.

Graduate courses

Anatomy 203. Functional Neuroanatomy. (4) See Physiology-Anatomy for a complete description of this course.

Anatomy 206. Seminar in Advanced Neuroanatomy Topics. (2) See Physiology-Anatomy for a complete description of this course.

EECS 286. Neurophysiology of the Visual System. (3) See Electrical Engineering and Computer Sciences for a complete description of this course.

Entomological Sciences 219. Physiological Mechanisms In Insect Behavior. (1) See Entomological Sciences for a complete description of this course.

IDS 200. Comparative Neurophysiology. (4) See Interdepartmental Studies for a complete description of this course.

IDS 200L. Advanced Laboratory in Neurophysiology. (5) See Interdepartmental Studies for a complete description of this course.

IDS 201. Cellular Mechanisms Underlying Nervous Activity. (4) See Interdepartmental Studies for a complete description of this course.

IDS 202. Neural Integration and Coordination. (4) See Interdepartmental Studies for a complete description of this course.

IDS 202L. Advanced Laboratory in Neural Integration and Coordination. (2) See Interdepartmental Studies for a complete description of this course.

IDS 272. Neurobiology of Language. (4) See Interdepartmental Studies for a complete description of this course.


Molecular Biology 200C. Introduction to Molecular Biology (5) See Molecular Biology for a complete description of this course.

Physiological Optics 206. The Oculomotor System. (4) See Optometry for a complete description of this course.

Physiological Optics 207. Simulation of Visual Systems. (4) See Optometry for a complete description of this course.

Physiological Optics 208. Neurosensory Physiology of Vision. (4) See Optometry for a complete description of this course.

Turkish

LOWER DIVISION COURSES

1A–1B–1C. Elementary Modern Turkish. (5–5–5) Five 1-hour recitation sessions per week. Sequence beginning (F).

1A–1B–1C. Elementary Modern Turkish. (5–5–5) Five 1-hour recitation sessions per week. Sequence beginning (F).

100A–100B–100C. Intermediate Modern Turkish. (5–5–5) Five 1-hour recitation sessions per week. Sequence beginning (F).

*101A–101B–101C. Readings in Modern Turkish. (4–4–4) Three hours per week. Prerequisite: course 100A–100B–100C or equivalent. Selected topics from modern Turkish literary (prose and verse) and historical texts in Arabic script, from the 13th to the 20th century. Mr. Hickman (F, W, Sp).

*102A–102B–102C. Ottoman Turkish Texts. (4–4–4) Three hours per week. Prerequisite: Turkish 1A–1B–1C or equivalent. Practice of spoken Turkish as a supplement to intermediate Turkish. (F, W, Sp).

UPPER DIVISION COURSES

100A–100B–100C. Intermediate Modern Turkish. (5–5–5) Five 1-hour recitation sessions per week. Sequence beginning (F).

101A–101B–101C. Readings in Modern Turkish. (4–4–4) Three hours per week. Prerequisite: course 100A–100B–100C or equivalent. Selected topics from modern Turkish literary (prose and verse) and historical texts in Arabic script, from the 13th to the 20th century. Mr. Hickman (F, W, Sp).


H198. Senior Honors. (2) Prerequisite: limited to senior honors candidates. Directed study centering upon preparation of an honors thesis. The Staff (F, W, Sp).

Supervised Independent Study and Research. (1–5) Enrollment restricted by regulations listed on page 36. May be taken on a pass/no pass basis. The Staff (F, W).

GRADUATE COURSES

*200A–200B–200C. Advanced Turkish. (4–4–4) Three 1-hour recitation sessions per week. Prerequisite: 28 units of upper division work in Turkish. Different sections offering a variety of texts from all periods of the literature. May be repeated for additional credit.

*298. Seminar. (3) Students may receive credit for more than one seminar in the same quarter. May be repeated for additional credit with consent of the instructor. The Staff (F, W, Sp).

Neurobiology

Group Major Office, Division of Special Programs, 301 Campbell Hall

Major Advisers: Mr. C.H.F. Rowell (A-H), Mr. Richard C. Van Sylters (I-R), Mr. Robert Zucker (S-Z)

Group Major in Neurobiology

The group major program is administered through the Division of Special Programs. Students are referred to this office for all administrative matters, and this is where major students will file their study lists.

The neurobiology group major is intended for students seriously committed to the study of the nervous system. In order to understand what is known about the function of the nervous system, and to prepare for graduate study, a student must complete the 199 course. An additional 11 units of the course work in the very large field of relevant subjects. It may lead to graduate study in neurobiology, and might also be appropriate for those entering the health sciences who are already strongly biased towards later specialization in neurology, neuropathology, psychiatry, pharmacology, or mental health. It must be understood that the departmental majors in physiology, zoology, electrical engineering, and psychology also provide a starting point for graduate work in neurobiology and lead to a greater range of career choices.

The group major requires a basic background in physics, chemistry, and mathematics, and gives guidance on course work in the very large field of relevant subjects. It may lead to graduate study in neurobiology, and might also be appropriate for those entering the health sciences who are already strongly biased towards later specialization in neurology, neuropathology, psychiatry, pharmacology, or mental health. It must be understood that the departmental majors in physiology, zoology, electrical engineering, and psychology also provide a starting point for graduate work in neurobiology and lead to a greater range of career choices.

The honors program consists of the preparation of a written thesis on a topic in neurobiology. Ordinarily the thesis consists of a report on the results of independent study and research conducted under the supervision of a faculty sponsor. The student must enroll in at least 6 units of credit, including 199 course units, for the purpose of preparation of the thesis, but units for such courses will not count toward the 45 units of upper division courses required in the major. The thesis must be presented to the faculty sponsor before the ninth week of the quarter in which the student expects to graduate, and the sponsor will inform the major adviser whether the honors program has been satisfactorily completed. Then, if the student has satisfied the required grade-point stipulation, he or she will be recommended to the Dean for a degree with honors.

Graduate Program

The M.A. and Ph.D. degree programs in neurobiology are administered by the Graduate Group in Neurobiology. Information concerning admission and degree requirements may be obtained from the Chairperson of the Group, Mr. F. S. Werblin. Department of Electrical Engineering and Computer Science.
Oriental Languages

Department Office, 104 Durant Hall

Professors:
Haruo Aoki, Ph.D.
Cyril Birch, Ph.D.
Kun Chang, Ph.D.
John G. Jameson, Ph.D.
Lewis R. Lancaster, M.Th., Ph.D.
Helen C. McCullough, Ph.D.
William H. McCulloch, Ph.D.

Associate Professors:
James E. Bosson, Ph.D.

Assistant Professors:
H. Samuel Cheung, Ph.D.
John S. Cikowski, Ph.D.

 Acting Assistant Professor:
Michel Strickmann

Senior Lecturer:
Suzumu W. Nakamura, M.A.

Departmental Major Advisers:
Mr. Cheung (Chinese); Mr. Motolufi (Japanese); Mr. Bosson (Altai).

Graduate Advisers:
Mr. Chang (Chinese); Mr. Schaefer (Classical Chinese); Mr. Aoki (Japanese); Mr. Bosson (Altai).

The Department of Oriental Languages at Berkeley offers a thorough training in the classical and modern languages and literatures of Eastern Asia. The East Asian Library, which houses one of the largest American collections of materials related to China, Japan, Korea, and Tibet, is located on the Berkeley campus. A student selects one area of emphasis in the undergraduate major program: Chinese, Japanese, or Altai languages. In all cases students proceed from initial acquisition of a facility in the spoken language to a reading knowledge of both modern and classical forms. Individual upper division courses stress the philosophical, linguistic, or literary study of Oriental cultures, and students are encouraged to select courses that will provide them an insight into each of these disciplines. The Department also emphasizes the study of a particular Oriental culture in its broader geographical context.

The Major

Emphasis on Chinese

Lower Division:

Oriental Languages—Chinese 1A–1B–1C (5–5–5); Chinese 10A–10B–10C (5–5–5); Chinese 2A–2B–2C (5–4–4); Linguistics 20 (5).

Upper Division:

A total of 36 upper division units, with at least 4 units from each of the following areas: Modern Chinese (100A, 100B, 100C, 102A, 102B, 156A, 156B, 156C, 165A, 165B); Chinese Linguistics (125, 134, 135, 145, 175, 185); and Classical Chinese (103, 123, 124A, 124B, 110A, 110B, 110C, 118, 153, 163A, 158B, 158C). The remaining 24 units should be met primarily through upper division Oriental Languages language courses, but, with permission of the major adviser, some courses from other departments will be acceptable. Also, with permission of the major adviser, up to 8 upper division units may be drawn from the following Oriental Languages lecture courses: 112A, 112B, 132, 141, 142, 143, 151, 152, 171A, 171B.

Emphasis on Japanese

Lower Division:

Oriental Languages—Japanese 1A–1B–1C (5–5–5); Japanese 12AB (4); Linguistics 20 (5) (may be taken on a passed/not passed basis).

Upper Division:

Oriental Languages—Japanese 100A–100B–100C (5–5–5); Japanese 128A (4) or Japanese 128B (4) or Japanese 129C (4) or Japanese 150 (4); Japanese 159A (4); Oriental Languages 132 (4).

Lower and Upper Division: in consultation with the adviser, a program of courses in addition to those prescribed to make a total of 49 lower division units and 36 upper division units.

Emphasis on Altai Languages

Lower Division:

Oriental Languages—Korean 1A–1B–1C (5–5–5) or Near Eastern Studies—Turkish 1A–1B–1C (4–4–4); Linguistics 20 (5).

Upper Division:

Oriental Languages—Altai 144A–144B–144C (5–5–5); Altai 154A–154B–154C (4–4–4); and other relevant courses as designated by the adviser (e.g., Oriental Languages 143 (4), Altai 177A–177B (4–4), Near Eastern Studies—Turkish 100A–100B–100C (4–4–4); 198A–198B–198C (4–4–4)) to make a total of 36 upper division units.

Honors Program.

An 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 to the Departmental Chairman for admission to the honors program. If accepted, the student will enroll in H195 for three consecutive quarters leading to the completion of the honors thesis, which must be submitted at least two weeks before the end of the quarter in which the student expects to graduate. While enrolled in H195, the student will undertake independent advanced study under the guidance of appropriate members of the staff. Upon satisfactory completion of the program, a faculty committee will determine the degree of honors to be awarded (Honors, High Honors, Highest Honors), taking into consideration both the quality of the thesis and overall performance in the Department. Honors will not be granted to a student who does not achieve a minimum cumulative grade-point average of 3.3 in all undergraduate work in the University.

Letters and Science List of Courses: 162 units from the list must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the list.

Graduate Programs

M.A. and Ph.D. programs are offered in Chinese Language and Literature, in Classical Chinese, and in Japanese Language and Literature. The M.A. degree is offered in Altai Language and Literature, with emphasis on Mongolian. Information concerning graduate degree requirements may be obtained from the Department Office.

Prospective graduate students are urged to acquire an active command of their language of emphasis as early as possible. Toward this end, a period of study at the Inter-University Program for Chinese Language Studies in Taipei, Taiwan, or at the Inter-University Center for Japanese Language Studies in Tokyo, Japan, both institutions co-sponsored by the University of California at Berkeley, is strongly recommended.

Oriental Languages—General

(Courses in which knowledge of an Oriental language is not required.)

Lower Division Courses

38. Great Books of Eastern Asia. (4) Three hours of lecture per week. Prerequisite: no knowledge of an Oriental language is required. Lectures and readings in the great literary classics of China, Japan, Korea, and Tibet, in English translation.

Mr. Lancaster (Sp)

Upper Division Courses

*1112A–*1112B. Chinese Literature in Translation. (4–4) Three hours of lecture and discussion per week. Prerequisite: junior standing; sophomores admitted with consent of instructor. Lectures on principal genres, authors, and individual works of Chinese literature from the beginning to the present day, with section discussions (to follow each lecture) based on lectures and on students' reading of selected works in English translation.

Mr. McCullough (W)

141–143. Civilizations of Eastern Asia. (4) Three hours of lecture per week.

Mr. Bosson (F)


Mr. Motolufi (W)

152. Modern Japanese Literature in Translation. (4) Three 2-hour meetings per week. Reading in English translation of representative works of Japanese writers from the end of the nineteenth century to the present day.

Mr. Motolufi (Sp)

*171A–171B. Development of Buddhism in East and Inner Asia. (4–4) Three 1-hour lectures per week. The introduction of Buddhism from India into Central Asia and China, and its subsequent spread to Korea and Japan. The separate tradition of Tibetan Buddhism is included. A two-quarter sequence beginning in Fall (F). May be repeated for credit with consent of instructor.

Mr. Lancaster (W)

Chinese

Lower Division Courses

1A–1B–1C. Elementary Chinese. (5–5–5) Five 1-hour meetings plus two additional hours in the language laboratory required per week. Prerequisite: students with previous knowledge of the language admitted only by consent of instructor. Final examinations for 1A–1B–1C will be given during the last two class meetings of each quarter. Sequence beginning (F).

2A–2B–2C. Introduction to Classical Chinese. (5–4–4) Formerly 11A–11B. 2A: Five 1-hour meetings per week; 2B–2C: three 1-hour meetings per week. Prerequisite: 2A is prerequisite to 2B; 2B or equivalent is prerequisite to 2C. 2A: Characters, radicals, grammar, easy readings in pre-Han literature; 2B: dictionaries, easy readings in Han and Six-dynasties literature; 2C: easy readings in T'ang literature.

Mr. Cikowski (F); Mr. Jameson (W); Mr. Schaefer (Sp)


Note: For key to symbols, see page 36.
Five 1-hour meetings and one additional hour in the language laboratory per week. Prerequisite: course 1C. Students who have attended a Chinese school admitted only by consent of instructor. Sequence beginning (F). The Staff (F, W, Sp)

13. Introduction to the Study of Chinese Characters. (4) Two 1 1/2-hour lectures per week. Prerequisite: course 1A-1B or 1A 1B. Historical development of Chinese characters within China and their application to Japanese, Korean, and Vietnamese. Mr. Cikoski (Sp)

UPPER DIVISION COURSES

100A-100B-100C. Advanced Chinese. (5 5 5) Five 1-hour meetings per week. Prerequisite: Chinese 1OC, or consent of instructor. 100A is not prerequisite to 100B; 100B is not prerequisite to 100C. Readings in prose and discussion, in Chinese, of modern Chinese texts, literary, political, and general, in a variety of styles. Assignments to develop oral and writing skills. Students who have attended a Chinese school admitted only by consent of instructor. Mr. Cheung (100A); Mr. Birch (100B-100C) (F, W, Sp)

102A-102B. Readings in Modern Chinese Scholarship. (4 4) Formerly 102. Course 102 open to students who have received credit for 102.) Two 1 1/2-hour meetings per week. Prerequisite: courses 101 or 101 1B. A four-year level course designed to develop the reading and understanding of primary sources in Chinese literature.

103. Classical Chinese: Medieval Prose. (4) Three 1-hour meetings per week. Prerequisite: course 2C. Open to students who have received credit for course 113, with consent of instructor. Historical and narrative texts from the T‘ang period. Mr. Schafer (F)

104A-104B. Studies in Ancient Chinese Literature: Philological Analysis of Texts. (4 4) Three 1-hour meetings per week. Prerequisite: courses 102 or 102 1B, or with consent of instructor. Further exploration of the Chinese literary tradition. Mr. Cikoski (F, W)

110A-110B-110C. Readings in Chinese Buddhist Texts. (4 4 4) Two 1 1/2-hour meetings per week. Prerequisite: advanced level in Chinese. Continue reading of the Classics. Chinese 110A is not prerequisite to 110B; 110B and 110C are not prerequisite to 110C.

116. Documents on the Chinese World Order. (4) Two 1 1/2-hour meetings per week. Prerequisite: three quarters of Classical Chinese, including course 133. Philological analysis of documents pertaining to the Chinese tributary system, c. B.C. 100-c. A.D. 1200. The selection of documents is designed to illustrate, in specific historical contexts, the tension between rhetoric and reality, and to contrast the Sinic Zone with the Inner Asian Zone. Mr. Rogers (W)

123. Classical Chinese: Medieval Poetry. (4) Three hours of lecture per week. Prerequisite: course 2C or 11A.

125. Chinese Dialectology. (4) Two 1 1/2-hour meetings per week. Prerequisite: one quarter of Classical Chinese. Open to seniors or by consent of instructor. Mr. Jamieson (Sp)

130. Cantonese. (4) Three 1-hour meetings per week. Prerequisite: course 100C and 201. Open to students who have received credit for course 134A-134B 134C prior to Fall 1975. A linguistic analysis of the Cantonese dialect spoken in Canton and Hong Kong. The course will begin with a phonological examination with emphasis on the relationships between Cantonese and other related dialects. The second half of the quarter will be devoted to grammar, particularly the syntactic differences between Cantonese and Mandarin. Mr. Cheung (Sp)

135. Phonology of Ancient Chinese. (4) Two 1 1/2-hour meetings per week. Prerequisite: course 2C or 11B and Linguistics 20. Mr. Chang (F)

145. Chinese Grammar. (4) Two 1 1/2-hour meetings per week. Prerequisite: course 2B or 11B. Linguistics 100C, and Linguistics 20. Mr. Chang (Sp)

153. Classical Chinese: Taoist Texts. (4) Three 1-hour meetings per week. Prerequisite: Chinese 2C. Selected readings, both in prose and in poetry, from Taoist texts of the medieval period - liturgical, cosmological, hagiographical and imaginative. Mr. Cikoski (W)

Japanese

LOW DIVISION COURSES

1A-1B-1C. Elementary Japanese. (5 5 5) Formerly 1J-2J-3J. Five 1-hour meetings per week. Regular exercises in vocabulary, syntax; an introduction to the phonetics of the Japanese language Lab is required. Students with previous knowledge of the language admitted only by consent of instructor. Sequence beginning (F). The Staff (F, W, Sp)

10A-10B-10C. Intermediate Japanese. (5 5 5) Formerly 4J-5J-6J. 10A. Five 1-hour meetings per week. Prerequisite: course 101C. 10B. Three 1-hour meetings per week. Prerequisite: 10A is prerequisite to 10B; 10B is prerequisite to 10C. Students who have attended a Japanese school admitted only by consent of the instructor. Mr. Chang (Sp)

12. Introduction to Literary Japanese. (4) Three 1-hour meetings per week. Prerequisite: course 101C or equivalent. (F)

UPPER DIVISION COURSES

100A-100B-100C. Advanced Japanese. (5 5 5) Five 1-hour meetings per week. Prerequisite: 100A: Japanese 100B; for 100B: 100C or 100B. Readings in modern Japanese, 100A-100B. Expository writings. 100A is not prerequisite to 100B. 100C: Fiction. Students who have attended a Japanese school admitted only by consent of the instructor. Mr. Chang (F, W, Sp)

129A-129B-129C. Readings in Classical Japanese Literature. (4 4 4) Three 1-hour meetings per week. Prerequisite: course 129A is prerequisite to 129B; 129B and 129C are not prerequisite to 129C. Courses may repeat for credit. Mr. Chang (Sp)


159. Contemporary Japanese Literature. (4) Three 1-hour meetings per week. Prerequisite: course 100C. Mr. Miyoshi (F)

180. Japanese Drama. (3) Three 1-hour meetings per week. Prerequisite: course 129A or 129B or 129C. In Japanese. Mr. Motomuki (F)

189. Japanese Documents. (3) Three 1-hour meetings per week. Prerequisite: course 129A or 129B or 129C. In Japanese. Mr. Motomuki (F)

Korean

LOW DIVISION COURSE

110A-110B-110C. Intermediate Korean. (4 4 4) Three hours of lecture per week. Prerequisite: course 110C. Mr. Rogers (F, W, Sp)

UPPER DIVISION COURSE

110A-110B-110C. Intermediate Korean. (4 4 4) Three hours of lecture per week. Prerequisite: course 110C. Mr. Rogers (F, W, Sp)

Altai

164A-164B-164C. Introduction to Mongolian. (5 5 5) Four 1-hour meetings per week. An introduction to the official language of the Mongolian People's Republic (Khalkha). Graded readings in literary and expository texts. Mr. Boisson (F, W, Sp)

154A-154B-154C. Intermediate Mongolian. (4 4 4) Three 1-hour meetings per week. Continued reading and exercises in Khalkha, together with an introduction to the orthography and grammar of literary Mongol in vertical script. Selected prose texts from the 17th century to the present in both Cyrillic script and Mongolian script. Mr. Boisson (W, Sp)

177A-177B. Manchu. (4 4) Three 1-hour meetings per week. Prerequisite: junior standing; consent of instructor. An introduction to literary Manchu; reading of selected prose texts. Mr. Boisson (W, Sp)

178A-178B. Survey of Mongolian Languages. (4 4) Three 1-hour meetings per week. Prerequisite: courses 144A, 144B, 144C. The linguistic classification of the Mongolian language family and its development. An introduction to selected language groups. Mr. Boisson (F, W, Sp)

179. Buriat. (4) Three 1-hour meetings per week. Prerequisite: courses 178A, 178B. An introduction to the standard modern Buriat literary language; reading of selected prose texts. Mr. Boisson (Sp)

Tibetan

164A-164B-164C. Elementary Tibetan. (4 4 3) Four 1-hour meetings per week. Prerequisite: consent of instructor. Introduction to the grammar of standard literary Tibetan; graded readings in Tibetan prose from literary and historical sources. Mr. Rogers (Sp)

174A-174B-174C. Intermediate Tibetan. (3 3 3) Three hours of lecture per week. Prerequisite: course 164C. Emphasis on doctrinal Buddhist texts. Mr. Lancaster (F, W, Sp)

184. Advanced Tibetan. (2) Two 1-hour meetings per week. Prerequisite: courses 174A, 174B, 174C. Extensive reading in historical and literary texts. May be repeated for credit. Mr. Boisson (F)

SPECIAL UPPER DIVISION COURSE

H195. Honors Course. (3 3) Hours to be arranged. Directed independent study and preparation of Senior Honors Thesis. Limited to senior honors candidates in Oriental Languages. (For description of Honors Program, see Index.) The Staff (F, W, Sp)

198. Preceptorial and Reading Course. (1 4) Hours to be arranged. Prerequisite: junior standing. The Staff (F, W, Sp)

199. Supervised Independent Study and Research. (1 5) Enrollment is restricted by regulations listed on page 36. Additional limitations: restricted to students who have attended a Chinese school admitted only by consent of the instructor. The Staff (F, W, Sp)

GRADUATE COURSES

201. Japanese Bibliography. (3) Three 1-hour meetings and one additional hour in the language laboratory per week. Prerequisite: course 110C. Mr. Chang (F, W, Sp)
**202. Korean Bibliography and Research Method.** (4) Two 1 1/2-hour meetings per week. Prerequisite: Korean 1C; Chinese 103, 113, or consent of instructor. Analysis of major sources works from the Three Kingdoms period through the Yi Dynasty. Mr. Jamieson (F)

205. Seminar in Early Chinese Fiction. (4) One 2-hour seminar per week. Studies in the historical development of Chinese fiction and a critical analysis of some early fictional writings. May be repeated for credit with consent of instructor. Mr. Cheung (Sp)

206. Chinese Vernacular Literature. (4) One 2-hour seminar per week. Detailed study of a text with its literary and historical background. May be repeated once for credit with consent of instructor. Mr. Birch (W)

210. Seminar in Buddhism and Buddhist Texts. (4) One 2-hour seminar per week. May be repeated for credit with consent of instructor. Mr. Lancaster (Sp)

*212. Seminar in Chinese Literary History. (4) One 2-hour seminar per week. Textual and aesthetic criticism. — (W)

213A–213B. Seminar in Philological Analysis of Ancient Chinese Texts. (4–4) One 2-hour seminar per week. Prerequisite: Chinese 112B or consent of instructor. A seminar on the philological approach to the texts of the late Chou period; the particular text will vary from year to year. Mr. Cheung (Sp)


**218. Seminar in the Pharaohs of Egypt. (4–4) Two 1-hour seminars per week; one 2-hour seminar per week; one 2-hour demonstration section per week. Open to students who have received credit for course 218, with consent of instructor. 218A will be devoted to the study of the New Kingdom and in alternate years. 218B will be devoted to the study of primary sources. Mr. Ikeda (W)

**219. Seminar in Historical Analysis of Koryo and Yi Dynasty Sources. (4–4) One 2-hour seminar per week. May be repeated for credit with consent of instructor. Mr. Rogers (W)

218. Seminar on the Sources for the Traditional Chinese World Order. (4) One 2-hour seminar per week. Prerequisite: advanced knowledge of literary Chinese. Cultural, strategic, and economic factors in the operation of the tribute system of the Chinese empire. Historiographical effects of the tension between orthodox ideology and political realities. Emphasis on textual analysis of primary sources. Mr. Rogers (Sp)

*224. Reading in Altic Alps. (4) One 2-hour seminar per week. May be repeated for credit with consent of instructor. Mr. Bosson (Sp)

*229A–*229B. Seminar in Classical Japanese Texts: Heian Prose. (4–4) A two-quarter sequence. The first quarter is devoted to individual reading and consultation; in the second quarter, one 2- to 3-hour seminar meeting is held each week. A final grade is assigned upon completion of both quarters. Prerequisite: 129B or consent of instructor. Mr. McCullough (W, Sp)

236. Seminar in Chinese Linguistics. (4) One 2-hour seminar per week. Prerequisite: one or more of the following: 125, 135, 145, 165, 185. Mr. Chang (W)

239. Seminar in Japanese Linguistics. (4) One 2-hour seminar per week. Prerequisite: 129B. May be repeated for credit. Mr. Aoki (F)

*244. Seminar in Altic Comparative Phonology. (4) One 2-hour seminar per week. Prerequisite: 129B. May be repeated for credit. Mr. Aoki (F)

249A–249B. Seminar in Modern Japanese Literature. (4–4) One 2-hour meeting per week. Prerequisite: Japanese 159. O.L. 249A is prerequisite to 249B. May be repeated for credit with consent of instructor. Mr. Bosson (W)

*250. Seminar on Classical Japanese Drama. (4) One 2-hour seminar per week. Prerequisite: 129B or 129C or 160. Analysis and discussion of major plays from the nô and jûrâ theater. Selections from works of Zeami and Chikamatsu will be made in alternate years. Mr. Motofuji (Sp)

*269A–*269B. Seminar in Classical Japanese Poetry. (4–4) One 2-hour meeting per week. Pre-
One or more field trips. Prerequisite: a course in paleontology or in a related science. Paleontology 101 is designed for science-oriented students not majoring in paleontology. Examination and discussion of selected examples from the fossil record of plant and animal groups.

Mr. Clemens (Sp)

110. Marine Paleocology. (3) Two 1-hour lectures and 1 hour of laboratory per week. Prerequisite: consent of instructor. A course in paleocology on a related field. Approaches to the study of fossil assemblages, associations and communities, with emphasis on benthic invertebrates. Ancient community structure and interactions, both among organisms and with the physical environment, will be considered with reference to modern ecological theory.

Ms. Hickman (Sp)

111. Invertebrate Paleontology. (4) Two 1-hour lectures and two 3-hour laboratory sessions per week. Prerequisite: course 1 or 15 or Biology 1A–1B, or 1A–1B, or Geology 5. Paleobotany, morphology, and systematics of the invertebrates.

Mr. Berry (F)

112. Stratigraphic Paleontology. (4) Two 1-hour lectures and two 3-hour laboratories per week. Prerequisite: course 111. Elements of biostratigraphy and the stratigraphic sequence of fossils.

Mr. Berry (W)

115. Paleobotany of Microorganisms. (4) Two 1-hour lectures and two 3-hour laboratories per week. Prerequisite: course 111. Examination of microfossils, with emphasis on foraminifera and other marine protistans.

Mr. Savage, Mr. Clemens, Mr. Gregory (F, Sp)

120. Paleobotany. (4) Two 1-hour lectures and two 3-hour laboratories per week. Prerequisite: consent of instructor. Advanced study of plants represented in the fossil record. Primarily for students with comprehensive knowledge of earth sciences. Mr. Fry (F)

121. Floras of the Past. (4) Two 1-hour lectures, one 3-hour laboratory per week and term report. Prerequisite: course 120, 220, or consent of instructor. Mr. Fry (W)

122. Field Investigations in Paleobotany. (4) Lectures, demonstrations and special investigations in the field, preparation of acceptable research papers, examinations.

Mr. Fry (Sp)

125. Vertebrate Paleontology. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: course 1 or Anthropology 1, and Biology 1A–1B or 1A–1B or equivalent. Geologic history and evolution of backboned animals.

Mr. Gregory (Sp)

126. Morphology of the Vertebrate Skeleton. (2) One hour of lectures and one 3-hour laboratory per week. Prerequisite: course 1 or Anthropology 1, and Biology 1A–1B or 1A–1B. Development and morphology of skeleton and dentition.

Mr. Gregory (F)

*1170. History of Paleontology. (4) Three 1-hour lectures per week, assigned reading and written report. Prerequisite: senior or graduate standing. To be offered alternate years with courses 224, 225. Discovery and development of ideas, principles and methods; modern trends and theories.

Mr. Gregory (F)

H195. Honors Thesis. (8) Restricted to candidates for honors with the bachelor’s degree. Preparation of a satisfactory report on original research. In evaluating the report emphasis will be placed on composition and style as well as scientific content.

The Staff (F, W, Sp)

199. Supervised Independent Study and Research. (1–5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis.

The Staff (F, W, Sp)

GRADUATE COURSES

*120. Principles of Phylogeny and Systematics. (2) Two hours of lecture per week. Analysis and discussion of paleontological approaches to phylogeny and systematics.

Mr. Berry (Sp)

*120. Advanced Paleobotany. (4) Two hours lecture and two 3-hour laboratories per week. Prerequisite: advanced training in plant anatomy and systematics. Advanced study of plants represented in the geologic record.

Mr. Gregory (W)

*122A. Paleontology and Evolution of Fish. (4) Two hours of lecture and two 3-hour laboratory sessions per week. Prerequisite: courses 125 and 126 or Zoology 105 or equivalent. To be offered in alternate years.

Mr. Gregory (F)

*1225. Paleontology and Evolution of Amphibians and Reptiles. (4) Two hours of lecture and two 3-hour laboratory sessions per week. Prerequisite: courses 125 and 126 or Zoology 105 or equivalent.

Mr. Gregory (W)

*122A–122B. Evolution and Systematics of Mammals. (6) Two 1-hour lectures, one 2-hour discussion section, and two 3-hour laboratory sessions per week. Prerequisite: courses 125 and 126 or comparative anatomy of vertebrates. Study of fossil record of Mammalia and comparative research on modern animals contributing to determination of mammalian phylogenetic relationships. One week of field trips will provide experience with collecting techniques. To be offered alternate years.

Mr. Clemens (F, W)

*1227. History and Paleoecology of Higher Vertebrates. (4) Two-hour lectures and two 3-hour laboratories per week. Prerequisite: course 122A–122B.

Mr. Savage (Sp)

229. Field Studies in Vertebrate Paleontology. (1–4) Prerequisite: course 225. Participate in studies in the field and write up reports on problems in occurrence, taphonomy, stratigraphic relationships, and correlation of vertebrate-bearing deposits.

Mr. Savage, Mr. Clemens, Mr. Gregory (F, Sp)

250. Seminars in Paleontology. (2) Advanced study and current literature in various fields of paleontology. Topics vary from year to year.

250A. Ms. Hickman (F, Sp) 250B. Mr. Berry (F)

250C. Mr. Clemens (F) 250F. Mr. Fry (W, Sp)

250G. Mr. Gregory (F) 250S. Mr. Savage, Mr. Fry (F)

299. Research in Paleontology. (1–9)

The Staff (F, W, Sp)

601. Individual Study for Master’s Students. (1-8) Individual study for the comprehensive or language requirements in consultation with the field adviser. Units may not be used to meet either unit or residence requirements for the master’s degree. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

602. Individual Study for Doctoral Students. (1-8) 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 either unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

COURSES IN OTHER DEPARTMENTS

IDS 150. Man’s Earliest Ancestors. (3) See Interdepartmental Studies for the complete description of this course.

IDS 219A–215B. Faunal Analysis in Archaeology. (4–4) See Interdepartmental Studies for the complete description of this course.

IDS 216. Pollen Analysis. (4) See Interdepartmental Studies for the complete description of this course.

IDS 228. Human Evolution, Prehistory and Paleoenvironments. (2) See Interdepartmental Studies for the complete description of this course.

Biology 186A–186B. Marine Geology. (4–4) See Biology for the complete description of this course.

Philosophy

Department Office, 314 Moses Hall


Associate Professors: Thompson Clarke, Ph.D. George Myco, Ph.D. David Rynin, Ph.D. Edward W. Strong, Ph.D. (Mills Professor, Emeritus) Joseph Tussman, Ph.D. (Emeritus)

Assistant Professor: Alan Code, Ph.D. Samuel Scheffer, Ph.D.

Acting Assistant Professor: Linda Q. Foy

Visiting Mills Professor: Gregory Vlastos, Ph.D.

The Major

Lower Division. 12A–12B or 14A–14B; 25A–25C–25D.

Upper Division. 100; 104; 134A.

A total of 60 units is required in the major program. Twenty-four units are required in the upper division in addition to the three required upper division courses: 100, 104, and 134A. The student must take two courses from the 180–179 series and four additional upper division restricted courses (one course numbered 191–199 may be counted among the four only if the major adviser gives written approval). Philosophy 12A–12B or 14A–14B should be passed before the end of the junior year. Philosophy 100 should be taken as soon as possible after declaring a major. One of the four additional upper division courses may be taken in another department, provided that the course selected is deemed by the major adviser to be relevant to the major.

Honors Program. With the consent of the major adviser, a student with an overall 3.3 grade-point average or higher and a grade-point average of 3.5 or higher in courses in the major may apply for admission to the honors program. This program requires completion of either (1) Philosophy H196, Senior Colloquium, or (2) a graduate seminar, admittance to such seminar being contingent upon approval of the instructor in charge. It also requires that the candidate write an acceptable honors thesis, for which 5 units of credit will be given under Philosophy H195.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Higher Degrees

Attention is called to the requirement of a reading knowledge of French or German and one other foreign language for the Ph.D. in philosophy. Students who contemplate advanced study in philosophy should prepare themselves for the requirement in their undergraduate years.
LOWER DIVISION COURSES

2. Introduction to Philosophy: Ethical and Political Philosophy. (3) Three 1-hour lectures per week and one weekly section meeting for discussion and written work.
Mr. Tussman (F, Sp)

4. Introduction to Philosophy: Theory of Knowledge. (4) Three 1-hour lectures per week and one weekly section meeting for discussion and written work.
Mr. Scheffler (W), Mr. Stroud (Sp)

12A-12B. Introduction to Logic. (5-5) Three hours of lecture and two hours of discussion per week.
Course 12A in logic should not be regarded as a formal course in logic.
Mr. Craig (F, W), Mr. Adams (F, W), Mr. Mates (W, Sp)

Mr. Craig (F, W)

*114A. Rudiments of Logic and the Philosophy of Logic. (5) Formerly 91A. Three hours of lecture and two hours of discussion per week. The first part of a sequence in which approximately equal time will be given to an elementary treatment of propositional and predicate logic, and to an elementary examination of philosophical question directly raised thereby.
Mr. Staal (W)

*114B. Rudiments of Logic and the Philosophy of Logic. (5) Formerly 91B. Three hours of lecture and two hours of discussion per week. Study of topics in philosophy of logic, especially those arising out of courses offered in the sections of logical studies, truth, meaning, the relationship between formal systems and natural languages, between logical studies and empirical investigations of languages.
Mr. Tussman (F, W)

25A. Ancient Philosophy. (5) Three 1-hour lectures per week and one weekly section meeting.
Mr. Matson (F)

*25B. Medieval and Early Modern Philosophy. (5) Three 1-hour lectures per week and one weekly section meeting.
Mr. Scheffler (W)

25C-25D. Modern Philosophy to Kant. (5-5) Three hours of lecture and discussion per week.
25C: Mr. Matson (W) 25D: Mr. Stroud (Sp)

UPPER DIVISION COURSES

General prerequisites. — Students enrolling in any restricted upper division course must have completed 8 units in courses 1, 2, 25A, 25B, 25C, or 25D, or have completed, under conditions specified below, course 101. Additional prerequisites are indicated in certain courses.

Unrestricted Course

101. Philosophical Theories. (5) Three 1-hour lectures and one section meeting per week. Fundamental problems in metaphysics and the theory of knowledge. Course 101 is open to juniors and seniors who are not majors in philosophy and who have not taken course 4 or its equivalent.

102. Philosophy of the Social Sciences. (4) Three 1-hour lectures and one section meeting per week. Formulation of explanations of actions? Mr. Stroud (F)

112A-12B. Aesthetics. (4) Three hours of lecture per week. An introduction to the study of art. What is art? Mr. Craig (W)

129A-129B. Aesthetics. (4) Three hours of lecture per week. A study of aesthetic theories based on historical and recent materials.

130. 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? Are intentions causes of actions? What is the structure of explanations of actions? Mr. Vermaan (W)

*131. Metaphysics. (4) Three hours of lecture per week.

*132. Philosophy of Mind. (4) Three hours of lecture per week. Mind and matter: other minds; the concept "person." Mr. Searle (F), Mr. Feuerabend (W), Ms. Foy (Sp)

133A-133B. Philosophy of Language. (4-4) Three hours of lecture per week.

134A-134B. Theory of Knowledge. (4-4) Three hours of lecture per week.

*135. Perception. (4) Three hours of lecture per week. The course will be devoted to studying major conflicting accounts of the nature of the simplest kinds of perception, and their roles in the acquisition of knowledge with an emphasis on underlying divergent philosophical principles and orientations.

138. Special Topics in the Philosophy of Science. (4) Three hours of lecture per week. A course in some depth of one or two special issues in, or approaches to, the philosophy of science. Details of current topics are available in the departmental guide for each quarter in which the course is offered. Mr. Scheffler (W)

*139. Philosophy of Science. (4) Three hours of lecture per week. The course will be devoted to examining major paradigms of the philosophy of science — the nature of laws, explanations, probability, reduction, etc. — and of other issues coming under the general heading of the philosophy of science — overviews of science and its direction, etc.

140. Philosophy of the Natural Sciences. (4) Three hours of lecture per week. Philosophical topics arising from physics, biology, etc.

*141. Philosophy of the Social Sciences. (4) Three hours of lecture per week. Philosophical topics arising from psychology, economics, sociology, etc.

142. Probability and Induction. (4) Three hours of lecture per week. Different approaches to the foundations of probability; inductive confirmation of scientific theories.

143A-143B. Logic. (4-4) Three hours of lecture per week. Prerequisite: course 12A or 12B or equivalent.


145. Modal Logic. (4) Three hours of lecture per week.

*146. Philosophical Logic. (4) Three hours of lecture per week. Philosophical logic from the point of view of general aspects of language, and its relations to formal logic. Special attention will be given to unsettled questions of logical theory, including the nature of generalizations, time and tense, etc.

147. History of Logic. (4) Three hours of lecture per week. Aristotle and Stoic logic; problems in medieval logic; Leibniz; the nineteenth century to Frege.

150. Anglo-American Philosophy 1900-1945. (4) Three hours of lecture per week.


*152A-152B. Phenomenology and Existentialism. (5-5) Three hours of lecture and one hour of discussion per week. A critical appraisal of the philosophical foundations and implications of Mann's view of man and society. During the first quarter, particular attention will be devoted to Heidegger and Feuerbach and their influence on the development of Marxism.

118. Philosophy of Religion. (4) Three hours of lecture per week. The nature and the validity of religious claims.

155. Marxism. (4-4) Formerly 182A-182B. Three hours of lecture per week. A critical appraisal of the philosophical foundations and implications of Marx's view of man and society. During the first quarter, particular attention will be devoted to Hegel and Feuerbach and their influence on the development of Marxism.

156. Marxism. (4-4) Formerly 182A-182B. Three hours of lecture per week. A critical appraisal of the philosophical foundations and implications of Marx's view of man and society. During the first quarter, particular attention will be devoted to Hegel and Feuerbach and their influence on the development of Marxism.

161. Aristotle. (4) Three hours of lecture per week.

166. Medieval Philosophy. (4) Three hours of lecture per week.


172. Spinoza. (4) Three hours of lecture per week.

173. Leibniz. (4) Three hours of lecture per week.

174. Locke. (4) Three hours of lecture per week.

175. Berkeley. (4) Three hours of lecture per week.

176. Hume. (4) Three hours of lecture per week.

178A-178B. Kant. (4-4) Three hours of lecture per week.

*180. Philosophy of the 19th Century. (4) Three hours of lecture per week.

*184. Nietzsche. (4) Three hours of lecture per week.

190. The Later Wittgenstein. (4) Three hours of lecture per week.

1910. Merleau-Ponty. (3) Three hours of lecture and 1 hour of discussion section per week. Prerequisite: either 152A or 152B or 191A. Lectures and discussion of Merleau-Ponty's work. The Phenomenology of Perception. To be offered 1978-79 only.

Mr. Dreyfus (F)

*191S. Kierkegaard. (3) Three hours of lecture and 1 hour of discussion section per week. A course in Kierkegaard as the theologian, psychologist and philosopher, with emphasis on those aspects of his thought which have provided the basis of existential phenomenology. Readings in The Present Age, Either/Or, Fear and Trembling, Concept of Dread, and Sickness unto Death.

Mr. Dreyfus (W)

191T. Gottfried Freg. (4) Three hours lecture per week.

NOTE: For key to symbols, see page 36.
Preparation for Graduate Study

Students must complete the equivalent of the undergraduate major.

The Graduate Major

For the M.A. degree, either Plan I requiring 30 units and a thesis or Plan II requiring 36 units and a comprehensive final examination may be followed. Programs of study with sponsorship in Education and Physical Education lead to the Ed.D. or Ph.D. degree.

Activities Instruction

The Department of Physical Education offers to all students an opportunity in instructional classes to learn and to improve skills in a wide variety of sports, dance, and gymnastic activities and to maintain or develop physical fitness. All classes are open to both men and women.

Fees. The incidental fee payable by all students at the time of registration entitles students to use of gymnasiums, swimming pools, towels, showers, lockers, tennis courts, and the athletic fields; also to the use of clothing for certain physical education activities, including swimming.

A few special activity classes such as bowling and sailing require payment of extra fees.

Fines. Fines are imposed for each formal transaction necessitated by failure of the student to comply with the regulations of the Department: (a) failure to return equipment or clothing on or before the date posted for such return at the end of each quarter, or at the end of each special session of the University; (b) overnight use of dressing locker.

LOWER DIVISION COURSES

1. Physical Education Activities at Harmon Gymnasium. (1/2) Sections meet two hours per week. Each special session of the University; (b) overnight use of dressing locker.

2. Physical Education Activities at Hearst Gymnasium. (1/2) Sections meet two hours per week. Students select section by activity, level, and time preference. A wide variety of sports, exercise, and conditioning activities are offered. Students should consult the Schedule of Classes each quarter to determine the particular activities and levels of instruction available.

30. Theory and Practice of Staged Combat. (2) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisite: elementary or theatrical fencing, or consent of instructor. The mechanics of movement in staged combat. Analysis and practice of related skills in dramatic scenes; choreography of physical conflict.

50. First Aid. (2) Formerly numbered 5. One 1 1/2-hour lecture and one 1 1/2-hour laboratory per week. Standard and advanced course. Upon successful completion of the course, an American Red Cross Certification is awarded. Offered on a passed/not passed basis only.

UPPER DIVISION COURSES


102. Kinesiology of the Handicapped. (3) Three 1-hour lectures per week. Prerequisite: P.E. 101. Causes, incidence, effects of those physical disabilities that affect participation in society. Current research and nature of programs designed to lead to...
optimum function of the handicapped.

Mr. Royce (Sp)

105A. Physiological Hygiene. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: a course in human physiology with laboratory and Chemistry 1A, or equivalent. Discussions of how chemical energy is captured within cells, and how potential energy is converted to work. En ergetics, direct and indirect calorimetry, pathways of carbon flow in exercise, ventilation, circulation, skeletal muscle fiber types.

Mrs. Lothrus (Sp)

105B. Physiological Hygiene. (4) Three hours of lecture and one 3-hour laboratory per week. Prerequisite: Physical Education 105A. Discussions of the effects of exercise on the central and peripheral nervous system, exercise and cardiovascular disease, exercise in the heat, cold, under water, and at altitude, nutrition and performance, effects of drugs and performance, sleep, sleep disorders, and performance.

Mr. Brooks (W)

106. Energy Sources for Human Movement. (3) Two hours of lecture and one 1-hour discussion section per week. Prerequisite: course 105B or permission of instructor. Lectures on the transduction of potential, organic energy sources to work in the human. Emphasis will be placed on direct and indirect methods of performing work. Experiments on cardiovascular, digestion, pathways of intermediary metabolism, and the effect of exercise on the human organism. Examining the different forms of physical exercise, and in training. Miss Piek (Sp)

110A-110B. Psychological Bases of Physical Activity. (4-3) Three hours of lecture and 2 hours of laboratory per week. Prerequisite: Psychology 1 and an elementary course in statistics (Psychology 101A recommended). Perception, learning, timing, and coordination as factored into physical activity.

Miss Norrie (W, Sp)

110B. Three hours of lecture per week. Prerequisite: P.E. 110A. Personality variables, motivation, emotions, presence of others, and competition as factors in physical activity.

Miss Norrie (Sp)

111. Motor Development. (4) Three hours of lecture and one hour of section per week. Prerequisite: Psychology 1, and a course in elementary statistics. Motor development according to the type of handicap, definition, growth, and development of the handicapped. Emphasis will be placed on direct and indirect methods of performing work. Experiments on cardiovascular, digestion, pathways of intermediary metabolism, and the effect of exercise on the human organism. Examining the different forms of physical exercise, and in training. Miss Piek (Sp)

112. Motor Development of the Handicapped. (3) Three hours of lecture per week. Prerequisite: course 111. Comparative motor development of the handicapped with reference to type of handicap, developmental ages for the handicapped. Mr. Rarick (F)

113A-113B. Measurement and Evaluation in Physical Education. (4-4) Three hours of lecture and two hours of laboratory per week. Prerequisite: a course in elementary statistics.

Miss Eckert (F)

135B. Three hours of lecture and three hours of laboratory per week. Prerequisite: course 135A. Historical development of educational measurement of physical abilities and specialized motor skills, analysis of selected research studies in the field. Interest in development and refinement of the analysis and variance analysis and regression. The statistician's nature of different individual differences and error. Miss Eckert (F)

140. Recreation in American Society. (3) Two 1-hour discussion sessions per week. Prerequisite: Sociology 1A or Anthropology 3. Nature, scope and significance of recreation in the social and physical world, and its effects on the individual.

Mr. Brooks (Sp)

141*142. Neuromuscular Fatigue. (3) Three hours of lecture per week. Prerequisite: elementary statistics, human anatomy and physiology, and consent of instructor. The analysis of fatigue and recovery processes in gross motor human motor activity. Lectures on the nature of fatigue ranging from a historical inquiry to contemporary considerations.

Ms. Lothrus (W)

110A-110B. Psychological Bases of Physical Activity. (4-3) Three hours of lecture and 2 hours of laboratory per week. Prerequisite: Psychology 1 and an elementary course in statistics (Psychology 101A recommended). Perception, learning, timing, and coordination as factored into physical activity.

Miss Norrie (W, Sp)

110B. Three hours of lecture per week. Prerequisite: P.E. 110A. Personality variables, motivation, emotions, presence of others, and competition as factors in physical activity.

Miss Norrie (Sp)

111. Motor Development. (4) Three hours of lecture and one hour of section per week. Prerequisite: Psychology 1, and a course in elementary statistics. Motor development according to the type of handicap, definition, growth, and development of the handicapped. Emphasis will be placed on direct and indirect methods of performing work. Experiments on cardiovascular, digestion, pathways of intermediary metabolism, and the effect of exercise on the human organism. Examining the different forms of physical exercise, and in training. Miss Piek (Sp)

112. Motor Development of the Handicapped. (3) Three hours of lecture per week. Prerequisite: course 111. Comparative motor development of the handicapped with reference to type of handicap, developmental ages for the handicapped. Mr. Rarick (F)

160. Theory of Dance. (4) Formerly 160A-160B. Two hours of lecture and six hours of laboratory per week. Required: course 2 (sections in dance). Psychology 1. Ethnic, social, and contemporary dance. Miss Park (Sp)

161A. Introduction to the Biomechanical Analysis of Human Movement. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: Physiology 10, or equivalent. Basic biomechanical and anatomical concepts of human movement and their application to fundamental movement patterns and athletic skills.

Miss Park (F)

161B. Theory of Sports Activities. (3) Two hours of lecture and four hours of laboratory per week. Prerequisite: course 165A, courses 163A with laboratory. The mechanics of movement in gymnastics, apparatus, individual exercise. The mechanics of movement in gymnastics. Analysis of complex skills in a wide range of gymnastic activities and the analysis of exercise as it is related to such activities.

171. Conditioning of Athletes and Care of Injuries. (2) One hour of lecture and two hours of laboratory per week. Prerequisite: course 165A, courses 163A with laboratory. Conditioning and care of athletes; sleep, diet, health, and activity habits. Care of injuries, with special emphasis on taping, therapy, and protective equipment.

Mr. Royce (W)

195. Honors Course. (3-6) Individual conferences to be arranged. Special study and/or research in the field of the major.

The Staff (Miss Norrie in charge) (F, W, Sp)

196. Honors Thesis. (3) Individual conferences to be arranged.

The Staff (Miss Norrie in charge) (F, W, Sp)

197. Field Study in Physical Education. (1-5) Supervised experience relevant to specific aspects of Physical Education in off-campus organizations. Regular individual meetings with faculty sponsor and written reports required. Must be taken on a passed/not passed basis.

The Staff (Miss Norrie in charge) (F, W, Sp)

199. Supervised Independent Study and Research for Undergraduates. (1-5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis.

The Staff (Miss Norrie in charge) (F, W, Sp)

PROFESSIONAL COURSE

300. Problems and Methods in Teaching Physical Education. (4) Three hours of lecture per week. Prerequisite: satisfactory score in qualifying examinations in physical education activities; course 101 or 105; 110 or 1A. Analysis of modern, practical and theoretical problems in teaching physical education in secondary school. Study of methods and outcomes of the teaching of physical education skills, especially as applied to developmental activities and individual, dual, and team sports.

Mrs. Flanagan (Sp)

GRADUATE COURSES

200. Seminar in Physical Education. (3) One 3-hour meeting per week. Critical review of literature and research methods.

Miss Norris (F)

211 Seminar in Movement and Body Mechanics. (3) One 3-hour meeting per week. Prerequisite: course

101. Neurophysiological concepts, physical laws, and kinesiology.

Mr. Royce (F)

205. Seminar in Physiological Hygiene. (3) One 3-hour meeting per week. Prerequisite: course 105A. Long-range and short-range adaptations of the body to exercise. Physiological limits and work capacities in relation to age, sex, diet, environment factors, and nature of activity.

Mr. Brooks (F, Sp)

210. Seminar in Psychological Bases of Physical Activity. (3) One 3-hour meeting per week. Prerequisite: course 110. Critical review of current literature relating to learning, memory, and personality factors in relation to physical activity. Miss Norrie (W)

211. Seminar in Motor Development. (3) One 3-hour meeting per week. Prerequisite: course 111. Contemporary theories of development. Changing motor abilities and behavior from childhood through youth and age.

Mr. Rarick (F), Miss Eckert (W)

212. Seminar in Motor Development of the Handicapped. (3) One 3-hour meeting per week. Prerequisite: course 112. Special problems in the motor development of the handicapped with reference to type of disability, maturational level, sex, and environmental factors.

Mr. Rarick (Sp)

211. Seminar in Sociocultural Bases of Human Movement. (3) One 3-hour meeting per week. Prerequisite: course 121. Sociocultural analyses of sports, games, and dances in primitive and modern societies.

Miss Park (W)

231. Seminar in Contemporary Administrative and Curriculum Theories in Problems of Physical Education. (3) One 3-hour meeting per week. Prerequisite: course 131 or instructor's consent. Theories, policies, and practices relative to the administrative process and curriculum planning in physical education.

290. Research. (2-6) Hours to be arranged.

The Staff (Miss Norrie in charge) (F, W, Sp)

295. Department Seminar. (0) One hour of lecture per week. Presentations of research and lectures by faculty, visiting lecturers, and students. Masters degree students required to enroll for three quarters. Doctoral students in the Special Problems in Education requirement to enroll unless toward to candidacy.

Mr. Brooks (F), W, Sp)

299. Special Study for Graduate Students. (2-4) Hours to be arranged. Advanced study of special topics under the direction of a faculty member.

The Staff (Miss Norrie in charge) (F, W, Sp)

601. Individual Study for Master's Students. (1-8) Hours to be arranged. Individual study to prepare for master's comprehensive. Units may not be used to meet either unit or residence requirements for the master's degree. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (Miss Norrie in charge) (F, W, Sp)

602. Individual Study for Doctoral Students. (1-8) Hours to be arranged. Individual study in consultation with major field advisor to prepare for doctoral examinations. May not be used for either unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (Miss Norrie in charge) (F, W, Sp)

Physical Science

Adviser: Mr. Walter D. Knight, 341 Bigle Hall

Field Major in Physical Sciences

This program has been developed for students who wish to concentrate in 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

NOTE: For key to symbols, see page 36.
Plan A

(Broad introduction to physical science)

Lower Division Courses.

Mathematics 16A, 16B, 5A or 4I; Physics 6A, 6B, 6C; Chemistry 1A, 1B, 1C.

Additional Required Course.

Computer Science 3 or 103.

Upper Division Courses.

Physics 106B, 132; Chemistry 103A, 103B; Statistics 130A, 130B. Electives in computer science, mathematics, statistics, and physical science with the approval of the adviser to complete a total of 45 upper division units in the major. Up to 12 upper division units in engineering science will be accepted with the approval of the adviser.

Plan B

(Option of departmental concentration)

Lower Division Courses.

Mathematics 1A, 1B, 1C, 5A, 5I, 1C; Physics 5A, 5B, 5C, 5D, 5E; Chemistry 1A, 1B, 1C or 4B, 4C. 14. Strongly Recommended. Mathematics 51B.

Additional Required Course.

Geology 5 or 101 or Astronomy 101 or 127A.

Upper Division Courses.

Physics 105A; Chemistry 110A and Physics 110A, or Physics 137A and Chemistry 104A. Electives in computer science, mathematics, statistics, and physical science with approval of the adviser to complete a total of 36 upper division units. Up to 12 upper division units in engineering science will be accepted with the approval of the adviser.

Honors Program.

Students with a grade-point average both overall and in the major of at least 3.3 may write an honor's thesis in an honors program leading to graduation with honors. The honors program will include two quarters of work in a departmental honors program with a senior thesis.

Single Subject Teaching Credential.

All credential candidates must be certified under the provisions of the California Teacher Preparation and Licensing Act of 1970. Prospective single subject teachers in physics are encouraged to complete the field major in physical sciences. For students who began their post-secondary studies before July 1, 1975, and who complete the field major, the state examination in physical science is waived. Students beginning college work after this date may be required to pass a state examination in addition to completing a program of professional preparation.

For further information on requirements for the Single Subject or Multiple Subject Credential, see the Announcement of the School of Education.

Professors.

Kinsely A. Anderson, Ph.D. Karoluk, J. A., Ph.D. Harry H. Bingham, Ph.D. Robert R. Conner, Ph.D. Owen Chamberlain, Ph.D. Geoffrey F. Chew, Ph.D. Plymouth Y. Chiao, Ph.D. William Chownisky, Ph.D. John Clarke, Ph.D. Marvin L. Cohen, Ph.D. Eugene P. DiV. Frank S. Crawford, Ph.D. Kenneth M. Crowe, Ph.D. Samuel J. Davis, Ph.D. Robert P. Dry, Ph.D. Lynn M. Faison, Ph.D. William B. Fetter, Ph.D. Donald A. Glaser, Ph.D. Gerard Goldhaber, Ph.D. Erwin L. Hahn, Ph.D. Martin B. Halpern, Ph.D. August C. Heimholtz, Ph.D. David Jesus, Ph.D. Carson D. Jeffress, Ph.D. Robert Kerouel, Ph.D. Allen N. Kaufman, Ph.D. although some specialized courses are among the options open to the student. Those considering a physics major are urged to consult the department adviser early. In order to discuss the content of the major and also the opportunities after graduation. Recent graduates have entered graduate work in a number of scientific fields such as biophysics and geophysics as well as in physics, and others have gone on to jobs in industrial and government laboratories. Students who are considering high school teaching as a career are especially urged to consult their adviser early.

Lower Division Courses.

Physics 5A–5B–5C–5D–5E, Mathematics 1A–1B–1C–5A–5B–5C, or Math 15 for 12 units. Those who have not taken a substantial chemistry course in high school are urged to take Chemistry 1A–1B, or preferably Chemistry 4A–4B.

Upper Division Courses.

Physics 105A, 105B; Physics 110A, 110B, 110C; Physics 112; Physics 107B; eight units of Physics 111; two additional courses below the following list chosen with the approval of the major adviser; Physics 124, 128A, 128B, 137C, 139, 141A, 141B, 142A, 142B, 150, and 145A. These options will give the student an introduction to some areas of current research. Special programs may be worked out in consultation with the adviser. Completion of the physics major is usually required for admission to graduate work. Additional mathematical training is strongly recommended. The major requires 140A–140B, 120A–120B–120C, 121A–121B, 185 is recommended.

Honors Program.

Students with an overall grade-point average of 3.3 or higher and a grade-point average of 3.0 or higher in courses in the major may consult the major adviser concerning the honors program. This program requires completion of the major, at least one quarter of Physics H190 and a senior thesis, Physics 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 group in biophysics, which appears under Medical Physics, Division of Advisers: Mr. Robert F. Glaser, Mr. Nichols.

Engineering Physics.

The College of Engineering, with the cooperation of the Department of Physics, offers a curriculum in engineering physics leading to the degree of Bachelor of Science. Major Adviser: Mr. Wright.

Field Major in Physical Sciences.

Students interested in this major see Physical Science for the description of the major program. Major Adviser: Mr. Wright.

Letters and Science List of Courses:

125 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Graduate Programs

Graduate work leading to the M.A. and Ph.D. degrees is offered in physics with emphasis placed on the Ph.D. In addition to requirements and transcripts of undergraduate work, applicants for admission must submit scores on the graduate record examination in physics.

Requirements for the Ph.D. include the contents of the following courses: Physics 210A–210B–210C and 221A–221B–221C plus 21 units (7 quarter-quarter units) of material elected from upper division or graduate courses (not including any upper division material required for the undergraduate major), of which at least 12 units must be in 200 courses. Some of these 12 units could include courses in mathematics, biophysics or astrophysics. Mathematics 224 is recommended. Courses 290, 295, and 299 are excluded from the 12 units considered above. 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, non-linear optics, solid state physics, low-temperature physics, electron and nuclear magnetic resonance, gaseous electronics, and nonlinear optics. 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. Special courses, physics, interdepartmental programs of graduate study and research in atmospheric and space sciences. Students with special research interests should make inquiry in the department office.

The M.A. degree is offered under Plan II of the Graduate Division.

LOWER DIVISION COURSES

Courses 2A–5B–5C–5D–5E, or HSA–H5B–HSC–H5D–HSE are fundamental and are designed to meet the needs of students majoring in any of the physical sciences or who are enrolled in the College of Chemistry or Engineering. Those proceeding with the second year mathematics sequence should take courses in the order 51C–51A–51B concurrently with Physics 5C–5D–5E, respectively. Physics 5A–5B–5C is designed for premedical students, students in architecture, and students in the biological sciences. Physics 10 is recommended for the nonscience major student who does not plan to take the courses in the mathematical and physical sciences. This course fulfills, in part, the natural science science requirements of the College of Letters and Science.

All students planning to take lower division courses, except Physics 10, should have completed trigonometry.

5A. Physics for Scientists and Engineers. (3) Sec-
tion 1: three hours of lecture and one hour of discussion per week. Prerequisite: high school physics, Mathematics 1A or 1S: Mathematics 1B or 1S must be taken concurrently if it has not been completed. Vectors, parametric equations, motion of rigid bodies in three dimensions, acceleration, coordinate systems, introduction to Lagrange’s and Hamiltonian mechanics, conservation of mechanical energy, moment of inertia, center of mass, motion of rigid bodies in central force fields.

The Staff (F, W, Sp)

SB. Physics for Scientists and Engineers. (4) Section 1: three hours of lecture, one hour of discussion, and three hours of laboratory per week. Prerequisite: course 5A or 5A-I; Mathematics 1B or 1S; Mathematics 1C or 1S must be taken concurrently or have been completed. Prerequisite: course 5B or 5B-I. Students with credit for Physics 5C or 5D will not receive credit for Physics 6B. Electricity and magnetism, optics and wave motion.

Mr. Crawford, Mr. Dalven (F, W, Sp)

6C. Introductory Physics. (4) Three hours of lecture and one hour of discussion per week, and five 3-hour laboratory periods per quarter. Prerequisite: course 6A. Students with credit for Physics 5E will not receive credit for Physics 6C. Quantum and statistical modern physics, atomic, nuclear, elementary particles, condensed matter.

Mr. Dalven, Mr. Knight (F, W, Sp)

6A-I. Introductory Physics. (4) Formerly 6A-S. One hour of lecture and three hours of individual tutoring per week, plus 15-20 hours of lab per quarter. Prerequisite: Proficiency in pre-college mathematics required. Math 16A or 16B required. Students with credit for Physics 5A or 5B will not receive credit for Physics 6A-I. Course equivalent to Physics 6A but designed for individual, flexibly-paced study. Topics of biological interest are included. Mr. Helmholtz (W)

6B-I. Introductory Physics. (4) Formerly 6B-S. One hour of lecture and three hours of individual tutoring per week, plus 15-20 hours of lab per quarter. Prerequisite: Physics 6A-I or 6A or equivalent. Students with credit for Physics 5C or 5D will not receive credit for Physics 6B-I. Course equivalent to Physics 6B but designed for individual, flexibly-paced study. Topics of biological interest are included. Mr. Helmholtz (Sp)

10. Descriptive Introduction to Physics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: introductory physics, with particular emphasis on organizing knowledge, to enhance effective problem solving. With applications to the physics of atoms, molecules, solids, and nuclei.

Mr. Reif (Sp)

14. Nuclear Physics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 137A or consent of instructor. Ad- vanced laboratory for junior and senior students involving some of the significant experiments of atomic, nuclear, and solid-state physics. Individual work is encouraged. Eight units required for physics majors; twelve may be taken for credit. Mr. Hahn (F, W, Sp)

124. Nuclear Physics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 129A. Not open for credit to those with credit for 129A. Tools of nuclear physics, alpha, beta, and gamma decay, nuclear cross sections and structure, brief introduction to particle physics.

Mr. Tripp (W)


Mr. Hahn (F, W, Sp)

49. Supplementary Work in Lower Division Physics. (1-3, Max. 9) Meetings to be arranged. Students with part- icular interest in physics courses may, with consent of instructor, complete the credit under this heading. Courses may be repeated for credit.

Mr. Shapo, Mr. Morrison (F, W, Sp)

80. Introduction to Environmental Physics. (4) Formerly 91A. Three hours of lecture and one hour of discussion per week. Prerequisite: open to students with high school physics or chemistry and physics. Elementary concepts of physics with application to problems of environmental energy, pollution, biology, geology. Specific examples of the role of physics in contemporary social issues.

Mr. Harte (W)

91. Problem Solving Skills Applied to Introductory Physics. (2) One hour of lecture and 1 hour of discussion per week. Prerequisite: Physics 5A and concurrent enrollment in introductory physics, or consent of instructor. This course is designed to teach students to solve problems not in the text for organizing knowledge, to enhance effective problem solving. Specific applications will be made to problems in introductory physics, with particular emphasis on problem solving.

Mr. Reif (Sp)

UPPER DIVISION COURSES

Courses 5A-5B-5C-5D-5E or 5A-I, 5B-I, 5C-I, 5D-I, and 5E-I, and differential and integral calculus are prerequisite to the following upper division courses except 106A, 106B, and 132.

Four upper division courses may have scheduled one additional hour to the three hours of lecture. See Schedule of Classes.

105A–105B. Analytic Mechanics. (4–4) Three hours of lecture and one hour of discussion per week. Prerequisite: courses 6A–6B–6C. Designed for optometry students. Geometrical methods applied to the optics of mirrors, lenses, and prisms; laboratory work to accompany the lectures.

Mr. Chamberlain (F)

108B. Physical Optics. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisite: course 6A–6B–6C. Physics 10A is not a prerequisite to 108B. Not open for credit to physics majors. Phenomena of diffraction, interference, and polarization of light, and their application; laboratory work to accompany the lectures.

Mr. Chamberlain (W)

110A–110B–110C. Electromagnetism and Optics. (4–4–4) Three hours of lecture and one hour of discussion per week. A course emphasizing applications of electromagnetic theory and problem-solving: electrostatics, magnetostatics, Maxwell's equations, applications of Maxwell's equations, wave equation, physical optics.

Sequence beginning (F, Sp) Mr. Kerth, Mr. Price, Mr. Schwartz, Mr. Halpern

111. Modern Physics and Advanced Electrical Laboratory. (1–4) Four hours of laboratory per week. Prerequisite: course 137A or consent of instructor. Advanced laboratory for students involving some of the significant experiments of atomic, nuclear, and solid-state physics. Individual work is encouraged. Eight units required for physics majors; twelve may be taken for credit. Half-units allowed.

Mr.Crowe, Mr. Tripp, Mr. Shen (F, W, Sp)

112. Introduction to Statistical and Thermal Physical s. (3) Two hours of lecture and three hours of dis- cussion per week. Basic concepts of statistical mechanics; conclusions leading to macroscopic thermodynamics; applications of Boltzmann's, micro-

126A–129B. Nuclear and Particle Physics. (4–4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 137A and 137B. Properties and classification of the elementary particles, their interactions, nuclear physics, and high energy phenomena, analyzed by quantum me-

132. Modern Physics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: course 6A–6B–6C, or equivalent or consent of instructor. Not open for credit to students who have completed 137A. A general descriptive course in modern physics; elec- trons and atoms, periodic table, X rays, spectra, nuclear physics, energy, solid state and particle physics.

Mr. Morrison (Sp)

137A–137B–137C. Quantum Mechanics and Its Applications to Atomic Physics. (4–4–3) Three hours of lecture and one hour of discussion per week. Prerequisite: course 137A and 137B. Properties and classification of the elementary particles, their interactions, nuclear physics, and high energy phenomena, analyzed by quantum mechan- ical methods.

Sequence beginning (F) Mr. Stevenson

139. Special Theory of Relativity. (3) Three hours of lecture and one hour of discussion per week. Prerequisite: courses 105A–105B, 110A–110B Einstein’s special theory of relativity, historical and experimental foundations, spatial and temporal measurements, par- ticle kinematics and dynamics, Lorentz invariance, re-
actions and cross-sections, electrodynamics, equivalence principle. Selected applications. Designed for advanced undergraduates in physics and astronomy.

301. Undergraduate Physics Instruction. (1-2) Three hours of lecture and one hour of discussion per week. Prerequisite: course 105A-105B, or consent of instructor. Introduction to physics for advanced undergraduates. Emphasis on the atmosphere and the solar system resulting from the interactions of particles, fields, radiation, and matter.


220A. Interactions of Light with Matter. (3) Three hours of lecture and one hour of discussion per week. Prerequisite: courses 110A-110B-110C and 137A. Light absorption, reflection, and propagation of light through classical and quantum mechanics. Transition to quantum theory through the correspondence principle.

221A. Basic Assumptions of Quantum Mechanics; Symmetry and Invariance Principles; Theory of Angular Momentum. (3-3) Three hours of lecture and one hour of discussion per week. Prerequisite: course 205A and 205B. Advanced topics in classical and quantum mechanics. Interactions of particles, fields, radiation, and matter.

230A-230B-230C. Quantum Theory of Fields and Particles. (3-3-3) Three hours of lecture and one hour of discussion per week. Prerequisite: course 221A-221B or the equivalent. Advanced topics in relativistic quantum mechanics of fields and particles. Quantum electrodynamics. Phenomenological theories of weak and strong interactions.

240A-240B-240C. Theoretical Plasma Physics. (3-3-3) Three hours of lecture and one hour of discussion per week. Prerequisite: course 221A-221B or course 141A-141B or equivalent. Fluids and plasma physics. Magnetic and electron fields in solids and their interactions; superconductivity, many-body techniques; Green's functions; fluctuation; plasma waves and turbulence.

state for neutron stars and dense nuclear matter.

253A–253B. Nuclear Theory. (3–3) Three hours of lecture and one hour of discussion per week. Prerequisites: Graduate Quantum Mechanics (Physics 221A). Nuclear Physics, e.g., Chemistry, 253A–253B or Nuclear Engineering 201A–201B, or consent of instructor. Foundation of single particle approximation, Harass-Fock, and central field. Extended shell model, particle-hole excitations, linearization of equations of motion. Macro-nuclear physics, level densities, potential energy surfaces, fission. Rotational nuclei, radiation; giant resonances. Nuclear reactions, resonance, origin of optical potential, direct reactions, heavy ions. Isobaric analog states.

290. Seminar. (2) Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

295. Research. (1–8) Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

299. Special Study for Graduate Students. (1–4) Prerequisite: graduate standing. This course is arranged to allow qualified graduate students to investigate possible research fields or to pursue problems of interest through reading or nonlaboratory study under the direction of faculty members who agree to give such supervision. Must be taken on a satisfactory/unsatisfactory basis. The Staff (W, Sp)

602. Individual Study for Doctoral Students. (1–5) Individual study in consultation with the major field advisor intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, Sp) Mr. Tripo (W)

See interdepartmental Studies for complete descriptions of the following courses:

IDS 145. Physical Problems about the Earth. (4)
IDS 252A. Stellar Structure and Evolution. (3)
IDS 252B. Stellar Structure and Evolution. (3)
IDS 253. Astrophysical Spectroscopy. (3)
IDS 254. High Energy Astrophysics. (4)
IDS 255. Theoretical Astrophysics Seminar. (2)

Medical Physics (See Index)

Physiology-Anatomy

Graduate Major in Physiology

Students qualified for admission may elect a course of work leading either to the M.A. degree or directly to the Ph.D. degree in physiology. The M.A. degree is not prerequisite for the Ph.D. degree. On the other hand, candidates for either degree must have completed the equivalent of the requirements for the undergraduate major shown above, in addition to the minimum requirements for the particular graduate degree, as follows:

1. The M.A. degree in physiology is to be earned according to Plan I of the Graduate Division, which includes the satisfactory completion of 30 units of course work and a thesis.

2. The Ph.D. degree in physiology. Required: Biochemistry 102 (5), Anatomy 109A–109B (3–3); a course in statistics; at least 8 units of upper division or graduate courses each in physiology and morphology: at least 24 units of course 299. Recommended: Physics 132 (4).

Before advancement to candidacy for the Ph.D. degree the student must demonstrate that he can make an accurate written translation from the physiological scientific literature in two of the languages approved by the Department (e.g., French, German, Russian, or Computer Language). Selection of a major professor should also have been made by that time. The student must also pass an oral qualifying examination to test general knowledge of physiology and at least two related subjects which are approved by the major professor and the graduate adviser. A dissertation based upon original research in physiology is to be prepared according to Plan B of the Graduate Division.

All candidates for the Ph.D. degree are required to acquire teaching experience to include the supervision of one quarter of full-time teaching as a Teaching Assistant or Associate (e.g., 2 quarters of 1/2-time teaching; 4 quarters of 1/4-time teaching, etc.). For further details concerning the graduate degrees please consult the graduate adviser in physiology.

Major in Anatomy (Graduate Only)

In addition to meeting the general requirements of the Graduate Division, the student must have had the following courses, or their equivalents, before admission to the graduate degree program in anatomy: Biology 1A–1B (6–6); Chemistry 1A–1B–1C (4–4–4); Chemist

lower Division. Chemistry 1A–1B (4–4); Chemistry 8A–8B (4–4); Mathematics 16A–16B (4–4) or 1A–1B–1C (4–4–4); Physics 6A–6B–6C (4–4–4); Biology 1A–1B (6–6).

Upper Division. Physiology 101 (5), Physiology 102A–102B (5–5); Physiology 103A–103B (3–3); a course in human anatomy, either Anatomy 108–108B, 10A–104 (4–3) or Anatomy 104 (5); a course in biochemistry, e.g., Biochemistry 102 (5), 100A–100B (4–4) and three additional upper division courses in related biological sciences, two of which must be in physiology. Recommended: three additional quarters of course work in chemistry (e.g., Chemistry 5 or 109), physics or mathematics.

Honors Program. To be enrolled in the honors program a student must maintain a grade-point average of at least 3.3 overall and 3.3 in the courses required for the undergraduate major in physiology. To receive honors with the bachelor’s degree the student must (1) maintain a grade-point average of at least 3.3 in the major and in the honors program, (2) complete the undergraduate major in physiology as stipulated above, (3) complete at least 8 units of course 199 or equivalent, and (4) submit a thesis satisfactory based upon the research work performed.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Pharmacy

LOWER DIVISION COURSES

1. Introductory Human Physiology. (6) One hour lecture/demonstration, one hour film, one hour discussion, three hours lab, and 2 hours of individual tutoring and examination per week. Prerequisites: either high school chemistry or a course in college physics or chemistry of biology. Lecture/demonstration, laboratories and individual self-paced tutorials will include studies on basic mechanisms underlying human life processes. Topics include: cells and membranes, nervous and muscular function; cardiovascular, respiratory, renal and gastrointestinal biology; metabolism, endocrinology and reproduction. Mr. Machen, Mr. Zucker (Sp)

99. Supervised Independent Study and Research. (1–3) Prerequisite: consent of instructor. Limited to freshmen and sophomores. Must be taken on a passed/not passed basis. The Staff (F, W, Sp)

UPPER DIVISION COURSES

101. Introductory Cell Physiology. (5) Three 11/2-hour lectures and one hour of discussion per week. Prerequisite: one year of calculus, Biology 1A–1B and Biochemistry 102 (or concurrent enrollment). Recommended: Physics 6, Chemistry 109. Studies of fine structure and function in cells and organelles. Topics will include: membrane structure and transport, metabolism, secretion, ion transport, excitation, and cell motility. Mr. Burnside, Mr. Macey, Mr. Packer (F)

102A–102B. Mammalian Physiology. (5–5) Three 11/2-hour lectures and one hour of discussion per week. Prerequisite: Biology 1A–1B and a course in vertebrate anatomy. Recommended: course 101, Physics 6, and Physiology course 102 (or concurrent enrollment). Recommended: course 102A–102B and course 102A–102B should be taken concurrently. Laboratory experiments to teach basic principles and techniques of cellular and organ physiology.

Mr. Macey, Mr. Nicoll (Sp)

103A–103B. Physiology Laboratory. (3–3) One and one/half hours of lecture and four and one/half hours of laboratory per week. Prerequisite: course 103A and course 102A–102B should be taken concurrently. Laboratory experiments to teach basic principles and techniques of cellular and organ physiology.

Mr. Macey, Mr. Nicoll, Mr. Westheimer (Sp)

NOTE: For key to symbols, see page 36.

Graduate Major in Physiology

Students qualified for admission may elect a course of work leading either to the M.A. degree or directly to the Ph.D. degree in physiology. The M.A. degree is not prerequisite for the Ph.D. degree. On the other hand, candidates for either degree must have completed the equivalent of the requirements for the undergraduate major shown above, in addition to the minimum requirements for the particular graduate degree, as follows:

1. The M.A. degree in physiology is to be earned according to Plan I of the Graduate Division, which includes the satisfactory completion of 30 units of course work and a thesis.

2. The Ph.D. degree in physiology. Required: Biochemistry 102 (5), Anatomy 109A–109B (3–3); a course in statistics; at least 8 units of upper division or graduate courses each in physiology and morphology: at least 24 units of course 299. Recommended: Physics 132 (4).

Before advancement to candidacy for the Ph.D. degree the student must demonstrate that he can make an accurate written translation from the physiological scientific literature in two of the languages approved by the Department (e.g., French, German, Russian, or Computer Language). Selection of a major professor should also have been made by that time. The student must also pass an oral qualifying examination to test general knowledge of physiology and at least two related subjects which are approved by the major professor and the graduate adviser. A dissertation based upon original research in physiology is to be prepared according to Plan B of the Graduate Division.

All candidates for the Ph.D. degree are required to acquire teaching experience to include the supervision of one quarter of full-time teaching as a Teaching Assistant or Associate (e.g., 2 quarters of 1/2-time teaching; 4 quarters of 1/4-time teaching, etc.). For further details concerning the graduate degrees please consult the graduate adviser in physiology.

Major in Anatomy (Graduate Only)

In addition to meeting the general requirements of the Graduate Division, the student must have had the following courses, or their equivalents, before admission to the graduate degree program in anatomy: Biology 1A–1B (6–6); Chemistry 1A–1B–1C (4–4–4); Chemistry

L&S: Physiology-Anatomy / 179
105. Histophysiology. (5) Two 11/2-hour lectures per week. Prerequisite: Biology 1A–1B. The structural basis for the function of mammalian (particularly hu-
man) tissues. Both light and elec-
tron microscopic levels of organization are considered. Ms. Burnside (W)

109. Survey of Mammalian Physiology. (4) Four and one-


110. Introduction to Neurobiology. (3) Three 1-hour lectures per week. Prerequisite: Biology 1A–1B or consent of instructor. The important contributions of neuro-
ological, anatomical, physiological, comparative and behavioral studies to the understanding of the nervous system, particularly that of humans. Properties of neu-
rons and neural systems in terms of structure and func-
tion and adaptation. Not open for credit to students currently enrolled in or who have credit in 102B or Zoology 136.

123. Comparative Physiology. (5) Four and one-
half hours of lecture per week. Prerequisite: Biology 1A–1B or equivalent. Organisms demonstrating the functional mechanisms underlying life processes in mammalian systems.

124. Environmental Physiology. (4) Three 1 1/2-
hour lectures per week. Prerequisite: Biology 1A–1B or equivalent. Introduction to the functional mechanisms underlying life processes in mammalian systems. Mrs. Timiras (W)

150. Bioluminescence. (3) Two 1 1/2-hours of lecture per week. Prerequisite: a course in Cell Physiology (course 101 or equivalent) and Biochemistry (102 or equivalent), or graduate standing and/or consent of instructor. Structure and function of membranes. Special emphasis upon membrane bioenergetics of micro-
organisms, halobacteria, and yellow-green algae. Mr. Packer, Mr. Mehlhorn, Mr. Quintanilla (W)

152. Physiology of Human Development. (4) Three 1 1/2-
hour lectures per week. Prerequisite: an introduc-
tory course in the biological sciences. Recommended: Anatomy 151. The developing human body from prenatal life to maturity; fertilization, embryo-

tic and fetal physiology; birth and neonatal adjustments; functional maturation in infant, child and adolescent; neuroendocrine control of puberty; factors influencing growth and development. Mrs. Timiras (W)

153. Physiology of the Aging Process. (3) Three 1 1/2-
hour lectures per week. Prerequisite: an introduc-
tory course in the biological sciences. Recommended: Anatomy 151. The developing human body from prenatal life to maturity; fertilization, embryonic and fetal physiology; birth and neonatal adjustments; functional maturation in infant, child and adolescent; neuroendocrine control of puberty; factors influencing growth and development. Mrs. Timiras (W)

155. Physiology of Mammalian Reproduction. (4) Four and one-
half hours of lecture per week. Prerequisite: Biology 1A–1B or equivalent. Comparative, epidemiological and environmental aspects.

169. Bioiology of Human Reproduction. (5) Four and one-
half hours of lecture per week. Prerequisite: course 101–102A–102B or equivalent. Instructor: Mr. Machen. Neurosecretory phenomena, neural control of endo-
ctrine glands and effects of hormones on brain func-
tions. Mr. Machen (F)

219. Seminar in Neuroendocrinology. (2) One and a half hours of lecture per week. Prerequisite: courses 101–102A–102B, 215 or consent of instructor. Current research in the field will be consid-
ered. Mr. McCall (F)

218. Neuropharmacology. (4) Four hours of lecture per week. Prerequisite: Biochemistry 102 & Physiology 108. Instructor: Mr. McCall. Study of principles and mechanisms of actions on neurons and classes of drugs with primary actions on the central nervous system. Students may enroll for letter grade or Pass/Not Pass.

223. Seminar in Comparative Physiology. (2) One and a half hours of lecture per week. Prerequisite: course 101. Instructor: Mr. McCall. Selected topics in the field will be consid-
ered. Mr. Macey (Sp)

221. Seminar in Environmental Physiology. (2) One 1 1/2-hour per week. Prerequisite: courses 101-102A-102B. Mode of action of drugs and effects of environmental factors on man. Mr. Rosenberg (Sp)

242. Seminar in Endocrine Physiology. (3) Three hours of class per week. Prerequisite: consent of instructor. Selected topics on current research in endo-
ocrinology. Mr. Rosenberg (Sp)

261. Seminar in History of Neurophysiology. (2) Two hours of class per week. Prerequisite: consent of instructor. Selected readings in classical texts of physi-
ology with emphasis on the historical development of ideas about the nervous system. Mr. Freeman (F)

272. Physiological Transport Processes. (3) Two 1 1/2-hour lectures per week. Prerequisite: course 101–102A–102B and 132. Mode of action of drugs at the organ and cellular levels. Mrs. Diamond (F)

281. Seminar in Physiological Action of Drugs. (2) Two and one-half hours of lecture per week. Prerequisite: course 101, 102A–102B. Mode of action of drugs at the organ and cellular levels. Mrs. Diamond (F)

290. Seminar in Neurobiology. (2) Prerequisite: con-
sent of instructor. Discussions and readings in special topics, to be varied each quarter. May be taken more than once for credit. Mr. Mehlhorn (F). Mr. Freeman (W), Mr. Zucker (Sp)

292. Seminar. (1) One hour of lecture per week. De-
partmental seminar dealing with various topics in func-
tional biology. Course must be taken on a satisfactory/ unsatisfactory basis. The Staff (Mrs. Timiras in charge) (F, W, Sp)

298. Special Study in Physiology. (1–12) Prerequisite: consent of instructor. Individual arrangements to be made. The Staff (F, W, Sp)

299. Individual Research in Physiology. (1–12) Indivi-
dual arrangements to be made. Prerequisite: consent of instructor. Course must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

391. Physiological Surgery. (2) One 4 1/2-hour laboratory per week. Prerequisite: course 102A–102B, and graduate standing in physiology, or anatomy, or consent of the instructor. Techniques of anesthesia and sterile surgical procedure, and experiments with special physiological research preparations. (F)

492. Physiological Instrumentation. (2) One hour of lecture and three hours of laboratory per week. Prerequisite: graduate standing in Physiology or Anatomy or consent of the instructor. Instruction in the design and application of mechanical and electronic instru-
tions for the complete description of this course.

502. Physiological Instrumentation— Electronics. (4) Two 1-hour lectures and one 4 1/2-hour laboratory per week. Prerequisite: consent of instructor. Cardiovascular physiology; cardiac output and cardiac cycle; measurement of conditions under various situations; investigation of individual mechanical instrumentation projects to monitoring of physiological parameters. Must be taken on a satisfactory/unsatisfactory basis.

602. Individual Study for Doctoral Students. (1–8) Individual study in consultation with the major profes-
sor, intended to provide an opportunity for qualified students to prepare themselves for the various examina-
tions required of the candidate for the Ph.D. May not be used for unit or residence requirements for the doc-
oral degree. Must be taken on a satisfactory/ unsatisfactory basis.

IDS 201. Cellular Mechanisms Underlying Nervous Activity. (4) See Interdepartmental Studies for the complete description of this course.

IDS 201L. Laboratory in Cellular Mechanisms Underlying Nervous Activity. (2) Laboratory for Interdepartmental Studies for the complete description of this course.

IDS 202. Neural Integration and Coordination. (4) See Interdepartmental Studies for the complete descrip-
tion of this course.

IDS 202L. Advanced Laboratory in Neural Integration and Coordination. (3) See Interdepartmental Studies for the complete description of this course.

Anatomy

LOWER DIVISION COURSE

99. Supervised Independent Study and Research. (1–3) Limited to freshmen and sophomores. Consent of the instructor required. To be taken on an individual basis. The Staff (F, W, Sp)

108. General Human Anatomy. (4) Three 1 1/2-
hours of lecture per week. Prerequisite: a college course in Biology or Chemistry. The functional anatomy of the human body as revealed by gross and micro-
scopic examination. Mrs. Diamond (F)

108L. General Human Anatomy Laboratory. (3) One hour discussion and one 4-hour laboratory. Prerequisites: Biology 1A–1B or consent of instructor. An introductory study of the major anatomical divisions of the brain and spinal cord examined at gross and microscopic level. Functional neuroanatomy will be stressed.

110T. Introductory Mammalian Neuroanatomy. (2) Two 1-hour lectures and one 4-hour laboratory. Prerequisites: Biology 1A–1B or consent of instructor. An introductory study of the major anatomical divisions of the brain and spinal cord examined at gross and microscopic levels. Mrs. McCall (Sp)

110T. Introductory Mammalian Neuroanatomy. (2) Two 1-hour lectures and one 4-hour laboratory. Prerequisites: Biology 1A–1B or consent of instructor. An introductory study of the major anatomical divisions of the brain and spinal cord examined at gross and microscopic level. Functional neuroanatomy will be stressed. Mrs. McCall (Sp)

115. Developmental Anatomy. (5) Three 1-hour lec-
tures, one 1-hour discussion, and one 3 1/2-hour labor-
atory per week. Prerequisite: Biology 1A–1B or consent of instructor. The development of the human embryo and fetus. Biology of abnor-
mal development and introduction to experimental ter-
atology. Enrollment limited. Mrs. Srebnik (F)

190. Directed Group Study. (2–3) The Staff (F, W, Sp)

199. Supervised Independent Study and Research. (1–5) Enrollment is restricted by regulations listed on page 36. Individual conferences to be arranged. Prerequisite: course 104. Special library and laboratory projects may be assigned. Must be taken on a passed/not passed basis. The Staff (F, W, Sp)
GRADUATE COURSES

203. Functional Neuroanatomy. (4) Two 1 1/2-hour lectures and two 3-hour laboratories per week. Prerequisite: consent of instructor. Developmental and functional relationships of the mammalian nervous system. Mrs. Diamond (W)

*205A—205B. Systematic and Regional Human Anatomy. (5—6) Two 1-hour lectures and two 4 1/2-hour laboratories per week. Prerequisite: either course 151 or Zoology 105 or other advanced work in mammalian biology, consent of instructor. Dissection, x-ray, and surface anatomy of the body, with special reference to the functional capacities of the structures examined. Mr. Srebnik (W, Sp)

206. Seminar in Advanced Neuroanatomical Topics. (2) Two hours of lecture per week. Prerequisite: course 203 or equivalent or consent of instructor. Current research topics in functional neuroanatomy. Mrs. Diamond (Sp)

209. Advanced Topics in Histology. (4) Two one-hour lectures and one 4 1/2-hour laboratory per week. Prerequisites: 105 or consent of instructor. Comparative vertebrate histology. Practical experience in tissue preparation techniques combined with a survey of organ systems in the common laboratory vertebrates. The Staff (F, W, Sp)

298. Special Study in Anatomy. (1—12) Individual arrangement to be made. Prerequisite: consent of instructor. The Staff (F, W, Sp)

299. Individual Research in Anatomy. (1—12) Individual arrangement to be made. Prerequisite: consent of instructor. Original research in anatomy. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

602. Individual Study for Doctoral Students. (1—6) Individual study in consultation with the major professor, intended to provide an opportunity for qualified students to study the various examination requirements of the candidate for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. May be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

Political Economy of Industrial Societies

Group Major Office, Institute of International Studies, 209 Moses Hall

Major Advisers: Mr. Giuseppe Di Palma (Political Science), Co-ordinator; Mr. Stephen Cohen (City and Regional Planning); Mr. Edwin M. Epstein (Business Administration); Mr. Gerald D. Feldman (History); Ms. Laura Tyson (Economics); Mr. David Vogel (Business Administration); Mr. Benjamin Ward (Economics); Mr. John A. Zysman (Political Science).

Group Major in the Political Economy of Industrial Societies

Industrial societies have undergone a series of unexpected developments in recent years, with far reaching and unclear consequences for their internal order and their external economic and political relations. These developments, which have affected industrial democracies as well as developed socialist countries, are the more difficult to understand and explain together because of their diversity: they range from a crisis of political institutions to a change in mass cultural values, from stagnation in the productive and service sectors to the emergence of new sources of social conflict (regional, linguistic, generational), from the expansion of government planning and intervention to the growth of corporate interests of supranational dimensions, from population explosion to the collapse of the international monetary order, from environmental and resource depletion to a new distribution of power between nations controlling and consuming crucial resources. Will these developments usher in a new and more effective way of handling internal conflict, accommodating new values, sustaining delivery of public services, and expanding performance, or will they bring about the progressive decay of social institutions—unable to cope with the expanding and novel nature of demands and problems—and arrest the growth and diversification of society? Will a new world order emerge, or will world-wide instability prevail? Will the search for solutions make industrial countries converge toward a new political format, neither democratic nor socialist, or will significant difference remain? Above all, is it possible or appropriate to make generalized and sweeping predictions, or will changes be more discrete and uneventful?

Our program intends to offer interested students a chance to study the nature of the emerging problems, but also the opportunities with which industrial societies are confronted. Above all, it intends to offer a better understanding of how the problems may be solved and the opportunities seized, both in view of their root causes and in view of the institutional and cultural resources which industrial societies can put to the task. In pursuing the latter objective, the program assigns first priority to the historical, comparative, and analytical study of what industrial societies have in common and what differentiates them from each other. Western industrial societies have capitalist economies, participatory democratic polities, open equalitarian and achievement cultures, welfare policies, complex and interdependent institutions, and share in a wide supranational network of political and economic transactions. Some of these properties point to principles of economizing, productive expansion, organized complexity, and applied knowledge, which variously inspire the developmental goals of these societies and the instrumentality for directing development. Other properties point to principles of freedom, diversity, and self-government, which inform the democratic goals of these societies and the means to pursue them, but may be curtailed by growth objectives. Socialist industrial countries also pursue development objectives. But these objectives, which in the West seem to curtail democratic practices, here seem to foster social and political diversity by hampering centralized rule. Irrespective of political format, political practitioners in every industrial country are faced with policy dilemmas when trying to accommodate development objectives with the preservation of their political institutions.

In order to achieve a better understanding of these issues, students in the program design their plans of study, in consultation with their advisers, so as to devote special attention to the institutions and values that have shaped and caused the emergence of contemporary issues. They also study the instrumentality available for planning and problem solving, the way in which institutions and values link with policy choices, and the way in which contemporary issues feed back into institutions, values, and solving processes. Students study the emerging problems of industrial societies not only as problems of resource use and distribution, but also, and above all, as problems of institutional adaptation, value innovation, and changing political equilibria. They have an opportunity to combine problem solving with historical and analytical interests, and to ground them in the study of some of the most salient country and institutional sites within which features and problems of industrialism emerge.

(For a more detailed description of the program and course offerings, please obtain a brochure from the Group Major Office.)

Declaration of Major Procedures: Students are expected to complete all lower division requirements before being accepted into the major.

Advising: In the major great importance is assigned to the advising function. The purpose of advising is to give students' personal interests the appropriate academical orientation within the major's intellectual goals. When declaring, students must devise a plan of courses to complete the major to be discussed and approved by a major adviser. Changes in the plan must also be approved by an adviser.

Lower Division: 23 to 32 units.

Economics 1. Introduction to Economics (5); Economics 100A-100B (5-5) or Economics 101A-101B (5-5) or History 5 (5) and History 170 (5); Interdepartmental Studies 1 (4) or Political Science 2 (4); 102 (5); 105A—105B (5—5) or History 5 (5) and History 170 (5); Interdepartmental Studies 1 (4) or Political Science 2 (5); optional: Mathematics 1A—1B (4—4) (Required only of students taking Economics 101A—101B to satisfy the methodology requirement. Must be taken in addition to the other lower division requirements, not in lieu of them.)

Upper Division: 45 to 54 units, including no more than three courses offered outside the College of Letters and Science.

Methodology: 10 units.

Economics 100A—100B (5—5) or Economics 101A—101B (5—5).

NOTE: For key to symbols, see page 36.
Political Science

Department Office, 210 Barrows Hall

Professors:
Reinhard Bendix, Ph.D.
Giuseppe Di Palma, Ph.D.
James Q. Wilson, Ph.D.
Ernst B. Haas, Ph.D. (Robson Research Professor of Government)
Norman Jacobson, Ph.D.
Chalmers Johnson, Ph.D. (Chairman)
Martin Landau, Ph.D.
Tod R. LaPorte, Ph.D.
Eugene C. Lee, Ph.D.
George Lenczowski, Jr., L.M.S., Ph.D.
Leslie Lipson, Ph.D.
Herbert McCloskey, Ph.D.
William K. Milh, J.D., Ph.D.
Hanna Pitkin, Ph.D.
Nelson W. Polsby, Ph.D.
Michael P. Rogin, Ph.D.

Associate Professors:
Jacob Citlin, Ph.D.
David Collier, Ph.D.
Joylindesa Gupta, Ph.D.
Lowell Gittner, Ph.D.
Andrew C. Janos, Ph.D.

Assistant Professors:
Christopher H. Achen, Ph.D.
George W. Breule, Ph.D.
Bill L. Caves, Ph.D.
Karl D. Jackson, Ph.D.
Gail W. Lapidus, Ph.D.

Lecturers:
James M. Boyd, Ph.D.
H. Owen Porter, Ph.D.

Leo Rose, Ph.D.

The Major

The major in political science at Berkeley consists of twelve courses. The courses required in the lower division are Political Science 1, 2, and 3. Equivalent courses approved by the department may be accepted in lieu of these. For example, for seniors who are not in the major, honors program offerings, undergraduate course content, and faculty scheduling, contact the Undergraduate Office, 210 Barrows Hall. Booklets on the undergraduate program for the year 1978-79 are available.

The American Institutions Requirement. This requirement may be satisfied by completing an approved course, or by passing an examination. Please check with the American History and Institutions Office, 29 Dwinelle Hall for further information.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Higher Degrees

Inquiries should be addressed to the departmental Graduate Office, 210 B Barrows Hall.

LOWER DIVISION COURSES

1. Introduction to Political Science: American Politics. (Formerly 1A. Three hours of lecture and one hour of discussion per week. Prerequisite: Not open to students who received credit for any two of the following before Fall 1977: 1B, 1C, 1D. An introductory analysis of the structure and operations of the American political system, primarily at the national level.)

Mr. Muir (F)

2. Introduction to Political Science: Comparative Government and Politics. (Formerly 1B. Three hours of lecture and one hour of discussion per week. Prerequisite: Not open to students who received credit for any two of the following before Fall 1977: 1A, 1C, 1D. The variety of political forms, the theory of political differentiation and development, and politics in industrialized democracies, communist systems, and developing nations.)

Mr. Janos (W)

3. Introduction to Political Science: Scope and Methods in Political Science. (Three hours of lecture and one hour of discussion per week. Analytical and methodological problems of political inquiry, including the social implications of social science research.)

Mr. Gregor (F); Mr. Citlin (Sp)

*41. Experimental Course. (1-5) Prerequisite: consent of instructor. Topics, experimental in nature, will vary from year to year.

52. National Security Policy. (Two hours of lecture per week. Analysis of the evolution, development and formulation, and execution of current U.S. National Security Policy. Will include consideration of fundamental concepts of national interest; the translation of these concepts into specific policy objectives and supporting programs; the relationship to foreign policy; and current national security policy problems.)

Mr. Boyd (Sp)

UPPER DIVISION COURSES

100. American Institutions. (Formerly 5. Three hours of lecture and one hour of discussion per week. Prerequisite: Not open to students who received credit for any two of the following before Fall 1977: 1A, 1C, 1D. Survey of the powers, structure, and operations of government, primarily at the national level.)

Mr. Staff (F, W, Sp)

American Politics

102. The American Executive. (Formerly 107. Two 1 1/2-hour lectures and one 1-hour discussion per week. Analysis of principal institutions, functions and problems of the Presidency and the federal execu-
tive branch. Special attention will be given to topics of preexisting staffing, executive decision-making, administrative relations, and policy formation. Comparative reference to executive processes in other political systems. 

Mr. Polsby (F) (W) 

103. Congress. (Formerly 108) Three hours of lectures and one hour of discussion per week. Prerequisite: (formerly 1A) or another course in American politics. Normal legislative tasks, role of the political parties, formal and informal structures of both houses, relations with the executive branch, policy formation, and lobbying. 

Mr. Novak (F, W) 

104. Political Parties. (Formerly 163A--163B--163C) Three hours of lecture and one hour of discussion per week. The institutional environment within which American politics takes place. Concept and history of political parties, party system, and their operations within the political context; their nature and function, origin and development. Party organization and structure. State, national, and local party systems and their processes. 

Mr. Cavala (F) 

105. The Politician. 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. Selections with elected officials and party workers on their vocation. Directed field research. 

Mr. Cavala (W) 

106. Social Groups and Political Power. (Formerly 168) Three hours of lecture and one hour of discussion per week. Social groups and organizations: their nature and their influence on political decision making. 

Mr. Fiske (F, W) 

*114. The Theorist and His Theory. (5) Three hours of lecture and one hour of discussion per week. *Prerequisite: one quarter of 113 or 118, or consent of instructor. Intensive study of one great political theorist. Topic will vary with instructor. 

115. Marxism. Three hours of lecture and one hour of discussion per week. The principal constituents of the Marxism of Karl Marx and Friedrich Engels: the generativeocoanalysis of the "social totality" and the construction and the nature and consequences of the "class struggle." Some consideration of the problems that attend Marxism as a "guide to revolution" and as the institutionalized polity for "the socialist state" in the twentieth century. 

Mr. Gregor (Sp) 

118A--118B--118C. Political Theory. (5--5--5) Three hours of lecture, one hour of discussion per week. Prerequisite: 112. A course in political theory or one hour of discussion per week. 

Mr. Jacobson (Sp) 

118D. Modern Political Theory. (5) Three hours of lecture and one hour of discussion per week. Prerequisite: one quarter of 113 or 118, or consent of instructor. 

Mr. Fiske (F, W) 

119. Community and Intellectual Life. (5) Three hours of lecture and one hour of discussion per week. The evolution of the intellectual tradition of modern political theory. Intellectuals as a social group in the process of "modernization." Definitions of "the intellectual," Renaissance, Reformation, and Enlightenment. Intellectuals in the theories of Marx and his followers are the main themes. 

Mr. Polsby (F) (W) 

International Relations 

120A--120B--120C. International Relations. (5--5--5) 120A formerly 120B. Three hours of lecture and one hour of discussion per week. Prerequisite: 120A is prerequisite to 120B. 120B is prerequisite to 120C. Students with credit for 120B prior to Fall 1977 may not take 120A. 120A: Comparative foreign policy. 120B: The theory of international relations. 120C: Concepts and problems in international relations and foreign policy. 

Mr. Haas (F); 120B: Mr. Waltz (W) 

121. International Organization. (5) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: course 120A. An examination of the impact of international interdependencies (in security relations, economic relations, and culture) upon the activities of international organizations (regional and global), and upon the structure of the international political order. 

Mr. Hauck (W, Sp) 

122A--122B. Public International Law. (5--5) Three hours of lecture and one hour of discussion per week. Prerequisite: Course 122A is prerequisite to 122B. National, social, and international law; principles of international law-making and adjudicatory processes; treaties and executive agreements; jurisdiction; immunities; state law; war; intervention; human rights; trade. 

Mr. Hauck (W, Sp) 

1123. Regional Communities. (5) Two 1 1/2-hour lectures and one 1-hour conference per week. Examination of supranational regional communities; the processes of political, cultural, economic and military integration occurring within them. 

124. Politics and Military Strategy. (5) Two 1 1/2-hour lectures and one 1-hour conference per week. The international dimension of military strategy, technological, science, relationships between strategic doctrine, national security concepts, and domestic politics. 

Mr. Thes (F) 

126A--126B. International Political Economy. (5--5) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: 126A is prerequisite to 126B. The theory of the "international political economy" operative since World War I; Wilsonianism, internationalism, the Open Door, the Monroe Doctrine, and the Good Neighbor Policy; containment, anti-containment, and liberation to substantive policies and to the character of American democracy. 

Mr. Thes (F, W) 

128A--128B. The American Rôle in Asia. (5--5) Formerly 145C--145D. Two 1 1/2-hour lectures and one 1-hour conference per week. 128A: The role played by the United States in East Asia from the 19th century to the present. Trends in U.S. policy, including evaluation of current policy alternatives in Japan, China, Korea, and Indochina. 128B: Analysis of the origins and characteristics of American interests and involvements in South and Southeast Asia, especially on the Indian subcontinent, Indochina, and Indonesia. 

Mr. Scalapino (Sp); 128B: Mr. Rose (W) 

129A--129B. Soviet Foreign Policy. (5--5) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: 129A or equivalent is prerequisite to 129B. 129A: The evolution of policy from 1917 to the 1950s. Continuity and change in Soviet foreign policy, the development of revolution and reality to substantive policies and priorities. Current relations with the West, Socialist bloc, and Third World. 129B: Selected topics, such as the Cold War; detente; relations among the superpowers; the Sino-Soviet dispute; Soviet policy in West and East Africa, Middle East, Middle East, and Third World. 

129A: Ms. Lapidus (W); 129B: Mr. Breslauer (W) 

Empirical Theory and Quantitative Methods 

131A--131B. Political Inquiry. (5--5) Formerly 101A--101B--101C. Three hours of lecture and one hour of discussion per week. 131A: Introduction to the epistemological and methodological issues that characterize political science inquiry. The processes involved in theory generation in the social sciences: the discovery, formulation, and evaluation of hypotheses. 

Mr. Fiske (F) (W) 

131C. Communication, confirmation, and articulation of logical truth claims. 131B: Research procedures in political science inquiry: experimental, survey, and non-experimental designs, methods of data collection, sample selection, data processing and analysis, hypothesis testing, formal models and statistical inference. 

Mr. Fiske (F) (W) 

132A--132B. Quantitative Methods for Political Scientists. (5--5) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: 132A is prerequisite to 132B. Introduction to research methods, statistics, and computer usage for social science majors. Interpretation and evaluation of quantitative research and experience in conducting own studies. 

Mr. Sperlich (F, W) 

Comparative Politics 

140A--140B. Process and Character of Modernization. (5--5) Two 1 1/2-hour lectures and one 1-hour discussion per week. Modernization and political change. 140A: The distinction between Tradi- 

140A: The distinction between Tradi- 

140C. Introduction to Theory and Practice of Development Politics. (Formerly 140D) Two 1 1/2-hour lectures and one 1-hour discussion per week. Major theories of development in growth economics, social change theory, and comparative politics in the light of contemporary experience in selected countries. 

Mr. Ms. Das Gupta (W) 

140D--1410E. The Industrial State. (5--5) Two 1 1/2-hour lectures and one 1-hour conference per week. The nature of the modern industrial state from its feudal origins. The emergence of the institutions that comprise the political economy of the industrial state, the nature and the role of the political and economic power. Particular attention will be paid to the role of the state in economic life. 

140F. Revolutionary Movements. (Formerly 139) Two 1 1/2-hour lectures and one 1-hour discussion per week. The evolution of radical movements from the middle ages to the present day, emphasizing reactions to the rise of modern capitalism, industrial society, and the post-industrial age. 

Mr. Janos (Sp) 

140G. Authoritarian Government. (5) Two 1 1/2-hour lectures and one 1-hour discussion per week. Authoritarianism in traditional and revolutionary socie- 

140G. Authoritarian Government. (5) Two 1 1/2-hour lectures and one 1-hour discussion per week. Authoritarianism in traditional and revolutionary societies, tensions between personal and institutional power, efficiency and effectiveness, political ends and bureaucratic means. 

140H. Comparative Communism. (5) Formerly 140B. Two 1 1/2-hour lectures and one 1-hour discussion per week. The formation and evolution of com- 

140H. Comparative Communism. (5) Formerly 140B. Two 1 1/2-hour lectures and one 1-hour discussion per week. The formation and evolution of commu- 

140J. Political Violence. (5) Two 1 1/2-hour lectures and one 1-hour discussion per week. 

Area Studies 

141A--141B. Government and Politics in the Sovi- 

141A--141B. Government and Politics in the Sovi- 

141C--141D. Government and Politics in Latin America. (5--5) Two 1 1/2-hour lectures and one 1-hour conference per week. 141A. Introduction to Soviet government and politics. Bases of the Soviet system. Political history of the USSR. The Communist Party: objectives, organization, and operational dynamics. Formal institutions of government: federalism, the administrative structure, the legal and economic system, and society as related to government and politics. 

141B: Prerequisite: 141A or permission of instructor. A more advanced course based on 141A. Selected themes in Soviet internal politics; elites and functional groups; political leadership, factionalism and succession. 

Mr. Bendix (F) 

141C. Selected Problems in Soviet Government. (5) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: course 141A or equivalent. Guided research and in-depth analysis of selected 

141D. Comparative Politics. (5) Two 1 1/2-hour lectures and one 1-hour discussion per week. 

NOTICE: For key to symbols, see page 36.
themes in the evolution of Soviet politics and in current economic and social policy.

141D. Government and Politics in Eastern Europe. (5-5) Formerly 141C–141D. Two 1 1/2-hour lectures and one 1-hour discussion per week. 141A. A study of the political processes in relation to social structure and national diversity. A comparison of Communist and prewar political systems, and an analysis of contemporary political developments. The rise of the nation state, and the persistence of nationalist aspirations in Eastern Europe and its impact on the Western Union with a particular reference to nationalism and "decolonism." Mr. Janos (F); Mr. Janos (Sp).

141F. Political Theory in Communist Societies. (5) Formerly 141E–141F. Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: may be taken concurrently with 141A. The development of the Central and Eastern European Communist political systems and their evolution. The structure, ideology, religious values, economic development, and political thought in selected countries. Mr. Lenczowski (F, W).

142C. Government and Politics in the Middle East. (5-5-5) Two 1 1/2-hour lectures and one 1-hour conference per week. The Middle East in World Affairs. International relations and domestic policies of contemporary states in the Middle East. The search for power and strategy of major states; supranational movements; regional political and security organizations. The area comprises Turkey, Iran, Afghanistan, Pakistan, India, and the Arab countries. Mr. Lenczowski (F, W).

142D. Political Cultures of Southeast Asia. (5) Formerly 143D–143E. Two 1 1/2-hour lectures and one 1-hour conference per week. An analysis of the value systems and political cultures of the countries in China, Japan, and Korea. Emphasis upon such topics as nationalism, political modernization, and ideology. Mr. Dittmer (F, W, Sp).

143D. Policy Problems of Southeast Asia. (5) Formerly 143D–143E. Two 1 1/2-hour lectures and one 1-hour conference per week. Problem-oriented approach to the future of Southeast Asia. Effect on Southeast Asian politics of the Indian influence, religious values, economic change, patron-client relations, and the psychological roots of colonialism. Mr. Jackson (F).

143E. Policy Problems of South Asia. (5) Formerly 143D–143E. Two 1 1/2-hour lectures and one 1-hour conference per week. An analysis of the value systems and political cultures of South Asia. Issues of growth, migration to the cities, the impact of new food technologies, military security, and regional cooperation. Mr. Jackson (W).


145A–145B. Government and Politics in South Asia. (5–5) Formerly 145A–145B. Two 1 1/2-hour lectures and one 1-hour discussion per week. A comparative analysis of development and change in the political systems of contemporary South Asia. 145A: India. Two 1 1/2-hour lectures and one 1-hour conference per week. 145B: Mr. Rose (Sp).

*145C. Political Theory in Non-Western Societies. (5) Formerly 145E. Two 1 1/2-hour lectures and one 1-hour discussion per week. Political thought in Far Eastern, South Asian, and African societies. The impact of modern Western thought on traditional political theories and ideologies. An analysis on current ideological trends, nationalist movements, and the impact of modern Western and neo-Marxist thought.

146A–146B. Government and Politics in Africa. (5–5) Two 1 1/2-hour lectures and one 1-hour discussion per week. Political thought in Far Eastern, South Asian, and African societies. The impact of modern Western thought on traditional political theories and ideologies. An analysis on current ideological trends, nationalist movements, and the impact of modern Western and neo-Marxist thought.

146C. Selected Topics in African Politics. (5) Two 1 1/2-hour lectures and one 1-hour conference per week. An in-depth analysis of a problem area, which will vary depending upon the instructor. Course may be repeated once subject to approval by the department. Mr. Rosser (Sp).

147A–147B–1147C. Government and Politics in Western Europe. (5–5–5) Two 1 1/2-hour lectures and one 1-hour conference per week. The origins and development of state and society in Western Europe from the Middle Ages to the Industrial Revolution. The structure, ideology, religious values, political thought, and political modernization. State building, authority, and social relations. 147B. Western Europe from the constitutional state to the corporate state. Patterns of industrialization and social conflict. Mass politics and political parties. Democratic and authoritarian paths to development. 147C: The State, inflation, and industrial adjustment. Enrollment by consent of instructor. Mr. Di Palma (W); Mr. Di Palma (Sp).

147D. Government and Politics in Southern Europe. (5–5) Two 1 1/2-hour lectures and one 1-hour conference per week. Nation-building, political development, and current politics in Southern European countries. Comparison with the politics of Continental Europe. Mr. Di Palma (F).

148A–148B. Government and Politics in Latin America. (5–5) Two 1 1/2-hour lectures and one 1-hour conference per week. The political systems of Latin American countries. Basic characteristics of political processes in Latin America. Problems of political development and modernization and political change. Comparative study of political systems: institutions, groups and political culture. Mr. Collier (W, Sp).

Public Law and Jurisprudence

150. The American Legal System. (5) Formerly 109. Two 1 1/2-hour lectures and one 1-hour 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. Mr. W. Spender (F, Sp).

151. Legal Theory. (3) Three hours of lecture and one 1-hour discussion per week. Legal theory and its application to modern legal systems, especially from the analytical, historical, philosophical, and sociological points of view. Particular attention will be given to modern theories of the function of law.

152. Legal Techniques. (5) Two 1 1/2-hour lectures and one 1-hour discussion per week. The study of legal techniques in selected policy areas like health, employment, environment, education, etc.

153. Comparative and Historical Approaches to Legal Institutions. (5) Formerly 152. Two 1 1/2-hour lectures and one 1-hour discussion per week. Development and agencies of legal growth since primitive times and the interrelations between law and government. Early legal institutions of national states and their influence on modern legal systems.

157A–157B. Constitutional Law of the United States. (5–5) Two 1 1/2-hour lectures and one 1-hour conference per week. The study of selected parts of constitutional law; leading cases; causes and consequences of legal decisions. Mr. Kagan (W, Sp).

170A–170B–1170C. Government and Politics in Eastern Europe. (5–5–5) Two 1 1/2-hour lectures and one 1-hour conference per week. Prerequisite: not open to students who have received credit for course 161C prior to Fall 1975. Extraterritorial, protest and violence, ideology, political participation, recruitment to political activity and office. Mr. Citrin (W).

171A–171B–171C. Urban Government and Politics. (5–5–5) Three hours of lecture and one 1-hour discussion per week. Prerequisite: course 161, or consent of instructor. Advanced study and research on topics in political behavior. Analysis of data on voting behavior, public opinion, alienation, extreme belief, and ideology. Mr. Sperlich (Sp).

Public Organization, Administration, and Policy

181. Public Organization and Administration. (6) Two 1 1/2-hour lectures and one 1-hour discussion per week. The methods used to manage the power of the bureaucracy in the American political system and its role in the political process. An introduction to theories of organizational behavior. The effects of administrative structure upon the creation and distribution of public benefits. Mr. Lee (F); Mr. Lee (Sp).

182. Development Policy, Planning, and Administration. (5) Two 1 1/2-hour lectures and one 1-hour discussion per week. Policy analysis in developing countries. Economic, social, political, and administrative factors that are and should be considered in planning governmental intervention in the development process. Mr. Leonard (Sp).

183. The Development of the Civil Services. (5) Two 1 1/2-hour lectures and one 1-hour discussion per week. This course concentrates on the origins, evolution, and contemporary character of selected national administrative systems.

*184. Policy and Administration of Public Finance. (5) Three hours of lecture and one 1-hour conference per week. Financial administration in the modern state—American, comparative, historical, fiscal implications of the budgetary process in public administration; management devices to secure administrative accountability and political responsibility.

185. Public Policy and Decision Theory. (5) Three hours of lecture and one hour of discussion per week. An inquiry into synoptic and incremental decision-making in public policy and its relationship to the acquisition, evaluation, and implementation of public policies in the American political system. Mr. Landau (W).

186. Administrative Behavior. (5) Two 1 1/2-hour lectures and one 1-hour conference per week. Concepts of administrative behavior with particular reference...
Comparative Analysis

Courses

200. Major Works in Comparative Analysis. (4) Two hours of lecture per week. Major works in the field of comparative politics. Lectures will be on (1) the process of social change and methodological aspects of social analysis. Typically, students will read one book a week and take an examination at the end of the quarter.

201A–201B. Comparative Analysis of Western Political Systems. (4–4) Two hours of lecture and one hour of discussion per week. 201A. The comparative study of political systems: historical development of domestic and foreign policy. 201B. The comparative study of political parties in Western societies; the origins, development, structures, programs and clienteles of parties; the relation of party systems to constitutional focus; the comparative study of interest groups. Credit and grade awarded upon completion of the sequence.

Mr. Jowitt (F, W)

202A–202B. Comparative Analysis of Developing Political Systems. (4–4) Two 1-hour conference per week. The comparative analysis of the processes of political modernization and change in developing countries. Major emphasis will be given to comparative theoretical analysis and methodology. Credit and grade to be awarded upon completion of the sequence.

Mr. Jowitt (F, W)

203A–203B. Comparative Analysis of Communist Political Systems. (4–4) One 2-hour conference and one 1-hour conference per week. An analysis of the interrelations between Communist states, with particular reference to institutional and ideological differences, presented at an advanced level for graduate students. Discussion and papers required.

Mr. Jowitt (W)

204. Theories for Comparative Analysis. (4) For- merly 200. Two hours of lecture per week.

205. The Nation-Building Process. (4) Three hours of lecture and one hour of consultation per week. An analysis of the interrelations between Communist states, with particular reference to institutional and ideological differences, presented at an advanced level for graduate students. Discussion and papers required.

Mr. Jowitt (Sp)

206. Communication and Political Behavior in Peasant Societies. (4) Formerly 264. Two hours of lecture per week. Readings and discussion concerning the processes of mass communication as they are found in the study of political behavior in peasant societies. Credit and grade to be awarded upon completion of the sequence.

Mr. Jowitt (Sp)

212. Symposium in Political Theory. (4) Two hours of seminar per week. Prerequisite: consent of instructor. Topics in political theory. Credit and grade to be awarded upon completion of the sequence. Mr. Jacobson (F, W)

219A–219B. Perspectives in Political Theory. (4–4) One 2-hour session and one 1-hour conference per week. Topics in political theory. Must be taken on a special study basis. Mr. Pitkin (W)

International Relations

Courses

220. Theories of International Relations. (4) One 2-hour session per week. Prerequisite: previous work in international relations. Origin, application and utility of major concepts featured in the study of international relations. Relation of various strands of political and social theory to international relations. Mr. Haas (W)

222. Nationalism and Imperialism. (4) One 2-hour session per week. Prerequisite: course 200 or 220. Themes in political theory. Must be taken on a special study basis. Mr. Pitkin (W)

224. Soviet Policy and International Communism. (4) Three hours of lecture per week. Theoretical framework of the Soviet Union's policy in international affairs; the functions and forms of international politics. Credit and grade to be awarded upon completion of the sequence. Mr. Waltz (Sp)

299A. Future World Orders (4) Three hours of lecture per week. Prerequisite: any two of the following courses: 200, 220, 283A, 280A. A study of the likely consequences for the international political order of the existence of the multi-national corporation, the international politics of high technology and ecology, trade and monetary regimes, and the changing role and nature of force in international affairs.

Seminars

222. International Relations Theory. (4) Two hours of seminar per week. Prerequisite: course 220. The construction, refinement, and application of theories in the field of International Relations. Mr. Waltz (Sp)

224. Soviet Policy and International Communism. (4) Two hours of lecture per week. The formation and evolution of the international Communist movement; the forms and functions of interparty and interstate cooperation; policy towards the West. Credit and grade to be awarded upon completion of the sequence. Mr. Waltz (Sp)

Special Studies

H190A-H190B-H190C. Senior Honors Seminars. (5–5–5) Four hours of seminar each week. Prerequisite: senior honors candidates, consent of instructor and department chairman. Directed research and study in a field of interest with faculty sponsor and written reports required. The Staff (F, W, Sp)

H195A-H195B. Senior Honors Thesis. (5–5) Four hours each week, to be arranged. Prerequisites: Senior honors candidates, completion of suitable seminar as determined by instructor. Directed research and study in a field of interest with faculty sponsor and written reports required. The Staff (F, W, Sp)

197A–197B. Political Internship Program. (5–5) Formerly 197C–197D. Three hours of lecture and 15–20 hours of field work per week. Prerequisite: Consent of faculty sponsor and department chairperson. Internships and seniors only. Supervised experience in field positions with California state and local governments for one or two quarters with thesis written in last quarter. Credit and grade awarded upon completion of sequence. Applications and details through the Undergraduate Office.

The Staff (F, W, Sp)

197F. Field Study in Political Science. (1–5) Meetings to be arranged. Prerequisite: consent of faculty sponsor and department chair. Supervised experience relevant to specific aspects of Political Science in off-campus organizations. Regular individual meetings with faculty sponsor and written reports required.

The Staff (F, W, Sp)

188. Directed Group Study for Undergraduates. (1–5) Meetings to be arranged. Prerequisite: course must be an extension of an existing Political Science course; submission of study proposal by faculty sponsor and department chairperson. Meetings and seminars arranged by mutual consent. Mr. LaPorte (W)

199. Supervised Independent Study and Research for Undergraduates. (1–5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis.

The Staff (F, W, Sp)

GRADUATE COURSES

A statement on admission to graduate work may be obtained from the graduate office in the department. Properly qualified undergraduates may be admitted to graduate standing on formal application with special permission of the instructor. For updated information on graduate course descriptions and faculty scheduling, consult the departmental graduate office.

L&S: Political Science / 185

NOTE: For key to symbols, see page 36.
relations; contemporary Soviet foreign policy and the implications of "Euro-communism." Mr. Breslau (F)
225. International Law. (4) One 2-hour session and one 1-hour conference per week. Selected problems in modern international law.
Prerequisite: course 226A. Papers dealing with specific organizational situations, regional and United Nations.
227B. International Relations and Foreign Policy. (4) One 2-hour session per week. Prerequisite: course 227A.

Mr. Thies (Sp)
228A–228B. American National Security Policy. (4–4) One 2-hour seminar per week. Prerequisite: course 226A. Historical evolution of national security policy, processes involved in policymaking, the role of Congress and the Executive, deterrence and strategic stability, arms racing and arms control, uses of military force in a nuclear environment, and future challenges to American national security. 228B. Strategic concepts, theories of national security, and the relationship of conflict/theory to policy planning and national action. Special, but not exclusive, emphasis on United States data and policy problems.

Mr. Seabury (Sp)

**229B. Future World Orders. (4) Three hours of lecture per week. Prerequisite: 229A.**

Empirical Theory and Quantitative Methods

**230. Foundations of Political Inquiry. (4) One 2-hour session and one 1-hour conference per week. Prerequisite: consent of the instructor. A systematic introduction to the philosophy of science and the language of contemporary political inquiry. This will include theory construction; conceptualization; the use of inference and induction; the process of generalizing knowledge claims; confirmation; and the role of values in political inquiry.**

231A–231B–231C. Quantitative Analysis in Political Research. (4–4–4) One 2-hour session and one 1-hour conference per week. Prerequisite: 230B. Emphasis on the use of multi-equation causal models. Special attention to procedures appropriate for survey data. 231A. Linear statistical models. 231B. Seminar structure with individual analysis projects. Also extension of multivariable topics from 231B. 231C. Political behavior: Personality and Politics.

Mr. Shanks (F, Sp)

**232A–232B. Formal Models of Politics. (4–4) Two hours of lecture and one hour of discussion per week. Prerequisite: 231A–231B or consent of the instructor. 232A. Econometric techniques at a more advanced level than the 231A–231B sequence. Statistical methods are extended to meet special cases of interest to political scientists. 232B. Mathematical models of political processes. Special, but not exclusive, emphasis on the relationship between national tradition, social structure and political change.**

Mr. Janos (W)

242A–242B. Politics and Diplomacy in the Middle East. (4–4) One 2-hour session and one 1-hour conference per week. Mr. Lenczowski (F, W)

243A–243B. Contemporary Problems of the Far East. (4–4) One 2-hour session and one 1-hour conference per week. Mr. Scalapino (W)

**243C. Research Seminar on Southeast Asian Politics. (4) Formerly 243C–243D. Two hours of lecture and one hour of discussion 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 Asia.**

Mr. Jackson (Sp)

244A–244B. China. (4–4) One 2-hour seminar per week. Mr. Dittmer (F, W)

244C–244D. Japan. (4–4) One 2-hour seminar per week. Mr. Johnson (W, Z)

245A–245B. South Asian Politics. (4–4) One 2-hour session and one 1-hour conference per week. Prerequisite: 145A or consent of instructor.

Mr. Rosse (W); Mr. Das Gupta (Sp)

245A–245B–245C. African Politics. (4–4–4) One 2-hour session and one 1-hour discussion per week. Credit and grade to be awarded upon completion of 245A–245B. 245C may be taken at the student's option and will be graded separately.

246A–246B–246C. African Politics. (4–4–4) Formerly 243C–243D. Two hours of seminar per week. Credit and grade to be awarded upon completion of the sequence.

Mr. Di Palma (W, Z)

246A–246B–246C. Latin American Politics. (4–4–4) One 2-hour session and one 1-hour conference per week. Mr. Collier (F, W)

Public Law and Jurisprudence

Course

252A. Legal Institutions. (4) Two hours of lecture per week. The organization and behavior of legal institutions, with particular reference to American courts and administrative agencies. Institutional responses to problems of legality, authority, and decision making, and the organization of enforcement and decision-making processes. Readings include empirical studies, judicial opinions, jurisprudential writings, and organization theory.

Mr. Kagan (W)

Seminars

**251. Legal Theory. (4) Two hours of lecture per week. Fundamental legal principles; justice, the rule of law; private and public law; natural law and statutory language and purpose; judicial legislation and legislative legislation; judicial functions and executive functions.**

252. Comparative Law. (4) Formerly 252. Two hours of lecture per week. A comparative and historical approach to judicial and administrative processes within Western one and Communist systems of law and within the international state system.

254. Public Policy Doctrines. (4) Two hours of lecture per week. The fundamental legal frameworks of public policy in tax, business, health, welfare, energy, environment, labor, agriculture, education, family, housing, and land use.

Mr. Muir (F)

**256. Legal Bibliography and Field Research Methods. (4) Two hours of lecture per week. An introduction to the collection, use, and analysis of law data.**

257A–257C. Constitutional Law. (4) Two hours of lecture per week. Fundamental principles of constitutional law, leading cases, judicial decision-making affecting the liabilities, rights, duties, and procedures of governmental officers and agencies; causes and consequences of legal decisions; judicial behavior.

Mr. Muir (Sp)

258A–258B. The Jury System. (4–4) Two hours of lecture and one hour of discussion per week. Development and current functions of juries; investigation and will be graded separately.

Mr. Sperlich (W, Sp)

**Political Behavior

Seminars

261A–261B. Political Behavior. (4–4) One 2-hour session 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. Credit and grade will be awarded upon completion of the full sequence.**

Mr. Citrin (F, W)

261C. Political Behavior: Personality and Politics. (4) One 2-hour session per week. Prerequisite: 261A. Special topics in political behavior. Topics may vary from year to year.

262A–262B–262C. Voting Behavior and Public Opinion. (4–4–4) Two hours of lecture per week. Examination of the basic literature on American voting behavior and public opinion as it has developed. Special emphasis on related topics in this field. Credit and grade to be awarded upon completion of 262A–262B sequence. 262C is optional and will receive letter grade.


Mr. Cavalla (F, W)

272A–272B–272C. National Policy Making. (4–4–4) Formerly 269A–269B–269C. Two hours of lecture per week. Examination of the elite role in political decision making and candidate selection, with special attention to participation, organization, representation, and responsibility. Credit and grade will be awarded upon completion of the sequence.

274A–274B. Sub-national Government and Politics. (4–4) 274A formerly 266B. Two hours of lecture per week. Research on local political processes, decision-making, and community power structure.

Mr. Lee (W)

**275A–275B. Politics and Culture. (4–4) Two hours of lecture per week. An examination of the inter-relationships of politics, personality, and culture, normally with specific focus on American materials. Research papers will be written and discussed during the second quarter. Credit and grade to be awarded upon completion of the sequence.**

276A–276B. Research in the American Executive Branch. (4–4) Two hours of seminar per week. Prerequisite: 276A is prerequisite to 276B. Analysis of the organization of the executive branch, the interaction of executive and legislative branches, and the role of the executive in the political system.

Mr. Polk (F, W)

280A. Public Organization Theory. (4) One 2-hour
session and one 1-hour conference per week. A survey of the literature of organization and management theories of the major writers and distinctive contributions of various disciples. Mr. LaPorte (F)

280B. Comparative Administration. (4) Two hours of lecture per week. A comparative analysis of the structures and processes which are used to control public bureaucracies in selected political systems and the effect of these controls on the character of administrative performance. Mr. Leonard (W)

**280C. Public Policy and Decision Theory. (4) One 2-hour session and one 1-hour conference per week. The process of public policy formulation, governmental planning and programming, and administrative decision-making.**

Seminars

1280D. The Politics of Taxation. (4) One 3-hour session per week. Taxation as policy and a unit of decision-making.

*286. Governmental Planning and Societal Pur- pose. (4) Two hours per week. The principles and processes of public planning for socio-economic goals and ecologic-environmental objectives.

287A—287B. Development Administration and Political Economy. (4—4) Two hours of lecture and one 1-hour conference per week. The structure and functions of public administration in the development process of "low-income" countries; the relationship of administration to a nation's political regime, social structure, and economic organization and objectives; an assessment of the comparative success enjoyed by various systems in achieving their public purposes. Credit and grade will be awarded upon completion of the sequence. Mr. Leonard (Sp)

288. Science and Politics. (4) One 2-hour session and one 1-hour conference per week. The structure of science and politics, public problems and technological change; the governance of science and technology and the administration of science and technology.

Mr. LaPorte (W)

289A—289B—289C. Research in Public Organiza- tion. (4—4—4) One 2-hour seminar per week. Credit and grade to be awarded upon completion of the full sequence. Mr. Landau (F, W, Sp)

Special Studies

1291. Experimental Course. (1-5) Prerequisite: consent of instructor. Topics, experimental in nature, will vary from year to year.

292. Directed Advanced Study. (4 or 8) Pre- requisite: consent of instructor and graduate advisor. Open to qualified graduate students wishing to pursue special study and research under direction of a member of the staff. The Staff (F, W, Sp)

296. Directed Dissertation Research. (8) Open to qualified graduate students interested in candidacy for the Ph.D. degree. Must be taken on a satisfactory/unsatisfactory basis. May be repeated for credit.

The Staff (F, W, Sp)

299. Independent Study in Preparation for the M.A. Essay. (4 or 8) Open only to qualified first-year graduate students working toward the M.A. degree. Credit and grade will be awarded upon completion of the M.A. essay. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

398. Professional Preparation for Teaching As- signs entry to the doctorate directly to the direction of a staff member, with emphasis on the teaching of graduate- course subjects in political science. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

602. Individual Study for Doctoral Students. (4 or 8) Individual study in consultation with the major field advisor, intended to provide opportunity for qualified students to prepare themselves for the various examinations required for the Ph.D. degree. Must be used for examination or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (F, W, Sp)

IDS 159. Introduction to Marxism. (6) See Inter- departmental Studies for the complete description of this course.

IDS 175. A Nontechnical Introduction to Opera- tion Research. (6) See Interdepartmental Studies for the complete description of this course.


**Psychology**

Department Office, 3210 Tolman Hall

Professors:

- Jack Bloch, Ph.D.
- Philip A. Cowan, Ph.D.
- Kenneth H. Craik, Ph.D.
- Russell L. Develops, Ph.D.
- Susan M. Ervin-Tripp, Ph.D.
- Stephen E. Glickman, Ph.D.
- Harrison G. Gough, Ph.D.
- Rhea F. Jarrett, Ph.D.
- Robert K. Kennedy, Ph.D.
- Sheldon J. Korchin, Ph.D.
- James Langer, Ph.D.
- Richard S. Lazarus, Ph.D.
- Gerald A. Mendelsohn, Ph.D.
- William M. Meredith, Ph.D.
- Paul H. Musson, Ph.D.
- Leon J. Namon, Ph.D.
- Leo J. Postman, Ph.D.
- Donald A. Riker, Ph.D.
- Mark R. Rosenzweig, Ph.D.

Associate Professors:

- Martin V. Covington, Ph.D.
- Evvin R. Halter, Ph.D.
- Arnold L. Leiman, Ph.D.
- Christine Maiash, Ph.D.

Assistant Professors:

- C. G. Conklin, Ph.D.
- Enrico Jones, Ph.D.
- Mary B. Main, Ph.D.
- Stephen Palmer, Ph.D.

Acting Assistant Professor:

- Seth D. Roberts, B.A.

Psychology represents an extremely broad discipline, ranging from the study of behavior of the simplest of organisms to the behavior of humans and groups of humans in complex situations.

The major attempts to give basic and well-rounded coverage of most of the major established fields of psychology. The areas covered include social, developmental, biological, comparative, differential, industrial, quantitative, clinical, and cognitive psychology, learning (human and animal), perception, personality, and psycholinguistics.

The fact that psychology is so diverse means, how- ever, that all areas of study cannot be represented within the expertise or primary interest of a single faculty member. Thus, it is important that Berkeley, where the emphasis is upon empirical research and theoretical analysis of fundamental aspects of animal and human behavior. Since it is our experience that students who are interested in the major often have been exposed to introductory courses with topics different from those present at Berkeley, prospective majors are strongly urged to examine closely our upper division course offerings to see if they are consonant with their interests in psychology. A perusal of these courses will reveal, for example, that certain popular topics are not covered. Thus, if students wish to transfer to Berkeley with a major in psychology should apply for fall quarter admission. Admission to the major is contingent upon admission to Psychology 100A. However, all students completing the listed prerequisites with grades of "C" or higher have been admitted in recent years.

The Major

Lower Division. Prerequisites must be completed with a grade of C or higher. Prerequisite areas and their respective courses and options are listed below.

**Psychology: Psychology 1.**

Biological Science: Biology 11AB or equivalent, or two courses from the following: Molecular Biology 10, Physiology 1, Zoology 1, 10, 30.

Evolution: Resource Sciences 14 or Anthropology 1 or 15 or equivalent.

Social Science: Two courses from among the follow- ing: Anthropology 3, Linguistics 20, Sociology 1A.

Quantitative: Two years of high school algebra or a course in college algebra or successful performance on the departmental diagnostic quantitative examina- tion.

A departmental diagnostic quantitative examination will be administered during registration week each quarter. The purpose of this examination is to assess the student's preparation for the statistics-methodology requirement of the major. Test scores will be used to determine whether or not the student must obtain additional training in quantitative methods at Berkeley before being permitted to enroll in either 101A or 102A or 102B or 102B.

Upper Division

1. Breath: 100A—100B—100C.

2. Statistics-methodology: Either (a) 101A—101B or (b) 102A—102B—102C. Which sequence in either alterna- tive must be taken consecutively.

3. Specialization: Three advanced courses in psy- chology. (Only one 198 or 199 course may be included in this total.)

NOTE: For key to symbols, see page 36.
Subject to the provisions of the passed or not passed option, any or all of the lower division courses may be accepted with a passing grade, but no courses to be counted toward the completion of the upper division requirements may be taken on a passed or not passed basis except with the explicit approval of the major advisor.

**Honors Program.** The award of departmental honors is contingent upon: (1) maintenance of an overall grade-point average of 3.3; (2) achievement of a grade-point average of 3.3 in upper division Psychology courses; (3) submission of a thesis of high quality, based upon independent study with a member of the Psychology Department faculty, and marked by satisfactory completion of at least 4 units of course 199. Evaluation of a student's eligibility and responsibility of the faculty supervisor and then of the departmental committee on undergraduate honors. It is the responsibility of the latter group to decide on the level of honors to be awarded. Additional information concerning the honors program is available in the Student Services Office, Room 3305 Tolman Hall.

**Letters and Science List of Courses:** 162 units from the list must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the list.

**Graduate Study**

**Preparation.** The Department of Psychology regards a broad undergraduate background in the natural, physical, and social sciences as the best preparation for graduate study. A laboratory course in experimental psychology and a course in statistical methods are strongly recommended. Provisional acceptance of an applicant seeking to make undergraduate deficiencies is set by the number of qualified students applying in a given year. Hence, the prospective applicant, who has little or no background in psychology, is well advised to defer enrolling until such time as he or she is prepared to enter as a regular student.

**Graduate Training Programs.** The graduate program is designed for doctoral students interested in pursuing advanced study and conducting original research in psychology. New admissions are restricted to candidates for the Ph.D. Students are accepted for the fall quarter only, and enrollment is by permission of the departmental committee on graduate study. All students are expected to have a strong orientation concerning admission, financial aid, and degree requirements is given in a brochure which is available from the Graduate Office, Department of Psychology, University of California, Berkeley, CA 94720.

Graduate training is organized around seven major areas of study. Formal graduate training, including the selection of a thesis advisor, the development and maintenance of the training programs, is the primary responsibility of faculty members who have taught themselves in the following areas: biological, social, and psychological research methods, quantitative, and statistical. The core of each training program is a set of core courses and seminars. These courses are designated as "core" courses (i.e., 200, 210, 220, etc.) and are required for satisfactory completion of the program. They are intended to provide the core content necessary for a student to become an effective scholar and researcher in the area of specialization. Students are expected to affiliate themselves with one of the area programs and to complete the core sequence for that area. Depending upon the area, additional course requirements might consist of (1) courses on methodology, experimental design, and statistical analysis, (2) courses selected from lists of courses either within or outside of the Psychology Department, (3) advanced courses and seminars in the area of specialization, and (4) individual study and research (200 and 299). Most programs recommend a major research or theoretical paper by the end of the second year of graduate study. The final requirements of all programs consist of the successful passing of the Qualifying Examination, taken usually during the third year, and the submission and approval of the dissertation.

**LOWER DIVISION COURSE**

1. General Psychology. (5) Three 1-hour lectures and one 1-hour section meeting per week. Introduction to the main areas, problems, and concepts of psychology. — Mr. DeRienzo in charge (Sp)

45. Freshman Seminars. (1) Two hours of lecture per week. Prerequisite: Open to students in the psychology freshman cluster program. Weekly discussions on the nature, methods and aims of contemporary psychology. Course is to be taught on a pass/not pass basis. — Mr. Covington in charge (Sp)

99. Supervised Independent Study and Research. (1-5) Prerequisites: Psychology 1 and consent of instructor. Intended for freshmen and sophomores who wish to undertake a program of self-study on a topic in psychology. Must be taken on a pass/not pass basis. — The Staff (F, W, Sp)

**UPPER DIVISION COURSES**

Psychology 1 is prerequisite for all upper division courses. Additional requirements are also stated for certain courses.

**General**

100A–100B–100C. Advanced General Psychology. (5–5–5) Three 1 1/2–2 hours of lecture and one hour of discussion per week. Prerequisites: course 1 and completion of the lower division prerequisites for the major. Offered primarily for majors. Enrollment restricted to 300 students. See description of major for further information. A systematic study of the role of psychology in our society. We will include guest lectures given by a number of members of the staff. A detailed and integrative overview of major areas of interest within psychology. Course must be taken in the A, B, C order. Statistics or concurrent enrollment in statistics is recommended. — Mr. Mendelsohn (F); Mr. Mckean (W); Mr. Glickman (Sp)

105. Environmental Psychology. (5) Formerly 191X. Two 2-hour lectures per week. Prerequisite: course 111A useful but not necessary. Survey of environmental psychology, including environmental perception and assessment, cognitive representations of the large-scale environment; environmental attitudes and dispositions; analysis of behavior settings; human spatial behavior; behavioral effects of density; psychological factors in environmental planning, design, and decision-making. (Sp)

109. History of Psychology. (5) Three 1 1/2–2 hours of lecture per week. Prerequisite: completion of the lower division psychology courses or consent of instructor. Development of scientific study of human and animal behavior from the origins of recorded history of fields and special subject areas—such as biological, comparative developmental, personality, and social psychology—as well as general trends.

**Quantitative**

101A. The Analysis of Psychological Data. (5) Three 1 1/2–2 hours of lecture and one 2-hour laboratory per week. Prerequisites: course 1 and completion of the quantitative prerequisite for the major or consent of the instructor. An introduction to the use of statistical and data analytic techniques and research design. Topics to be covered include experimental design, concepts, data analytic techniques, and the analysis of data, including tests of hypotheses, regression and correlation. — Mr. Meridith (F), Mr. Morin (W)

101B. The Analysis of Psychological Data. (5) Three 1 1/2–2 hours of lecture and one 2-hour laboratory per week. Prerequisite: course 101A. Continuation of 101A with heavy emphasis on application. Students will be expected to collect and analyze their own data. Reliability, validity and level of measurement; factorial designs and their analyses. — Mr. Meredith (W), Mr. Mckean (Sp)

102A–102B–102C. Research Design In Psychology. (4–4–4) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisite: completion of the quantitative prerequisite for the major or consent of the instructor. A broad survey of experimental design and the use of operational, statistical, and other techniques generally found useful by psychologists. The formulation of scientifically testable research problems as well as the theory of measurement will be emphasized. — Mr. Jarrett (F), Mr. Sp

104. Theory of Psychological Measurement. (5) Three 1-hour lectures and one 2-hour discussion/laboratory per week. Prerequisites: courses 100A–100B–100C and either 101A–101B or 102A–102B–102C; or consent of instructor. To be offered in alternate years. An introduction to the methodology of psychological measurement with emphasis on the notion of reliability, validity and homogeneity. Correlational methods included. Emphasis on the experimental use of factor analytic techniques and special correlational techniques will be emphasized. — Mr. Jarrett (Sp)

**1105. Introduction to Multivariate Psychological Experimentation.** (5) Two 2-hour lectures and one 2-hour laboratory per week. Prerequisites: courses 100A–100B–100C and either 101A–101B or 102A–102B–102C, or consent of instructor. To be offered in alternate years. General techniques of multivariate psychological experiments yielding multiple measures of observations. Emphasis on multivariate prediction methods, factor and component analysis, discriminant and classification, multivariate analysis of variance, and latent class and structural analysis. Topical review may be arranged. — Mr. Jarrett (Sp)

**1106. Topical Seminars in Quantitative Psychology.** (5) Two 2-hour lectures per week. Prerequisites: as indicated below. For a precise schedule of offerings check the Student Services Office. May be repeated for credit with a different topic and permission of instructor.

106A. Test Theory. Prerequisite: consent of instructor, 104 or 105 recommended.

106B. Factor Analysis. Prerequisite: consent of instructor, 105 recommended.

106C. Psychological Scaling. Prerequisite: consent of instructor, 104 or 105 recommended.

106D. Models and Causal Analyses. Prerequisite: consent of instructor, 104 or 105 recommended.

**Biological Psychology**

110. Introduction to Biological Psychology. (5) Two 2-hour lectures and one 2-hour laboratory per week. Prerequisites: course 100A–100B–100C or 110 or consent of instructor. Survey of relationships between behavior and physiological processes. Topics include sensory and perceptual processes, neural maturation, neural bases of motivation, learning, memory, and memory. — Mr. Mendelsohn (W), Mr. Elman (Sp)

111. Sensory Processes: Vision. (5) Formerly part of 111A. Two 2-hour lectures per week. Prerequisites: course 100A–100B–100C or 110 or consent of instructor. Discussion of various aspects of visual perception (adaptation, brightness and color vision, binocular vision, object detection) in relation to anatomy and physiology of the visual system. — Mr. DeValois (Sp)

111L. Laboratory in Vision. (3) Formerly part of 111A. Two 3-hour laboratories per week. Prerequisites: concurrent enrollment in course 111 and consent of instructor. Various experiments carried out in visual psychophysics and perception; observation of physiological studies of single cell responses. — Mr. DeValois (Sp)

112. Sensory Processes: Hearing. (5) Formerly 123. Two 2-hour lectures per week. Lectures cover a broad range of topics related to the psychology of hearing and the physiology of the auditory system. — Mr. Hafer (F)

**112L. Laboratory in Hearing.** (3) Formerly 124. Two 2-hour laboratories per week. Prerequisites: concurrent enrollment in course 111 and consent of instructor. Various experiments carried out in visual psychophysics and perception; observation of physiological studies of single cell responses. — Mr. DeValois (Sp)

114. Biology of Learning and Neural Plasticity. (5) Formerly part of 111B. Two 2-hour lectures. Prerequisite: course 100A–100B–100C or 110 or consent of instructor. A study of theoretical and experimental investigations of the biological substrates of learning, memory, and learning in 112 and consent of instructor. Laboratory research on selected topics in learning. — Mr. DeValois (Sp)

111B. Laboratory in Learning. (3) Formerly part of 111B. Two 3-hour laboratories per week. Prerequisites: consent of instructor. Various experiments carried out in visual psychophysics and perception; observation of physiological studies of single cell responses. — Mr. DeValois (Sp)

114L. Laboratory in the Biology of Learning and Neural Plasticity. (3) Formerly part of 111B. Two 3-hour laboratories per week. Prerequisites: concurrent enrollment in course 114 and consent of instructor. Laboratory research on selected topics in the biology of learning and neural plasticity. — Mr. DeValois (Sp)

**115. Introduction to Comparative Psychology.** (5) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: course 1. Studies of animal behavior in evolutionary perspective, including
129. Topical Laboratories in Cognitive Psychology. (5) Two 1 1/2-hour lectures and four hours discussion/ laboratory per week. Prerequisites: consent of instructor and, depending upon the course with which the seminar forms a sequence, course 121, 122, 124, or 126. For a precise schedule of offerings, check with the Student Services Office each quarter. May be repeated for credit with a different topic and permission of instructor.

129A. Animal Learning Mr. Zucker (W); Mr. Hodos (Sp)
129B. Human Learning and Memory Mr. Zucker (W)
129C. Thinking and Problem Solving Mr. Robins (F)
129D. Psycholinguistics Mr. Zucker (W)
129E. Information Processing Ms. Rosch (Sp)

130. Principles of Psychopathology. (5) Formerly 155. Two 1 1/2-hour lectures and one hour of discussion per week. Prerequisites: courses 100A-100B or consent of instructor. Course 101A is useful but not necessary. Theoretical and experimental analysis of classical conditioning, operant conditioning, and discrimination learning. Additional topics of current interest in the area of animal learning will also be considered.

122A-122B. Human Learning and Memory. (4-4) Formerly 122. Two 1 1/2-hour lectures, one 1-hour discussion per week. Prerequisite: course 101A or consent of instructor. Mr. Zucker (W); Mr. Roberts (F)
124. Psycholinguistics. (5) Formerly 134. Two 1 1/2-hour lectures and one hour of laboratory or discussion section per week. Prerequisites: course 1 and an introductory course in linguistics or consent of instructor. Introduction to psycholinguistics, emphasizing effects of psychological variables on the learning and use of language. Processes of language behavior on psychological processes; special attention to psychological appallability of modern linguistic theory and to sociolinguistic principles of language behavior. Mr. Slobin (W)

125. Second Language Learning and Bilingualism. (5) Formerly 135. Two 1 1/2-hour lectures. Process and personality factors in language acquisition including development of "interlanguages." Processing of linguistic information by bilinguals (perception, recall, translation); structure of bilingual discourse. To be given in alternate years. Background in linguistics and psychology recommended.

126. Information Processing. (5) Formerly 129. Two 1 1/2-hour lectures and one 1-hour discussion/laboratory per week. Prerequisites: courses 100A-100B or consent of instructor. Princi- pal concepts and research concerning human processing of visual, auditory, and symbolic information; object recognition, categorization, and classification; memory and comprehension of language; attention; theoretical models and experimental techniques in the study of imagery and other cognitive processes. Mr. Palmer (Sp); Ms. Rosch (F)

128. Topical Seminars in Cognitive Psychology. (5) Two 1 1/2-hour lectures per week. Prerequisites: consent of instructor and, depending upon the course with which the seminar forms a sequence, course 121, 122, 124, or 126. For a precise schedule of offerings, check with the Student Services Office each quarter. May be repeated for credit with a different topic and permission of instructor.

128A. Animal Learning Mr. Zucker (W)
128B. Human Learning and Memory Mr. Zucker (W)
128C. Thinking and Problem Solving Mr. Robins (F)
128D. Psycholinguistics Mr. Slobin (Sp)
128E. Information Processing Ms. Rosch (Sp)

148. Topical Seminars in Developmental Psychology. (5) Two 1 1/2-hour lectures per week. Prerequisites: consent of instructor and, depending upon the course with which the seminar forms a sequence, course 121, 122, 124, or 144. For a precise schedule of offerings, check with the Student Services Office each quarter. May be repeated for credit with a different topic and permission of instructor.

148A. Development during Infancy Ms. Main (W); Mr. Watson (Sp)
148B. Cognitive Development Mr. Langer (Sp)
148C. Child Language Development Ms. Ervin-Tripp (F)
148D. Personality and Social Development Mr. Muschen (F)

149. Topical Laboratories in Developmental Psychology. (5) Two 1 1/2-hour lectures and three hours of discussion/laboratory per week. Prerequisites: consent of instructor, and depending upon the course with which the laboratory forms a sequence, course 141, 142, 143, or 144. For a precise schedule of offerings, check with the Student Services Office each quarter. May be repeated for credit with a different topic and permission of instructor.

149A. Development during Infancy Mr. Zucker (W)
149B. Cognitive Development Mr. Langer (Sp)
149C. Child Language Development Ms. Ervin-Tripp (F)
149D. Personality and Social Development Ms. Muschen (F)

Personality Psychology

150. Psychology of Personality. (5) Two 1 1/2-hour lectures and one hour of discussion per week. Prerequisites: courses 1, 131A and 131B in general and systematic issues in the study of personality, and an evaluation of major theories and points of view. Ms. Weinsteint (Sp)

151. Assessment of Personality. (5) Two 1 1/2-hour lectures and two 1 1/2-hour laboratories per week. Prerequisites: course 150 and consent of instructor. For a precise schedule of offerings, check with the Student Services Office each quarter. Mr. Crain (Sp)

153. Stress and Adjustment. (5) Two 1 1/2-hour lectures and one 1 1/2-hour discussion/laboratory per week. Prerequisites: course 150 and consent of instructor. Examines stress theory and research from clinical field and laboratory settings dealing with the psychological issues involved in adjustment to life stresses.

158. Topical Seminars in Personality. (5) Two 1 1/2-hour lectures per week. Prerequisites: consent of instructor. For a precise schedule of offerings, check with the Student Services Office each quarter. May be repeated for credit with a different topic and permission of instructor.

Social Psychology

160. Social Psychology. (5) Three 1-hour lectures and two hours of discussion per week. Prerequisite: course 1. Survey of social psychology including inter- action processes, small groups, attitudes and attitude change, and social problems. Ms. Muschaw (F); Mr. Hodes (W)

*161. Interpersonal Processes. (5) Three 1 1/2-hour lectures per week. Prerequisite: course 160 or consent of instructor. Theory and research in interpersonal processes including social perception, attraction, and friendship. Ms. Muschaw (F)

162. Attitudes, Beliefs, and Influence Processes. (5) Two 1 1/2-hour lectures and one 1-hour laboratory per week. Prerequisites: course 160 or consent of instructor. Theoretical and methodological issues in the study of attitudes and social influence. Ms. Muschaw (F)

163. Small Group Structure and Processes. (5) Three 1 1/2-hour lectures and one 1-hour laboratory per week. Prerequisites: course 160 or consent of instructor. Social psychological theories and research methods in the area of small groups.

165. Language in Social Interaction. (5) Formerly Rhetoric 152. Two 2-hour lectures per week. Variation in linguistic features, register, style, dialect and language.
Differential Psychology

**170. Differential Psychology.** (5) Two 1 1/2-hour lectures and one 1 1/2-hour laboratory per week. Prerequisite: course 102B or equivalent course; course 170 is recommended. Theory and evaluation of the principal tests of abilities and aptitudes. \- Mr. Tuddenham (W)

**172. Appraisal of Personality Differences.** (5) Two 2-hour lectures per week. Prerequisite: course 101B or 102B or equivalent course; course 170 is recommended. \- Mr. Tuddenham (W)

**173. Social Psychology of Organizational Behavior.** (5) Three 1 1/2-hour lectures per week. Prerequisite: course 102B or equivalent course; course 170 is recommended. Examination of social behavior in organizations. Three 1 1/2-hour meetings per week. Two-thirds of the course will be devoted to lecture/discussion; one-third will be devoted to laboratory/felid trips. \- Mr. Tuddenham (Sp)

**Industrial–Organizational Psychology**

**180. Industrial–Organizational Psychology.** (5) Three 1 1/2-hour lectures per week. Prerequisite: course 101A or 102A or consent of instructor. Primarily for majors. Introduction to the field of industrial psychology, covering fundamental theory and concepts in personnel and social aspects of the field. Concerned with the process involved in developing and maintaining organizations. \- Mr. Zedeck (F)

**182. Personnel Psychology.** (5) Two 1 1/2-hour lectures and two hours of discussion per week. Prerequisite: courses 180 and 101B or 102B or consent of instructor. Emphasis on psychological contributions in the development of techniques and practices in personnel selection and development. \- Mr. Zedeck (Sp)

**183. Social Psychology of Organizations.** (5) Formerly 183A–183B. Three 1 1/2-hour lectures/discussions per week. Prerequisite: course 180 or consent of instructor. Psychological approaches to organization theory with emphasis on the social, motivational, and attitudinal aspects of the work environment. \- Mr. Zedeck (Sp)

**190. Cluster Seminars.** (1) Two hours of lecture per week. Prerequisite: Psychology major and admission to cluster program. Weekly discussion on the nature, methods, and aims of contemporary psychology. Course to be taught on a pass/not pass basis. \- Mr. Tuddenham (F)

**191N. Psychology in an International Context.** (5) One 3-hour meeting per week. Prerequisite: Psychology 102A–102B–103C or consent of instructor. Examination of the role and status of psychology as a science and profession in representative advanced and developing nations, including national and cultural differences and trends in evolution of psychology. To be offered 1978–79 only. \- Mr. Rosenzweig (F)

**197. Field Study in Psychology.** (1–6) Individual study to be arranged. Prerequisite: course 102B or equivalent 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 sponsor and written report required. Offered on a passed/not passed basis only. \- The Staff (F, W, Sp)

**198. Directed Group Study.** (1–5) Prerequisite: consent of instructor. Group study of a selected topic or topics in psychology. To be offered on a passed/not passed basis only. \- The Staff (F, W, Sp)

**199. Supervised Independent Study and Research.** (1–5) Prerequisite: consent of instructor. Enrollments are restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. Offered on a passed/not passed basis only. \- The Staff (F, W, 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 seminars and are designed to provide the background essential for a student planning to concentrate in that area of specialization. These seminars are sufficiently general, however, for students from other areas of Psychology to obtain breadth of training in complementary areas of study. (Most seminar courses are self-contained and may be taken separately. For most the sequence is not critical. See instructor before enrolling.) Students from other departments must obtain permission to enroll in these courses since they are designed primarily for first and second year graduate students in Psychology.

**Quantitative**

**200A. Proseminar: Survey of Hypothesis Testing.** (6) Three 1 1/2-hour lectures per week. Comprehensive analysis of variance, nonparametric and large sample hypothesis testing. Model fitting will be stressed as will post hoc comparison procedures. \- Mr. Jarrett (F)

**200B. Proseminar: Regression and Test Theory.**
(5) Three 1 1/2-hour lectures per week. Correlational analysis, regression analysis, phi coefficients, reliability, validity, latent trait models, test theory.

200C. Proseminar: Factor Analysis and other Multivariate Analyses. (5) Three 1 1/2-hour lectures per week. Techniques of multivariate analyses, discriminant function, canonical correlation, factor analysis and factor analysis. Mr. Meredith (Sp)

201A-201B. Design and Analysis of Psychology Experiments. (5-5) Three hours of lecture per week. Prerequisites: 200A; consent of instructor. Two 1 1/2-hour lectures per week. Mr. Keppel (W, Sp)

201A. Design and Analysis of Psychology Experiments. (5-5) Three hours of lecture per week. Prerequisites: 200A; consent of instructor. Two 1 1/2-hour lectures per week. Mr. Keppel (W, Sp)

202A-202B. Computers in Psychology. (3-3) Two 1 1/2-hour lectures per week. Survey course on computer utilization for data collection and analysis. Mr. Sherman in charge (F, W, Sp)

209. Quantitative Seminar. (1) One 1 1/2-hour lecture per week. Prerequisite: graduate standing or consent of instructor. Reports and discussions of original research in quantitative psychology. Mr. DeValois in charge (W); Mr. Jones in charge (Sp)

210A. Proseminar: Sensory Processes. (3) Three 2-hour lectures per week. A discussion of selected topics in sensory physiology and psychophysics. Mr. DeValois (F)

210B. Proseminar: Animal Behavior. (5) Three 2-hour lectures per week. A consideration not only of behavioral and clinical bases of species-typical behavior, mainly of mammals. Included are discussions of reproductive behavior, social behavior, feeding, sleep, and behavioral rhythms. Mr. Beach, Mr. Glickman, Mr. Sherman, Mr. Zucker (W)

210C. Proseminar: Biology of Learning. (3) Three 2-hour lectures per week. A consideration of research involving the neural processes that underlie the capture, storage, and retrieval of information. Observations are made not only from behavioral and clinical investigations but also from neighboring fields including neurochemistry, neuroanatomy, and neurophysiology. Mr. Rogoff (W)

211. Hormones and Behavior. (5) Three hours of lecture per week. Prerequisite: course 210A, 210B, 210C. A consideration of the role of hormones in the mediation of male and female reproductive behaviors, including emphasis on hormones in the process of sexual differentiation and sex differences in behavior. Discussion of parental behavior, seasonal reproductive design, and of hormonal involvement with various non-reproductive processes, including eating, social behavior, and mood changes. Emphasis will be placed on topics to be offered alternative years. Mr. Zucker (Sp)

212. Biological Clocks and Animal Behavior. (5) Three 2-hour lectures per week. Prerequisite: course 210A, 210B, 210C. A consideration of fundamental models of entrainment and generation of circadian rhythms. Consideration of the role of circadian processes in photoperiodic time measurement with particular emphasis on seasonal reproductive cycles. Discussion of chemical and neural bases for biological clocks of behavioral and internal mechanisms by which entrainment to the light-dark cycle occurs. Will be offered every other year.

219. Biological Seminar. (1) One 1 1/2-hour lecture per week. Prerequisite: graduate standing or consent of instructor. Reports and discussions of original research in the area of biological psychology. Not all participants need report in any given quarter, but all are expected to attend and to enter into the discussions. Required course for all students in the biological graduate program. Satisfactory/Unsatisfactory basis only. Mr. Meredith in charge (F, W, Sp)

Cognitive

220A. Proseminar: Information Processing. (5) Three 1 1/2-hour lectures per week. Intake and processing of incoming information, including topics such as: iconic storage, pattern recognition, classification and concepts, mental imagery, attention, semantic memory, and other humanistic schools, as well as systems theory. Mr. Palmer, Ms. Rosch (F)

220B. Proseminar: Conditioning and Discrimination Learning. (5) Three 1 1/2-hour lectures per week. Classical and instrumental conditioning and discriminative learning, with material taken both from human and animal literature, but with emphasis on the animal work.

220C. Proseminar: Human Learning and Memory. (5) Two 1 1/2-hour lectures per week. Theories, methods, and findings concerning complex human problem solving, especially creative problem solving and productive thinking. Topics include cognitive processes and factors in convergent and divergent thinking, computer simulation, and the measurement and training of problem-solving efficiency.

229. Cognitive Seminar. (1) One 1 1/2-hour lecture per week. Prerequisite: graduate standing or consent of instructor. Reports and discussions of original research in the area of cognitive psychology. Not all participants need report in any given quarter, but all are expected to attend and to enter into the discussions.

230A. Proseminar: Problem Solving. (5) Three 1 1/2-hour lectures per week. Theories, methods, and findings concerning complex human problem solving, especially creative problem solving and productive thinking. Topics include cognitive processes and factors in convergent and divergent thinking, computer simulation, and the measurement and training of problem-solving efficiency.

Clinical

230A. Proseminar: Theory and History of Clinical Psychology. (5) Two hours of lecture and one hour of tutorial per week. Prerequisite: consent of instructor. Examination of major theoretical and historical themes in the development of modern clinical psychology, with special attention to concepts of mental health and psychopathology, models of intervention and clinical search, and emerging professional roles and institutions. Mr. Korchin (W)

230B. Proseminar: Community Psychology. (5) Two hours of lecture and one hour of tutorial per week. Prerequisite: consent of instructor. Theoretical and empirical framework for community psychology; history, scope, and direction of field; examples of social and community psychology in regions of the United States. Credit and grade awarded upon completion of the three-quarter sequence. Ms. Miller (F, W, Sp)

230C. Proseminar: Child Clinical Psychology. (5) Two hours of lecture per week. Prerequisite: consent of instructor. Examination of three major theoretical views of child development: neo-Freudian (Erikson), social learning (Bandura), cognitive-developmental (Piaget, Kohlberg), and one theory of family psychopathology (Kackson, et al). Examination of research and clinical work on family therapy and individual change through intensive readings. MR. Cowan in charge (F, W, Sp)

231A-231B-231C. Laboratory in Clinical Assessment. (5-5-5) Two 1 1/2-hour lectures per week. Prerequisite: courses 230A and/or consent of instructor. Reading and discussion in the study of community psychology. Discussion focuses on theory, research, and methods of intervention. Ms. Burton (W)

232A-232B-232C. Special Topics in Clinical Psychology. (5-5-5) Three hours of practical per week. Prerequisite: consent of instructor. Not all participants need report in any given quarter, but all are expected to attend and to enter into the discussions. Required course for all students in the clinical graduate program. Satisfactory/Unsatisfactory basis only. Mr. Cowan in charge (F, W, Sp)

233A. Proseminar: Theory and History of Clinical Psychology. (5) Two hours of lecture and one hour of tutorial per week. Prerequisite: consent of instructor. Examination of major theoretical and historical themes in the development of modern clinical psychology, with special attention to concepts of mental health and psychopathology, models of intervention and clinical search, and emerging professional roles and institutions. Mr. Korchin (W)

234A. Child Therapy. (3) One two-hour lecture per week. Prerequisite: course 230A and/or consent of instructor. Reading and discussion in the study of therapy with families. Topics include the role of parents and students in therapy with children. Grades reported at end of quarter.

235. Community Psychology. (3) One two-hour lecture per week. Prerequisite: courses 230A and/or consent of instructor. Examination of research in psychotherapy, including its historical development, problems in methodology, and new approaches to case formulation and current state of the field. Special attention will be brought to bear on the implications of research findings for clinical practice. Mr. Jones (W)

237A-237B-237C. Laboratory in Clinical Assessment. (5-5-5) Three hours of practical per week. Prerequisite: courses 230A and/or consent of instructor. Readings and discussion in the study of community psychology. Discussion focuses on theory, research, and methods of intervention. Ms. Burton (W)

238. Clinical Seminar. (1) One 1 1/2-hour lecture per week. Prerequisite: consent of instructor. Reading and discussion in the study of therapy with families. Topics to be announced yearly. More than one section may be given each year, and taken for credit. Grades reported at end of sequence.

Develpmental

240A. Proseminar: Early Cognitive Development. (6) Three 2-hour lectures per week. A consideration of formative stages in cognitive development and methods used to examine them. Emphasis will include learning processes, memory, and sensory-motor intelligence. Mr. Watson (F)

240B. Proseminar: Human Ethology and Early Social Development. (5) Three 1 1/2-hour lectures per week. A consideration of formative stages in social development and methods used to examine them. Emphasis will be placed on topics as these relate to human development will be critically reviewed. Grades reported at end of sequence. Mr. Cowan (Sp)

242A. Proseminar: Personality and Social Psychology. (5-5) Three 1 1/2-hour lectures per week. A consideration of formative stages in social development and methods used to examine them. Emphasis will be placed on topics as these relate to human development will be critically reviewed. Grades reported at end of sequence. Ms. Main (W)
reviewed. Research methods and methodological problems will be emphasized. Mr. Mussen (Sp)

**240D. Proseminar: Cognitive Development.** 5 Each Three 1 1/2-hour lectures per week. Stages and structures of reasoning from sensorimotor action schemes in infancy through formal operations in adolescence and adulthood, with focus upon the progressive construction of an abstract and physical conceptual. As relevant, methodological aspects of symbolization, perception, and learning will be considered.

**240E. Proseminar: Language Development.** 5 Each Three 1 1/2-hour lectures per week. Chats language development within the theoretical and methodological framework of psycholinguistics. Review of phonologica, grammatical, semantic, and sociolinguistic develop- ment, considered in relation to developmental models, with special attention to interactions between linguistic and cognitive development. To include work in language within communicative contexts.

**240F. Proseminar: Development of Behavior Problems.** 5 Each Three 1 1/2-hour lectures per week. Extensive coverage of theoretical and research litera- ture pertaining to several of the most dominant theories of behavior problems, their origins, diagnoses, and treat- ment. Relationships between normal behavior and emotional disturbance will be assessed, and modern (including preventative) treatment methods are dis- cussed and evaluated.

**249. Developmental Seminar. (1) One 1 1/2-hour lecture per week.** Prerequisite: graduate standing or consent of instructor. Reports and discussions of original research in the area of developmental psychol- ogy. Not all group members will have a seminar paper in the fall, but all are expected to attend and to enter into the discussions. Required course for all students in the developmental graduate program. Satisfactory/Unsatisfactory basis only.

Ms. Ervin-Tripp in charge (F, W, Sp)

**Personality**

250A–250B. Proseminar Courses in Personality Psychology. (1) Three 1 1/2-hour lecture per week. Basic and fundamental issues in personality psychology. Discussion of topics from current theoretical importance. Analysis of significant research paradigms.

250A: Mr. Covingston (F); 250B: Mr. Calk (W)

251A–251B–251C. Personality Assessment. (5–6) Three hours of lecture and 3-5 hours of discus- sion per week. Prerequisite: Ph.D. candidate in personal- ity psychology or consent of instructor. Lectures and laboratory work on personality assessment, including (A) the historical development of assessment instruments, design of an assessment program, (B) conducting an assessment, and (C) case conferences, preparation of research reports, and methods of data analysis.

Mr. Gough (F, W, Sp)

253A–253B–253C. Appraisal of the School-Age Child. (5–5–5) Two 3-hour laboratories or equivalent. Field work in the observation of the various psychological factors in the development of the school-age child. Lecture/discussion per week. Primarily for first-year graduate students. Appraisal of the child, integrating the methods of observation, personality and psychological testing, and interview. Individual supervision.

253A: Mr. Tuddenham (W); 253B: Mr. Tuddenham (Sp)

**259. Personality Seminar. (1) One 1 1/2-hour lecture/ discussion per week.** Prerequisite: 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 quarter, but all are expected to attend and to enter into the discussions. Satisfactory/Unsatisfactory basis only.

**Social**


260B. Proseminar: Attitudes and Attitude Change in Social Psychology: Human Motivation. (5) Three 1 1/2-hour lectures per week. Mr. Zedeck (W)

260C. Proseminar: Small Groups in Social Psych- ology: Organizational Behavior. (8) Three 1 1/2-hour lectures per week. (Sp)

268. Social Seminar. (1) One 1 1/2-hour lecture per week. Prerequisite: 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 quarter, but all are expected to attend and to enter into the discussions. Required course for all students in the social graduate program. Satisfactory/Unsatisfactory basis only.

Ms. Nemeth in charge (F, W, Sp)

**Special Course Offerings**


289. Directed Study. (1–6) Special study under the direction of a member of the staff.

299. Research. (1–6) Individual research.

The Staff (F, W, Sp)

**Religious Studies**

Group Major Office, Division of Special Programs, 301 Campbell Hall

Advisers: Mr. Albert J. Raboteau (Christianity), Mr. Baruch M. Bokser (Judaism), Mr. William Hickman (Islam), Mr. Lewis Lancaster (Buddhism and Hinduism), Mr. Juergensmeyer (General Studies), other advisers: Mr. Michael Nagler, Mr. Wei-ming Tu.

---

Group Major Program in Religious Studies

The group major program is administered through the Division of Special Programs. Students are referred to this office for all administrative matters, and this is where major students will file their study lists.

The group major in religious studies offers specialization in one of five major religious traditions or in more general religious studies, with a certain amount of crossover in either track. The major is designed primarily for its intrinsic value or as preparation for graduate work in religion or related areas rather than as preparation for theological studies or a ministerial career. Although it could serve the latter purposes for some individuals. Most religious studies courses are open to non-majors. Because of the wide variety of approaches possible in the academic study of religion and the need for detailed work in one or more of these approaches, students are encouraged to begin as early as possible in their careers. This is especially true for students contemplating specialization in a particular cultural area or attempting the degree with honors, as these require special knowledge. Students majoring in religious studies under the old program may see their adviser about desired changes in their program.

In addition to the courses listed below, the Advisory Committee on Religious Studies maintains a revised list of University courses of general interest for students of religion (some of which can be included in the major offerings with consent of the adviser). Berkeley students may also take for credit (outside the major) courses at the centering Graduate Theological Union. Consult the Group Major Office concerning the approval required. With adviser approval, religious studies students may use up to two of these courses for credit toward completion of the major.

**Major Program**

One course, to be taken by all major students and before selection of the field of specialization by area studies students: Religious Studies 90A–90B–90C, Introduction to the Study of Religion (4–4–4). Courses in Area Studies or General Studies, as indicated below (substitutions can sometimes be arranged with the major adviser).

---

I. Area Studies. Reading knowledge of a relevant scriptural language and course work in one of the following areas. Students desiring to major in a different religious tradition, e.g., Confucianism and/or Taoism, pre-Christian European religions, etc., may sometimes do so with the guidance of an adviser and, if necessary, a faculty member from outside the program. With the guidance of the adviser, advanced language courses that emphasize readings from religious texts can be substituted for the elective courses in each area.

A. Christianity. Reading knowledge of Latin or Greek (or, in some cases, Hebrew: intensive workshops in all three languages are available at Berkeley and highly recommended). Required (five courses): History 108A (5) or 117A (5); 108B (5) or 117B (5); 108C (5); Religious Studies 120A–120B (5–5). Two of the five core courses in General Studies; two courses in one Eastern religion. Additional courses, if required, from the following: to make a total of at least 65 upper division units: Classics (Greek) 125 (4); Comparative Literature 145A (4); English 118 (5), 120A–120B (5–5), 154 (5); History 130A–130B (5–5), 131 (5); Italian 135A (5), 135B (5), 135C (5); Philosophy 168 (4), 184 (4), 191S (5); Scan- dinavian 175A–175B (5–5); Slavic 146 (5).

B. Judaism. Reading knowledge of Biblical Hebrew; Near Eastern Studies (Hebrew) 1A–1B–1C, Elementary
lower division course
90A—90B—90C. Introduction to Religious Studies. (4—4—4) Three hours of lecture per week. A three-quarter series designed as a survey of major religious traditions and themes, and introduction to various approaches to religious studies. 90A surveys basic teachings of various cultural areas, 90B examines major themes which appear cross-culturally, and 90C considers the ways in which the religion has been analyzed and interpreted. —Mr. Juergensmeyer (F, W, Sp)

upper division courses
115. Mysticism. (4) Three hours of lecture per week. Studies in the literature and piety of various mystical traditions, including readings of scripture, lyrical poetry, spiritual discourse, autobiography, etc. The relationships of several forms of mysticism to their religious traditions will be treated.

120A—120B. The Origins of Christianity. (5—5) Three one-hour meetings and one hour of discussion per week. The World of the New Testament; the emergence of the Gospels with special attention to Mark, Early Christianity and the theology of Paul. —Ms. Kolenkopf (F, W, Sp)

190. Topics in the Study of Religion. (4) Three hours of lecture per week. Selected problems in religion; topics vary from year to year. Students should consult the secretary of the program for offerings in the current academic year.

H195A—H195B. Honors Course. (4—4) Hours to be arranged. Prerequisite: Admission to honors program in Religious Studies. Credit assignment. Student may enroll for a total of 4 units one quarter, or 8 units for two quarters, with credit to be earned upon completion of a successful thesis. The work may take the form of two quarters at the option of the instructor and the student. Successful completion of the course will normally, but not necessarily, mean the awarding of honors. —(F, W, Sp)

*198. Directed Group Study for Upper Division Students. (1—5) Two to five hours per week. Tutorial instruction in areas not covered by regularly scheduled courses. —The Staff (F, W, Sp)

199. Supervised Independent Study and Research. (1—5) Two to five hours per week. Enrollment is restricted by instructor. The student must apply for permission in advance to the instructor. —(F, W, Sp)

related courses in other departments
Afro-American Studies 188A. The Black Church: A Historical Perspective. (5) Mr. Raboteau (F, W, Sp)
**Afro-American Studies 188B. Sociology of Black Religion. (5) Mr. Raboteau (Sp)

Classics 25. The Classical Myths. (4) Mr. Nagler (W)

History 103. Proseminar: Problems in Interpretation and Research in the Several Fields of History. (5)

History 104. Special Topics in the Various Fields of History. (5) Cullinane in the United States. Mr. Raboteau (Sp)

History 120. The Renaissance. (5) Mr. Starn (Sp)

*History 135B. European Jewish History Since 1917. (5) Mr. Webster (F)

History 176. Religion in American Society. (5) Mr. May (W)

*Near Eastern Studies 35. Introduction to Judaism. (4) Mr. Bokser (F)


Philosophy 102. Practical Ethics. (4) Mr. Scriven (W)

Philosophy 104. Ethical Theories. (4) Mr. Scheffler (F) and Mr. Searle (Sp)

*Political Science 118A. History of Political Theory. (5) Ms. Pottk (Sp)

Rhetoric 131. Rhetoric of Religious Discourse. (5) —(Sp)

lower division course
90A—90B—90C. Introduction to Religious Studies. (4—4—4) Three hours of lecture per week. A three-quarter series designed as a survey of major religious traditions and themes, and introduction to various approaches to religious studies. 90A surveys basic teachings of various cultural areas, 90B examines major themes which appear cross-culturally, and 90C considers the ways in which the religion has been analyzed and interpreted. —Mr. Juergensmeyer (F, W, Sp)
Graduate Program

The Department of Rhetoric offers programs leading to both the M.A. and Ph.D. degrees. Students are admitted to the graduate program in th fall quarter only. The first three to four quarters are spent preparing for the M.A. oral examination, a 1 1/2 hour examination covering the major areas of study within the department. Pre-doctoral students with an M.A. from another department or institution must pass the M.A. oral review with a recommendation for continued graduate work by the end of their first year of study. For the M.A. a total of 36 units of course work is required, including 202A, 202B, and 202C, 205, 215A and 215B. There are no specific unit requirements beyond the M.A. for the Ph.D. degree. Ph.D. candidates are also required to serve as a Teaching Assistant in the Rhetoric Department for one year and to complete successfully Rhetoric 300, "Rhetorical Pedagogy." Opportunities for continued employment beyond the requirement are available. Individual programs for all graduate students are carefully planned in conference with the graduate advisor.

Teacher Training

There are opportunities for majors of senior standing to assist professors in teaching certain courses through a special tutorial program. Training and experience in teaching are regarded as an essential part of the program leading to M.A. and Ph.D. degrees. The structure of the program requires that graduate programs make it possible for able students to seek promotion to the rank of Teaching Associate.

LOWER DIVISION COURSES

1A-1B. The Craft of Writing. (6-8) Four to 4 1/2 hours of meeting per week. Prerequisite: Subject A or exam is prerequisite for 1A. Course 1A or equivalent is prerequisite for 1B. Rhetorical approach to reading and writing with emphasis on the development of the course. Rhetorical writing of selected texts; written developments from class discussion and analysis of rhetorical strategies. 1B: Intensive study and development of essay writing. Emphasis on improvement stimulated through selected readings and class discussion. The Staff (F, W, Sp)

1C. Fundamentals of Oral Interpretation. (6) Formerly 2. Four to 4 1/2 hours of lecture per week. The use of oral performance as a critical instrument in the rhetorical analysis of literature. The literature is primarily, though not exclusively, lyric poetry. Mr. Sloane (F, W, Sp)

10. Rhetorical Theory and Practice. (5) Formerly 115. Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 10 or consent of instructor. Consideration of the special problems of an author's or speaker's presentation of self in relation to the character of the intended audience. Mr. Sloane

100. Modern Rhetorical Theory. (5) Formerly 112. Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30 or consent of instructor. A close reading of the works of the last 200 years whose point of view can be described as rhetorical—Richards, Burke, Cassirer, and others. Mr. Quinn

101. Rhetorical Theory and Practice: Middle Ages. (5) Formerly 111C. Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30 or consent of instructor. Examination of the way in which various rhetorical principles are applied in modes of expression as allegory, romance, fabliau, sermon, saint's legend, etc. Mr. Richardson

102. Rhetorical Theory and Practice: Renaissance and 17th Century. (5) Formerly 150C. Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30 or consent of instructor. Consideration of the special problems of an author's or speaker's presentation of self in relation to the character of the intended audience. Mr. Willy

104. Rhetorical Theory and Practice: Nineteenth Century. (5) Formerly 151C. Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30 or consent of instructor. Consideration of the special problems of an author's or speaker's presentation of self in relation to the character of the intended audience. Mr. Willy

105. Rhetorical Theory and Practice: Eighteenth Century. (5) Formerly 152C. Prerequisite: Rhetoric 10 or consent of instructor. Consideration of the special problems of an author's or speaker's presentation of self in relation to the character of the intended audience. Mr. Willy

106. Advanced Writing: Argument and Discourse. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: Any 1A-1B sequence, upper division standing or permission of instructor. Designed for candidates for the general element of the M.A. in Rhetoric and for other non-majors. Intensive work in writing to persuade, mainly on topics of current concern. Will not fulfill major requirement. The Staff

107. Fundamentals of Oral Interpretation. (5) Formerly 2. Four to 4 1/2 hours of lecture per week. Emphasis on problems of evidence, inference, induction, deduction, semantic analysis, and the relationships of speaker, situation, intention, language, meaning, form, poetic persuasion and knowledge. Specific poems for examination. Prerequisite: Rhetoric 30. Mr. Chatman

108. The Rhetoric of the Novel. (5) Formerly 121. Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. An examination of the articulation of selected novels, working from an identification of basic narrative units to gross structure, directed toward an understanding of the relationship of structure to meaning. Mr. Willy

120. Rhetoric of Drama. (5) Formerly 122A, 122B, 122C. Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. A consideration of the way character is created in drama by repetitive rhetorical patterns. Form and way themes are defined by the manipulation of such patterns. Topic to be announced. May be repeated once for credit as subject changes. The Staff

123. Narrative Structure in Fiction and Cinema. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. A survey of narrative types from the simplest folk tale to the modern novel, including advanced topics like the stream of consciousness. Emphasis will be placed on the definition and the techniques of narrative, rather than on content and thematic analysis. Mr. Chatman

124. Rhetoric of Poetry. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. Consideration of the relationship between the literature of poetic discourse largely defined by figures of speech and overall poetic structures. Mr. Brandt

125. Rhetoric of Symbolism. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. The functions of language in literature, especially poetry; the literary symbol; the nature and function of figurative speech. Mr. Beloff

127. Film Auteurs. (5) Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. Investigation of major 19th
and 20th century European and American works of fiction in which political stances are exploited as domi-
nant or major themes. Reading of authoritative viewpoints and
rhetorical strategies. Mr. Willy

158. Rhetoric of Continental European ideology. (5) Formerly 148. Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30 or consent of instructor. Examination of formal ideological structures as they appear in mod-
ern novels, speeches and political tracts. Emphasis upon Romantic, Communist, Liberalism, and Socialism as the latter emerged between 1890 and 1945.

160. Oral Argument. (3) Three hours of discussion per week. Analysis of oral argument. May be repeated for a maximum of 9 units. Mr. Stripp

161. Rhetoric of Legal Documents. (5) Formerly 144. Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. An introduction to legal rhetoric through analysis of structure and style in judicial opinions, legal problems and methods of the law. Shapiro in such documents as contracts, statutes, or constitutions, and reference to major authors in legal and rhei-
torical theory. Ms. Shapiro

162. Stasis in Legal Argumentation. (5) Formerly 140. Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30 or consent of instructor. Introduction to the concept of stasis (controlling the appearance of issues) as developed by classical rhetoricians. Analysis of how stasis operates in modern legal argumentation. Discussion of the various stases as they appear in stasis theory as a tool for the forensic writer. Ms. Shapiro

164. Ethos and Audience in Legal Proceedings. (5) Formerly 141. Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. Examination of the char-
acteristics and relationships of speakers and audi-
ences in the trial and other legal forums. Advocacy, de-
termination and decision making will be studied as they are influenced by the forms and ends of particular dispute settlement procedures. Ms. Shapiro

168. Legal Conceptions of Proof and Authority (5) Formerly 158. Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. Examination of fundamental concepts and assumptions in Anglo-American proce-
dural law and the place of the judge in the process for judicial decision. Major topics will include methods of proof and issues of judicial reliance on precedent, nat-
ure of evidence, and techniques of argument. Ms. Shapiro

169. Rhetoric of Legal Philosophy. (5) Formerly 159. Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. Consideration of basic philo-
osophical issues in legal theory and in the intellectual history of the law. Methods include rhetorical analysis of legal philosophical disputes, as well as conventional legal documents. Ms. Shapiro

171. Rhetoric of Scientific Discourse. (5) Formerly 161. Four to 4 1/2 hours of lecture per week. Prerequisites: Rhetoric 30, Rhetoric 1A–1B or 10. An examination of the rhetorical function of scientific discourse. Mr. Quinn

172. Rhetoric of Social Theory. (5) Formerly 164. Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30. Systematic rhetorical analysis of selected theorists from Durkheim and Weber, as well as Marx, Ricardo and Bentham, to contemporary representatives of mar-
xist and economic thought. Mr. Quinn

173. Rhetoric of Historical Discourse. (5) Formerly 165. Four to 4 1/2 hours of lecture per week. Prerequisites: Rhetoric 30, Rhetoric 1A–1B or 10. An examination of the rhetorical practice of selected narrative historians such as Gibbon or Carlyle; historical discourse considered as a rhetorical art. Mr. Quinn

174. Rhetoric of Psychological Discourse. (5) Formerly 166. Four to 4 1/2 hours of lecture per week. Prerequisite: Rhetoric 30, Rhetoric 1A–1B or 10. An introduction to the psychological language focusing on the significant the-
oretical innovations of the Freudian school and extend-
ing to the rhetoric of contemporary psychological thought. The Staff

175. Rhetoric of Philosophical Discourse. (5) Former to 4 1/2 hours of lecture per week. Prerequisites: Rhetoric 30, Rhetoric 1A–1B or 10. An introduction to the theoretical issues involved in the application of rhetorical analysis to philosophical discourse; inten-
sive rhetorical analysis of selected philosophical works. Mr. Quinn

Independent Studies

190. Senior Thesis. (5) Prerequisites: Seniors may elect an appropriate study under the supervision of a faculty director. Independent study under guidance of a faculty director culminating in a written thesis. May be used as an upper division elective in the major. Independent study under guidance of a faculty director culminating in a written thesis. Required of all majoring majors seeking to earn the A.B. degree with honors. The Staff

191. Honors Thesis. (5) Prerequisite: An overall grade point average of 3.3 or better and a 3.3 grade point average or better in courses completed in the major. Independent study under guidance of a faculty director culminating in a written thesis. Required of all majoring majors seeking to earn the A.B. degree with honors. The Staff

197. Field Study In Rhetoric. (1–5) Prerequisite: Junior standing and good academic standing. Super-
vision experience relevant to specific aspects of rhen-
torical work in individual student's interest. May en-
roll with consent of professor and written reports re-
quired. Chairperson in charge

189. Supervised Group Study. (1–5) Prerequisites: An honest indication of the student's potential for supervising small group of students in work on a topic initi-
ated by those students. May be used toward the major with prior approval of the student's adviser. Chairperson in charge

199. Supervised Independent Study and Re-
search. (1–5) Enrollment is restricted by regulations of the department and the approval of the graduate adviser. Problems in the scope, applications, and divergencies of an extensive examination of their canon. Students and instructors are required to attend meetings with faculty sponsor and written reports re-
quired. Chairperson in charge

GRADUATE COURSES

A prerequisite for all graduate courses is grade status and approval of the graduate adviser.

200. Introduction to Graduate Study in Rhetoric. (4) Formerly 291A. Four hours of seminar per week. Prerequisite: An introduction to research methodology, bibliography, and scholarly writing in the field of Rhetoric. Mr. Nathan

202A–202B–202C–202D. Principles of Rhetorical Invention. (5–5–5–5) Formerly 202A–202B–202C–202D. Four to 4 1/2 hours of seminar per week. Prerequisite: graduate status and approval of graduate adviser. Problems in the scope, applications, and divergencies of an extensive examination of their canon. Students and instructors are required to attend meetings with faculty sponsor and written reports re-
quired. Chairperson in charge

210A–210B. History of Oral Literature and Oral Interpretation. (5–3) Three hours of seminar per week. Prerequisite: Rhetoric 30 or consent of instructor. Examination of the persuasive character of oral materials. Ms. Shapiro

211. Contemporary Theory of interpretation. (5) Four to 4 1/2 hours of seminar per week. Prerequisites: Rhetoric 169 or consent of instructor. Intensive examina-
tion of issues in contemporary rhetorical criticism. Mr. Nathan

212. Style and Discourse. (5) Four to 4 1/2 hours of seminar per week. Examination of the developing connections between rhetorical theory and aesthetics, particularly poetics, in the Middle Ages and Renais-
sance, with attention to the consequences for poetic practice. Mr. Sloane

217A–217B. Poetics and the Lyric Voice. (5) Four to 4 1/2 hours of seminar per week. Prerequisite: Rhetoric 30. Consideration of the persuasive character of the period will be considered. Credit and grade will be awarded upon completion of the full se-
quence. Mr. Mella and Staff

230. Rhetoric and Rhetorical Criticism: Ancient Thought. (5) Formerly 199. Four to 4 1/2 hours of seminar per week. Prerequisite: competence in Greek, Rhetoric in Ancient Greece, both as it was expounded by theorists and as it permeated subsequent discourse. Topic to be an-
nounced. The Staff

232. Rhetoric and Rhetorical Criticism: The Middle Ages. (5) Four to 4 1/2 hours of seminar per week. Examination of the development of rhetorical thought in the Middle Ages, as well as conventional medieval rhetoricians and as practiced by medieval writers. Mr. Sloane

243A–243B. Rhetoric and Poetics in the Middle Ages and Renaissance. (3–3) One 2-hour seminar per week. Examination of the developing connections between rhetorical theory and aesthetics, particularly poetics, in the Middle Ages and Renais-
sance, with attention to the consequences for poetic practice. Mr. Sloane

244A–244B. Rhetoric and Rhetorical Criticism: The Middle Ages and Renaissance. (3–3) One 2-hour seminar per week. Examination of the developing connections between rhetorical theory and aesthetics, particularly poetics, in the Middle Ages and Renais-
sance, with attention to the consequences for poetic practice. Mr. Sloane

253. Style and Discourse. (5) Four to 4 1/2 hours of seminar per week. The nature and function of style as a technique for the examination of style in different cultures: relations of credibility in different cultures; relations of verbal to non-verbal behavior. Mr. Brandt

254. Advanced Narrative Analysis. (5) Four to 4 1/2 hours of seminar per week. An examination of the nature and function of style as a technique for the examination of style in different cultures: relations of credibility in different cultures; relations of verbal to non-verbal behavior. Mr. Brandt
### Scandinavian

#### Department Office, 1305 Dwinnelle Hall

**Professor:** Eric J. Johannesson, Ph.D.

**Associate Professors:** James L. Larson, Ph.D.; Chad F. Schuller, Ph.D.

**Assistant Professor:** Carol J. Clover, Ph.D.

The Department of Scandinavian offers undergraduate majors in three Scandinavian languages, Danish, Norwegian, and Swedish, and courses in English in Scandinavian literature, ancient and modern. A graduate program offering work leading to the M.A. and Ph.D. degree is also available.

### The Major

**Lower Division.** Four courses from the following course sequences: Scandinavian 1A-1B, 3A-3B, 4A-4B, 11A-11B, 13A-13B, 14A-14B; or the equivalents.

**Upper Division Courses.** Ten upper division courses, including at least two language and two literature courses from the following sequences: Scandinavian 101A-101B, 103A-103B, 104A-104B, 141A-141B-141C, 143A-143B-143C, 144A-144B-144C.

**Honor Program.** Students must complete with distinction the courses required for the major as well as three quarters of course H195. A thesis is also required.

**Letters and Science List of Courses:** 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

### Graduate Degrees

For information regarding admission to the graduate program in Scandinavian and the specific requirements for the M.A. and Ph.D. degree, interested students should consult the Graduate Adviser.

**The M.A. in Scandinavian.** General requirements: 36 units of courses in Scandinavian, including courses in Old Icelandic, in history of the language, and in advanced composition. A comprehensive examination will test the student's knowledge of two Scandinavian literatures and the special emphasis on the literature in his major language. Programs with emphasis on linguistics and folklore are also available. For interdepartmental options, consult the Graduate Adviser.

**Ph.D. in Scandinavian.** After the master's degree there are no specific course requirements; each student, instead, plans a program that will best prepare him for the qualifying examinations and for the writing of his dissertation. There are two curricula leading to the Ph.D. degree. In Scandinavian, one in the field of history and criticism of Scandinavian literature, the other in romance studies.
LOWER DIVISION COURSES

1A-1B. Elementary Swedish. (5-5) Five classroom hours and at least a 1-hour language laboratory per week.
1A. Elementary grammar, conversation. (F)
1B. Elementary grammar, conversation, easy prose reading. (W)

3A-3B. Elementary Norwegian. (5-5) Five classroom hours and at least a 1-hour language laboratory per week.
3A. Elementary grammar, conversation. (W)
3B. Elementary grammar, conversation, easy prose reading. (W)

4A-4B. Elementary Danish. (5-5) Five classroom hours and at least a 1-hour language laboratory per week.
4A. Elementary grammar, conversation. (F)
4B. Elementary grammar, conversation, easy prose reading. (W)

**5. Intensive Elementary Swedish. (10) Ten hours of lecture and two hours of laboratory per week. Elementary grammar, conversation, composition, reading. This course is equivalent to Scandinavian 1A and 1B.**

11A-11B. Intermediate Swedish. (5-5) Five classroom hours per week. Prerequisite: course 1A-1B or the equivalent. Intermediate grammar, extensive reading, composition. Ms. McKnight 11A (Sp); 11B (F)

13A-13B. Intermediate Norwegian. (5-5) Five classroom hours per week. Prerequisite: course 3A-3B or the equivalent. Intermediate grammar, extensive reading, composition. Ms. Johns 13A (Sp); 13B (F)

14A-14B. Intermediate Danish. (5-5) Five class hours per week. Prerequisite: course 4A-4B or the equivalent. Intermediate grammar, extensive reading, composition. Ms. Gray 14A (Sp); 14B (F)

**21. Conversational Swedish. (4) Three hours of lecture and one hour of laboratory per week. Prerequisite: consent of instructor. Practice of conversation in connection with reading of selected Swedish texts. Recommended for prospective majors.**

UPPER DIVISION COURSES

Language and Literature Courses

101A-101B. Advanced Swedish. (4-4) Four hours of lecture per week. Prerequisite: course 11A-11B or the equivalent. Grammar review, reading, conversational composition. Ms. McKnight 101A (W); 101B (Sp)

103A-103B. Advanced Norwegian. (4-4) Four hours of lecture per week. Prerequisite: course 13A-13B or the equivalent. Grammar review, reading, conversational composition. Ms. Johns 103A (W); 103B (Sp)

104A-104B. Advanced Danish. (4-4) Four hours of lecture per week. Prerequisite: course 14A-14B or the equivalent. Grammar review, reading, conversational composition. Ms. Gray, 104A (W); 104B (Sp)

141A-141B-141C. Introduction to Swedish Literature. (4-4-4) Three classroom hours per week. Prerequisite: 20 units of lower division courses in Swedish or the equivalent. Reading and analysis of representative Swedish works. 141A: From 1700 to 1870. 141B: From Strindberg to World War I. 141C: From World War I to the present. Ms. McKnight 141A (F); Mr. Johannesson 141B (Sp)

143A-143B-143C. Introduction to Norwegian Literature. (4-4-4) Three classroom hours per week. Prerequisite: 20 units of lower division courses in Norwegian or the equivalent. Reading and analysis of representative Norwegian works. 143A: From Holberg to 1870. 143B: From Strindberg to World War I. 143C: From World War I to the present. Mr. Nybo 143B (F); Ms. Johns 143C (Sp)

144A-144B-144C. Introduction to Danish Literature. (4-4-4) Three classroom hours per week. Prerequisite: 20 units of lower division courses in Danish or the equivalent. Reading and analysis of representative Danish works. 144A: From Holberg to 1870. 144B: From Brandes to World War I. 144C: From World War I to the present. Ms. Gray 144B (F); 144C (W)

**150. The Scandinavian Languages: History and Structure. (4) Three hours of lecture and discussion per week. Prerequisite: elementary knowledge of a Scandinavian language or an older Germanic dialect. An introduction to Scandinavian language history and development, with comparative survey of the modern Scandinavian languages, with reading of selected texts. Recommended for Scandinavian majors.** Mr. Lindow (W)

H195. Special Study for Honors Candidates. (2-5) Lectures and discussions. (W)

198. Directed Group Study for Advanced Undergraduates. (2-5) Prerequisite: at least two years of one of the Scandinavian languages. Advanced reading and interpretation of modern Scandinavian texts. The Staff (Mr. Nybo in charge) (F) (Mr. Larson in charge) (W, Sp)

199. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations of the faculty. (W)

Courses in Scandinavian Literature

Courses listed below require no knowledge of a Scandinavian language. They are open to students with at least a junior standing and, with consent of instructor, to properly qualified students with sophomore standing.

107. The Plays of Ibsen. (4) Three 1-hour lectures per week. Reading and discussions of Ibsen’s major plays.

108. Strindberg. (4) Three 1-hour lectures per week. Reading and discussions of Strindberg’s major works with emphasis on his dramas and their significance.

109. Scandinavian Drama of the Twentieth Century. (4) Three 1-hour lectures per week. Reading of modern Scandinavian dramas in translation; discussions.

110. Hans Christian Andersen. (4) Three 1-hour lectures per week. Reading and discussion of Andersen’s major works, with special reference to their relation to the standard languages of the different countries.

112. Knut Hamson. (4) Three 1-hour lectures and discussions per week. Reading and discussion of Hamson’s major novels. Some attention will also be given to Hamson’s essays and articles.

114. Isak Dinesen. (4) Three 1-hour lectures and discussions per week. Reading and analysis of Dinesen’s best stories and tales. Mr. Johannesson (F)

120A-120B. The Novel in Scandinavian Literature. (4) Three 1-hour lectures per week. Course 120A is not prerequisite to 120B. Reading and discussion of great Scandinavian novels; lectures on the development of the novel. Mr. Johannesson 120A (W); 120B (Sp)

123. The Viking Age. (4) Three 1-hour lectures per week. A survey of Viking culture and civilization from the first Viking raids to the end of Norse saga-writing. Reading of selected texts in English translation and discussion of problems connected with the nature of the sources and archaeological evidence.

125. Old Icelandic Literature. (4) Three 1-hour lectures per week. Reading and discussion of the Icelandic sagas and representative selections from the Eddas and the Scaldic songs. Mr. Lindow (W)

160. Scandinavian Mythology. (4) Three 1-hour lectures per week. Critical survey of mythology in ancient Scandinavia. Lectures and readings of selected material in English translation. Mr. Lindow (Sp)

165. Scandinavian Folklore. (4) Three 1-hour lectures per week. A survey of Scandinavian folklore, with primary emphasis on oral narrative traditions (legends, folktales, and ballads). Proverbs, riddles, folk belief, customs, and entertainment material, including folk fiddle music, will also be considered.

171. Contemporary Swedish Literature. (4) Three classroom hours per week. Reading and discussion of representative Swedish works in translation from World War II to the present.


Language Courses

**201. History of the Swedish Language. (4) Three 1-hour lectures per week. Prerequisite: an A.B. degree in an undergraduate major in Scandinavian. Phonology, historical grammar, texts.**

202. Old Icelandic. (4) Three 1-hour lectures per week. Descriptive and historical phonology and grammar, texts. Some attention is given to Old Norwegian.

203. History of the Norwegian Language. (4) Three 1-hour lectures per week. Prerequisite: an A.B. degree in an undergraduate major in Scandinavian. Phonology, historical grammar, texts.

205. Runology. (4) Three 1-hour lectures per week. Prerequisite: course 202 or the equivalent. Interpretation and discussion of runes in the Germanic, Danish, and Swedish-Norwegian futharks (2008 C–1200 A.D.). Mr. Lindow (Sp)

208. The Poems of the Poetic Edda. (4) Three 1-hour lectures per week. Reading of some more important poems with emphasis on the mythological songs.

215. Scandinavian Dialects. (4) Three 1-hour lectures per week. A survey of the Scandinavian dialects with special reference to their relation to the standard languages of the different countries.

220. Seminar in Scandinavian Linguistics. (4) One 2-hour lecture per week. Conference work on chosen or assigned topics; at least one shorter paper a quarter is normally required.

Literature Courses

210. Graduate Readings. (4) Graduate lecture course covering broad areas and directing students in wide reading. Offerings vary from year to year. May be repeated for credit with permission of the Graduate Adviser and the Instructor.

Swedish Literature. Mr. Johannesson, Mr. Larson Danish Literature. Mr. Nybo Old Icelandic and Medieval Literature. Mr. Lindow Swedish Language. Mr. Lindow Norwegian Language. Mr. Nybo Danish Language. Mr. Gray Icelandic.

**220. The Icelandic Saga. (4) Three 1-hour lectures per week. Prerequisite: courses 202 and 206 or the equivalent. Reading and analysis of representative works with emphasis on problems of origin and on the saga as narrative art.**

225. The Scandinavian Ballad. (4) Three 1-hour lectures per week. A comparative and historical study of the medieval ballads in Scandinavia. This course covers the development of the ballad, its relation to ballads of other European countries. Some attention will also be paid to modern folklore forms, broadsides and the troubadour tradition from C. M. Bellman to the present. (W)

230. Eighteenth Century Scandinavian Literature. (4) Three 1-hour lectures per week. Reading and analysis of representative works.

231. Romanticism in Scandinavia. (4) Three 1-hour lectures per week. Reading and analysis of representative works.

241. Modern Swedish Literature. (4) Three 1-hour lectures per week. Reading of selected texts. May be repeated for credit with consent of the instructor.

Reading of selected texts. May be repeated for credit with consent of the instructor.

275A–275B. Kierkegaard. (5-5) Three classroom hours and one hour of laboratory per week. Prerequisite: 275A is prerequisite to 275B. 275A. Introduction to Kierkegaard. Critical analysis of three of Kierkegaard’s major works, Either/Or, Concluding Unscientific Postscript, and Fear and Trembling, designed to provide a comprehensive introduction to the basic tenets of Kierkegaard’s existentialism. 275B. Problems in the Philosophy of Kierkegaard. Close critical study of a few of the central issues in Kierkegaard’s philosophy which have not been examined sufficiently in an introductory course: subjectivity as truth, indirect communication, inwardness, the existential dialectic, etc.

Mr. Larson (W)
The Department offers courses in the several Slavic languages and literatures and in Slavic linguistics, both for those pursuing the Department's own degree programs and for interested students from other departments. A large number of its literature courses require no knowledge of any foreign language.

The undergraduate major program usually emphasizes Russian, but honors students may choose Czech, Polish, or Serbo-Croatian as their special field of study. Students who complete the major program receive an introduction to the cultural history and the literatures of other Slavic peoples and requires at least an elementary knowledge of Russian.

Under the auspices of the Department, courses in Slavic and non-Slavic languages and literatures of Eastern Europe are given as upper-division: Albanian, Bulgarian, Georgian, Hungarian, Lithuanian, Romanian, and Ukrainian.

### The Major

#### Lower Division

Emphasis on Russian: courses 1, 2, 3, 4, 5, or 6 of their equivalents; courses 45, 46, and 47, taken in sequence if possible.

Emphasis on a Slavic language other than Russian: courses 1, 2, 3 and 12 units of the other Slavic language; courses 45, 46, 47.

#### Upper Division

45 units, including 15 units in the major language (103A-103B-103C or 104A-104B-104C in the case of Russian) and, also for students majoring in Russian, course sequence 128A-128B, course 130, and one of the following: 186, 187A, 187B or 188 (taught in Russian), 4 additional units in Russian literature, and one of the following course sequences: 150A-150B, 160A-160B or 170A-170B. Students majoring in another Slavic language and literature are required to take course sequence 129A-129B, in addition to the 8-unit survey sequence.

#### Honors Programs

With the approval of the major advisor, students with an overall grade-point average of 3.3 or higher and an average of 3.3 or higher in courses completed in the major may apply for admission to the honors program. This program will include course H195, in which a thesis will be written, and 10 units, in addition to those required for the major, in upper division language courses. For majors in Russian these are courses 104A-104B or, in special cases and with the permission of the Department, courses 125A-125B. Successful completion of the honors program requires a minimum grade of B+ in each of these three courses and a 3.3 grade-point average or higher in the major. A member of the Department must agree to direct the thesis. Applications for the program should be submitted through the major advisor.

### Letters and Science List of Courses:
162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

### Preparation for Graduate Study

Candidates for higher degrees must have completed the undergraduate major program in Slavic languages and literatures as required by the Department, or must present evidence that they have received equivalent training. Both the M.A. and Ph.D. programs require work in two Slavic languages or literatures, of which one must be Russian. Preparation in other European literatures (especially French, German, English), in comparative literature, in languages (especially French, German, Italian), and in Russian intellectual history is valuable for candidates in literature. For candidates in linguistics, preparation in French, German, Latin and Greek, and in general and comparative linguistics is desirable.

### Graduate Programs

M.A. and Ph.D. programs are offered in Russian, Polish, Czech, and Serbo-Croatian, each with either linguistic or literary emphasis.
LOWER DIVISION COURSES

1. Elementary Russian, Beginners' Course. (5) Five 1-hour meetings and two 1-hour laboratories per week. Prerequisite: course 1 or the equivalent. J. Nichols in charge (F, W, Sp)

2. Elementary Russian. (5) Five 1-hour meetings and two 1-hour laboratories per week. Prerequisite: course 1 or the equivalent. J. Nichols in charge (F, W, Sp)

3. Elementary Russian. (5) Five 1-hour meetings and one 1-hour laboratory per week. Prerequisite: course 2. J. Nichols in charge (F, W, Sp)

4. Intermediate Russian. (5) Five 1-hour meetings and one 1-hour laboratory per week. Prerequisite: course 3. J. Nichols in charge (F, W, Sp)

5. Intermediate Russian. (4) Four 1-hour meetings and one 1-hour laboratory per week. Prerequisite: course 4. J. Nichols in charge (W, Sp)

6. Intermediate Russian. (5) Five 1-hour meetings per week. Prerequisite: course 5. J. Nichols in charge (Sp)

9. Russian Language Workshop. (5-10) Prerequisite: course 1. Students who have accumulated more than five units in the course (whether in one quarter or two) are not eligible for re-enrollment. Individualized instruction covering the material of courses 2, 3, 4, 5, 6, and 7. Intended primarily for students whose programs prevent them from taking one, or two, of those courses when regularly scheduled. May be repeated for credit not to exceed the accumulated total of ten units. Units of credit to be assigned at the end of the quarter, depending on achievement. O. Astromoff, F. Whitfield in charge (F)

12. Elementary Russian Conversation. (2) Three hours of conversation per week. Prerequisite: course 1 or the equivalent. May be taken concurrently with Slavic 2 or by consent of instructor. May be repeated up to a total of 6 units. J. Bosky (F, W, Sp)

13. Intermediate Russian Conversation. (2) Two hours of lecture per week. Prerequisite: Slavic 4 or 5 or 6 (may be taken concurrently) or the equivalent or consent of instructor. May be repeated up to a total of 6 units. J. Bosky (F, W, Sp)

14A—14B—14C—14D. Individualized Instruction in Russian. (1—5; 1—5; 1—5; 1—5) Self-paced course covering the material of Slavic 1—4. Students may enter at any time and may withdraw without duplication of credit until five units have been completed. The student's program, including this course, must meet the requirements of the unit. Few units beyond those contracted for are completed, credit will be given. O. Astromoff in charge (F, W, Sp)

21A—21B—21C. Intensive Russian. (10—10—10) Ten 1-hour meetings and two 1-hour laboratories per week. This sequence covers the same ground as courses 1 through 6 and qualifies for admission to 103 or 104. F. J. Whitfield in charge (F, W, Sp)

23. Elementary Polish. (4) Four 1-hour lectures and one hour of laboratory per week. F. J. Whitfield in charge (F)


25. Elementary Serbo-Croatian. Intensive Course. (6) Two 2-hour meetings per week. E. Leskovar (F)

26A—26B. Intermediate Serbo-Croatian. (4—4)

26A: Two 2-hour meetings per week. Prerequisite: course 25 or permission of instructor (W). E. Leskovar

26B: Two 2-hour meetings per week. Prerequisite: course 25 or permission of instructor (F). E. Leskovar

UPPER DIVISION COURSES

102. Readings in Russian Expository Prose. (3) Three hours of lecture per week. Prerequisite: Slavic 6 or the equivalent. J. Nichols in charge (F, W, Sp)

103A—103B—103C. Advanced Russian. (5—5—5) Four 1-hour meetings per week. Prerequisite: course 6 or 21C. Sequence beginning (F). O. Astromoff

104A—104B—104C. Russian Composition and Style. (5—5—5) Four 1-hour meetings and one hour of conversation per week. Prerequisite: course 103C. Sequence beginning (F). O. Sorkin-Vasiliev

106A—106B. Polish Reading, Grammar, and Composition. (5—5) Four 1-hour meetings per week. Prerequisite: course 24B. Sequence beginning (F). F. J. Whitfield in charge

112A—112B. Serbo-Croatian Reading, Grammar, and Composition. (5—5) Four 1-hour meetings per week. Prerequisite: course 26B. Sequence beginning (F)

116A—116B. Czech Reading, Grammar, and Composition. (5—5) Four 1-hour meetings per week. Prerequisite: course 26B. Sequence beginning (F). W. Schamschula in charge

120A—120B—120C. Advanced Russian Conversation. (2—2—2) Open to students enrolled in courses 103 or 104 or who have completed these or equivalent courses. Two 1-hour classes and one 1-hour laboratory per week. Recommended for majors in Russian (W). O. Astromoff (F, W, Sp)

125A—125B. Introduction to Descriptive Russian Grammar. (5—5) Three 1-hour meetings and one 1-hour discussion section per week. Prerequisite or corequisite: course 103A (to 125A), course 103B (to 125B). Phonology, morphology, and syntax of standard literary Russian. Recommended for prospective teachers. Though it is not a prerequisite, students are urged to take Linguistics 20 before taking this course. Sequence beginning (W), J. Nichols

126B. Readings in Russian Literature. (5—5) Four hours of lecture, seminar and discussion per week. Prerequisite: 126A: course 103A (may be taken concurrently): 126B: course 103B (may be taken concurrently). Study and analysis of the development of the Russian literary language and short fiction from the 19th century to the present. Required for majors in Russian. Sequence beginning (F), S. Karlinsky

130. Medieval Russian Culture. (3) Three hours of lecture, discussion and slides per week. Introduction to the Eastern Orthodox culture of Old Russia, including literature, iconography, and other visual arts. O. Hughes (Sp)

132. Topics in Twentieth Century Russian Literature. (4) Formerly 130. Three 1-hour lectures per week. Variable subject matter. Course may be repeated with the consent of the instructor without duplication of credit. R. Hughes (W)

133A—133B—133C. The Russian Novel and Literatures of Western Europe. (4—4—4) Three 1-hour lectures per week. Discussion section to be arranged. Prerequisite: to 133A: 133A or permission of the instructor; to 133B: 133B or 45B or permission of the instructor. J. Grossman

133A. Sentimentalism and Romanticism (F)

133B. Romanticism and Realism (W)

133C. Realism (Sp)

134A. Gogol. (4) Formerly 134G. Three 1-hour lectures per week. Discussion section to be arranged. S. Karlinsky (Sp)

134B. Turgenev. (4) Formerly 134D. Three 1-hour lectures per week. Discussion section to be arranged. C. Milosz (Sp)

134D. Dostoevsky. (4) Three 1-hour lectures per week. Discussion section to be arranged. A survey of the writer's principal artistic works, treated chronologically in relation to his life and to developments in Russian and European literature. C. Milosz (F)

134E. Tolstoy. (4) Formerly 134E. Three 1-hour lectures per week. Discussion section to be arranged. A survey of the writer's principal artistic works, treated chronologically in relation to his life and to developments in Russian and European literature. H. McLean (F)

134F. Topics in Tolstoy. (4) Three 1-hour lectures per week. Discussion section to be arranged. Close study of individual works, periods or themes in Tolstoy's career. Content varies from year to year. May be repeated for credit with permission of instructor. C. Milosz (Sp)

134G. Chekhov. (4) Formerly 134G. Three 1-hour lectures per week. Discussion section to be arranged. Close study of individual works, periods or themes in Chekhov's career. Content varies from year to year. May be repeated for credit with permission of instructor. S. Karlinsky, H. McLean

134H. Studies in Russian Literature. (4) Three 1-hour lectures per week. Discussion section to be arranged. Variable subject matter. Course may be repeated with the consent of the instructor without duplication of credit. S. Karlinsky, H. McLean

135. Russian Drama from the Seventeenth to the...
Twentieth Century. (5) Three 1-hour lectures per week. Discussion section to be arranged. S. Karlnsky

*139. Twentieth Century Russian Literary Criticism. (6) Three 1-hour lectures per week. Discussion section to be arranged. W. Schamschula

*147. Slavic Folklore. (4) Three hours of lecture per week. Discussion section to be arranged. Lectures and assigned readings on translation theory. Critical reports on selected English prose translations of selections of translations prepared by members of the United States Russian Literature Project. P. F. Whithfield (W).

150A–150B. Polish Literature and Intellectual Trends. (4–4) Three 1-hour lectures per week. Discussion section to be arranged. No knowledge of Polish required. 150A: To 1848. 150B: 1848 to the present (W). Sequence beginning (W). C. Milosz

*156. The Polish Theater. (4) Three 1-hour lectures per week. Discussion section to be arranged. No knowledge of Polish required. C. Milosz

*159. Contemporary Polish Poetry and Fiction. (4) Three 1-hour lectures per week. Discussion section to be arranged. No knowledge of Polish required. C. Milosz

160A–160B. Masterworks of Czech and Slovak Literature. (4–4) Three 1-hour lectures per week. Discussion section to be arranged. No knowledge of Czech or Slovak required. Sequence beginning (W). W. Schamschula

170A–170B. Survey of Serbian and Croatian Literature. (4–4) Three 1-hour lectures per week. Discussion section to be arranged. No knowledge of Serbian or Croatian required. Sequence beginning (F).

LECTURE COURSES REQUIRING KNOWLEDGE OF RUSSIAN

*180. Studies in Russian Literature. (5) Three 1-hour lectures and one hour of discussion per week. Variable subject matter. Course may be repeated with the consent of the instructor without duplication of credit. O. Hughes, L. Fleishman (F)

181. Pushkin. (5) Formerly 134F. Three 1-hour lectures and one hour of discussion per week. L. Fleishman (F)

186. Nineteenth Century Russian Literary Criticism. (5) Three 1-hour lectures in Russian and one hour of discussion per week. Prerequisite: course 103B (may be taken concurrently) or consent of the instructor. S. Karlnsky (Sp)

187A–187B. Russian Poetry. (5–5) Three 1-hour lectures in Russian and one hour of discussion per week prior to 1890. Prerequisite: course 102B (may be taken concurrently) or consent of instructor. Survey of techniques of Russian versification and history of Russian poetry. 187A: eighteenth century to 1890; 187B: 1890 to the present. Sequence beginning (W). L. Fleishman

188. Russian Prose. (5) Three 1-hour lectures in Russian and one hour of discussion per week. Prerequisite: course 103C (may be taken concurrently) or consent of instructor. Reading, analysis, and interpretation of representative authors from the nineteenth century to the present. All readings in the original. Course may be repeated without duplication of credit. Topic to be changed every quarter. O. Hughes (Sp)

189. History of the Russian Literary Language. (5) Three 1-hour lectures per week. Discussion section to be arranged. L. Fleishman (Sp)

190. Undergraduate Seminar. (4) Three 1-hour meetings per week. Discussion section to be arranged. Lectures on one or more major pieces of Russian fiction. Readings will be in English, in addition to a close reading of the work, students will read critical works. Topics for Winter 1978: Solzhenitsyn. O. Hughes (W)

H195. Honors Seminar. (5) Two 2-hour discussions, or individual meetings with the instructor per week. Advanced study for seniors in the honors program, culminating in the writing of a thesis. The Staff (W, Sp)

199. Supervised Independent Study and Research. (1–9) Enrollment is restricted by regulations listed on page 36. Additional limitation: overall grade point average of at least 3.00. Must be taken on a pass/fail basis. The Staff (F, W, Sp)

GRADUATE COURSES

Graduate Colloquium. (No Credit) Three meetings per quarter. Reports of current scholarly work by faculty, graduate students, and visitors. Graduate students are expected to attend. 210A–210B. Old Church Slavonic. (3–3) Two 1 1/2-hour meetings per week. Sequence beginning (W). F. J. Whithfield

211. Readings in Old Russian. (4) Prerequisite: Slavonic 210A–210B. F. J. Whithfield (F)

*220. Comparative Slavic Linguistics. (4) Two 1-hour lectures and one 1/2-hour meetings per week. Prerequisite: course 210A–210B. W. Schamschula

226. Historical Russian Grammar. (4) Three 1-hour meetings per week. Prerequisite: courses 210A–210B. J. Nichols (W)

*229. Russian Oral Traditions. (3) Three hours of lecture per week. Prerequisite: much of the reading is in nonstandard Russian, and requires a good command of the language. Major emphasis will be placed on the oral poetry, but other forms of oral transmitted literature will also be discussed. H. McLean

*230A–230B. Old Russian Literature. (4–4) Three hours of lecture per week. Prerequisite: reading knowledge of Old Russian. J. Nichols (W)

*230A. Eleventh through thirteenth century. O. Hughes, H. McLean

*230B. Fourteenth through sixteenth century. O. Hughes

230C. Seventeenth century. O. Hughes (W)

*231. Eighteenth Century Russian Literature. (4) Three hours of lecture per week. L. Fleishman (F)

280. Studies in Slavic Literatures and Linguistics. (4) One 2-hour meeting per week. Advanced studies in the several fields of Slavic literatures and linguistics. Course content varies. Course may be repeated with out duplication of credit. Russian Romantic Poetry: S. Karlnsky (F); Twentieth Century Russian Poetry: L. Fleishman (W); Dostoevsky Backgrounds: C. Milosz (Sp); Slavic Linguistics: F. J. Whithfield (Sp)

281. Proseminar: Aims and Methods of Literary Scholarship. (4) Two 1 1/2-hour lectures per week. Course designed particularly for new graduate students in the Department whose programs will emphasize the study of Slavic literatures. L. Fleishman (F)

282. Proseminar: Aims and Methods of Linguistic Scholarship. (4) Two 1 1/2-hour lectures per week. Course designed particularly for new graduate students in the Department whose programs will emphasize the study of Slavic linguistics. J. Nichols (F)

*289. Seminar. (4–4) One 2-hour meeting per week. Advanced study in Slavic languages and literatures. Topics will vary from year to year and will be announced at the beginning of each quarter. Two-quarter sequence required for completion in Seminar 290. Credit and grade to be awarded at close of sequence. The Staff

298. Special Study for Graduate Students. (2–9) Preliminary exploration of a restricted area of study involving research and a written report. The Staff (F, W, Sp)

299. Directed Research. (2–9) Normally reserved for students directly engaged upon the doctoral dissertation. To be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

301A–301B–301C. Methods of Teaching Slavic Languages. (1–1–1) One hour of lecture and 1-2 hours of laboratory per week. Lectures on practical teaching methods, grading, testing, with demonstration lessons, conferences and discussions. Required of all new teaching assistants and associates. Ms. Bosky (F, W, Sp)

601. Individual Study for Master’s Students. (1–8) Individual study for the comprehensive or language requirements in consultation with the field adviser. Units may not be used to meet either unit or residence requirements for a master’s degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

602. Individual Study for Doctoral Students. (1–8) 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. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

EAST EUROPEAN STUDIES

10. East European Language Workshop. (4–12) Individualized instruction, at elementary and intermediate levels, in East European languages not offered in regularly announced courses. May be repeated for credit not exceeding an accumulated total of twelve units. Topics will vary from quarter to quarter. Languages to be offered 1978-79: Hungarian, Romanian, Russian, Ukrainian. The Staff (F, W, Sp)

100. Advanced East European Language Workshop. (12) Individualized instruction, at an advanced level, in East European languages not offered in regularly announced courses. May be repeated for credit not exceeding an accumulated total of twelve units. Topics vary from quarter to quarter. The Staff (F, W, Sp)

145. Studies in East European Literatures. (5) Three 1-hour lectures and one hour of discussion section per week. Variable subject matter. Course may be repeated. May be repeated for credit not exceeding an accumulated total of twelve units. The Staff (F, W, Sp)

285. Studies in East European Literatures and Linguistics. (2–5) Course content and class hours vary. Advanced studies in non-Slavic East European literature and linguistics. Course may be repeated for credit. The Staff (F, W, Sp)

LITHUANIAN

*1 Lithuanian 270. Structure of Modern Lithuanian. (4) Three hours of lecture per week.

SOCIAL SCIENCE

Field Major Office, Division of Special Programs, 301 Campbell Hall

FIELD MAJOR IN SOCIAL SCIENCES: THE MAJOR PROGRAM

The field major in social sciences is presently under review. Prospective majors should inquire at the Division of Special Programs office regarding any revisions in the major and the date of their implementation.

UPPER DIVISION COURSES. REQUIRED: A minimum of 45 approved upper division units in the areas listed below (approved lower division courses may occasionally be substituted for upper division courses in satisfaction of certain requirements but may not be counted as part of the minimum total of 45 upper division units): (1) the junior course and the senior course (Social Sciences 103A–103B and 190); (2) three courses providing an historical foundation in Western history and culture—these must include at least one course from a time period before the Renaissance and at least one course before the 20th Century; (3) a minimum of 18 units including either (a) at least three courses representing the high points of a coherent historical tradition and one course in an immediately related area of a non-historical social science or (b) at least three courses in a coherent area of a non-historical social science (normally selected from the offerings of the departments of Anthropology, Economics, Geography, Linguistics, Political Science, Psychology, and Sociology) and one course in an immediately related area of a historical tradition; and (4) at least two related courses in the arts or humanities or sciences. Recommended: Prospective majors who have not completed all Social Sciences 1A–1B–1C, 2A–2B, 2C or a sequence in reading and composition with a grade of C+ or higher are urged to elect Social Sciences 100 before enrolling in Social Sciences 103A–103B.
Although the foregoing requirements will generally be satisfied by courses in the College of Letters and Science, the Board of Advisers will consider petitions to substitute courses offered by other colleges and schools.

Honors Program. Upper division students with an overall grade-point average of 3.3 and a grade-point average of 3.3 in the major program may, upon approval from the adviser, enroll in the honors program in the major at any time up to the first term of their senior year. The specific requirements for the honors program are under revision. Specific information may be obtained in the main office of the Division, 301 Campbell Hall.

Teaching Credential. Students interested in securing a teaching credential should inquire from the chairman of the Teaching Training Committee of the Division of Special Programs.

UPPER DIVISION COURSES

100. The Study of the Social Sciences. (4) Four 1-hour lectures and discussions per week. Prerequisite: upper division standing or instructor's permission. Examination of materials from the Social Sciences, with attention to both history and the nonhistorical social sciences. Particularly designed for the general student or prospective major who has satisfied the requirement in reading and composition but has not completed courses 1A–1B–1C and 2A–2B–2C at Berkeley. Mr. Von Blum (F, W, Sp)

103A–103B. Alms and Materials of the Social Sciences. (4–4) Three hours of lecture per week. Prerequisite: completion of a reading and composition sequence. Examination of the province and the goals of the Social Sciences in comparison to those of the other disciplines. Mr. Von Blum in charge (F, W, Sp)

190. Problems in the Social Sciences: Senior Thesis. (4) Prerequisite: 103A–103B and at least 12 upper-division units in history and other social sciences, including at least one course in the pre-modern period. The preparation and presentation of a senior thesis pertaining to the student's individual area of concentration within the Social Sciences field major. Students work tutorially under the supervision of a member of the faculty. (F, W, Sp)

196. Directed Group Study for Upper Division Students. (1–5) Directed group study on special topics approved by the Division. (F, W, Sp)

H198. Honors Course. (1–5) Prerequisite: honors standing. Examination of materials from the Social Sciences and other social sciences including course 103A–103B or the equivalent, and a knowledge of two foreign languages including either classical Greek or classical Latin. Preparation and writing of an honors thesis under the supervision of a member of the faculty. (F, W, Sp)

199. Supervised Independent Study and Research. (1–5) Meetings to be arranged. Enrollment is restricted by regulations on page 36. Must be taken on a passed/not passed basis. (F, W, Sp)

Social Welfare

Group Major Office, 117 Haviland Hall

Major Advisers: Mr. Neil Gilbert, Mr. James R. W. Leiby

Staff and courses are listed under the School of Social Welfare.

Group Major in Social Welfare

The group major in social welfare, leading to the degree of Bachelor of Arts in the College of Letters and Science, offers a social welfare sequence of general interest to liberal arts students. It provides students with an opportunity to test their career interest in social work prior to pursuing graduate professional education and prepares them for community service positions beginning directly after graduation. Applications to the major are considered in fall on a first-come/first-served basis. The number of units and prerequisite courses completed are considered for admission.

Major Requirements

Lower Division

Psychology 1, Sociology 1A, and Statistics 2. Recommended: Anthropology 3, Economics 1, Political Science 1.

Senior Division

Social Welfare 102A–102B (3–3), 103A–103B (2–2), 110A–110B (5–5); and a minimum of five courses chosen from the following list, with three of the courses taken in one department and two selected from the other departments: Anthropology 140, 142, 144, 149, 150; Economics 100A, 100B, 133, 134, 155, 157; Political Science 102, 103, 182, 183, 189; Psychology 130, 140, 150, 151, 160; Public Policy 181, 182, 184, 185, 186; Sociology 120, 130, 140, 142, 157, 160, 162, 163.

Honors Programs. Eligible social welfare majors, upon recommendation of their advisers, may enroll in an honors program. A candidate for honors must complete an honors seminar in social welfare and social work problems (Social Welfare H195A–H195B–H195C). A senior essay is part of the work of the final quarter of the seminar. The essay, which will be of a creative and integrative nature, will be the culmination of an individual library research project on a topic of special interest to the student. It will meet criteria established to assure breadth and depth and will be produced with reference to a timetable for completion. Some time in the senior seminar is devoted to the planning and writing of the essay.

The Major

Students intending to major in social welfare are advised to prepare themselves by taking background work in such areas as history, philosophy, cultural anthropology, psychology, economics, and political science.

Prerequisite Courses in the Major: A student must have successfully completed Sociology 1A–1B and a course in either statistics or logic prior to enrolling in the major. The statistics or logic course prerequisite may be waived if the student completes Sociology 105A–105B at the first possible opportunity after declaring the major.

Lower Division: Sociology 5, Evaluation of Evidence, is required for the major. A student may choose to declare the major in their sophomore year. The Sociology 5 requirement may be waived if the student completes Sociology 105A–105B after declaring the major.

Upper Division: A student must take not less than 36 upper division units in sociology selected to fulfill the following requirements:

1. Sociology 157, History of Sociological Theory
2. Sociology 105A–105B if the student has not completed the statistics or logic prerequisite and Sociology 5
3. Three courses from the following core list: 107 or 119, 110A or 110B, 118, 124, 129, 130, 132, 140, 146, 148 or 149, 179 or 179.9
4. Five elective upper division or graduate courses. Two of these may be elected from the category of Sociology 191, 197, 198, 199, or courses taken in other departments.

Honors Program: Majors who enter their senior year with a 3.3 grade-point average and a 3.3 grade-point average in the major may join the honors program, after conferring with a major adviser, by completing a 190 course in sociology (or other suitable preparation) with Sociology H194A or H194A and H194B, Senior Honors Thesis.

Students who plan to go on to graduate work in sociology or other related disciplines and professions are strongly urged to take both Sociology 157 and 158 and Sociology 105A–105B.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

The Graduate Major

Facilities for graduate study and research, leading to the M.A. and Ph.D. degrees, include courses, seminars, and research training under faculty supervision in the areas of comparative institutions, demography, demographic, educational sociology, industrial sociology, methodology, political sociology, race relations, social change, social psychology, social stratification, sociology of culture, of health and medicine, of law, of religion, and urban sociology.

Candidates for admission must apply by February 1, except those applying for a fellowship, who must apply by December 1. Applications will be available from the graduate assistant of the Department of Sociology, 410 Barrows Hall, after September 1. In addition to the Graduate Division application, the applicant must complete the Department's own special form; applicants should also use the Department's own letter of recommendation forms rather than those supplied by the
themes of the contemporary United States: Government, Resources, and Cities. Stress on the importance of the transition from the 1960s. Examination of how each factor is influenced by policy, current economic trends, and social conflicts.

**1116. Sport as a Social Institution.** (3) Three hours of lecture per week. Prerequisite: course 1A–1B or consent of instructor. Credit will not be given to students who have taken course 1915. Analysis of sport as social institution, its structure and functions; male-female role contrasts, race, economics of sport; the roles of coaches, athletes, fans, inter-relationships and complexities; current turmoil in sport and the ideological struggle which has developed.

**1117. American Society: A Comparative Analysis.** (3) Three lecture hours and two discussion hours per week. Prerequisite: restricted to majors in sociology and to those non-majors who have completed two upper division sociology courses. Various aspects of American values and behavior patterns over time; sources of differences from other developed nations.

**116. Introductory Political Sociology.** (5) Three lecture hours and two consultation hours per week. Prerequisite: one lower division sociology course, or consent of the instructor. Political processes in organized groups, the social bases of power. The role of social classes, occupational groups, and religious groups, and the influence of cultural values.

**1119. Law and Society.** (5) Three lecture hours and two consultation hours per week. Prerequisite: one lower division sociology course, or consent of the instructor. Problems of research design treatment from a sociological perspective. Influence of culture and social organization on law: role of law in social control. Comprehension of the methods of sociological inquiry, with attention to both qualitative and quantitative research methods. A maximum of 12 units may be counted from the methods of the course.

**120. Population and Society.** (4) Three lecture hours per week. Introduction to sociological analysis using demographic data and concepts.

**UPPER DIVISION COURSES**

**100. Social Evolution.** (5) Three lecture hours and two consultation hours per week. Prerequisite: course 1A, 1B lower division sociology course, or consent of the instructor. Major concerns of sociological theory: structuralism, functionalism, conflict, and modernization. Theorists and theories to be examined include: Parsons, Talcott; Durkheim, Emile; Marx, Karl; Weber, Max; Gouldner, Alvin; Radcliffe-Brown, A. R.; and others. Historical societies, cultures, and lifeways will be treated from a sociological perspective. Problems of research design treatment from a sociological perspective. Influence of culture and social organization on law: role of law in social control. Comprehension of the methods of sociological inquiry, with attention to both qualitative and quantitative research methods. A maximum of 12 units may be counted from the methods of the course.

**110. Ethic and Social Relations: Theoretical Perspectives.** (5) Three lecture hours and two consultation hours per week. Prerequisite: one lower division sociology course, or consent of the instructor. Current issues and problems in the sociology of social structure, social relations, and social change. Topics will include: role theory, social interaction, small group behavior, social networks, status attainment, social structure, and social movement. The theories and concepts will be applied to the study of social change, including such issues as urbanization, industrialization, and global communication.

**110A. Peoples of Color: Continuities, Conflicts, and Change.** (5) Three lecture and two discussion hours per week. Prerequisite: one lower division sociology course, or consent of the instructor. Recent trends in occupational stratification; the role of race, ethnicity, and gender in the labor market; the effects of race and ethnicity on social inequality. Theories of race and ethnicity will be examined from a sociological perspective.

**111C. Selected Topics in Ethnic and Racial Relations.** (5) Three lecture hours and two consultation hours per week. Prerequisite: consent of instructor. Recent trends in occupational stratification; the role of race, ethnicity, and gender in the labor market; the effects of race and ethnicity on social inequality. Theories of race and ethnicity will be examined from a sociological perspective.

**111D. Social Change and Cultural Variations.** (5) Three lecture hours and two consultation hours per week. Prerequisite: one lower division sociology course, or consent of the instructor. Recent trends in occupational stratification; the role of race, ethnicity, and gender in the labor market; the effects of race and ethnicity on social inequality. Theories of race and ethnicity will be examined from a sociological perspective.

**126. Sociology of Science.** (4) Three lecture hours and two consultation hours per week. Prerequisite: one lower division sociology course, or consent of the instructor. The role of formal education in modern societies: Educational systems in relation to the religious, cultural, economic, and political forces shaping their character.

**129. Industrial and Occupational Sociology.** (5) Three lecture hours and two consultation hours per week. Prerequisite: one lower division sociology course, or consent of the instructor. Recent trends in occupational stratification; the role of race, ethnicity, and gender in the labor market; the effects of race and ethnicity on social inequality. Theories of race and ethnicity will be examined from a sociological perspective.

**130. Sociology of the Family.** (5) Three lecture hours and two consultation hours per week. Prerequisite: one lower division sociology course, or consent of the instructor. Recent trends in occupational stratification; the role of race, ethnicity, and gender in the labor market; the effects of race and ethnicity on social inequality. Theories of race and ethnicity will be examined from a sociological perspective.

**131. Social Stratification.** (3) Three lecture hours and two consultation hours per week. Prerequisite: one lower division sociology course, or consent of the instructor. Recent trends in occupational stratification; the role of race, ethnicity, and gender in the labor market; the effects of race and ethnicity on social inequality. Theories of race and ethnicity will be examined from a sociological perspective.

**132. Social Stratification.** (3) Three lecture hours and two consultation hours per week. Prerequisite: one lower division sociology course, or consent of the instructor. Recent trends in occupational stratification; the role of race, ethnicity, and gender in the labor market; the effects of race and ethnicity on social inequality. Theories of race and ethnicity will be examined from a sociological perspective.

**134. Sociology of War and Conflict.** (3) Three lecture hours and two consultation hours per week. Prerequisite: one lower division sociology course, or consent of the instructor. Recent trends in occupational stratification; the role of race, ethnicity, and gender in the labor market; the effects of race and ethnicity on social inequality. Theories of race and ethnicity will be examined from a sociological perspective.
135. The Study of Social Change in New Nations. (4) Three hours of lecture per week. Prerequisite: course 1A–IB or consent of instructor. Major theoretical perspectives on the causes of future changes. Analysis of the sick role and the role of experts and intellectuals. Special attention to variations in patient behavior and contemporary Soviet society. Mr. Schurmann (Sp)

136. Sociology of Women. (5) Three lecture hours and two tutorial hours per week. Prerequisite: Sociology 1A–IB or consent of the instructor. The role of women and their interests in society. Statistical methods. Mr. Fireman (W)

137. History of Sociological Theory. (5) Three lecture hours and two tutorial hours per week. Prerequisite: one lower division sociology course or consent of instructor. History of sociological theory in light of field and laboratory research. Ms. Heyns (F); Mr. Fireman (W); Ms. Bonnell, Mr. Bock (Sp)

138. Supervised Independent Study and Research. (1–5) One to five meeting and consultation hours per week. Prerequisite: consent of the instructor. Group studies of selected topics which cannot be included in current semester offerings listed on page 36. Must be taken on a passed/not passed basis. The Staff (F, W, Sp)

GRADUATE COURSES

203A–203B. Research Methods Seminar Sequence. (1–5) Two hours of seminar meetings biweekly throughout the year and two tutorial hours biweekly throughout the year. Prerequisite: 203A or 203B. Credit and grade will be assigned only upon completion of the full sequence.

205B. Basic Viewpoints in Social Psychology. (4) Three lecture hours and two consultation hours per week. Prerequisite: Students may take 205A by itself, however it is prerequisite to 205B. Credit and grade assigned separately for each course. Mr. Swanson (Sp)

*206. Socialization and Personality. (4) Two lecture hours and two consultation hours per week. Prerequisite: 1A–IB or consent of instructor. The study of inter-personal aggression, violence and intergroup conflict from an interdisciplinary perspective.
ture hours and two consultation hours per week. Goals and process of socialization; the self; organized social roles as mediated through the norms and patterns of interaction. Mr. Sharlin (W).  

210A-210B. Racial and Ethnic Minorities. (4-4) Two hours of lecture or seminar and two hours of tutorial per week. Prerequisite: course 210 A is recommended but not prerequisite to 210B. Students may take the lecture course 210A or the seminar 210B, or they may take 210A-210B in sequence, with credit and grade assigned upon completion of the full sequence. The study of the origins, development, and dissolution of social movements. Emphasis upon the social, political, and economic processes that provide the context and content of social change. Mr. Duster (Sp).  

215. Sociology of Law. (4) Two lecture hours and two consultation hours per week. Philosophy of science and introductory statistics, or equivalent. Credit and grade will be given only upon completion of sequence. The topics will include types of generalization; measurement; levels of analysis and ascription; theory construction, explanation and inference; problems of subjectivity and free will; fact and value. Mr. Glock (F, W).  

215A-215B. Seminar in the History of Social Thought. (4-4) Two seminar hours and two tutorial hours per week. Prerequisite: course 215 A is recommended but not prerequisite to 215B. Students may take 215A or 215B, or they may take 215A-215B in sequence with credit and grade assigned upon completion of the full sequence. Mr. Bock (Sp).  

216. Sociology of Work. (4) Two seminar hours and two consultation hours per week. Prerequisite: course 227 or equivalent.  

Mr. Hermassi (F); Mr. Lowenthal (W).  

222. Sociology of Education. (4) Two lecture hours and two consultation hours per week. Mr. Duster (Sp).  

224A–224B. Social Change. (4–4) Two lecture hours and 1 tutorial hour per week. Prerequisite: Students may take 224A or 224B, or they may take 224A–224B in sequence with credit and grade assigned upon completion of the full sequence.  

224A: Mr. Halle (F).  

224B. Comparative Social Structure. (4–4) Two seminar hours and two consultation hours per week. Prerequisite: course 224A is recommended but not prerequisite to 224B. Course may be repeated for credit.  

Mr. Nonen (Sp).  

225A–225B. Marxism and Functionalism. (4–4) Two lecture hours and two consultation hours per week. Prerequisite: course 225A is recommended but not prerequisite to 225B. Students may take the course 225A or the seminar 225B, or they may take 225A–225B in sequence with credit and grade assigned upon completion of the full sequence.  

225A: Mr. Glock (Sp).  

226. Sociology of Work. (4) Two seminar hours and two consultation hours per week. Prerequisite: course 227 or equivalent.  

Mr. Hermassi (F); Mr. Lowenthal (W).  

229. Sociology of Work. (4) Two seminar hours and two consultation hours per week. Prerequisite: course 229 may be taken in one quarter or in two. When course 229 is followed by one quarter of Sociology 290 with the same instructor, the credit and grade will then be assigned upon completion of the full sequence. The organization of work and varieties of work arrangements; occupational roles and career patterns; the interplay of machine, man, colleague group, and complex organization; worker participation in management; social aspects of industrial conflict; labor, industry, and society.  

(Sp).  

230. Population. (4) Three lecture hours and one tutorial hour per week. Prerequisite: a course in population or consent of instructor. Problems in the theory of population; institutional and motivational aspects of demographic behavior.  

231. Sociology of Marriage, Family, and Kinship. (4) Two lecture hours and two consultation hours per week. Prerequisites: The seminar 231B, or they may take 231A–231B with credit and grade assigned upon completion of the full sequence. A survey of sociological thought on comparative political systems. Mr. Herrmann (F).  

232. Social Stratification. (4) Two lecture hours and two consultation hours per week. Prerequisite: course 232A is recommended but not prerequisite to 232B. Mr. Herrmann (F).  

233. Structural-Functionalism. (4) Two seminar hours and two consultation hours per week. Mr. Herrmann (F).  

234. Social Interaction and Organization. (4) Three lecture hours and two consultation hours per week. Prerequisite: graduate standing in sociology or psychology.  

240. Social Movements. (4) Two hours of seminar and two hours of tutorial per week. Prerequisite: may be taken either as a one-quarter course or as a two-quarter sequence with credit 290 with the same instructor. Sociology of social movements, with special emphasis on comparative materials. Mr. Heysn (Sp).  

241. Organizations and Institutions. (4) Two lecture hours and two consultation hours per week. Mr. Nonen (Sp).  

242A–242B. Comparative Social Structure. (4–4) Two lecture hours and two tutorial hours per week. Prerequisite: course 242A is recommended but not prerequisite to 242B. Course may be repeated for credit.  

Mr. Nonen (Sp).  

244. Comparative Behavior. (4) Two lecture hours and two consultation hours per week. Studies in mass behavior, social movements, and political action.  

Mr. Fireman (W).  

245. Social Institutions. (4) Two years of seminar and two years of tutorial per week. Mr. Herrmann (W).  

246. Sociology of Religion. (4) Two lecture hours and two consultation hours per week. Prerequisite: course 246 A is recommended but not prerequisite to 246B. Mr. Herrmann (F).  

247. Sociology of Gender Roles. (4) Two lecture hours and two consultation hours per week. Mr. Herrmann (W).  

248. Collective Behavior. (4) Two lecture hours and two consultation hours per week. Analysis of social systems and processes, with special emphasis on the relations of education to social institutions. Mr. Herrmann (W).  

250A–250B. Marxism and Functionalism. (4–4) Two lecture hours and two consultation hours per week. Prerequisite: course 250A is recommended but not prerequisite to 250B. Mr. Herrmann (Sp).  

252. Sociology of Gender Roles. (4) Two hours of tutorial with one hour per week. Study of the origins, development, and dissolution of social movements. Emphasis upon the social, political, and economic processes that provide the context and content of social change. Mr. Duster (Sp).  

254. Sociology of Health and Medicine. (4) Two lecture hours and one tutorial hour per week. Prerequisite: consent of the instructor.  

261A–261B. Sociological Thought. (4–4) Two lecture hours and two tutorial hours per week. Prerequisite: course 261A is recommended but not prerequisite to 261B. Course may be repeated for credit. Mr. Sharlin (W).  

262A–262B. Urbanization. (4–4) Two hours of lecture and two hours of tutorial per week. Prerequisite: course 262A is recommended but not prerequisite to 262B. Mr. Glock (Sp).  

263. Modern Society: Structural Uniformity and Cultural Diversity. (4) Two lecture hours and two consultation hours per week. Prerequisite: may be taken either as a one-quarter course or as a two-quarter sequence with credit and grade assigned upon completion of the full sequence. Mr. Bonell (F, W).  

265. Modern Society: Structural Uniformity and Cultural Diversity. (4) Two lecture hours and two consultation hours per week. Prerequisite: may be taken either as a one-quarter course or as a two-quarter sequence with credit and grade assigned upon completion of the full sequence. Mr. Bonell (F, W).  

271. Deviance and Social Control. (4) Two lecture hours and two consultation hours per week. Deviance and social system analysis; ethnography of deviant communities. Mr. Bock (Sp).  

274A–274B. Methodological Issues in Comparative and Historical Research. (4–4) Two lecture hours and two consultation hours per week. Prerequisite: 274A alone is not prerequisite to 274B; 274A and 274B are taken in one quarter or in two. When course 274A is taken in one quarter, it may be considered a sequence course; students may take 274A–274B in sequence, with credit and grade assigned upon completion of the full sequence. A survey of sociological thought on comparative political systems. Mr. Herrmann (F).  

275. Sociology of Literature. (4) Two lecture hours and two consultation hours per week. Prerequisites: 275 A and 275B are taken in one quarter or in two. When course 275A is taken in one quarter, it may be considered a sequence course; students may take 275A–275B in sequence, with credit and grade assigned upon completion of the full sequence. Mr. Herrmann (Sp).  

280A–280B–280C. Political Sociology. (4–4–4) Two lecture hours of seminar or lecture and two hours of tutorial per week. Prerequisite: consent of instructor. Mr. Glock (W).  

283. Sociological Thought. (4–4) Two lecture hours and two consultation hours per week. Prerequisite: consent of instructor.  

285A–285B. Participant Observation. (4–4) Two lecture hours and two consultation hours per week. Prerequisite: consent of instructor.  

286A–286B. Industrial Conflict. (4–4) Two lecture hours and two consultation hours per week. Prerequisite: consent of instructor. Mr. Glock (Sp).
*276. Mathematical Sociology. (4) Two hours of lecture and one hour consultation per week. An introduction to basic conceptions of social phenomena in mathematical sociology. Matrix algebra is used to analyze static networks of relations. Markov chains are used to analyze social mobility. Basic optimization methods in equilibrium statics and comparative statics are used to analyze platforms of competing political parties, social exchange systems and the distribution of collective goods.

*277A–277B. Structural Equation Models. (4–4) Formerly 214A–214B. Two hours of lecture plus one hour tutorial per week. Prerequisite: An introductory statistics course covering inference and analysis up through correlation/regression, such as Statistics 131-132, or the instructor's consent. 277A or equivalent is prerequisite for 277B. An introduction to basic issues in using structural equation models to capture and assess explanations as epistemic and structural constraints on flows of effects in systems of observed and unobserved variables. Substantive and methodological issues are emphasized over statistical issues.

290. Seminar. (4) Two seminar hours and two consultation hours per week. Advanced study in modern sociology. The specific topics will be announced at the beginning of each quarter. (F, S; Ms. Heys, Ms. Lapidus, Mr. Schurmann (W); Mr. Blumer, Mr. Fireman, Mr. Matza, Mr. Swanson (Sp))

*298. Directed Group Studies for Graduates. (1–8) Prerequisite: consent of the instructor. Group studies of selected topics which vary from year to year.

299. Individual Study and Research. (1–8) Primarily for students engaged in writing a Ph.D. dissertation. May not be substituted for available graduate lecture courses or course 290. The Staff (F, W, Sp)

601. Individual Study for Master's Students. (1–8) Individual study for the comprehensive requirements in consultation with the adviser. Units may not be used to meet either unit or residence requirements for a master's degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

602. Individual Study for Doctoral Students. (1–8) Individual study in consultation with the graduate adviser, intended to provide an opportunity for qualified students to prepare themselves for the various examinations required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

South and Southeast Asian Studies
Department Office, 4115 Dwinelle Hall

Professors: George F. Dales, Ph.D. P. S. Jain, Ph.D.
Leonard Nathan, Ph.D. J. F. Staal, Ph.D.

Associate Professors: Robert P. Goldman, Ph.D. George L. Hart, III, Ph.D. Bruce R. Pry, Ph.D.
Amin Sweeney, Ph.D. Barred A. van Nooten, Ph.D. (Chairman)

Assistant Professor: Karine Schomer, Ph.D.

Lecturers: Kausalya Hart, M.A. Usha R. Jain, M.A.

Departmental Major Advisers: Hindi-Urdu, Ms. Karine Schomer, Sanskrit, Mr. Robert Goldman; South Asian Archaeology, Mr. George Dales; Tamil, Mr. George Hart; Malay-Indonesian, Southeast Asian Civilization, Mr. Amin Sweeney.

Graduate Advisers: Hindi-Urdu, South Asian Civilization, Mr. Bruce Pray; South Asian Archaeology, Mr. George Dales; Sanskrit, Mr. Robert P. Goldman; Tamil, Mr. George Hart.

The Department offers programs of both undergraduate and graduate instruction and research in the languages and civilizations of South and Southeast Asia from the most ancient period to the present. Instruction includes a) intensive training in several of the major languages of the area: Sanskrit (including Buddhist Sanskrit), Pali and Prakrit, Hindi and Urdu, Tamil, Malay-Indonesian, and Thai; b) specialized training in the areas of 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 devised to fit the needs of students with a wide range of interests. Opportunities exist for a limited number of students to participate in both archaeological projects and language training programs in Pakistan. The Department has at its disposal the resources of the Center for South and Southeast Asia Studies, the South/Southeast Asia Library Service, and is 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, history, and archaeology, and Southeast Asian language (Malay-Indonesian) or civilization.

Formerly 214A–214B. Two hours of lecture plus one hour consultation per week. Advanced study in modern sociologies. The specific topics will be announced at the beginning of each quarter. (F, S; Ms. Heys, Ms. Lapidus, Mr. Schurmann (W); Mr. Blumer, Mr. Fireman, Mr. Matza, Mr. Swanson (Sp))

List IV. Fine Arts: History of Art 136A, 136B, 136C; Music 133A, 133B (with consent of instructor)

List V. Archaeology: Relevant courses in Anthropology, Geography, Geology, Statistics, or other departments as the student's specific field of archaeology requires.

With written permission from the student's adviser, other courses may be substituted for not more than two of the courses listed above, particularly in the event that certain of these courses may not be offered or new courses may be added to the curriculum. For the language emphasis, a minimum of two upper division courses in literature or literature in translation must be taken in fulfillment of the general upper division requirement.

General requirements for the South Asian emphases are: lower division: South Asian 10A–10B; upper division: South Asian 15; upper division: South Asian 100. In addition, specific requirements for each South Asian emphasis are as follows:

I. South Asian Language

A. Hindi-Urdu: 1) Hindi-Urdu 1A–1B–1G; 2) Hindi-Urdu 100A–100B–100C; 3) South Asian 123; 1 other South Asian language course in translation or one advanced Hindi-Urdu literature course; 2) 10 upper division units from List I through V below. 

B. Sanskrit: 1) Sanskrit 100A–100B–100C; 2) Sanskrit 101, 102, 103; 3) 10 upper division units from List I through V below; 4) Linguistics 20 is recommended.

C. Tamil: 1) Dravidian 1A–1B–1C; 2) Dravidian 100A–100B–100C; 3) 21 upper division units to be chosen from Lists I through V below.

II. South Asian Archaeology

A. 1) A minimum of 10 upper division units in a South Asian language (preferably modern): prerequisite, 15 lower division units of a South Asian language; 2) South Asian 192A–192B, South Asian 193A–193B; Anthropology 2; Near Eastern Studies 143A–143B; Anthropology 133 or Anthropology 134; prerequisite, consent of the instructor; 3) electives may be chosen from Lists I through V below.

III. South Asian Civilization

A. 1) Sanskrit 100A–100B–100C plus 25 upper-division units or one year of a modern South Asian language (15 lower division units) plus 31 upper division units distributed as follows: a) one literature course from List I below; b) one course in religion or philosophy from List II below; c) one course in history or social science from List III below; d) one course in the fine arts from List IV below; 2) remain of required upper division units (either 25 or 31 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 emphases:

List I. Literature: South Asian 122, 123, 124, 125, 127

List II. Religion and Philosophy: South Asian 127, 131, 140, 141, 160; Interdepartmental Studies 155

List III. History and Social Science: History 187A, 187B, 187C; Anthropology 188A, 188B; Political Science 145A, 145B

II. Southeast Asian Civilization

A. 1) One year of a Southeast Asian language (15 lower division units); 2) 35 upper division units distributed as follows: a) two courses from List I below; b) one course from List II below; c) one course from List III below; d) one course from List IV below; 3) remainder of required upper division units to be selected from Lists I through IV below.

Courses recommended for fulfillment of the upper division unit requirement for the Southeast Asian emphases:

List I. Literature: Malay-Indonesian 130A–130B; Southeast Asian 110, 124, 128

List II. Religion and Philosophy: South Asian 127, 140, 162; Interdepartmental Studies 155

List III. Social Science: Anthropology 159, 160 (with consent of instructor); 189A, 189B; Geography 163; Political Science 143D, 143E

List IV. Fine Arts: History of Art 137; Music 133A (with consent of instructor), Music 140 (with consent of instructor).

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 in the event that certain courses may not be offered or new courses may be added to the curriculum.

Honors Program. To be eligible for admission to the honors program, a student must attain a 3.3 grade-point average or higher in courses completed in the major and in all courses that must be completed in the University. An honors thesis is required. Students who wish to participate must choose a thesis topic in consultation with an adviser and apply for admission to the program through the departmental office no later than the first week of winter quarter of the senior year. Information concerning the honors program is available in the departmental office, Room 4115 Dwinelle.

Letters and Science List of Courses: 162 units from the List must be included in the 180 required for graduation. See the Announcement of the College of Letters and Science for courses on the List.

Graduate Study

Programs of graduate study and research leading to the M.A. degree are offered with emphases on South and Southeast Asian studies. See the Announcement of the College of Letters and Science for courses on the List.
Asian archaeology, and South Asian civilization. Programs leading to the Ph.D. degree are offered with emphases on Dravidian (Tamil), Modern Indo-Aryan: Hindi and Urdu, Sanskrit, and South Asian archaeology.

Degrees. All students admitted to programs leading to a degree are required to take a qualifying examination in addition to a B.A. or its equivalent, some formal academic background in South or Southeast Asian languages and area studies. Students should in general be prepared to have taken appropriate training equivalent to that required of the departmental major in one of the various areas. M.A. candidates with insufficient preparation may be required to make up deficiencies without credit toward the M.A. unit requirement.

The M.A. degree is offered under Plan II (see Index under Graduate Division) which requires the student to complete 48 hours of coursework totaling at least 36 upper division and graduate units, of which at least 18 must be graduate. The distribution of courses is determined in consultation with the graduate adviser, following the special requirements for each area. Effective January 1, 1977 the Plan I option (requiring a thesis) is no longer available.

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 his or her adviser decide is relevant to the student's program, i.e., Dutch, French, German, Japanese, Russian. In addition, first-year proficiency in a second area-related language is required. Students who pass the qualifying examination may be required to pass a reading examination or by earning a satisfactory grade (B- or better) in relevant coursework.

Before being admitted to the comprehensive examination, students are required to submit to the graduate adviser two acceptable scholarly papers, prepared either independently or in connection with graduate courses, and to fulfill the language requirements.

Students must then pass a written examination in a major area and two minor areas of specialization (toward which they have directed their reading and coursework) and a final oral examination.

Except in unusual circumstances, a student must complete the M.A. program in at most six quarters. Further information about University degree regulations can be found in this catalog.

The general prerequisites for admission to the Ph.D. program are the requirements for the M.A. degree in the appropriate area. Students without a B.A. degree would normally be advised to apply for admission to the M.A. program, even though their eventual goal is the Ph.D. degree. At the conclusion of the M.A. program, they may be required to take a qualifying examination in addition to the M.A. program, even though their eventual goal is the Ph.D. degree. At the conclusion of the M.A. program, they may be required to take a qualifying examination in addition to the M.A. program.

The Ph.D. degree is offered according to Plan B. Beyond the course requirements for the M.A., students must complete a course in Indo-Aryan or Indo-European linguistics. In addition, students must take a second-year proficiency in a second area-related language.

Students must demonstrate a reading knowledge of two languages and have the major field of interest. These languages will normally be selected from the following list: Dutch, French, German, Japanese, and Russian. Under special circumstances students may offer another language with the approval of the 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 three fields of specialization. These fields may be in the area of study outside the department. Examples of fields outside the department are history, Indo-European languages, and the study of the traditional systems of India.

127. Brahmanism and Hinduism. (4) Three hours of lecture per week. Readings in selections from the Hindu scriptures—the Vedas, the Brahmans, the Upanishads, the Puranas, and the Vedanta philosophy and the Vedanta philosophy in the later Vedic and the Brahmanic periods. Emphasis on the nature and interpretation of the Vedic poetry of the earlier period of Vedic religious poetry. Staff (W)

130. Historical Survey of Indo-Aryan Languages. (4) Three hours of lecture per week. Prerequisite: One year of an Indo-Aryan language or Linguistics 20 or consent of instructor. Readings in Indo-Aryan languages, bilingual studies, and Indo-European languages. Emphasis on the nature and interpretation of the Vedic poetry of the earlier period of Vedic religious poetry. Staff (F)

131. Indian Buddhism. (4) Three hours of lecture per week. Emphasis on the systems of Buddhism as developed in India. Emphasis on the nature and interpretation of the Vedic poetry of the earlier period of Vedic religious poetry. Staff (W)

140. Hindu Mythology. (4) Three hour lectures per week. Prerequisite: Consent of instructor. Reading of selected mythological texts in translation. Staff (Sp)

141. Religion in South India. (4) Three hours of lecture per week. Prerequisite: Consent of instructor. Study of religion as practiced and religious beliefs as expressed in the various ethnic groups and as practiced in the various ethnic groups. Staff (Sp)

146A—146B—146C. Studies in South Asian Languages (2-4, 2-4, 2-4) Two to four meetings per week.

150. Great Books of India. (4) Three hours of lecture per week. Reading and discussion of 10 classic works of Indian literature in translation. The books ranging from the Sanskrit epics to Kiplings' Kim are representative of different historical periods, regions, and languages and genres. Each book, however, has been chosen because it defines or speaks for a central element of Indian culture. Staff (Sp)

10A. Introduction to the Civilization of India. (5) Four and one-half hours of lecture per week. Readings, lectures, and discussions in the development of civilization of India from the Indus valley and Brahmanic civilization to the advent of Islam. Emphasis on the development of religious, philosophical, and scientific systems of traditional India. Staff (Sp)

10B. Introduction to the Civilization of India. (5) Four and one-half hours of lecture per week. Prerequisite: course 10A or consent of instructor. Readings, lectures, and discussions in the development of Indian culture from the advent of Islam to the present. Staff (Sp)

151A. Religion and political movements of Bhakti and Indian Islam and the conflict of traditional and modern values in contemporary India. Staff (W)

152. Hinduism in modern South India. Staff (Sp)

160. Jainism and Other Heterodox Systems. (4) Three hours of lecture per week. Prerequisite: course 131 and consent of instructor. Emphasis on the nature and interpretation of the Vedic poetry of the earlier period of Vedic religious poetry. Staff (Sp)

175. Sanskrit Bibliography. (4) Three hours per week. A survey of Indological bibliographic material from the past fifty years with emphasis on present sources of information. Staff (W)

192A—192B. South Asian Prehistory. (4—4) Three hours of lecture per week. A survey of archaeological discoveries in South Asia, Pakistan, Afghanistan, and Central Asia as an area of research. Staff (W)

193A—193B. South Asian Archaeology: Prehistoric and Early Historical Periods. (4-4) Three hours of lecture per week. A survey of archaeological discoveries in South Asia, Pakistan, Afghanistan, and Central Asia as an area of research. Staff (W)

194. Field Project in Pakistan. (10-15) For six to eight hours per week for the last five weeks of the quarter. Prerequisites: a knowledge of basic archaeological techniques, either from previous field experience or from the project. Staff (W)

195. Iran, Architecure and Archaeology. (4) Three hours of lecture per week. Lectures and discussion of 19th and 20th century as well as older Iranian art, based on readings in English or in English translation. Staff (W)

201. Introduction to the Civilization of India. (5) Four and one-half hours of lecture per week. Prerequisite: Consent of instructor. Reading of selected mythological texts in translation. Staff (Sp)

207. History and Culture of the Islamic World. (4) Three hours of lecture per week. Prerequisite: Consent of instructor. Staff (Sp)

127. Brahmanism and Hinduism. (4) Three hours of lecture per week. Readings in selections from the Hindu scriptures—the Vedas, the Brahmans, the Upanishads, and the Vedanta philosophy in the later Vedic and the Brahmanic periods. Emphasis on the nature and interpretation of the Vedic poetry of the earlier period of Vedic religious poetry. Staff (W)

130. Historical Survey of Indo-Aryan Languages. (4) Three hours of lecture per week. Prerequisite: One year of an Indo-Aryan language or Linguistics 20 or consent of instructor. Readings in Indo-European languages. Emphasis on the nature and interpretation of the Vedic poetry of the earlier period of Vedic religious poetry. Staff (F)

131. Indian Buddhism. (4) Three hours of lecture per week. General introduction to the systems of Buddhist thought in India. Selected readings from the Hinayana and Mahayana scriptures in translation. Brief survey of the historical development of the Buddhist samatha and its impact on the peoples of South and Southeast Asia. Staff (W)

140. Hindu Mythology. (4) Three hour lectures per week. Prerequisite: Consent of instructor. Reading of selected mythological texts in translation. Staff (Sp)

141. Religion in South India. (4) Three hours of lecture per week. Prerequisite: Consent of instructor. Study of religion as practiced and religious beliefs as expressed in the various ethnic groups and as practiced in the various ethnic groups. Staff (Sp)

146A—146B—146C. Studies in South Asian Languages (2-4, 2-4, 2-4) Two to four meetings per week.

150. Great Books of India. (4) Three hours of lecture per week. Reading and discussion of 10 classic works of Indian literature in translation. The books ranging from the Sanskrit epics to Kiplings' Kim are representative of different historical periods, regions, and languages and genres. Each book, however, has been chosen because it defines or speaks for a central element of Indian culture. Staff (Sp)

10A. Introduction to the Civilization of India. (5) Four and one-half hours of lecture per week. Readings, lectures, and discussions in the development of civilization of India from the Indus valley and Brahmanic civilization to the advent of Islam. Emphasis on the development of religious, philosophical, and scientific systems of traditional India. Staff (Sp)

10B. Introduction to the Civilization of India. (5) Four and one-half hours of lecture per week. Prerequisite: course 10A or consent of instructor. Readings, lectures, and discussions in the development of Indian culture from the advent of Islam to the present. Staff (Sp)

151A. Religion and political movements of Bhakti and Indian Islam and the conflict of traditional and modern values in contemporary India. Staff (W)

152. Hinduism in modern South India. Staff (Sp)

160. Jainism and Other Heterodox Systems. (4) Three hours of lecture per week. Prerequisite: course 131 and consent of instructor. Emphasis on the nature and interpretation of the Vedic poetry of the earlier period of Vedic religious poetry. Staff (Sp)

175. Sanskrit Bibliography. (4) Three hours per week. A survey of Indological bibliographic material from the past fifty years with emphasis on present sources of information. Staff (W)

192A—192B. South Asian Prehistory. (4—4) Three hours of lecture per week. A survey of archaeological discoveries in South Asia, Pakistan, Afghanistan, and Central Asia as an area of research. Staff (W)

193A—193B. South Asian Archaeology: Prehistoric and Early Historical Periods. (4-4) Three hours of lecture per week. A survey of archaeological discoveries in South Asia, Pakistan, Afghanistan, and Central Asia as an area of research. Staff (W)

194. Field Project in Pakistan. (10-15) For six to eight hours per week for the last five weeks of the quarter. Prerequisites: a knowledge of basic archaeological techniques, either from previous field experience or from the project. Staff (W)

195. Iran, Architecure and Archaeology. (4) Three hours of lecture per week. Lectures and discussion of 19th and 20th century as well as older Iranian art, based on readings in English or in English translation. Staff (W)
197. Field Studies in South and Southeast Asia. (1–5) Individual conferences to be arranged. Pre-requisite: consent of instructor. Supervised experience relevant to specific aspects of South and Southeast Asian studies in off-campus locations. Regular individual meetings with faculty sponsor and written reports required. Staff.

198. Directed Group Study for Upper Division Students. (1–4) Hours of meeting are variable. Tutorial instruction in areas not covered by regularly scheduled courses. Staff (F, W, Sp).

199. Supervised Independent Study and Research. (1–5) Must be taken on a passed/not passed basis. Enrollment is restricted by regulations shown on page 36. Staff (F, W, Sp).

**GRADUATE COURSES**

*201. Readings in Jaina Sanskrit Texts. (4) Three hours of lecture per week. Prerequisite: one year of Sanskrit and course 160. The aim of the seminar is to give the student a firsthand acquaintance with Jaina doctrine and practice through selections from both canonical and non-canonical sources, notably the Acanagga, Udfurtahdyana, Samayasara, and Tattvavarta-sutra, and relevant commentaries in Sanskrit. Mr. Jaini.

210. Linguistics in India. (4) Three 1-hour meetings per week. Prerequisite: some familiarity with linguistics and proficiency in the language of instruction of the instructor. The linguistic description and analysis of grammatical Sanskrit as created and developed by the Sanskrit grammarians. Mr. Staal (W).

212. Indian Philosophical Texts. (4) Three 1-hour meetings per week. Reading of Sanskrit texts on Indian Philosophy (e.g., Sankara or other Vedanta & Mimamsa) for students with some knowledge of Sanskrit. Mr. Staal (W).

*215A–215B–215C. Readings in Indian Buddhist Texts. (4–4–4) Three hours of lecture per week. Prerequisite: one year of Sanskrit and/or consent of instructor. The development of the Abhidharma texts and commentaries in Pali and Sanskrit. 215B: Selected readings in Pali. 215C: Selected readings in Sanskrit. Mr. Staal (F).

216. Malay-Indonesian Literature in Translation. (4) Three hours of lecture per week. Survey of literary traditions in Indonesia from ancient to contemporary times. Readings of old texts, mystical treatises, poetry, epics, novels, essays. Staff short-stories, novels, essays.

*218. Buddhism in Southeast Asia (4) Three hours of lecture per week. The history and development of the major schools of Buddhism in the Indianized cultures of Southeast Asia. Survey of inscriptions, literary, cultural, historical and doctrinal manifestations of Mahayana and Hinayana Buddhism in Indonesia (Borobudur), Cambodia (Ankor Wat), Burma, Thailand and Sri Lanka. Readings from original sources and secondary works in translation. No prerequisites; knowledge of area languages not required. Mr. Jaini.

198. Directed Group Study for Upper Division Students. (1–4) Tutorial instruction in areas not covered by regularly scheduled courses. Staff (F, W, Sp).

199. Supervised Independent Study and Research. (1–5) Must be taken on a Passed/Not Passed basis. Enrollment is restricted by regulations shown on page 36.

**Dravidian**

**LOWER DIVISION COURSE**

1A–1B–1C. Introductory Tamil. (5–5–5) Five hours of lecture per week. Prerequisite: one quarter of Tamil. The grammar of modern Tamil will be covered followed by readings in simple texts. Practice will also be given in spoken Tamil. Sequence begins in Fall. Mrs. K. Hart (F, W, Sp).

298. Seminar. (3) Hours of meeting are variable. Directed Group Study. Content varies from quarter to quarter. Students may receive credit for more than one seminar in the same quarter. May be repeated for additional credit with consent of instructor. Staff.

601. Individual Studies for Master Students. (1–5) Individual Study for the comprehensive or language requirements in consultation with the graduate adviser. Units may not be used to meet either unit or residence requirements for a Master’s degree. Must be taken on a satisfactory/unsatisfactory basis. Staff (F, W, Sp).

602. Individual Study for Doctoral Students. (1–8) 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. Must be taken on a satisfactory/unsatisfactory basis. Staff (F, W, Sp).

IDS 155. Philosophies of India. (4) See Inter-Departmental Studies for the complete description of this course. Mr. Staal (F).

**Southeast Asian**

**LOWER DIVISION COURSE**

10A–10B. Introduction to the Civilization of Southeast Asia. (5–5) Three hours of lecture and 1 1/2 hours of reading and discussion per week. Readings and discussions in the culture and civilization of mainland Southeast Asia. Subjects discussed will include art, architecture, social structure, systems of government and religion. (A) Mainland, special emphasis on the impact of Hinduism and Buddhism. (B) Insular Southeast Asia (Indonesia and Malaysia), special emphasis on impact of Hinduism, Buddhism and Islam. Mr. Sweeney (F, W).

110. Thai Literature in Translation. (4) Three hours of lecture per week. A survey of Thai literature including the classical Buddhist, and modern literary works. Staff.

124. The Shadow-play in Southeast Asia. (4) Three one-hour lecture per week. Introduction to study of Southeast Asian shadow-plays (Indonesia, Malaysia, Thailand, Cambodia) with special reference to Malay genres. Course will deal with origins, history & development, cultural context, transmission, language and style of performance, repertoire and ritual. Students will also learn rudiments of performance. Mr. Sweeney (F).

126. Malay-Indonesian Literature in Translation. (4) Three hours of lecture per week. Survey of literary traditions in Indonesia from ancient to contemporary times. Readings of old texts, mystical treatises, poetry, epics, novels, essays. Staff short-stories, novels, essays.

*148. Buddhism in Southeast Asia (4) Three hours of lecture per week. The history and development of the major schools of Buddhism in the Indianized cultures of Southeast Asia. Survey of inscriptions, literary, cultural, historical and doctrinal manifestations of Mahayana and Hinayana Buddhism in Indonesia (Borobudur), Cambodia (Angkor Wat), Burma, Thailand and Sri Lanka. Readings from original sources and secondary works in translation. No prerequisites; knowledge of area languages not required. Mr. Jaini.

198. Directed Group Study for Upper Division Students. (1–4) Tutorial instruction in areas not covered by regularly scheduled courses. Staff (F, W, Sp).

199. Supervised Independent Study and Research. (1–5) Must be taken on a Passed/Not Passed basis. Enrollment is restricted by regulations shown on page 36.

**Hindi-Urdu**

**LOWER DIVISION COURSE**

1A–1B–1C. Introductory Hindi and Urdu. (5–5–5) Five hours of lecture and two laboratory periods per week. Hindi and Urdu writing systems, survey of a variety of literary forms and styles. Systematic study of grammatical and lexical problems arising from these readings. Advanced exercises in composition. Staff (F, W, Sp).

110. Modern Urdu Literature. (4) Formerly 210. Three hours of lecture per week. Prerequisites: At least two years of Hindi and a good knowledge of the basic grammar. Readings in late-nineteenth and twentieth century Urdu literature. In addition to one novel and a number of short stories, students will read selected essays, as well as articles on literary criticism. Mr. Pray (Sp).

*115. Urdu Poetry. (4) Three hours of lecture per week. Prerequisites: Hindi-Urdu 1A–B–C or equivalent. Representative readings in Hindi and Urdu literature and expository prose, exploring variety of literary forms and styles. Systematic study of grammatical and lexical problems arising from these readings. Advanced exercises in composition. Staff (F, W, Sp).

120. The Hindi Short Story. (4) Three hours of lecture per week. Reading and analysis of representative modern Hindi short stories. Mr. Schomer (F).

*121. The Hindi Novel. (4) Three hours of lecture per week. Critical reading of a major Hindi novel. Mr. Schomer (F).

127. Hindi-Urdu Composition and Conversation. (4) Three hours of lecture per week. Prerequisites: Hindi-Urdu 1A–B–C or equivalent. Systematic practice of the productive language skills. Daily compositions on subjects of increasing sophistication. Discussion of subject-matter and evaluation of the compositions will be conducted in Hindi-Urdu. Staff (F, W, Sp).

184. Intensive Urdu Language Study in Pakistan. (14) Four hours of Urdu per day for one quarter, under the Berkeley Urdu Language Program in Pakistan. Staff.

H198. Senior Honors. (2) Prerequisite: limited to seniors who have completed an honors thesis. Staff (F, W, Sp).

199. Supervised Independent Study and Research. (1–5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. Staff (F, W, Sp).

**GRADUATE COURSES**

221. Hindi Bhakti Poetry. (4) Three hours of lecture per week. Prerequisite: Two years of Hindi or Sanskrit or consent of instructor. Readings in the medieval bhakti poets of the Hindi area (Kabir, Surdas, Mirabai, Tulsidas), one of which will be studied in depth every year. Ms. Schomer.


225. Medieval Hindi Literary Dialects. (4) Formerly 125. Three hours of lecture per week. Prerequisites: Two years of a South Asian language, or background in Sanskrit and/or permission of instructor. A rapid introduction to the phonology, morphology and syntax of a number of medieval Hindi. Linguistic comparisons will be made with Sanskrit and with modern Hindi-Urdu. A variety of illustrative texts will be read, including some by Tulsidas, Surdas and Kabir. Mr. Pray (F).

**NOTE:** For key to symbols, see page 36.
Malay/Indonesian

LOWER DIVISION COURSE

1A–1B–1C. Introductory Malay-Indonesian. (5–5–5) Five hours of lecture and one-hour laboratory per week. Survey of grammar, graded exercises and readings drawn from Indonesian literature, leading to a mastery of basic grammatical patterns, essential vocabulary and achievement of basic reading and writing competence.
Mr. Sweeney (F, W, Sp)

UPPER DIVISION COURSE

110A–110B–110C. Readings in Malay-Indonesian (5–5–5) Five hours of lecture and one-hour laboratory per week. Prerequisite: Malay-Indonesian 1A–1B–1C or equivalent. Representative readings in Malay and Indonesian literature and expository prose, exploring a variety of literary forms and styles. Systematic study of grammatical and lexical problems arising from these readings. Advanced exercises in composition.
Mr. Sweeney (F, W, Sp)

130A–130B. History of Malay/Indonesian Literature. (4–4) Two 1 1/2-hour lectures per week. Prerequisite: Malay-Indonesian 1A–1B–1C or consent of instructor. (A) This course will provide an introduction to the history of classical Malay literature, ranging in time from the seventh-century inscriptions of Srivijaya to the nineteenth-century writings of Munsyi Abdullah. Genres discussed will include historiography, Malay versions of the Ramayana and Panji cycle, Islamic literature, poetry and oral literature. Selected texts in Malay will be studied. (B) This course will cover modern Indonesian (and Malaysian) literature from the nineteenth century to the present. Selected texts in Malay/Indonesian will be studied, and will include such genres as the novel, short story and poetry.
Mr. Sweeney (W, Sp)

GRADUATE COURSE

298. Group Study. (1-5) Students may receive credit for more than one seminar in the same quarter. May be repeated for additional credit with consent of the instructor. Mr. Sweeney (F, W, Sp)

Sanskrit

UPPER DIVISION COURSES

100A–100B–100C. Elementary Sanskrit. (5–5–5) Four and one-half hours per week. Introduction to Sanskrit grammar and first practice in reading Sanskrit texts. Attention will be paid to spoken Sanskrit.
Staff (F, W, Sp)

101. Epic Sanskrit. (5) Four and one-half hours per week. Prerequisite: course 100C or equivalent. Readings from the Sanskrit Epics and Purana. This course may be repeated for credit as materials will vary from year to year.
Staff (F)

102. Classical Sanskrit Poetry. (5) Four and one-half hours of lecture per week. Prerequisite: course 100C or equivalent. Introduction to the Kavya style. Selected readings in classical Indian poetry and drama. Selections will vary from year to year, therefore the course may be repeated for credit with consent of instructor.
Staff (W)

103. Readings in the Sāstra. (5) Four and one-half hours of lecture per week. Prerequisite: course 100C or equivalent. Introduction to Sanskrit scientific, scholarly, and commentarial texts. Selection of materials will vary in accordance with needs and interests of students. May be repeated for credit when subject matter differs.
Staff (Sp)

**104. Introduction to the Veda. (5) Four and one-half hours of lecture per week. Prerequisite: course 100C or consent of instructor. Introduction to the grammar of the Vedica language. Readings of selected passages from Rig Veda, other samhitas, brahmana, and upanisadic texts. May be repeated for credit as materials will vary from year to year.
Mr. van Nooten

**105. Pali. (5) Four and one-half hours of lecture per week. Prerequisite: course 100C or consent of instructor. Introduction to the grammar of the Pali texts. Selections of materials will vary from year to year. The course may be repeated for credit with consent of instructor.
Mr. van Nooten

106. Buddhist Sanskrit. (5) Four and one-half hours of lecture per week. Prerequisite: course 100C or consent of instructor. Introduction to grammar of Buddhist Sanskrit and readings of Buddhist Sanskrit texts.
Mr. van Nooten

**150. Sanskrit Prose Composition. (4) Three hours of lecture per week. Prerequisite: course 100C or equivalent. Practice in translation from English to Sanskrit. Consolidation of basic grammatical skills through composition. Discussion and evaluation of the composition will be conducted in Sanskrit.
Staff (F, W, Sp)

198. Senior Honors. (1–4) Hours of meeting are variable. Prerequisite: limited to senior honors candidates. Directed study centering upon preparation of an honors thesis.
Staff (F, W, Sp)

199. Supervised Independent Study and Research. (1–5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis.
Staff (F, W, Sp)

GRADUATE COURSES

200. Readings in Sanskrit. (5) Four and one-half hours per week. Advanced reading of Buddhist and middle-Indic texts. Such texts are read as are suited to the student's needs. This course may be repeated for credit with consent of the instructor.
Mr. Goldman

201. Sanskrit Religious Texts. (5) Four and one-half hours per week. Critical reading of an Upanishad or a similar text at an advanced level.
Mr. Staal

**203. Advanced Sanskrit. (5) Four and one-half hours per week. Readings of advanced Sanskrit texts with linguistic emphasis. The texts to be read will vary from quarter to quarter. The course may be repeated with consent of the instructor.
Mr. van Nooten

**204. Introduction to Vedic Ritual. (4) Three hours of lecture per week. Prerequisite: two years of Sanskrit or consent of instructor. A study of the Vedic scriptural texts with emphasis on the canons of poetic analysis of the Indian aesthetic tradition.
Staff (F, W)

205A–205B. Kaavya. (4–4) Three hours of lecture per week. Prerequisite: two years of Sanskrit or consent of instructor. Study of Sanskrit orite poetry with emphasis on the Canons of poetic analysis of the Indian aesthetic tradition.
Mr. Staal

206. Middle Indic. (5) Four and one-half hours of lecture per week. Prerequisite: course 105, or 106, or an equivalent introduction to Middle Indic. An intensive study of texts in one or more of the Prakrit dialects.
Mr. van Nooten

Thai

1A–1B–1C. Introductory Thai. (5–5–5) Five hours of lecture and one-half hour laboratory per week. Survey of grammar, graded exercises and readings drawn from Thai literature, leading to a mastery of basic grammatical patterns, essential vocabulary and achievement of basic reading and writing competence.
Staff (F, W, Sp)

100A–100B–100C. Readings in Thai. (5–5–5) Five hours of lecture and one-half hour laboratory per week. Prerequisite: Thai 1A–1B–1C. Representative readings in Thai literature and expository prose, exploring a variety of literary forms and styles. Systematic study of grammatical and lexical problems arising from these readings. Advanced exercises in composition.
Staff (F, W, Sp)

198. Directed Group Study in Thai Literature. (1–4) Variable hours of lecture per week. Prerequisite: reading knowledge of Thai. Selected readings in Thai literature, from early poetical works to modern fiction.
Staff (F, W, Sp)

Spanish and Portuguese

Department Office, 4321 Dwinelle Hall

Professors:
Arthur L. Askins, Ph.D. (Chairman)
Fred W. Bangham, Ph.D.
G. Arnold Chapman, Ph.D.
Richard R. Craddock, Ph.D.
Jose Duran,* Doctor en Filosofía
Louis A. Murillo, Ph.D.
John R. Pratt, Ph.D.
Luis Monguio, Licenciado en Derecho, LL.D. (Emeritus)

Associate Professors:
Charles B. Faulhaber, Ph.D.
Robert K. Spaulding, Ph.D. (Emeritus)

Assistant Professors:
Milton M. Azevedo, Ph.D.
Dru Dougherty, Ph.D.
L. Elaine Hoover, Ph.D.

Lecturer:
Dwayne E. Carpenter, Ph.D.

Visiting Professors:
Jose M. Caso Gonzalez, Doctor en Filosofía y Letras
Carlos Felipe Moises, Doutor em Letras
Benjamin M. Woodbridge, Jr., Ph.D.
Francine R. Massielo, Ph.D.

Em Letras

(Chairman)
(Emeritus)
(Chairman)
The Major in Spanish

Option A: Spanish and Spanish American

Lower Division. Courses 1, 2, 3, 4, 5, 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 4.

Upper Division. 45 units of upper-division work in the Department, including the core courses Spanish 100, 101, 102, 104A–104B, 107A–107B–107C; and four elective courses (i.e., upper-division courses in Spanish other than core courses) taken under the following conditions: Spanish 100 to be completed before enrollment in any of the elective courses; Spanish 104A–104B or Spanish 107A–107B–107C to be completed before enrollment in any elective course in Spanish American or Spanish literature, respectively; and Spanish 141 and 142 not to be included as one of the four. With the approval of the major adviser, one upper-division course in Brazilian or Portuguese literature may be substituted for one of the four elective courses. In addition, students are required to complete two courses (upper- or lower-division) specifically related to the major, but outside the Department.

Students will normally complete the core courses in the first four quarters of study and the elective courses within the Department in the final two quarters of study.

Recommended: further study in Western European and Latin American history, languages, and literatures.

Candidates for the teaching credential in Spanish as a single subject are advised to include courses 112, 113, and 125 in their program.

Option B: Spanish, Spanish American, and Luso-Brazilian

Lower Division. Courses Spanish 5 (or equivalent) and Portuguese 4 (or equivalent). Students transferring from other institutions with advanced standing and intending to enroll in the program must present evidence (by examination or otherwise) that their preparation includes the equivalents of Spanish 5 and Portuguese 4.

Upper Division. 45 units of upper-division work in the Department, including the core courses Spanish 100, 101, 102, Portuguese 122A–122B–122C, Portuguese 123A–123B, and Portuguese 150. Four additional upper-division courses, including two courses from among Spanish 104A–104B and 107A–107B–107C; but excluding Portuguese 101. Portuguese 122A–122B–122C or Portuguese 123A–123B to be completed before enrollment in any elective course in Portuguese or Brazilian literature, respectively. Students are required to complete two courses (upper- or lower-division) specifically related to the major, but outside the Department, unless these courses would bring the total work for the major to more than 90 units.

Honors Program. To be admitted to the honors program in Spanish, Option A or Option B, students shall have completed at least three quarters of work on this campus with an overall grade-point average of at least 3.3 and a grade-point average of at least 3.3 in courses in the major. Students must also have the approval of the major adviser in consultation with other members of the Department.

Graduate Study

Preparation for Graduate Study. Students who may wish to pursue work toward advanced degrees in the Department should note that two quarters of college Latin (or equivalent) are prerequisite for such work, which requires a student to have completed the core program in Spanish and Portuguese. The Ph.D. degree program in Spanish and Portuguese literature requires a reading knowledge of Latin, French, and Italian, besides Spanish; and that the Ph.D. degree program in Hispamic Literatures requires a reading knowledge of Latin, French, and one additional modern foreign language pertinent to Hispanic scholarship.

Students other than Berkeley A.B. Spanish majors applying for admission to graduate work in the Department of Spanish and Portuguese should have an undergraduate major in a related discipline having a reading knowledge of the undergraduate major in Spanish at Berkeley.

The Graduate Programs. The requirements for an M.A. degree in Spanish are: an A.B. degree with a major in Spanish equivalent to the undergraduate major in Spanish at the University of California, Berkeley (Option A); an advanced knowledge of Latin; a reading knowledge of another language; that the Ph.D. degree program in Romance Languages and Literatures includes a reading knowledge of Latin, French, and Italian, besides Spanish; and that the Ph.D. degree program in Hispanic Literatures includes a reading knowledge of Latin, French, and one additional modern foreign language pertinent to Hispanic scholarship.

For further details on the requirements for the M.A. degree in Spanish and the two doctoral programs administered by the Department of Spanish and Portuguese, consult the Graduate Division of this catalog, and consult the Graduate Secretary in Spanish, 4321 Dwinelle Hall.

The Department of Spanish and Portuguese also collaborates in the doctoral program in Romance Philology.

Spanish

LOWER-DIVISION COURSES (Mr. Azevedo in charge)

Evaluation of Credit Previously Earned. The first year of secondary-school credit in Spanish is considered to be equivalent to the first-quarter course; each successive year of credit is equal to one additional course (5 units) in a sequence of four quarter courses in college.

1. Elementary Spanish (Beginner's Course). (5) Five 1-hour class meetings per week. (F, W, Sp)

2. Elementary Spanish (Continuation of 1). (5) Five 1-hour class meetings per week. Prerequisite: course 1 or equivalent. (W, Sp)

3. Elementary Spanish (Continuation of 2). (5) Five 1-hour class meetings per week. Prerequisite: course 2 or equivalent. (F, W, Sp)

4. Intermediate Spanish (Continuation of 3). (5) Five 1-hour class meetings per week. Prerequisite: course 3 or equivalent. (F, W, Sp)

5. Intermediate Spanish (Continuation of 4). (5) Five 1-hour class meetings per week. Prerequisite: course 4 or equivalent. (F, W, Sp)

6. Advanced Spanish (Continuation of 5). (5) Five 1-hour class meetings per week. Prerequisite: course 5 or equivalent. (F, W, Sp)

7. Advanced Spanish (Continuation of 6). (5) Five 1-hour class meetings per week. Prerequisite: course 6 or equivalent. (F, W, Sp)

8A. Spoken Spanish. (4) Five 1-hour class meetings per week. Prerequisite: course 3 or equivalent. May be taken in conjunction with course 4, 5, or 25. Course designed to increase vocabulary and to improve grammar and pronunciation by means of oral expression. (F, W, Sp)

8B. Spoken Spanish. (4) Five 1-hour class meetings per week. Prerequisite: 8A. 4321 Dwinelle Hall. Designed to increase vocabulary and to improve grammar and pronunciation by means of oral expression. (F, W, Sp)

NOTE: For key to symbols, see page 36.
Upper-Division Courses in English Translation
(No previous knowledge of Spanish required.)

141. Cervantes' "Don Quixote." (4) Three class hours per week. Prerequisite: permission of the instructor. A critical introduction to Cervantes' masterpiece, including its literary antecedents and importance as a prototypical novel in modern European literature. Course given in English.

Mr. Murillo (Sp)

*142. The Spanish American Novel in English Translation. (4) Three class hours per week. Discussion of the Spanish American novel from its beginnings; reading and discussion of selected twentieth-century novels as translated.

Mr. Chapman

GRADUATE COURSES

Concerning conditions for admission to graduate courses, see Index under Graduate Division.

In the requirements for the master's degree this department follows Plan II. (See Index under Graduate Division.)

Philoilogy and Linguistics

201. Applied Linguistics and Foreign Language Acquisition. (3) Three class hours per week. Applied linguistics as a field of research and its relationship to theoretical linguistics and problems of second language acquisition. Emphasis on contrastive analysis of selected aspects of English, Spanish, and Portuguese. Students may not receive credit for both Portuguese 201 and Spanish 201.

202A—202B. Historical Grammar of Ibero-American Languages. (Formerly 212A—212B) One 2-hour meeting per week. Sequence beginning (F). Mr. Craddock

205. History of the Spanish Language Since the Middle Ages. (3) Formerly 217, One 2-hour meeting per week. Prerequisite: Courses 201A—202B.

Mr. Craddock (Sp)

*207. The Languages of the Iberian Peninsula in Romance Perspective. (3) One 2-hour meeting per week. Prerequisite: course 202A—202B or consent of instructor.

Mr. Craddock

*209. Seminar in Hispanic Linguistics. (3) One 2-hour meeting per week. Prerequisite: course 202A—202B or consent of instructor. Course may be repeated for credit when topic changes.

Mr. Craddock

Literature: Comprehensive Courses

*220A—*220B. Introduction to Medieval Hispanic Literature. (3-3) Formerly 200A—200B. Two hours of lecture per week.

*221A—*221B. Major Prose Authors of the Golden Age. (3—3) Two hours of lecture per week.

Mr. Murillo

*223A—*223B. Major Poets of the Golden Age. (3—3) Two hours of lecture per week.

Mr. Murillo (W)

*224A—*224B. Major Dramatists of the Golden Age. (3—3) Two hours of lecture per week.

Mr. Murillo

*225A—*225B. Spanish Enlightenment and Romanticism. (3—3) Two hours of lecture per week.

Mr. Caso Gonzalez (F)

*227A—*227B—*227C. The Spanish Novel Since 1850. (3—3—3) Two hours of lecture per week. Sequence beginning fall quarter.

Mr. Pott

*229A—*229B. Modern Spanish Poetry (After Romanticism). (3—3) Two hours of lecture per week.

Mr. Dougherty

*232A—*232B. Colonial Spanish American Literature. (3—3) Two hours of lecture per week.

Mr. Durand

*234A—*234B—*234C. Modern Spanish American Poetry. (3—3—3) Two hours of lecture per week.

Mr. Chapman

236A—236B—*236C. Modern Spanish American Prose. (3—3—3) Two hours of lecture per week. Sequence beginning (F).

Mr. Chapman (W, Sp)

Literature: Theory and Bibliography

240A—240B. Techniques of Literary Scholarship. (3—3) Formerly 203A—203B. One 2-hour meeting per week. Sequence beginning (F).

Mr. Askins
Literature: Studies

**Medieval**

*250. Medieval Epic Poetry. (3) One 2-hour meeting per week. Course may be repeated for credit when topic changes. Mr. Faulhaber*

*251. Libro de buen amor. (3) One 2-hour meeting per week. Course may be repeated for credit when topic changes. Mr. Walsh (F)

*252. La Celestina. (3) One 2-hour meeting per week. Mr. Murillo*

*254A—*254B. A Single Author or a Special Topic. (3-3) One 2-hour meeting per week. Course may be repeated for credit when topic changes.

**The Golden Age**

*255A—*255B. The Comedia and Related Minor Genres. (3-3) One 2-hour meeting per week. Course may be repeated for credit when topic changes. Mr. Murillo*

*256A—*256B. Lyric Poetry. (3-3) One 2-hour meeting per week. Course may be repeated for credit when topic changes. Miss Hoover*

*257A—*257B. The Ballad. (3-3) Formerly 208A—208B. One 2-hour meeting per week. Mr. Askins

*258. Epic Poetry. (3) One 2-hour meeting per week. Mr. Murillo*

*259A—*259B. A Single Author or a Special Topic. (3-3) One 2-hour meeting per week. Course may be repeated for credit when topic changes.

**The Enlightenment**

*263A—*263B. Studies In the Literature of the Enlightenment. (3-3) Formerly 206A—206B—206C. One 2-hour meeting per week. Course may be repeated for credit when topic changes. Mr. Pott

**Modern Spanish**

*265A—*265B. Narrative and Expository Prose. (3-3) One 2-hour meeting per week. Course may be repeated for credit when topic changes. Mr. Pott*

*266A—*266B. Lyric Poetry. (3-3) One 2-hour meeting per week. Course may be repeated for credit when topic changes. Mr. Woodbridge*

*267A—*267B. Drama. (3-3) One 2-hour meeting per week. Course may be repeated for credit when topic changes. Mr. Dougherty

*269A—*269B. A Single Author or a Special Topic. (3-3) One 2-hour meeting per week. Course may be repeated for credit when topic changes.

**Spanish American**

*270A—*270B. The Colonial Period. (3-3) One 2-hour meeting per week. Mr. Durand

*272A—*272B—*272C. The Modern Period. (3-3-3) One 2-hour meeting per week. Mr. Chapman

*274A—*274B. Poetry. (3-3) Formerly 205A—205B. One 2-hour meeting per week. Course may be repeated for credit when topic changes.

*276A—*276B—*276C. The Novel. (3-3-3) Formerly 204A—204B—204C. One 2-hour meeting per week. Mr. Chapman

*278A—*278B. The Literature of a Single Country. (3-3-3) Formerly 228A—228B—228C. One 2-hour meeting per week. Course may be repeated for credit when topic changes. Mr. Chapman

*279A—*279B. A Single Author or a Special Topic. (3-3) One 2-hour meeting per week. Course may be repeated for credit when topic changes. Mr. Chapman

**Portuguese**

**LOWER-DIVISION COURSES (Mr. Azevedo in Charge)**

**Evaluation of Credit Previously Received.** The first year of secondary-school credit in Portuguese is considered to be equivalent to the first-quarter course; each successive year of credit is equal to one additional course (5 units) in a sequence of four quarter courses in college.

1. Elementary Portuguese (Beginner's Course). (5) Five 1-hour class meetings per week. (F, Sp)

2. Elementary Portuguese (Continuation of 1). (5) Five 1-hour class meetings per week. Prerequisite: course 1 or equivalent. (F, W)

3. Intermediate Portuguese (Continuation of 2). (5) Five 1-hour class meetings per week. Prerequisite: course 2 or equivalent. (W, Sp)

4. Intermediate Portuguese (Continuation of 3). (5) Five 1-hour class meetings per week. Prerequisite: course 3 or equivalent. Reading, translation, and oral interpretation of modern texts. (F, Sp)

5. Advanced Portuguese. (5) Five 1-hour class meetings per week. Prerequisite: course 4 or equivalent. (F)

6. Spoken Portuguese. (4) Five 1-hour class meetings per week. Prerequisite: course 5 or equivalent. Course designed to increase vocabulary and to improve grammar and pronunciation by means of oral expression. (W)

**UPPER-DIVISION COURSES**

Prerequisite to all upper-division courses: 20 units or equivalent of Portuguese or another Romance language. With the approval of the graduate adviser, upper-division and graduate credits in Portuguese literature may be applied toward the M.A. degree in Spanish.

101. Portuguese for Advanced Students. (3) Three class hours per week. Intensive course for students with no previous study of Portuguese. Mr. Woodbridge (F)

102. Advanced Grammar and Composition. (3) Three class hours per week. Prerequisite: course 5 or the equivalent. Mr. Moisés (Sp)

114. The Contemporary Brazilian Novel. (4) Three class hours per week. Mr. Woodbridge (F)

120. Sixteenth-Century Portuguese Theater. (4) Three class hours per week. Mr. Moisés

122A—122B—122C. Portuguese Literature. (4-4-4) Three class hours per week. Studies in the literature of Portugal. 122C: Mr. Moisés (F); 122A: Mr. Moisés (W); 122B: Mr. Moisés (Sp)

123A—123B. Survey of Brazilian Literature. (4-4) Three class hours per week. Sequence beginning (W). Mr. Woodbridge

125. Camões. (4) Three class hours per week. The Lyrics and the Lusiads. Mr. Woodbridge (Sp)

135. Studies In Luso-Brazilian Literature. (4) Three class hours per week. Studies in the literature of Portugal. Mr. Moisés

150. Introduction to Portuguese Linguistics. (3) Three class hours per week. Prerequisite: consent of instructor. Analysis of selected problems of the Portuguese language, in an effort to enrich students' knowledge of Spanish and with other varieties of Romance speech. Mr. Azevedo

H195A—H195B. Portuguese Honors Course. (4-4) Honors thesis. Credit and grade will be awarded on a passed/not passed basis. Mr. Azevedo, Mr. Moisés, Mr. Woodbridge (F, W, Sp)

198. Special Study for Undergraduates. (2—4) Prerequisite: consent of instructor. Special tutorial or seminar on selected topics. Mr. Azevedo, Mr. Moisés, Mr. Woodbridge (F, W, Sp)

199. Supervised Independent Study and Research. (2—4) Enrollment is restricted by regulations with an adequate preparation for the subject proposed for special study, and by previous arrangement with members of the Departmental staff. Must be taken on a passed/not passed basis. Mr. Azevedo, Mr. Moisés, Mr. Woodbridge (F, W, Sp)

**GRADUATE COURSES**

Concerning conditions for admission to graduate courses, see Graduate Division in Index.

**Linguistics**

201. Applied Linguistics and Foreign Language Teaching. (5) Three class meetings per week. Applied linguistics as a field of research and its relationship to theoretical linguistics and problems of second language acquisition. Emphasis on corrective analysis of
selected aspects of English, Spanish, and Portuguese. Students may not receive credit for both Portuguese 201 and Spanish 201.

**Literature: Comprehensive Courses**

*220. Early Portuguese Literature. (3) Formerly 200. One 2-hour meeting per week. Mr. Askins

**Literature: Studies**

269. A Single Author or Special Topic in Portuguese Literature. (3) One 2-hour meeting per week. Course may be repeated for credit when topics change. Topic for Fall 1978: Modern Portuguese Poets.

*276. The Brazilian Novel. (3) Formerly 201. One 2-hour meeting per week. Mr. Woodbridge

*279. Single Author or Special Topic in Brazilian Literature. (3) One 2-hour meeting per week. Course may be repeated for credit when topics change. Mr. Woodbridge

280. Special Study for Graduate Students. (2–6) Hours of meeting are variable. Prerequisite: graduate standing. Individual conferences on special problems of study or research in a restricted field not covered by available courses or seminars. Mr. Askins, Mr. Azevedo, Mr. Moisés, Mr. Woodbridge (F, W, Sp)

290. Special Advanced Study. (2–6) Restricted to candidates for higher degrees with an adequate preparation for the subject proposed for special study, by previous arrangement with members of the Departmental staff. Sections 1 through 20: letter-graded; Sections 21 through 40: satisfactory/unsatisfactory grading. Mr. Askins, Mr. Azevedo, Mr. Moisés, Mr. Woodbridge (F, W, Sp)

**LOWER DIVISION COURSES** (Mr. Azevedo in charge)

Evaluation of Credit Previously Received. The first year of secondary-school credit in Catalan is considered to be equivalent to the first-year course; each successive year of credit is equal to one additional course (5 units) in a sequence of four quarter courses.

*1. Elementary Catalan (Beginner's Course). (5) Five 1-hour class meetings per week. Prerequisite: 101 or equivalent. The course involves basic vocabulary, sentences, simple conversations, and reading assignments. The course is designed to introduce students to the structure and the use of Catalan. Mr. Azevedo

*2. Elementary Catalan (Continuation of 1). (5) Five 1-hour class meetings per week. Prerequisite: Course 1 or equivalent. The course continues with the development of conversational and reading skills. Mr. Azevedo

*3. Elementary Catalan (Continuation of 2). (5) Five 1-hour class meetings per week. Prerequisite: Course 2 or equivalent. The course further develops conversational skills and introduces more advanced vocabulary and grammar. Mr. Azevedo

**UPPER DIVISION COURSES**

*101. Catalan for Advanced Students. (3) Three hours of lecture per week. Prerequisite: 20 units or equivalent of another Romance language, or consent of instructor. An intensive course for students with no previous study of Catalan. Mr. Azevedo

*102. Readings in Catalan. (4) Three hours of lecture per week. Prerequisite: Catalan 1, Catalan 101 (or equivalent), or consent of instructor. Selected readings in Catalan prose and poetry. Course may be repeated for credit when readings change. Mr. Azevedo

---

**Statistics**

Department Office, 367 Evans Hall

**Professors:**

Edward W. Barrack, Ph.D.
Richard E. Barlow, Ph.D.
Rudolph J. Beran, Ph.D.
Peter J. Bickel, Ph.D.
(Chairman)
David Blackwell, Ph.D., D.Sc.
Ron. (Hon.)
Albert H. Bowker, Ph.D.
LL.D. (Hon.), Dr. of Humane Letters (Hon)
David R. Brillinger, Ph.D.
Kari A. Doksum, Ph.D.
Lester E. Dubins, Ph.D.
Robert L. Feldman, Ph.D.
David A. Freedman, Ph.D.

**Associate Professor:**

Joseph L. Hodges, Jr., Ph.D.

**Associate Professor:**

Michael J. Klass, Ph.D.

**Assistant Professors:**

Chung-Shing Cheng, Ph.D.
Howard J. D'Abrera, Ph.D.

**Departmental Major Adviser:**

Mr. Hodges. The Department of Statistics offers the undergraduate a thorough introduction to the theory of probability and of statistics, their extensions in several directions such as stochastic processes and sampling surveys, and some of their applications in general and in special fields such as social sciences, economics, biology, and engineering.

The undergraduate courses are divided into several basic cycles according to their emphasis and mathematical background. One cycle, emphasizing theory but including some application in the laboratories, includes courses 200 and 104A–B–C (or 200A–B–C–D–E–M–N). Statistics 100B requires two years of calculus (Statistics 200 requires more); the first half is devoted to probability and the second half to statistics. A second cycle, requiring three quarters of calculus and emphasizing interpretation and concepts, is based on 134A and 147 (the first quarter is devoted to probability, the second to statistics) or 134A–134B and 142 (probability theory and stochastic processes). A third cycle emphasizing concepts and applications and requiring one quarter of calculus only in its third quarter, is the sequence 150A–150B–150C; the probability material is developed as needed for the statistics. A cycle intended mainly for social scientists, requiring less mathematics, involves 2, 131 with 131L, 132 with 132L.

A student may not receive full credit for partially parallel courses of sequences.

The interests of the members of the staff are too varied to be reflected completely in the courses given each year. The courses numbered from 160 to 181 cover a wide range; attention is also drawn to 191, given to recent developments.

**The Major**

Lower Division Courses. Required: Mathematics 1A–1B–1C and 51A–51B–51C, or preferably the corresponding honors courses. Recommended: Statistics 1A–1B or 1C in preparation for the upper division courses. Familiarity with computer programming (e.g., Computer Science 1) is very useful in applied statistical work.

Upper Division Courses. Statistics 100A–100B–100C; Mathematics 112 or 113C. At least four courses from Statistics 134B, 142, 160, 161, 162, 166 (with 165 and 168), and 181A, *but not more than two courses from Mathematics 104A, 104B, 105, 113A, 125A, 128A, 135, and 185; or at least three advanced nonoverlapping courses from a substantive field. The courses selected for the 40 or more upper division units required for the major must be approved in advance by the major adviser. Reasonable exceptions and substitutions in the above list may be authorized by the major adviser.

Hons Program. Students with an overall 3.3 grade-point average or higher and a 3.3 grade-point average in upper division majors in the major may apply for admission to the honors program with the approval of the major adviser. The program will include course 198-5, reading in a special topic and writing a thesis.

Double Major. Superior students are encouraged to consider a double major in statistics with mathematics or with a field of application.

Engineering Mathematical Statistics. The College of Engineering with the cooperation of the Department of Statistics offers a curriculum in engineering mathematics leading to the degree of Bachelor of Science. Major Adviser: Mr. Thomasian (see section on Program of Study in Engineering Science).

Preparation for Graduate Study. Those interested in the graduate statistics major should include in the undergraduate courses a strong foundation in mathematics as well as probability and statistics. For advanced degrees of the theoretical type, Mathematics 104B, 105, 113B and 185 are needed. For advanced degrees of the applied type, at least a year of upper division probability and statistics (course 200B–200C with 200L–200M–200N). It is also recommended that all students acquire some familiarity with French, German, or Russian.
Higher degrees may be of the theoretical or of the applied type. The program for the theoretical type of M.A. will usually include 205A–205B and 210A–210B–210C; the program for the applied type of M.A. will usually include 230A–230B, 238A–238B, 240 and at least one of 232, 238, 242, 248. The master’s degree may be taken either under Plan I or Plan II. For details consult the M.A. advisor. The Ph.D. program may emphasize theoretical probability, theoretical statistics, or applied probability and statistics. For details consult the M.A. advisor.

### Biostatistics
A program in biostatistics, leading to the M.A. or Ph.D. degree, is offered jointly with the School of Public Health. The emphasis may be toward the degree or toward the substantive field. For information, consult Ms. Scott.

### LOWER DIVISION COURSES

1A. Introduction to Probability. (3) Three 1-hour lectures per week. Prerequisite: high school algebra. Students who have completed a course in probability will receive only credit. Elementary concepts of probability; random variables; expectation and variance; binomial and hypergeometric distribution; normal distribution and approximation. (F, W, Sp)

1B. Introduction to Statistical Inference. (3) Three 1-hour lectures per week. Prerequisite: course 1A. Students who have completed a course in statistics will receive only credit. Estimation of statistical inference. Estimation with applications to the estimation of means, differences, variance. Determination of the size of a sample. Design of experiments. Testing hypotheses; simple examples of tests; the concept of power. (Sp)

2. Introduction to Statistics. (5) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisite: high school algebra. Students who have completed a course in probability or statistics will receive only partial credit. Elementary treatment of basic ideas in probability and statistical inference. Models; conditional probability; measures of location, spread, and association; binomial distribution; normal approximation. Sampling; point estimation; some standard significance tests; power. (W, Sp)

19. Introduction to Probability and Statistics. (4) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisite: one of the courses 1A–1B or 2. Students who have completed a course in probability or statistics will receive only partial credit. Descriptive statistics, concepts of probability, discrete and continuous random variables, distribution, expectation, independence; randomization, sampling, binomial, normal variables, two dimensional variables, covariance and correlation. Sampling, statistical inference, testing hypotheses, regression analysis. (F, W, Sp)

21. Introductory Probability and Statistics for Business. (4) Three hours of lecture and one 2-hour laboratory per week. Prerequisite: one year of calculus. (16A–16B or 1A–1B). (Students who have completed a course in probability or statistics will receive only partial credit). Descriptive statistics, concepts of probability, discrete and continuous random variables, distribution, expectation, independence; randomization, sampling, binomial, normal variables, two dimensional variables, covariance and correlation. Sampling, statistical inference, testing hypotheses, regression analysis. (F, W, Sp)

25. Introduction to Probability and Statistics for Engineers. (4) Three 1-hour lectures and one 1-hour discussion per week. Prerequisite: one year of calculus. (16A–16B or 1A–1B). (Students who have completed a course in probability or statistics will receive only partial credit). Descriptive statistics, concepts of probability, discrete and continuous random variables, distribution, expectation, independence; randomization, sampling, binomial, normal variables, two dimensional variables, covariance and correlation. Sampling, statistical inference, testing hypotheses, regression analysis. (F, W, Sp)

### UPPER DIVISION COURSES


200B–100C. Introduction to the Theory of Probability and Statistics. (5–5) Three 1-hour lectures and one 5-hour discussion per week. Prerequisite: one of the courses 100C, 135A, 135B or consent of instructor. (Continuation of 100A.) Statistical inference, including point and interval estimation and tests of hypotheses. Probability densities including the normal, t, X², and F. 100C: (Sp)

130A–130C. Statistical Inference. (4–4–4) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisite for 130C: one quarter of calculus. Students who have taken any part of Statistics 100, 131, 132, 134A, 135 may receive only two units for 130A or 130B. The course emphasizes the principal tools of probability theory, hypotheses testing and estimation. The conceptual and application aspects of these topics are stressed. All difficult theorems are stated without proof. Useful also for students taking only one quarter. 130A: (F, Sp); 130B: (W); 130C: (Sp)

131. Statistical Inference for Social Scientists. (4) Three hours of lecture and 1-hour discussion per week. Prerequisite: a mathematics course at the level of Mathematics 190 or consent of instructor. May not be taken for credit by students having completed Statistics 130A. Ideas of estimation and hypothesis testing basic to social science applications. Linear estimation and normal results. (F, W, Sp)

131L. Laboratory Course in Statistical Inference for Social Scientists. (1) One 2-hour laboratory per week. May be taken only in conjunction with Statistics 131. (Sp)

132. Second Course in Statistical Inference for Social Scientists. (4) Three 1-hour lectures per week. Prerequisite: course 131. May not be taken for credit by students having completed Statistics 130A. Further study of topics in probability and statistics relevant to social science applications. (W, Sp)

132L. Second Laboratory Course in Statistical Inference for Social Scientists. (1) One 2-hour laboratory per week. May be taken only in conjunction with Statistics 132. Course 131L is not prerequisite to 132L. (W, Sp)


134B. Prerequisite: course 134A or 134A. Characteristic function, central limit theorem. Markov chains, stationary distribution, transition to continuous time, pure jump Markov processes. (W, Sp)

135A–135B. Methods of Statistics. (4–4) Three hours of lecture and two hours of laboratory per week. 135A–135B present the principal inference methods used in social science applications. Prerequisite: course 135A or 134A. May not be taken for more than one unit by students having completed 130B or 131. Sampling distributions, EDF, and hypothesis testing. Applications of .X² and F distributions. Analysis of discrete data (Poisson, binomial, multinomial distributions. Fitting lines.) (W)


*1142. Introduction to Discrete Parameter Stochastic Processes. (4) Three hours of lecture per week. Prerequisite: course 134A or 144A. Theory of zero-sum, two-person games, illustrated by applications including the Von Neumann-Morgenstern theory of decision functions, binomial, hypergeometric, Poisson, normal, central limit theorems, moments, exponential families. Bayesian inference in binomial, Poisson, and normal models. Bayesian interpretation of the chi-square test of association and of the F-test and of the t-test for the normal distribution. (F, W, Sp)

191. Experimental Courses in Probability and Statistics. Recent developments of interest to the instructor as a senior level course.

*191C. Introduction to Statistical Computing. (4) Two hours of lecture and two hours of laboratory per week. Prerequisite: an upper division course in statistics. Factorization of joint distributions, Conjugate distribution families. Bayesian inference in binomial, Poisson, and normal models. Bayesian interpretation of the chi-square test of association and of the F-test and of the t-test for the normal distribution. (F, W, Sp)

H106. Special Study for Honors Candidates. (1–7) Prerequisite: consent of instructor. Special tutorial or seminar on selected topics. The Staff (F, W, Sp)

198. Directed Study for Undergraduates. (1–5) Prerequisite: consent of instructor. Special tutorial or seminar on selected topics. The Staff (F, W, Sp)


### GRADUATE COURSES

Courses 210A–210B–210C constitute the bases of the graduate instruction for students whose primary interest is in mathematical statistics; course 205A–205B–205C, for those with primary interest in probability. Courses 230, 238, 240, and one of 232, 242 represent the graduate program for students interested in statistics as a tool in empirical research, either experimental or observational.

200A. Introduction to Probability and Statistics at an Advanced Level. (4) Three 1-hour lectures per week. Prerequisite: a mathematics course at the level of Statistics 135A or consent of instructor. May not be taken for credit by students having completed 135B. Optimum point estimation in univariate linear models. Hypothesis testing and related confidence sets in the normal case. (W)

*162. Introduction to Multivariate Analysis. (5) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisite: one of the courses 100C, 135A, 135B or consent of instructor. Multivariate normal distribution, multiple correlation and regression, Hotelling’s T²-test, multivariate analysis of variance. (Sp)

166. Sampling Surveys. (4) Three 1-hour lectures per week. Prerequisite: course 100A or 130A or 135A or consent of the instructor. Theory of sampling and analysis of sampling methods. Unrestrictedly random, stratified, cluster and double sampling procedures. (Sp)


191A. Bayesian Statistics. (4) Three hours of lecture per week. Prerequisite: one upper division course in statistics. Factorization of joint distributions. Conjugate distribution families. Bayesian inference in binomial, Poisson, and normal models. Bayesian interpretation of the chi-square test of association and of the F-test and of the t-test for the normal distribution. (F, W, Sp)

191. Experimental Courses in Probability and Statistics. Recent developments of interest to the instructor as a senior level course.

*191C. Introduction to Statistical Computing. (4) Two hours of lecture and two hours of laboratory per week. Prerequisite: an upper division course in statistics. Factorization of joint distributions, Conjugate distribution families. Bayesian inference in binomial, Poisson, and normal models. Bayesian interpretation of the chi-square test of association and of the F-test and of the t-test for the normal distribution. (F, W, Sp)

NOTE: For key to symbols, see page 36.
lectures per week. Prerequisite: course 200A or consent of instructor. 200B, change of variables, generating functions, characteristic functions. Standard distributions, estimation, prediction, and methods. Testing hypotheses, simpler applications. 200C, testing hypotheses, optimally, power functions. Interval estimation. Nonparametric statistics, multiple normal, simple experimental designs. Nonparametric. Additional topics. (Sp)

20GF-200G. Accelerated Introduction to Probability and Mathematical Statistics at an Advanced Level. 4 Three 1-hour lectures per week. Prerequisite: a year of upper division mathematics. Course covers material of 200GF-200G in 16 weeks. Instructors: Students who have completed a course in probability or statistics will receive only partial credit. (W, F)

200L. Laboratory Course in Probability. (1) 2-hour laboratory per week. Prerequisite: consent of instructor. Open only to students in 200A. Applications of probability to "real" problems in various fields. (W, F; 200M (W); 200N (Sp))

200M-200N. Laboratory Course in Probability and Statistics. (1-2) One 2-hour laboratory per week. Strongly recommended for and open only to students in 100A, 200A, 200C; may be taken without the others. Applications of probability and statistics to "real" problems in various fields. (200M (W); 200N (Sp))

201. Mathematical Bases of Probability Theory. (4) Three 1-hour lectures per week. Prerequisite: Mathematics 105 or consent of instructor. Probability space, theory of convergence. Expectation. Conditional probability and conditional expectation. Daniell-Kolmogorov consistency theorem. Tolerance to increases and decreases. (Fall)

205A-205B-205C. Probability Theory. (4-4-4) Three 1-hour lectures per week. Prerequisite: course 201 or (may be corequisite) or consent of instructor. Expectation, conditional expectation, independence, conditional independence, probability spaces, convergence theorems, central limit problem. Stationary, ergodic chains. Markov chains. Sequence beginning (F, W, Sp)

210A-210B-210C. Advanced Theory of Statistics. (4-4-4) Three 1-hour lectures per week. Prerequisite: course 205A-205B or 205C. Probability Theory. Topics include test and estimation, confidence sets and multiple decision procedures with applications in areas such as normal theory, analysis of variance, multivariate analysis, nonparametric inference and sequential analysis. Sequence beginning (F, W, Sp)

210M. Laboratory for Statistics 210B. (1) One 2-hour laboratory per week. (W)

210N. Laboratory for Statistics 210C. (1) One 2-hour laboratory per week. (W)

216A-216B. Theory of Nonparametric Inference. (4-4) Three 1-hour lectures per week. Prerequisite: course 210A or equivalent. The theory of nonparametric and robust methods for problems such as the one- and two-sample problems, the hypotheses of randomness and independence, testing and estimation occurring in line models. Asymptotic null distributions, power and efficiency. 216B: (F); 216B: (W)


232. Experimental Design. (5) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisite: course 230A. Three part decomposition. Continuity, Levey-Jaroson, Poisson processes and Brownian processes. (W)


236A: (F); 236B: (W)

238. Sequential Experimentation. (4) Two 1-hour lectures and one 2-hour laboratory per week. Prerequisite: one of course 100C, 130B, 132, 135A, 200C. Wald ratio-ratio tests. Truncated sequential stochastic model of survival after artificial inspection. Sequential estimation. Two-stage procedures. (Sp)


242. Multivariate Analysis. (5) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisite: course 220A. Topics selected from the following, with testing and estimation. Multivariate analysis for multivariate normal populations. Multivariate analysis of variance and covariance. Classification and discriminant analysis. Component and factor analysis. Canonical correlations. Stochastic difference equations. (Sp)

248. Inference in Time Series. (5) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisite: one of course 100A, 135A, 200A, 200F, or consent of instructor. Concepts and applications of the Poisson process, the Wiener process, Markov processes, diffusion processes, general point processes. (Sp)

253. Applied Probability. (4) Three hours of lecture per week. Prerequisite: one of the courses 100A, 135A, 200A, 200F, or consent of the instructor. Renewal processes, birth and death processes, queueing processes. Storage, ruin and traffic problems. (F)


259. Statistics in Scientific Research. (5) Three 1-hour lectures per week. Prerequisite: course 230A or consent of instructor. Seaprobability, sample continuity, Martingale Processes, and further topics. (F)

260. Information Theory. (4) Three 1-hour lectures per week. Prerequisite: course 220A. Material in the Shannon theory of information such as: entropy rate, channel capacity, coding theorems, error bounds, algebraic coding, sequential estimation, channel capacity theorem. (F, W, Sp)

261. Foundations of Random Analysis. (4) Three 1-hour lectures per week. Prerequisite: course 260A or consent of instructor. Three part decomposition. Continuity, Levey-Jaroson, Poisson processes and Brownian processes. (W)

278. Seminars. 278A. Current Literature. (3) Supervised presentation, by students, of current literature. (F, W, Sp)

278B. Special Seminars. (2-6) Special topics, by means of lectures and informal conferences. (F, W, Sp)

278C. Seminar in Applied Probability and Statistics. (2-6) Special topics with informal lectures by researchers in substantive fields and by members of staff.


289. Directed Study for Graduate Students. (1-5) Prerequisite: consent of instructor. Special tutorial or seminar on selected topics. The Staff (F, W, Sp)

290. Individual Research Leading to Higher Degrees. (2-6) The Staff (F, W, Sp)

602. Individual Study. (1-5) By appointment. Prerequisite: one year of full-time graduate study and permission of the graduate adviser. Individual study in conjunction with the graduate course work can provide an opportunity for qualified students to prepare themselves for certain examinations required of candidates for Ph.D. degree or to fulfill certain residence requirements for the doctoral degree. Course to be taken on the satisfactory or unsatisfactory basis. (2-6) The Staff. The Laboratory.

Colloquium in Probability and Statistics. (No credit) Meeting for the presentation of original work by members of the staff, visitors, and graduate students. (F, W, Sp)

The Statistical Laboratory

When founded in 1939, the Statistical Laboratory was a unit of the Department of Statistics, serving the student body with an extensive instruction program 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. Since that time the Laboratory has been functioning as a research unit.

Research activity of the Statistical Laboratory includes work on the theory of statistics and its various applications (statistical decision theory, model building, simulation, classification of species), to communication theory, to problems of health (theory of diagnostic tests, bio-assay, apparent associations between disease and environment), to problems associated with weather (climate, meteorology (experiments on weather control), etc.

Some of the above research is conducted in cooperation with other units of the University and with individuals and institutions outside the University.
Every faculty member of the Department of Statistics may use the facilities of the Statistical Laboratory. A substantial number of research assistants are available.

Subject A: English Composition

Department Office, 216 Dwinelle Annex

Lecturers:
Kimberly S. Davis, M.A. (Supervisor)
Phyllis Brooks, M.A.
June Rumery McKay, Ph.D. (ESL Coordinator)
Stephen K. Tollefson, M.A.

See page 17 for Subject A information.

1. Introduction to Language. (2) Four hours of lecture and one hour and a half weekly seminar. An introductory course designed to develop proficiency in expository writing required for subsequent upper division courses. Lectures, readings, class discussions, regular writing assignments focusing on the nature and function of language. Fullfills the Subject A requirement.

Mr. Tollefson and Staff (F, W, Sp)

English as a Second Language

Performance on the Examination in English as a Second Language, given at the beginning of each quarter, will determine the course in which an entering student is to enroll. Auditors are not permitted.

23. English Composition. (5) Three 2-hour classes per week. Focuses on basic sentence patterns. Required of undergraduate students whose performance on the placement examination indicates need for work at this level. May be taken Passed/Not Passed. Must be passed with a grade of C- or better. Students who pass must take ESL 25 the following quarter.

25. English Composition. (5) Three 2-hour classes per week. Focuses on topics on basic sentence patterns. Required of undergraduate students (1) whose performance on the placement examination indicates need for work at this level or (2) who have passed course 25. May be taken Passed/Not Passed. A grade of A- or better (or a grade of Passed at the level of A- or better) satisfies the Subject A requirement. Must be passed with a grade of C- or better.

28. English Composition. (5) Three 1-1/2 hour classes per week. Focuses on grammatical variation and on the development of the paragraph and simple essay. Required of undergraduate students (1) whose performance on the placement examination indicates need for work at this level or (2) who have passed course 25. May be taken Passed/Not Passed. A grade of A- or better (or a grade of Passed at the level of A- or better) satisfies the Subject A requirement. Must be passed with a grade of C- or better.

350. Teaching Workshop. (3) Three 1 hour discussions per week for foreign-born teaching assistants with or without teaching experience in the United States. The course includes study of teaching methods commonly in use at the University of California, practice teaching using these methods, classroom visits, and practice of those aspects of pronunciation, vocabulary, etc., which are important in the classroom. Must be taken on a Satisfactory/Unsatisfactory basis. To be offered 1978/79 only.

Women's Studies

Group Major Office, Division of Special Programs, 301 Campbell Hall

Major Advisers: Gloria Bowles (Women's Studies), Carol Christ (English), Arlie R. Hochschild (Sociology)

Group Major in Women's Studies

The group major in women's studies groups together courses from various departments to create an undergraduate program in women's major. It is designed to allow students to examine in depth traditional and changing sex roles in various cultures, to study the role of women from the perspective of different disciplines, and to explore new alternatives for women and men in our society.

Major Program

I. One course from each of the following six groups:

Lower Division Literature. Comparative Literature 40A, 40B, 40C, 40D, Women and Literature (4-4-4-4); French 41, Women in French Literature (4) (in translation); German 40, German in Women Literature (4) (in translation); Women's Studies 10, Introduction to Women's Studies (5).

Upper Division Literature. Comparative Literature 185, Women's Perspective in Literature (4); English 171, Literature and Sexual Identity (5).

Ethnic Studies. Afro-American Studies 152H, Black Women Writers (5) (prerequisite: Afro-American Studies 3 and 150A, 150B or 150C); Afro-American Studies 155, Images of Black Women in Literature (5); Asian American Studies 151, Asian American Women (5); Chicano Studies 139, La Chicana (5); Ethnic Studies 147, Third World Women (5); Native American Studies 155, Native American Women (5) (prerequisite: Native American Studies 50 or consent of instructor).

History, History 119, Society and the Sexes in Early Modern Europe (5).

Biology. Psychology 118, Human Sexuality (5) (prerequisite: Psychology 1); Physiology 10, The Biology of Man (4); Physiology 169, Biology of Human Reproduction (5) (prerequisite: Biology 1A-1B or equivalent); Zoology 10, Animal Biology (4).

Sociology. Sociology 151, Sociology of Women (5) (prerequisite: lower division sociology course or instructor's consent).

II. Three additional courses in the humanities and one additional social science course, or three additional courses in the social sciences and one additional humanities course, selected from the two lists below:

Humanities Courses: Afro-American Studies 152H, Black Women Writers (5) (prerequisite: Afro-American Studies 3 and 150A, 150B or 150C); Afro-American Studies 155, Images of Black Women in Literature (5); Afro-American Studies 155, Major Afro-American Authors (5) when a woman writer is being considered (prerequisite: Afro-American Studies 150A, 150B or 150C or one of the previous courses); Comparative Literature 40A, 40B, 40C, 40D, Women and Literature (4-4-4-4); Comparative Literature 185, Women's Perspective in Literature (4); English 171, Literature and Sexual Identity (5); English 175, Women Writers (5); French 41, Women in French Literature (4); French 150A, 150B, Women in French Literature (4-4-4); Comparative Literature 40A, 40B, 40C, 40D, Women and Literature (4-4-4-4); Comparative Literature 185, Women's Perspective in Literature (4); English 171, Literature and Sexual Identity (5); English 175, Women Writers (5); French 41, Women in French Literature (4); French 150A, 150B, Women in French Literature (4-4-4).

Sociology. Sociology 151, Sociology of Women (5) (prerequisite: lower division sociology course or instructor's consent).


Honor Program. To be admitted to the honors program, a student must have attained at least a 3.3 grade-point average overall in the University and a 3.5 grade-point average in the major. In order to be granted honors, a student must write a thesis which in the judgment of the thesis director and the advisor of the program is characterized by superior distinction.

Letters and Science List of Courses: 162 units from the list must be included in the 28 units required for graduation. See the Announcement of the College of Letters and Science for courses on the list.

LOWER DIVISION COURSE

10. Introduction to Women's Studies. (5) Four to five hours of lecture per week. Focuses on introduction to women's studies, integrating literary, psychological, historical, sociological and biological approaches to the study of sex roles.

UPPER DIVISION COURSES

195A–195B. Thesis. (4-4) In this course, the Women's Studies major will write a thesis which uses the analysis of a particular problem to integrate and synthesize the knowledge gained in the course of study. Credit and grade to be awarded upon completion of the sequence.

196. Directed Group Study for Advanced Undergraduates. (1–5) Prerequisite: Open to Women's Studies majors with the consent of the instructor. Seminars for the group study of selected topics not covered by regular scheduled courses. Topics will vary from year to year.

199. Supervised Independent Study for Advanced Undergraduates. (1–5) Prerequisite: Open to Women's Studies majors with the consent of the instructor. Restricted by regulations listed on page 36. Reading and conference with the instructor in a field that shall not coincide with that of any regular course and shall be specific enough to enable the student to write an essay based upon the student's study. Must be taken on a passed/not passed basis.

Zoology

Department Office, 4079 Life Science Building

Professors:
Max Alfert, Ph.D. (Vice Chairman)
William Ballou, Ph.D.
K. W. Berg, Ph.D.
William T. Berry, Ph.D.
Howard A. Bern, Ph.D.
C. H. Begg, Jr., Ph.D.
K. W. Berg, Ph.D.
Morgan Harris, Ph.D.
K. P. H. H. H., Ph.D.
Paul Licht, Ph.D. (Chairman)
William Z. Liddle, Jr., Ph.D.
K. W. Berg, Ph.D.
S. W. Lovetra, Ph.D.
F. A. Pastika, Ph.D.

C. H. Fraser Rowell, Ph.D.
Richard C. Stromberg, Ph.D.
David B. Wake, Ph.D.
Eugene E. W., Ph.D.
Kenneth B. DeVena, Ph.D.
R. L. J., Ph.D.
Ned K. Johnson, Ph.D.
B. F., Ph.D.
A. Nandi, Ph.D.
R. A. Pitelka, Ph.D.

L&S: Zoology / 215

*Each student may elect only one 198 or 199 course for the entire major.

NOTE: For key to symbols, see page 38.
Robert C. Babbins, Ph.D. (Emeritus)

Curt Stern, Ph.D., D.Sc. (N.C.), (Emeritus)

Associate Professors:

David R. Bentley, Ph.D. (Emeritus)

Richard A. Steinhardt, Ph.D.

Robert K. Caldwell, Ph.D.

Thelma E. Powell, Ph.D.

John E. Simonds, Ph.D.

Assistant Professor:

G. Steven Martin, Ph.D.

Acting Assistant Professor:

A. Janice Brothers

Professors:

Werner Loher, Ph.D. (Emeritus)

Dorothy R. Pletka, Ph.D. (Adjunct)

Associate Professor:

George V. Elston, Ph.D. (Entomology)

Lecturer:

Lloyd F. Austin, B.A.

The Department of Zoology presents a broad coverage of animal biology, ranging from cell and molecular biology, ecology, evolution, and behavior to animal physiology and invertebrate zoology. The major may be entered after a basic year-long course in biology (see Biology), supported by courses in chemistry and physics. The core course consists of a selection of courses representing the areas of (1) genetics, (2) cell biology, (3) organismal form and function, (4) organismal diversity, (5) population. These courses represent the common ground upon which more specialized senior-level courses and graduate study may be developed.

The Major

LOWER DIVISION

Zoology 1; Biology 1A, 1B; Chemistry 1A, 1B, 8A, 8B; Mathematics 16A (minimum of 5-5) Two 1-hour lectures, one 3-hour laboratory and one 4-hour field period per week. Prerequisite: Biology 106 or concurrent enrollment.

Honors Program. Students with an overall grade-point average of 3.7 or higher in grade-point average of 3.3 or higher in the major may apply at the beginning of the senior year to the professor in charge of the Thesis Course (Zoology H196) for admission to the honors program. Students accepted in the honors program will be included in a 100 required for graduation. See the Announcement or College of Letters and Science for courses on the List.

Preparation for Graduate Study. Those planning to enter graduate study in Zoology are expected to have the equivalent of a major in zoology or biology. Foreign language requirements are five quarters or four semesters of college work with a grade of C or better, or competence at an equivalent level in one of the following: German, French, or Russian (other language may be acceptable if of scientific importance). Ordinarily this requirement will have been satisfied as a condition for admission to graduate study. In the unlikely event the foreign language deficiency must be rectified by further course work while in graduate status.

Graduate Degrees in Zoology. The Department offers the M.A. by either thesis or examination plan, details of which may be obtained from the departmental office. The Ph.D. program consists of a selection of courses representing the areas of (1) genetics, (2) cell biology, (3) organismal form and function, (4) organismal diversity, (5) population. These courses represent the common ground upon which more specialized senior-level courses and graduate study may be developed.

Research Facilities

The Museum of Vertebrate Zoology is a research institute and repository for specimens and information relating to many vertebrate animals and has a large and growing collection of mammals, birds, reptiles, and amphibians. Research activities center on problems in evolutionary biology, with emphasis on systematic, ecological, functional morphology, genetics, biogeography, and conservation. The museum serves many educational functions and houses a number of graduate and undergraduate laboratories. Among the major features is the Van Cleve Museum, which houses the Frances Simes Hastings Natural History Reservation, in upper Carmel Valley. The flora and fauna of the 1700-acre tract are completely protected for study of ecological relations in undisturbed communities. Qualified graduate students and guest workers may pursue advanced studies and use the facilities of the Museum and the region. The Museum is supported by the students and the University. The Museum houses the Department of Zoology, which consists of a number of laboratories and research facilities.

LOWER DIVISION COURSES

Perspectives in the Life Sciences

The following courses are designed to provide somewhat overlapping but different introductions to the life sciences. Most are different majors in biological sciences but may be useful to the lower division student who desires to explore areas of elementary biology before embarking on a major. Students should note carefully the credit restrictions indicated.

1. Animal Diversity. (3) Three hours of lecture and two hours of laboratory per week. A survey of animal diversity including marine invertebrates and vertebrates. Strongly recommended for Zoology majors.

2. Animal Biology: A Behavioral View. (3) Three hours of lecture, one hour of discussion, and one hour of discussion per week. Prerequisite: open without prerequisite to all students, but designed for those not specializing in Zoology. Natural history of humans in the tropics, with emphasis on ecological relationships between humans and other species. Students may not receive credit for this course if they have previously taken Biology 1A-1B or 1A-11B.

3. Introductory Human Biology. (4) Three hours of lecture and one hour of discussion per week. Open to all students but designed for those not planning to major in Biology or Zoology. No credit given to students who have taken Biology 10, Biology 1A-1B or 1A-11B. Elementary biology of human adaptation to modern culture. Intensive discussion of adaptive mechanisms relating to energy and human potential and evolution (3) behavioral level for performance.

G. Steven Martin, Ph.D.

Robert K. Colwell, Ph.D.

A. Janice Brothers

Assistant Professor:

John E. Simmons, Ph.D.

Ph.D.

Seth B. Benson, Ph.D.

M.P.H. (Public Health)

Walter Winkelstein, Jr., M.D.

Wayne P. Sousa, Ph.D.

Honors Program. Students with an overall grade-point average of 3.6 or higher in grade-point average of 3.3 or higher in the major may apply at the beginning of the senior year to the professor in charge of the Thesis Course (Zoology H196) for admission to the honors program. Students accepted in the honors program will be included in a 100 required for graduation. See the Announcement or College of Letters and Science for courses on the List.

Preparation for Graduate Study. Those planning to enter graduate study in Zoology are expected to have the equivalent of a major in zoology or biology. Foreign language requirements are five quarters or four semesters of college work with a grade of C or better, or competence at an equivalent level in one of the following: German, French, or Russian (other language may be acceptable if of scientific importance). Ordinarily this requirement will have been satisfied as a condition for admission to graduate study. In the unlikely event the foreign language deficiency must be rectified by further course work while in graduate status.

Graduate Degrees in Zoology. The Department offers the M.A. by either thesis or examination plan, details of which may be obtained from the departmental office. The Ph.D. program consists of a selection of courses representing the areas of (1) genetics, (2) cell biology, (3) organismal form and function, (4) organismal diversity, (5) population. These courses represent the common ground upon which more specialized senior-level courses and graduate study may be developed.

Research Facilities

The Museum of Vertebrate Zoology is a research institute and repository for specimens and information relating to many vertebrate animals and has a large and growing collection of mammals, birds, reptiles, and amphibians. Research activities center on problems in evolutionary biology, with emphasis on systematic, ecological, functional morphology, genetics, biogeography, and conservation. The museum serves many educational functions and houses a number of graduate and undergraduate laboratories. Among the major features is the Van Cleve Museum, which houses the Frances Simes Hastings Natural History Reservation, in upper Carmel Valley. The flora and fauna of the 1700-acre tract are completely protected for study of ecological relations in undisturbed communities. Qualified graduate students and guest workers may pursue advanced studies and use the facilities of the Museum and the region. The Museum is supported by the students and the University. The Museum houses the Department of Zoology, which consists of a number of laboratories and research facilities.

LOWER DIVISION COURSES

Perspectives in the Life Sciences

The following courses are designed to provide somewhat overlapping but different introductions to the life sciences. Most are different majors in biological sciences but may be useful to the lower division student who desires to explore areas of elementary biology before embarking on a major. Students should note carefully the credit restrictions indicated.

1. Animal Diversity. (3) Three hours of lecture and two hours of laboratory per week. A survey of animal diversity including marine invertebrates and vertebrates. Strongly recommended for Zoology majors.

2. Animal Biology: A Behavioral View. (3) Three hours of lecture, one hour of discussion, and one hour of discussion per week. Prerequisite: open without prerequisite to all students, but designed for those not specializing in Zoology. Natural history of humans in the tropics, with emphasis on ecological relationships between humans and other species. Students may not receive credit for this course if they have previously taken Biology 1A-1B or 1A-11B.

3. Introductory Human Biology. (4) Three hours of lecture and one hour of discussion per week. Open to all students but designed for those not planning to major in Biology or Zoology. No credit given to students who have taken Biology 10, Biology 1A-1B or 1A-11B. Elementary biology of human adaptation to modern culture. Intensive discussion of adaptive mechanisms relating to energy and human potential and evolution (3) behavioral level for performance.

Robert K. Colwell, Ph.D.

A. Janice Brothers

Robert K. Colwell, Ph.D.

A. Janice Brothers

Robert K. Colwell, Ph.D.

A. Janice Brothers

Robert K. Colwell, Ph.D.

A. Janice Brothers

Robert K. Colwell, Ph.D.

A. Janice Brothers

Robert K. Colwell, Ph.D.

A. Janice Brothers

Robert K. Colwell, Ph.D.

A. Janice Brothers

Robert K. Colwell, Ph.D.

A. Janice Brothers

Robert K. Colwell, Ph.D.

A. Janice Brothers

Robert K. Colwell, Ph.D.

A. Janice Brothers

Robert K. Colwell, Ph.D.

A. Janice Brothers

Robert K. Colwell, Ph.D.

A. Janice Brothers

Robert K. Colwell, Ph.D.

A. Janice Brothers

Robert K. Colwell, Ph.D.

A. Janice Brothers

Robert K. Colwell, Ph.D.

A. Janice Brothers

Robert K. Colwell, Ph.D.

A. Janice Brothers

Robert K. Colwell, Ph.D.

A. Janice Brothers

Robert K. Colwell, Ph.D.

A. Janice Brothers

Robert K. Colwell, Ph.D.

A. Janice Brothers

Robert K. Colwell, Ph.D.

A. Janice Brothers

Robert K. Colwell, Ph.D.
108A–108B. Invertebrate Zoology. (S–F) Formerly 108. Two 1-hour lectures and two 3-hour laboratory periods per week, plus several Saturday field trips. Prerequisites: Biology 1A–1B or equivalent. An introductory survey of the biology of invertebrates, stressing natural history, comparative anatomy, and evolution. Sequence beginning (W). Credit and grade awarded upon completion of the sequence. Mr. Johnson, Mr. Lidicker (W, Sp)

109. Animal Evolution. (S) Three 1-hour lectures and one 1-hour discussion period per week, plus written reports and special readings. Prerequisites: Biology 1, Genetics 100, Biology 150 or equivalent recommended. A course in evolutionary theory, with emphasis on basic processes, selection theory, adaptive responses, and patterns of speciation and phylogeny. Mr. Wake (F)

110A–110B. Cytology. (3–3) Two 1-hour lectures per week. Prerequisite: Biology 1A–1B or equivalent. Sequence beginning (F). The structure and function of the cell and its organelles from an historical perspective; mitosis, meiosis, introduction to cyto genetics. Credit and grade will be awarded upon completion of the sequence. Mr. Allert (F, W)

110L. Cytology Laboratory. (3) Two 4-hour laboratory periods per week. Prerequisite: course 110A–110B or concurrent enrollment therein. Microscope study of cell organelles, mitosis and meiosis; selected staining procedures and preparatory methods. Mr. Allert (F, W)

111. Experimental Embryology. (4) Three 1-hour lectures per week. Prerequisite: course 105. A survey of experimental and biochemical studies of animal development. Mr. Berg (F)

111L. Experimental Embryology Laboratory. (4) Two 4-hour laboratory periods per week. Prerequisite: course 105, recommended 111. Enroll limited to ten students. Experimental embryology of sea urchin and amphibian embryos. Mr. Berg (W)

113. Normal and Abnormal Growth. (4) Two 1 1/2-hour lectures per week, plus written reports. Prerequisite: Biology 1. Biosynthesis at molecular, cellular, and organismal levels; regulatory aspects of growth as seen in cell cultures and in the development of tumors. Mr. Harris (W)

114. Laboratory in Cell Biology. (3) One hour of lecture and six hours of laboratory per week. Prerequisite: course 104 or equivalent and permission of instructor. An advanced treatment of methods used in cell biology, including experiments on living cells and on isolation and characterization of organelles and their constituents. Mr. Will (F)

1120A. Biology of Chemical Mediation. (4) Formerly numbered 120. Two 1 1/2-hour lectures and one hour of discussion per week. Prerequisite: Biology 1. Recommended: organic chemistry. Hormonal and para-hormonal mechanisms with emphasis on general principles and comparative vertebrate endocrinology. Mr. Bern (F)

120B. Biology of Chemical Mediation. (4) Two 1 1/2-hour lectures and one hour of discussion per week. Prerequisite: Biology 1. Recommended: 120A or equivalent or consent of instructor. Hormonal and para-hormonal mechanisms with emphasis on neurosecretion, invertebrate endocrinology, hormonal rhythmicity, and phenornenes. (W)

124. Invertebrate Physiology. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: Biology 1. Advised: Zoology 108A–108B or Zoology 157, or a course in physiology or entomology. Comparative physiology of nutrition, respiration, osmoregulation, coordination, effectors, and sense organs of invertebrates. Mr. Smith (Sp)

124L. Invertebrate Physiology Laboratory. (3) Formerly 124L–124M. Two 3-hour laboratory periods plus individual study, and reports. Prerequisite: Course 124 (may be taken concurrently). Topics in feeding, respiration, excretion, and water balance, or in nervous and hormonal coordination, effectors, and sense organs. May be repeated once without duplication of credit. Limited to 10 students. Mr. Smith (W)

131. Physiological Ecology. (4) Two 1 1/2-hour lectures per week. Prerequisite: Biology 1ABC, or equivalent or consent of instructor. Comparative physiology of the vertebrates with emphasis on adaptation to the various aspects of the physical environment, such as temperature, water, ions, and gases. Mr. Licht (Sp)

131L. Laboratory in Physiological Ecology. (5) Two formal 3-hour laboratory periods per week. Student projects may also require six or more hours of additional laboratory work per week, detailed laboratory reports and several discussion sections. Prerequisite: course 131 or concurrent enrollment therein. Mr. Licht (Sp)

132. Vertebrate Reproductive Biology. (5) Three hours of lecture and three hours of laboratory per week. Prerequisites: Zoology 1, Biology 1. Strongly recommended: Genetics 100 and Biology 150. A survey of morphological, developmental, physiological, behavioral, ecological and evolutionary aspects of the reproductive biology of vertebrates. (W)

135. Animal Behavior. (4) Three hours of lecture and 2 hours of demonstration and discussion per week. Prerequisites: Zoology 1, Biology 1. Strongly recommended: Genetics 100 and Biology 150. May not be taken for credit by students having completed either IDS 122 or Psychology 115. An introduction to the study of naturally occurring behavior, the phenomena and concepts, and their physiological and ecological correlates. Mr. Caldwell, Mr. Rowell (W)

135L. Laboratory Studies of Animal Behavior. (3) Two 3-hour laboratory periods per week with the possibility of field work. Prerequisite: course 135 (or concurrently) and consent of instructor. Limited to ten students. Mr. Caldwell (Sp)

138. Neurobiology. (3) Three 1-hour lectures per week. Prerequisites: Biology 1 recommended. An introductory course designed to provide a general understanding of the nervous system: its structure and function. May be repeated once without duplication of credit. Mr. Bern (Sp)

139. Ecological Aspects of Behavior. (3) Two 1 1/2-hour lectures per week. Prerequisite: course 135 or Biology 150 and consent of instructor. A description of behavioral and ecological interactions at the population and community levels, covering such topics as population regulation, migration and dispersal, territoriality and competition. Mr. Barlow (Sp)

140. Animal Ecology. (3) Three hours of lecture and one hour of optional discussion section per week. Prerequisite: senior standing and Biology 150, or course 107A–107B. Principles of population ecology stressing vertebrates and terrestrial environments. Quantitative approaches relying on algebra and elementary calculus. Mr. Piteitka (W)

141. Evolution and Ecology of Biological Communities. (4) Two 1 1/2-hour lecture per week. Prerequisite: course 140 or equivalent; knowledge of genetics and elementary statistics recommended. Lectures and discussion concerning the structure, development, and functional organization of natural biological communities; analytical and theoretical approaches. Mr. Colwell (Sp)

142. Marine Ecology. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: Biology 150. Population structure and organization of marine communities; the discussion section will review recent literature in marine science. Mr. Sousa (W)

142L. Laboratory and Field Studies in Marine Ecology. (5) Two 4-hour laboratory or field trips per week or three all-day weekend field trips. Prerequisite: Course 142 or equivalent and consent of instructor. Course begins with a field survey of local marine habitats emphasizing possible research problems. Methods of field experimentation and sampling will be discussed. Last half of the course is devoted to approved independent research projects. A written project report
...and class presentation are required. Enrollment limited to 16.

Mr. Sousa (Sp)

143. Marine Ecology. (10) Ten hours of lecture and thirty hours of field and laboratory per week. Prerequisite: course in biology and consent of instructor. Full-time study at Bodega Marine Laboratory including lectures, laboratory, field work, and individual study of problems in marine biology. Class limited to sixteen students. *144. Laboratory in Population and Community Ecology. (5) Two regular 4-hour laboratories or field trips per week plus three or four all-day Saturday field trips. Prerequisite: courses 140 and 141 or equivalent and consent of instructor. Introduction to field and laboratory study of ecological and evolutionary processes and patterns in nature. Enrollment limited to 16.

Mr. Colwell (Sp)

155. General Protozoology. (3) Three hours of lecture and seven hours of laboratory per week. Prerequisite: course in general biology with laboratory (e.g., Biology 1, 11A-11B). Comprehensive survey of the protozoa, including some groups often classified with the fungi (e.g., flagellates and slime molds). Coverage in lectures includes classification and comparative morphology, life cycles, evolutionary relationship and considerations of ecological adaptation.

Mr. Balamuth (F)

156. General Animal Parasitology. (4) Three 1-hour lectures per week, plus one hour of discussion per week. Prerequisite: course 142 or equivalent. General and comparative features of the major groups of animal parasites. Emphasis upon properties common to diverse taxonomic groups of animal parasites.

Mr. Simmons (W)

156L. Laboratory in General Animal Parasitology. (3) Two 4 1/2-hour laboratories per week. Prerequisite: course 156 or consent of instructor. Zoology of protozoan, helminth, and other invertebrate parasites with selected experiments.

Mr. Simmons (Sp)

157. Biology of Marine Invertebrates. (10) Full-time study at Bodega Marine Laboratory during six weeks of summer. Prerequisite: Biology 1A-1B or equivalent. Lecture, laboratory, field work, and individual study of marine invertebrates. Class limited to twenty-five students.

Mr. Smith (Summer)

*158. Experimental Protozoology. (4) One hour of lecture and six hours of laboratory per week plus special problems. Prerequisite: Biology 1. Recommended: Zoology 155 and a course in cell or developmental biology. Experimental analysis of protozoan organization. Protozoa as cells and organisms; aspects of growth and nutrition, cyclic differentiation and regeneration, sexuality and genetics.

Mr. Balamuth (W)

160. Regulation of Cells and Cell Systems. (3) Two 3-hour laboratories per week. Prerequisite: Zoology 104 or equivalent. Studies on the regulation of metabolism with special emphasis on the relationships of the cell to the control of intracellular activities. A comparative approach is used in uncovering regulatory mechanisms of fertilization, lympocyte activation, lymphoid nodes, hormonal stimulation, cell secretion, cell-cell interactions, and cell-cell communication.

Mr. Steinhardt (Sp)

*162. Evolutionary Cyto genetics of Vertebrates. (4) Two 1-hour lectures, one 3-hour laboratory and one 1-hour discussion per week, to include student projects. Prerequisite: a basic course in genetics; cytology recommended; and consent of instructor. The theoretical and practical applications of cytogenetics to vertebrate population structures, systematics, and phylogeny.

Mr. Parry (Fall)

163. Mammalogy. (6) Two 1-hour lectures and two 3-hour laboratories per week, plus two weekend field trips. Prerequisite: course 107A-107B. An advanced course in the biology of mammals.

Mr. Lidicker (Fall)

Mr. Patton (F)

164. Ornithology. (5) Two 1-hour lectures and one 4-hour laboratory per week, plus two weekend field trips. Prerequisite: course 107A. An advanced course in the biology of birds.

Mr. Parry (Spring)

165. Herpetology. (5) Two 1-hour lectures and one 3-hour laboratory per week, plus two weekend field trips. Prerequisite: course 107A-107B or equivalent. Advanced study of amphibians and reptiles.

Mr. Wake (Sp)

*166. Ichthyology. (5) Two 1-hour lectures and two 3-hour laboratories per week, plus two weekend field trips. Prerequisite: Biology 1. Recommended: course 106 or 107A-107B. A basic course in the biology of fishes.

Mr. Barlow (F)

*170. American Game Birds and Mammals. (2) Formerly numbered IDS 170. One hour of lecture and three hours of laboratory per week. Prerequisite: Forestry and Conservation 170 (may be taken concurrently). An introduction to the economically important birds and mammals including game species, predators, and fur-bearers. Identification, natural history, and conservation.

Mr. Leopold (F)

181. Tumor Biology. (4) Three hours of lecture per week, plus one hour of discussion per week. Prerequisite: open to senior and graduate students and by consent of instructor. Lectures, assigned reading, and individual reports on biological aspects of experimental cancer research.

Mr. Nandi, Mr. Harris (W)

*182. Biology of Human Cancer. (2) One 2-hour meeting per week. Prerequisite: Zoology 181 or equivalent and consent of instructor. Review of the current concepts and research dealing with human cancer.

Mr. Nandi (W)

*191A. Topics in Population Biology. (3) Two 1-hour lectures and two 1-hour laboratory periods. Prerequisites: Zoology 140 and 1ID 122 (or equivalents) and permission of instructor. Comparative survey of functional organization and adaptive significance of life-cycles in vertebrates; population consequences of varying strategies.

Mr. Petikela (F)

H166A—H166B. Thesis Course. (3-3) Prerequisites: overall grade-point average of 3.00 and a grade-point average of 3.30 in the major. Individual study and research on a special problem to be chosen in consultation with a member of the staff; preparation of a thesis on broad aspects of this work. H166A may be taken alone; if both H166A and H166B are taken, grade is given on completion of both courses.

Mr. Berg (F, W, Sp)

197. Extra Session Work. (1-4) Work on assigned subjects. Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis.

The Staff. Mr. Licht in charge.

(Su, W, F, Sp)

RELATED COURSES IN OTHER DEPARTMENTS

Biology 100. Problems in Marine Biology. (15) See Biology for the complete description of this course.

Biology 150. General Ecology. (4) See Biology for the complete description of this course.

Biology 153. Developmental Biology. (3) See Biology for the complete description of this course.

Biology 167. Biogeography. (3) See Biology for the complete description of this course.

IDS 122. Animal Behavior. (6) See Interdepartmental Studies for the complete description of this course.

**191. Experimental Zoology. (5) Two 1-hour lectures and three hours of laboratory per week plus special problems. Prerequisite: course in biology and consent of instructor. Comprehensive

Mr. Hand (W)

198. Seminar in Zoology. (1) One 2-hour meeting per week, plus individual conferences. Prerequisite: upper-division standing or permission of the instructor. Reading and group discussions on selected topics. Students may prepare individual reports on research in laboratory and/or library.

Mr. Berg (F); Mr. Balamuth (Sp)

199. Supervised Independent Study and Research. (3) Study for the complete description of this course.

Mr. Hand (W)

**231. Seminar in Physiological Ecology. (2) Two 1-hour meeting per week. Prerequisite: consent of instructor. May be repeated for credit.

Mr. Barlow (F)

**242. Comparative Population Ecology. (4) Two 2-hour meetings per week. Prerequisite: written consent of instructor. Seminar discussion of original research, writing on workers from the Berkeley campus and other universities.

Mr. Rowell (Sp)

232. Seminar in Comparative Neurophysiology. (2) Two 1-hour meetings per week. Prerequisite: consent of instructor. Critical discussion of current problems.

Mr. Rowell, Mr. Steinhardt (in charge).

Mr. Bentley (W)

237. Seminar in Animal Behavior. (2) One 2-hour meeting per week. Prerequisite: course 135 or equivalent and consent of instructor.

Mr. Barlow (F)

**244. Genetic Ecology. (3) Two 1 1/2-hour lectures per week. Prerequisite: an upper division course in genetics and one in animal ecology (course 140 or equivalent). Focus on the relationships between the genetic composition and populations and ecological processes. Specific topics will vary from year to year.

Mr. Hand (W)

245. Seminar in Parasitology. (2) One 2-hour meeting per week. Prerequisite: course 140 or equivalent, and consent of instructor. Reports and discussion of advanced literature. May be repeated for credit.

Mr. Oster (W)

Mr. Petikela (W)

246. Seminar in Marine Ecology. (1) One 2-hour lecture per week. Prerequisite: consent of instructor. Participation will involve the attendance of a seminar. The topic for each quarter will be determined prior to the first meeting and announcements will be posted.

Mr. Hand (W)

252. Seminar in Parasitology. (2) Two 1-hour meetings per week. Prerequisite: Consent of Instructor. Review and discussion of topics of current interest and importance to the phenomenon of parasitism.

Mr. Simmons (F)

**254. Ecology of Parasite Protozoa. (2) One 2-hour lectures and two 3-hour laboratory periods per week. Prerequisite: course 156 or equivalent background in general parasitology. Detailed treatment of
parasitic protozoa, with reference to morphology, life cycles, and host-parasite interactions. Examples of medical and veterinary importance are included with other forms in the interest of presenting a comprehensive survey. Offered occasionally in course of 158. (W)

256. Seminar in Protozoology. (2) One 2-hour meeting per week, plus outside preparation of papers. Prerequisite: consent of instructor. Mr. Balice (Sp)

*257. Advanced Biology of Marine Invertebrates. (6) Full-time study at Bodega Marine Laboratory during the first summer session. Lectures, seminar discussions, and individual study of selected problems. Class limited to six students. Prerequisite: 108 or 157 and consent of instructor.

258. Advanced Invertebrate Zoology. (3) Two hours of lecture and discussion plus individual conferences. Prerequisite: course 108 or equivalent. General biology of a selected major group of invertebrates. May be repeated for credit. Mr. White (Sp)

259. Seminar in Invertebrate Zoology. (2) One 2-hour meeting per week, plus individual conferences. Prerequisite: consent of instructor. Mr. Smith (F)

260. Seminar in Reproductive Biology. (2) One 2-hour meeting per week. Prerequisite: consent of instructor. Mr. Balice (Sp)

261. Seminar in Wildlife Ecology and Population Dynamics. (2) One 1 1/2-hour meeting per week. Prerequisite: course 101. Review of problems of speciation and isolating mechanisms in vertebrates, with emphasis on current literature. Mr. Johnson (Sp), Mr. Paton (in charge) (Sp)

*265. Vertebrate Review. (2) One 1 1/2-hour meeting per week. Review of current literature on ecology and evolution of higher vertebrates. May be repeated for credit. Mr. Lisker (F), Mr. Balamuth (Sp)

*275. Seminar in Wildlife Ecology and Population Dynamics. (2) One 1 1/2-hour meeting per week. Prerequisite: course 101 or equivalent. Mr. Leopold (F), Mr. White (Sp)

283. Tumor Biology Research Review. (1) Two hours of discussion per week. Prerequisite: standing, basic courses in biology of neoplasia, and consent of instructor. Report and discussion of original research and defense of research proposals. Mr. Nandi (F)

284. Seminar on Biology of Neoplasia. (2) One 2-hour meeting per week. Prerequisite: course 181 and consent of instructor. Presentation and discussion of current research in biology of neoplasia. Mr. Martin (in charge), Mr. Nandi, Mr. Harris, and others (Sp)

286. Malignant Transformation. (2) Two 1-hour lectures per week. Prerequisites: Course 181, or consent of instructor. Lectures and discussions concerning current research on gene expression and neoplastic transformation by viruses and other agents. Mr. Martin (Sp)

294. Principles and Concepts of Modern Zoology. (2) One 2-hour discussion per week and recommended reading. Prerequisite: graduate standing and consent of instructor. Beginning graduate students recommended. Must be taken on a satisfactory/unsatisfactory basis. Mr. Harris (in charge) (F)

296. Research. (1-12) Credit awarded according to work planned and accomplished. Must be taken on a satisfactory/unsatisfactory basis. The Staff (Su, F, W, Sp)

299. Special Study for Graduate Students. (1-4) Reading or other advanced study arranged with a staff member. The Staff (Su, F, W, Sp)

301. General Biological Microtechniques. (2) Two hours of lecture and four hours of laboratory per week. Prerequisite: a course in general biology with laboratory, preparation of invertebrate and vertebrate tissues for light microscopy. Basic histological and histochemical laboratory techniques including whole mounts, use of antifluorescent sera, fixation, embedding, sectioning and staining of tissues. The paraffin method is emphasized. Mr. Austin (W)

501. Biological Lab. (4) Three hours of laboratory per week. Prerequisite: consent of instructor. Mr. Smith (F)

502. Advanced Biology of Marine Invertebrates. (6) Full-time study at Bodega Marine Laboratory during the first summer session. Lectures, seminar discussions, and individual study of selected problems. Class limited to six students. Prerequisite: 108 or 157 and consent of instructor.

507. Tropical Biology—An Ecological Approach. (12) See Biology for the complete description of this course.

509. Seminar on Speciation in Vertebrates. (2) Two 1-hour meetings per week. Prerequisite: consent of instructor. Report and discussion of original studies required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. Mr. White (Sp)

510. Seminar Seminar. (No credit) Meetings for the presentation of original work by the faculty, visiting lecturers, and graduate students. Attendance by all graduate students is recommended. Mr. Bentley (F), Ms. D. Piotelka (W), Mr. Berg (Sp)

514. Information Access and Retrieval: Problems and Prospects. (3) Two hours of lecture per week. Prerequisite: consent of instructor. Key problems of information retrieval. Intended as introduction for students with engineering, science, or professional school backgrounds. Includes: design principles for document and data retrieval, binary, weighted, and statistical indexing techniques; retrieval evaluation; relevance, aboutness, utility; indexing vocabulary control. Mr. Maron (F)

199. Individual Study. (1-5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis.

The School of Library and Information Studies offers a basic curriculum at the graduate level, lasting one calendar year, leading to the Master of Library Science degree, which qualifies the holder for professional service in libraries and other information agencies. It offers a Master’s program leading to one of three Certificates for specialized study. It offers a program leading to the Ph.D. degree for students interested in advanced research and teaching in librarianship and the information sciences, and a program leading to the professional doctorate, the D.L.S., for students interested in a design-oriented preparation for administrative positions in libraries or other information services. Admission to the degree programs is contingent upon admission to graduate standing. The School also offers undergraduate courses in Bibliography for non-majors in Librarianship.

For further details on the School’s programs, consult the Announcement of the School of Library and Information Studies.

### Bibliography

1. **Methods of Library Use.** (3) Three hours of lecture per week. Students will learn how to approach the U.C. Library’s resources in a systematic way to meet their research needs, via lecture, section, problem sets, examinations and a term paper. They will learn to extend these techniques to future independent research.

2. **The Book as an Artifact.** (3) Three hours of lecture per week. A survey of the evolution of the written word and the manuscript and printed book, with emphasis on letterforms, typesetting, papermaking, printing processes, bookbinding and book design.

3. **Survey of Children’s Literature.** (3) Three hours of lecture per week. Children’s literature as a genre of literature; its role in the lives of children. Historical perspectives, major trends and the current scene in publication. All types of books read by children will be included. Not acceptable towards fulfillment of requirements for the Master of Library Science degree. Mrs. Roger (in charge), Mr. Maron (Sp)

4. **Information Access and Retrieval: Problems and Prospects.** (3) Two hours of lecture per week. Prerequisite: consent of instructor. Key problems of information retrieval. Intended as introduction for students with engineering, science, or professional school backgrounds. Includes: design principles for document and data retrieval, binary, weighted, and statistical indexing techniques; retrieval evaluation; relevance, aboutness, utility; indexing vocabulary control. Mr. Maron (F)

5. **Individual Study.** (1-5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis.

### Librarianship


202L. **Typographical Laboratory.** (1) One hour of laboratory per week. Prerequisite: Course 202 or may be taken concurrently. Operational aspects of book construction; includes typesetting, papermaking, hand printing.

203. **Origins and Spread of Printing and Publishing in Europe.** (4) Two hours of lecture and two hours of laboratory per week.

203B. **History of Printing and Publishing: 1500-1800.** (3) Three hours of lecture and three hours of laboratory per week. Prerequisite: course 202.


208. **Library Use Studies.** (3) Three hours of lecture per week. Survey of studies that use the methods of the behavioral sciences to examine library and information service use and information gathering behavior. Ms. Shosid (in charge), Mr. Maron (Sp)

NOTE: For key to symbols, see page 36.
209. Library in the Community. (3) Three hours of lecture per week. Analysis of the community for the librarian. Relationships between various factors and library use. Methods of relating the library to the community. Mr. Shosid

215. Popular Culture in the Public Library. (3) Two to three hours of lecture per week. An analysis of the characteristics of popular culture and its implications for public library programs. Ms. Blake

220. Reference and Bibliography. (4) Three hours of lecture per week. Prerequisite: Librarianship 250. Reference and bibliographical service; general and specific reference sources; bibliographic tools; sources, including national and subject bibliography.

221. Special Topics in Reference and Bibliography. (1–6) One to eight hours of lecture per week. Prerequisite: consent of instructor. Special topics in reference and bibliographic analysis and retrieval, including relevance, topicality, utility, and concept association. Mr. Maron

222. Computer-Based Reference Services. (4) Three hours of lecture and 1 hour of laboratory per week. Application of computer techniques to reference work. Bibliographic data bases in machine-readable form, current awareness services, batch and on-line retrospective searching, query formulation and search strategy, management considerations. Student work and demonstrations with representative computer sources, including national and subject bibliographies.

224. Government Documents. (4) Three hours of lecture per week. Identification, selection, acquisition, organization, and use of publications of federal, state & local governments, international organizations, and foreign governments.

225. Law Librarianship: Legal Research, Reference, and Bibliography. (3) Two hours of lecture per week. Prerequisite: open to students in the School of Library and Information Studies and to third year students in the Law School. Introduction to legal bibliography; cases and reports, statutes, administrative regulations and decisions, legislative history, legal citations and digests, legal periodicals and indexes, secondary materials, legal bibliography tools.

22A. Children's Literature. (4) Three hours of lecture and two hours of laboratory per week. Prerequisite: course 22A. Reading interests; types of library material; levels of reading ability; book selection; library programs. Mrs. Rogers

22B. Library Work with Children and Young Adults. (3) Three hours of lecture per week. Prerequisite: consent of instructor. Problems in development of children's libraries; twentieth-century trends; criticism and evaluation; trends in use of illustration. Mrs. Rogers

22C. Children's Literature; Oral Interpretation. (3) One hour of lecture and two hours of discussion per week. Prerequisite: consent of instructor. Historical development and critical analysis of folklore, legends, myths, and modern imagination; techniques needed in the library in the development of children's libraries. Mrs. Rogers

236. Library and Information Service Policy. (3–4) Two or three hours of class meetings per week. Prerequisite: consent of instructor. Problems in analysis and evaluation of alternative policies for provision of bibliographical, legal, and information service. Topics vary from offering to offering. May be repeated for credit with change of content. Mr. Buckland, Mr. Wilson, Ms. Blake

240. Introduction to the Information Sciences. (3) Three hours of lecture per week. The library problem from the viewpoint of the scientist, including those techniques and machines that deal with information and information processing. Relevance of the concepts presented to the tools of the practitioners of the sciences to information analysis, indexing, retrieval, and dissemination. Mr. Maron

242. Principles of Information Retrieval: Formal Techniques. (3) Two hours of lecture per week. Prerequisite: consent of instructor. Analysis of information retrieval systems. Information storage and retrieval. Stress on techniques of document and reference retrieval that can in principle be programmed for a digital computer. Topics should be covered including: types of retrieval systems; automatic indexing and classification; weighted indexes; association and similarity; clustering.

243. Automatic Data Retrieval and Question-Answering. (3) Two hours of lecture per week. Prerequisite: consent of instructor. A survey and analysis of computer-based question-answering systems. An examination of some of the major logical, linguistic, programming and file organization problems relating to automatic question-answering.

244. Principles of Information Retrieval: Foundational Concepts. (3) Two hours of lecture per week. Prerequisite: course 242 or consent of instructor. Analysis of retrieval of library information. Information retrieval including relevance, topicality, utility, and concept association. Mr. Maron

246. Evaluation of Information Systems and Servicess. (4) Three hours of lecture per week. A general survey of principles and methodologies for evaluating libraries and other information systems. The meaning and logical role of a library; a redefinition of the concept of utility and techniques of cost-effectiveness analysis.

248. Design of Mechanized Information Retrieval Systems. (3) Three hours of lecture per week. Prerequisite: course 275A or equivalent, or consent of instructor. Survey of problems of development of advanced computerized information retrieval systems. Topics include: query languages, telecommunication concepts, design of computer programs for information retrieval, file organization, evaluation of systems. Mr. Cooper

250. Introduction to Bibliography. (6) Three hour discussion meetings and eight to ten hours of laboratory per week. Tutorial instruction or equivalent individual or group study per week. Intensive introduction to the activities common to library and information services: sources, bibliographic tools, classification, literature search, selection of materials. The Staff, Mr. Wilson in charge

251. Cataloging and Classification. (4) One hour of lecture and seven hours of laboratory per week. Prerequisite: Librarianship 250. Standard techniques of identification, description, and subject access to bibliographic materials; uses of codes and schemes. Survey of cooperative and centralized cataloging activities. Mr. Wilson, Mrs. Cooke

252. Special Topics in Cataloging and Classification. (1–6) One to eight hours of lecture per week. Prerequisite: consent of instructor. Specific topics, hours, and credit vary from section to section and from year to year. May be repeated for credit, with change in content.

253. Library Technical Services. (3) Three hours of lecture per week. The history, functions, and characteristics of libraries and information agencies; the technical processes influencing the design of such agencies; existing and proposed types of agencies; concepts of administration and systems analysis. Mr. Swank

256. Libraries and Library Agencies. (3) Three hours of lecture per week. The history, functions, and characteristics of libraries and information agencies; the technical processes influencing the design of such agencies; existing and proposed types of agencies; concepts of administration and systems analysis. Mr. Swank

258. History of Libraries. (4) Three hours of lecture per week. A historical introduction to the libraries of the Western world, from antiquity to the present.

260. Libraries and Information Agencies. (3) Three hours of lecture per week. The utility, functions, and characteristics of libraries in the planning and development of management aspects of acquisitions, cataloging, classification, storage, and preservation of library materials; personal administrative and technical services; application of mechanized systems.

264. Descriptive Bibliography. (3) Three hours of lecture per week. Historical and analytical bibliography as methods of investigation, based on McKerrow and Bowes; methods of bibliographical description based on Bowes and Greg; literature of analytical bibliography. Mr. Harijan

265. Libraries and Information Agencies. (3) Three hours of lecture per week. The history, functions, and characteristics of libraries and information agencies; the technical processes influencing the design of such agencies; existing and proposed types of agencies; concepts of administration and systems analysis. Mr. Swank

266. Design Seminar. (3–4) Two to three hours of class meetings per week. Prerequisite: consent of instructor. A general introduction to the planning, acquisition, development, and maintenance of library collections and in the library's program of service.

273. Models of Library Systems. (3) Formerly 274. Three hours of lecture per week. Prerequisite: consent of instructor. Analysis and development of models of library functions (circulation, shelving, budget, etc.). Mr. Cooper

282A. Urban Public Libraries. (3) Three hours of lecture per week. Governance, management aspects of urban, county, and regional public libraries. Library service programs in relation to community patterns. Lecture, discussion, laboratory, field trips. Mrs. Blake

282B. Public Library Collections and Services. (3) Three hours of lecture per week. Problems in the selection, acquisition, development, and maintenance of library collections and in the library's program of service.

282C. Non-Print Media in Libraries. (4) Three hours of lecture per week. Planning, implementation and use of non-print media. The role of the librarian in a modern media center, evaluation of materials, the future of the media center, a look at the role of the audio-visual media centers, and some aspects of media technology.

284. School Libraries. (3) Three hours of lecture per week. Prerequisite: consent of instructor. A general survey of school libraries, planning and development of library resources; Emphasis on the function, administration, organization, services, materials, and the planning and equipment of school libraries in relation to the modern school. Lectures, committee and individual reports, reading, class discussions, and field trips.

286A. College and University Libraries. (3) Three hours of lecture per week. Planning and development of college and university libraries, the role of computer science libraries, and the role of the librarian in a modern media center, evaluation of materials, and some aspects of media technology.

286B. Resource Development for College and Research Libraries. (3) Two hours of lecture per week. Planning and development of college and research libraries, the role of the librarian in a modern media center, evaluation of materials, and some aspects of media technology.

296Z. Design Seminar. (3–4) Two to three hours of class meetings per week. Prerequisites: consent of instructor. A general introduction to the planning, acquisition, development, and maintenance of library collections and in the library's program of service.

296A–296B–296C. Seminar. (3–4; 3–4; 3–4) Two to three hours of class meetings per week. Topics in bibliography and information services, history of printing and libraries, comparative librarianship, library education, and other related fields. Specific offerings may vary from year to year. May be repeated for credit, with change of content. Some offerings may consist of one quarter sequence (296A–296B or 296A–296B–296C) in which quarter a topic is covered.

296D. Design Seminar. (3–4) Two to three hours of class meetings per week. Prerequisite: consent of instructor. Advanced problems in solution of planning and design problems and presentation of results. Intented for D.L.S., Ph.D., and Certificate students interested in college and university libraries, design and systems analysis and automation. May be repeated for credit.

297. Field Study in Librarianship. (1–5) Individual or group study of specific problems in library and information service in the field. Individual and group meet-
ings with faculty sponsor and reports required.

The Staff

298. Directed Group Study. (1–4)

The Staff

299. Individual Study. (1–6)

The Staff

300. Practicum in Libraries or Information Centers. (1–6) Prerequisite: consent of instructor and agency supervisor required. Supervised participation in the operations of a campus or off-campus library or information center, in tasks at or near the beginning professional level. On-the-job activities, conferences with agency supervisor and course instructor. Supplementary readings may be required. Staff (F, W, Sp)


602. Individual Study for Doctoral Students. (1–6) 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 D.L.S. degrees. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff

Colloquium (no credit).

College of Natural Resources

Office of the Dean, 101 Giannini Hall

Dean: David E. Schlegel, Ph.D., Acting

Associate Deans: Academic Affairs—George M. Briggs, Ph.D.; Research—David E. Schlegel, Ph.D.; Student Affairs—Paul R. Day, Ph.D.

The College of Natural Resources, formed on July 1, 1974, brings together in a single academic and professional College strongly complementary programs of teaching and research formerly offered at Berkeley in the College of Agricultural Sciences and the School of Forestry and Conservation. In its philosophical direction, the new College responds to many concerns among students and faculty in the society generally. Prominent among these concerns is the belief that, in meeting the challenging demand for essential foods, fibers, timber, and wood products and for recre
tional use of open space, our renewable natural resources must be used in ways that are at once productiv
e, conservative of those resources, and protective of environmental quality.

The College of Natural Resources offers a variety of academic programs which focus on renewable natural resources. These embrace most of the physical, bio
tical, technical, and social processes that people use for production and utilization of the food, fiber, and other materials that they require. The undergraduate pro
grams of the College place particular emphasis on two aspects of natural resources: they seek out and develop
doctoral level. These embrace most of the physical, bio
tical, technical, and social processes that people use for production and utilization of the food, fiber, and other materials that they require. The undergraduate pro
grams of the College place particular emphasis on two aspects of natural resources: they seek out and develop
doctoral level. These embrace most of the physical, bio
tical, technical, and social processes that people use for production and utilization of the food, fiber, and other materials that they require. The undergraduate pro
gams of the College place particular emphasis on two aspects of natural resources: they seek out and develop
doctoral level. These embrace most of the physical, bio
tical, technical, and social processes that people use for production and utilization of the food, fiber, and other materials that they require. The undergraduate pro
gams of the College place particular emphasis on two aspects of natural resources: they seek out and develop
doctoral level. These embrace most of the physical, bio
tical, technical, and social processes that people use for production and utilization of the food, fiber, and other materials that they require. The undergraduate pro
gams of the College place particular emphasis on two aspects of natural resources: they seek out and develop
doctoral level. These embrace most of the physical, bio
tical, technical, and social processes that people use for production and utilization of the food, fiber, and other materials that they require. The undergraduate pro
gams of the College place particular emphasis on two aspects of natural resources: they seek out and develop
doctoral level. These embrace most of the physical, bio
tical, technical, and social processes that people use for production and utilization of the food, fiber, and other materials that they require. The undergraduate pro
gams of the College place particular emphasis on two aspects of natural resources: they seek out and develop
doctoral level. These embrace most of the physical, bio
tical, technical, and social processes that people use for production and utilization of the food, fiber, and other materials that they require. The undergraduate pro
gams of the College place particular emphasis on two aspects of natural resources: they seek out and develop
doctoral level. These embrace most of the physical, bio
tical, technical, and social processes that people use for production and utilization of the food, fiber, and other materials that they require. The undergraduate pro
gams of the College place particular emphasis on two aspects of natural resources: they seek out and develop
doctoral level. These embrace most of the physical, bio
tical, technical, and social processes that people use for production and utilization of the food, fiber, and other materials that they require. The undergraduate pro
gams of the College place particular emphasis on two aspects of natural resources: they seek out and develop
doctoral level. These embrace most of the physical, bio
tical, technical, and social processes that people use for production and utilization of the food, fiber, and other materials that they require. The undergraduate pro

Undergraduate Departments

Conservation and Resource Studies

Office Department, 112 Giannini Hall

Chairman: Paul L. Gersper

Professors:

John R. Anderson, Ph.D.
Donald Argubright, Ph.D.
Kenneth L. Babcock, Ph.D.
James N. Bates, Ph.D.
George M. Briggs, Ph.D.
David L. Brink, Ph.D.
Dudley Pinnock, Ph.D.

Associate Professors:

Claudia Carr, Ph.D.
Fields W. Cobb, Jr., Ph.D.
H. Ralph Colby, Ph.D.
Harvey E. Doner, Ph.D.
John T. Doyen, Ph.D.

Assistant Professors:

Reginald H. Barrett, Ph.D.
Donald L. Beck, Ph.D.
W. Michael Hanemann, Ph.D.
Sally Fairfax, Ph.D.
Domenic G. Hausman, Ph.D.

Lecturers:

Mark Alper, Ph.D.
Rodney J. Arkley, Ph.D.

Richard R. Harris, M.L.A.
John Harte, Ph.D.
Roy L. Holmstead, Ph.D.
Angela C. Little, Ph.D.
M. Ronald Makin, Ph.D.
Alan S. Miller, Ph.D.
Robert L. Olson, M.B.A.
Nicolau A. Panopoulos, Ph.D.

NOTE: For key to symbols, see page 36.
Graduate and Research Departments

Agricultural Chemistry
Administered by an Interdepartmental Group Office, 145 Mulford Hall

Professors: George M. Briggs, Ph.D.
David L. Brink, Ph.D.
John E. Castis, Ph.D.
Donald G. Crosby, Ph.D.

Associate Professors: A. Douglas McLaren, Ph.D.
E. L. Robert Stockstad, Ph.D.
Eugene Zavarian, Ph.D.

Assistant Professors: George W. Chang, Ph.D.
Barbara M. Kennedy, Ph.D.

Lecturer: Harold T. Gordon, Ph.D.

Agricultural and Resource Economics
Department Office, 207 Giannini Hall

Professors: James N. Boles, Ph.D. (Chairman)
Sidney S. Koos, Ph.D. (Emeritus)
Ivan M. Lee, Ph.D. (Emeritus)
Davis McIntyre, Ph.D. (Emeritus)
Andrew Schmitz, Ph.D.
Murray R. Benedict, Ph.D. (Emeritus)
George M. Kuznets, Ph.D. (Emeritus)

Associate Professors: Alain Chopin de Janvry, Ph.D.
Richard Just, Ph.D.
Richard B. Norgaard, Ph.D.

Assistant Professors: Peter Berg, Ph.D.
W. Michael Hanemann, Ph.D. (Acting)

Lecturer: Eric Thor, Ph.D.

Biophysics
Administered by an Interdepartmental Group Office, 221 Wellman Hall

Professors: Daniel I. Amon, Ph.D.
Seymour Fogel, Ph.D.

Assistant Professor: George Oster, Ph.D.

Lecturer: Richard Malikin, Ph.D.

Cell Physiology
Department Office, 251 Hilgard Hall

Professors: Daniel I. Amon, Ph.D.
Docteur (Hon.) (Chairman)
Robert P. Buchanan, Ph.D. (Acting Chairman)

Lecturer: Richard Malikin, Ph.D.

Comparative Biochemistry
Administered by an Interdepartmental Group Office, 2553 Life Sciences Building

Professors: Daniel I. Amon, Ph.D.
Docteur (Hon.)
Clinton E. Ballou, Ph.D.
James A. Bassham, Ph.D.

Associate Professors: George Chang, Ph.D.

Assistant Professor: George Sensabaugh, D. Crim.

Entomological Sciences
Department Office, 137 Giannini Hall

Professors: John R. Anderson, Ph.D.
Leonard J. Callaghan, Ph.D.

Associate Professors: George M. Briggs, Ph.D.

Assistant Professor: John T. Dayen, Ph.D.

Lecturers: E. Philip LeVeon, Ph.D.

Nutritional Sciences
Department Office, 119 Morgan Hall

Professors: Docteur (Hon.)
Seymour Fogel, Ph.D.

Assistant Professors: Samuel Abraham, Ph.D.

Lecturers: Horace K. Burr, Ph.D.

Food Science
Administered by an Interdepartmental Group Office, 119 Morgan Hall

Professors: George M. Briggs, Ph.D.

Lecturer: Richard Malikin, Ph.D.

Forestry and Conservation
Department Office, 145 Mulford Hall

Professors: Donald H. Argun, Ph.D.
David L. Brink, Ph.D.
Robert N. Colwell, Ph.D.
Fred E. Dickinson, Ph.D.
Rudolf F. Graf, Ph.D.

Assistant Professors: Donald L. Bly, Ph.D.

Lecturers: Harold T. Gordon, Ph.D.

Genetics
Department Office, 345 Mulford Hall

Professors: Seymour Fogel, Ph.D.

Assistant Professors: Reginald H. Barrett, Ph.D.

Lecturers: James Bartsch, Ph.D.

Nutritional Sciences
Department Office, 119 Morgan Hall

Professors: Docteur (Hon.)
Seymour Fogel, Ph.D.

Assistant Professors: Samuel Abraham, Ph.D.

Lecturers: Horace K. Burr, Ph.D.

Food Science
Administered by an Interdepartmental Group Office, 119 Morgan Hall

Professors: George M. Briggs, Ph.D.

Lecturer: Richard Malikin, Ph.D.

Forestry and Conservation
Department Office, 145 Mulford Hall

Professors: Donald H. Argun, Ph.D.
David L. Brink, Ph.D.
Robert N. Colwell, Ph.D.
Fred E. Dickinson, Ph.D.
Rudolf F. Graf, Ph.D.

Assistant Professors: Donald L. Bly, Ph.D.

Lecturers: Harold T. Gordon, Ph.D.

Genetics
Department Office, 345 Mulford Hall

Professors: Seymour Fogel, Ph.D.

Assistant Professors: Reginald H. Barrett, Ph.D.

Lecturers: James Bartsch, Ph.D.

Nutritional Sciences
Department Office, 119 Morgan Hall

Professors: Docteur (Hon.)
Seymour Fogel, Ph.D.

Assistant Professors: Samuel Abraham, Ph.D.

Lecturers: Horace K. Burr, Ph.D.

Food Science
Administered by an Interdepartmental Group Office, 119 Morgan Hall

Professors: George M. Briggs, Ph.D.

Lecturer: Richard Malikin, Ph.D.

Forestry and Conservation
Department Office, 145 Mulford Hall

Professors: Donald H. Argun, Ph.D.
David L. Brink, Ph.D.
Robert N. Colwell, Ph.D.
Fred E. Dickinson, Ph.D.
Rudolf F. Graf, Ph.D.

Assistant Professors: Donald L. Bly, Ph.D.

Lecturers: Harold T. Gordon, Ph.D.

Genetics
Department Office, 345 Mulford Hall

Professors: Seymour Fogel, Ph.D.

Assistant Professors: Reginald H. Barrett, Ph.D.

Lecturers: James Bartsch, Ph.D.

Nutritional Sciences
Department Office, 119 Morgan Hall

Professors: Docteur (Hon.)
Seymour Fogel, Ph.D.

Assistant Professors: Samuel Abraham, Ph.D.

Lecturers: Horace K. Burr, Ph.D.

Food Science
Administered by an Interdepartmental Group Office, 119 Morgan Hall

Professors: George M. Briggs, Ph.D.

Lecturer: Richard Malikin, Ph.D.

Forestry and Conservation
Department Office, 145 Mulford Hall

Professors: Donald H. Argun, Ph.D.
David L. Brink, Ph.D.
Robert N. Colwell, Ph.D.
Fred E. Dickinson, Ph.D.
Rudolf F. Graf, Ph.D.

Assistant Professors: Donald L. Bly, Ph.D.

Lecturers: Harold T. Gordon, Ph.D.

Genetics
Department Office, 345 Mulford Hall

Professors: Seymour Fogel, Ph.D.

Assistant Professors: Reginald H. Barrett, Ph.D.

Lecturers: James Bartsch, Ph.D.

Nutritional Sciences
Department Office, 119 Morgan Hall

Professors: Docteur (Hon.)
Seymour Fogel, Ph.D.

Assistant Professors: Samuel Abraham, Ph.D.

Lecturers: Horace K. Burr, Ph.D.
Parasitology
Administered by an Interdepartmental Group Office, 201 Wellman Hall

Professors:
- John R. Anderson, Ph.D.
- Deane P. Furman, Ph.D.

Lecturers:
- George O. Poirier, Jr., Ph.D.

Soils and Plant Nutrition
Department Office, 108 Hillgard Hall

Professors:
- Kenneth L. Babcock, Ph.D. (Acting Chairman)
- A. Douglas McLaren, Ph.D. (Emeritus)
- R. Earl Storlie, B.S. (Emeritus)
- Theodore C. Broyer, B.S. (Emeritus)

Associate Professors:
- Harvey E. Doner, Ph.D.
- Raymond W. Schneider, Ph.D.
- Rodney J. Arkley, Ph.D.
- Fred E. Dickinson, Ph.D.

Lecturers:
- Robert D. Raabe, Ph.D.

Wood Science and Technology
Administered by an Interdepartmental Group Office, 478 Richmond Field Station

Professors:
- Donald G. Arganbright, Ph.D.
- Arno P. Schniewind, Ph.D.
- Eugene Zavarin, Ph.D.
- James Vlamis, Ph.D.

Lecturers:
- Barney E. Klamecki, Ph.D.

Undergraduate Programs
The College of Natural Resources offers a variety of academic programs which focus on renewable natural resources. For further information on the following programs write for the Announcement of the College of Natural Resources, obtainable free of charge from the Dean’s Office, 101 Giannini Hall, University of California, Berkeley, CA 94720.

Biology of Natural Resources
This major provides rigorous training in the broad, scientific aspects of the biology of natural resources. Study of basic sciences is emphasized in the first two years; in the junior and senior years, you will take a variety of resource science courses of both basic and applied nature with the opportunity to specialize. You may select a specialized field of emphasis, or you may pursue a general program including the broad and interdisciplinary aspects of the biology of renewable natural resources. In the latter case you would select the field of bioresource sciences. Specialized fields include animal resource sciences, bioenergetics, entomology, genetic resources, plant pathology, and soil and plant resources. You should consult your faculty adviser for information about the required courses in each of these fields.

With completion of this major, you will have obtained a broad education in science and humanities as well as a grasp of the application of science to renewable natural resources, their nature, utilization, and conservation. You will also have familiarity with the relationships between renewable natural resources and their environments and the impact of man’s utilization of such resources on environmental quality. The major constitutes excellent preparation for graduate study in many fields of employment in private and public agencies. With proper selection of electives within the major, you will have a strong preparation for medical or veterinary school and related health fields. The major will also provide continuing opportunity for you to pursue the subject matter preparation provided by the previous major in agricultural sciences, though with additional flexibility.

The major requires: 30 units of humanities and social sciences (including English 1A–1B and no more than 10 units of a foreign language; Chemistry 1A–1B, 8A–8B; Physics 6A–6B–6C; Mathematics 16A–16B; Computer Sciences or Statistics and Biology 1A–1B. In addition, 75 units relevant to Biological and Natural Resource Sciences are specified requirements in each field of emphasis, and 34 units of electives.

Conservation of Natural Resources
This major is an interdisciplinary program designed for students interested in environmental issues and areas of interaction among, population, technology, societal institutions, and cultural values. The major’s orientation is toward flexibility and an individualized educational approach to understanding the structure and dynamic functions of complex environmental systems within our society and biosphere.

The program encourages students to use the course offerings of the entire Berkeley campus and appropriate community resources in the development of individual programs of study. A growing number of courses and continuous innovation within the major provide the necessary flexibility to attempt to understand and resolve basic environmental issues. The major facilitates and encourages interaction among students, faculty, and community.

Breadth requirements include three quarter courses in each of four of the following five areas: physical sciences, biological sciences, social sciences, humanities, and mathematics and/or statistics. Three additional quarter courses are required in one of the four areas chosen, as well as two quarter courses in reading and composition. Other requirements include Interdepartmental Studies 10A–10B–10C, Conservation of Natural Resources 49 and 149, and a 10-course program in the area of interest that is selected by the student.

NOTE: For key to symbols, see page 36.
The Food, Nutrition, and Dietetics major gives students an excellent foundation in the biological and chemical sciences. In their program, students may choose to emphasize food science—the study of the properties and processing of food materials; nutrition—the study of food and dietary habits and their relationship to health; and related disciplines such as food utilization; or dietetics—a professional program in nutrition management.

A student with a Bachelor of Science degree in the food science or nutrition emphasis is well prepared to seek advanced professional study in the health sciences (nutrition, dietetics, and public health), advanced graduate study in the life sciences, or technical employment in research and in the food industry. The dietetics emphasis is for students planning to enter the dietetics profession as therapeutic and clinical dietitians.

The course of study in all emphases has a common core consisting of bacteriology or microbiology, 5 units; biochemistry, 5 units; Chemistry 1A–1B, 5A–5B, 8 units; English, 4 units; French, 4 units; general education courses, 15 units; Mathematics (12 units) including calculus (4), statistics (4), and computer science or additional calculus or statistics (4); Physics, 8 units; physiology, 5 units; and 30 units of courses in the major field.

The emphases in Food Science and Nutrition consist of additional courses in Biological and Natural Resource Sciences (12 units) which may be selected from bacteriology, biology, botany, genetics, plant nutrition, physiology-anatomy, soil science, or zoology; additional units in physical sciences and mathematics (8 units), as follows: quantitative chemistry, 4 units; physics with laboratory, 4 units; and in the Biological and Resource Sciences (9 units): biochemistry laboratory, 5 units; and biology, 4 units. Requirements in the Dietetics emphasis include humanities and social sciences, 15 units as follows: economics, 4 units; psychology, 4 units; sociology or cultural anthropology, 4 units; additional courses in psychology, sociology, or anthropology (upper division), 3 units. Biological and Natural Resource Sciences (12 units) include: upper division course in physiology or anatomy, 3 units; courses in biology, botany, zoology, or biore sources, 9 units. Major field requirements including the additional courses and clinical course work are sequenced during the junior and senior years. Enrollment in the dietetics option is limited and requires an application and interview.

For admission with junior standing see the announcement of the College of Natural Resources. Inquiries concerning special requirements in Dietetics and the professional course of study, and requests for application materials should be directed to the Dietetics Coordinator, Department of Nutritional Sciences, 119 Morgan Hall, Berkeley, CA 94720.

Forestry

This major is the primary vehicle for students intending to enter the profession of forestry. Its objective is to provide a strong education of men and women to manage forests and related wildlands to yield up to their full capacity of wood, water, forage, wildlife habitat, recreational opportunities, and other environmental benefits desired by mankind.

More than one-fourth of the upper division program may be taken as free electives. This enables the student to acquire either a highly specialized or a broad knowledge of the field of forestry. In addition, with the assistance of an adviser, the student may develop specialized programs in such areas as forest ecology, silviculture, and timber management; range ecology and management; wildlife biology and management; watershed management and hydrology; recreation and park management; and resource economics and planning. Courses to develop these interests are offered in the College by the Department of Forestry and Resource Management. Students also select appropriate courses given by other departments on campus in order to pursue individual interests, to study basic sciences or special courses offered by the College, to broaden understanding of human affairs. Advanced undergraduates will also wish to consider certain of the graduate courses in forestry offered by the Department of Forestry and Conservation.

Licensing. Completion of the Bachelor of Science degree with a major in forest resource sciences at the College, or to broaden understanding of human affairs. Advanced undergraduates will also wish to consider certain of the graduate courses in forestry offered by the Department of Forestry and Conservation.

Soil Resource Management

The primary objective of the major in soil resource management is to prepare students for professional and applied scientific work on conserving and improving the soil resources used by man. Students in the
Students graduating from this major may expect to understand the principles underlying professional techniques in such areas as soil resource classification and inventory, soil performance evaluation, and management of soils used in a variety of ways.

Students graduating from this major may expect to understand the principles underlying professional techniques in such areas as soil resource classification and inventory, soil performance evaluation, and management of soils used in a variety of ways.

The preparatory program requires: 10 units of economics; 10 units of English; Chemistry 1A–1B; work in surveying, geology, and statistics; Mathematics 16A–16B; Biology 1A–1B; ecology, and political economy. Major work in the upper division stipulates 61 units in the fields of soil science and soil resource management.

### Wood Science and Technology

The major in Wood Science and Technology is designed for students interested in the wise utilization of the many products obtained from trees and in obtaining an education embracing the broad field of renewable natural resources. Emphasis is placed on the management aspects of an integrated program of utilization to maximize benefits from the harvested tree. Courses provide a basic understanding of the interactions between forest management and the importance of effective utilization in the management and conservation of forests. Students may select technical elective courses that are relevant to their individual interests and career objectives.

The Wood Science and Technology major provides the academic background for many career positions in the forest products industry and related institutions, with technical specialization in such areas as resource planning, production management, operations research, wood engineering, and pulp and paper manufacture. Students who desire careers in research or teaching may also prepare themselves for graduate studies leading to the M.S. or Ph.D. degrees with specialization in areas such as wood chemistry, wood physics, forest products pathology, wood anatomy, and pulp and paper chemistry.

Fifty-four quarter units of specified lower division subject matter are required, including: biology, 4 units; chemistry, 12 units; calculus, 6 units; physics, 12 units; statistics, 4 units; English, 8 units; and economics, 8 units. Upper division courses in Forestry, Wood Science and Technology, and restricted technical electives are required.

### Graduate Programs

Academic and professional graduate degree programs are available in agricultural chemistry, agricultural economics, biophysics, comparative biochemistry, entomology, food science, forestry, genetics, nutrition, parasitology, plant pathology, plant physiology, range management, soil science, wildlife resource science, and wood science and technology. In addition, an ad hoc interdisciplinary doctoral program is offered.

#### Agricultural Chemistry

This program is administered by an intercampus group and is open to students who are interested in the application of chemical knowledge to resource and agricultural problems. For entry into the program, students should have the equivalent of the bachelor's degree in chemistry from the University of California.

Study leading to the Ph.D. degree is offered by a group of agricultural chemists who are engaged in research. A student is expected to be 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 Biochemistry in the College of Letters and Science, or in the College of Chemistry. The following special fields are represented: insecticide chemistry and insect biochemistry in the Department of Entomological Sciences; soil chemistry and plant nutrition in the Department of Soils and Plant Nutrition; forest products chemistry in the Department of Forestry and Conservation; and food chemistry and animal nutrition in the Department of Nutritional Sciences. In addition to the major field of specialization, predoc toral students must take courses in chemistry, biochemistry, and allied sciences as needed to enable them to pass a qualifying examination in agricultural chemistry. A reading knowledge of one foreign language is recommended but the student may petition the Executive Committee for acceptance of another language) is required before the qualifying oral examination for the Ph.D. degree.

### Agricultural and Resource Economics

The Department of Agricultural and Resource Economics, one of several departments of graduate instruction and research in the College of Natural Resources, offers programs leading to the M.S. and Ph.D. degrees. An applicant 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 economics program is relatively flexible; however, each program stresses economic theory, quantitative methods, and two elective fields defined in consultation with the adviser. Some common elective fields include marketing and trade, agriculture in economic development, domestic rural policy, and natural resource economics.

The first year of course work in the Ph.D. program is normally devoted to economic theory and quantitative methods, while the second year 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.

#### Biophysics

This program is administered by a campus-wide interdepartmental group which was organized to permit students interested in biophysics to obtain graduate training leading to the M.S. or Ph.D. degree. Students interested in study and research in biophysics may work under the supervision of any faculty member belonging to the group without having to pursue other graduate programs offered by the department with which the faculty member is affiliated. In this College, members of the group in biophysics include individual faculty members of the departments of Cell Physiology, Entomological Sciences, Genetics, Nutritional Sciences, and Soils and Plant Nutrition.

Undergraduate students interested in pursuing graduate work in biophysics should as undergraduates acquire training in the basic physical and biological sciences, but intensives may be removed during the early stages of graduate study.

#### Comparative Biochemistry

This program is administered by an interdepartmental group which was organized to permit students interested in a biochemical approach to biological problems to obtain graduate training and advanced degrees. This interdisciplinary program allows the student to do research on a biochemical problem and to fulfill M.A. or Ph.D. thesis requirements under the supervision of a faculty member in one of several departments, such as Biochemistry, Cell Physiology, Entomological Sciences, Nutritional Sciences, Physiology-Anatomy, and organized research units such as Chemical Biodynamics. Students are expected to obtain a background in physiology and biology and to specialize in some area of biochemistry.

### Entomology

This program is administered by the Department of Entomological Sciences. Both M.S. and Ph.D. degree programs are offered. A basic educational background in the physical and biological sciences is prerequisite to the study of entomology at the graduate level. The minimum requirements are usually fulfilled by a bachelor's degree from an institution of acceptable standing.

The preparatory undergraduate program should include the following subjects: general entomology, insect classification, insect anatomy and physiology, systematics and taxonomy, and a year of general biology, including zoology and botany as well as cellular and organismal biology. Courses in genetics, physiology and invertebrate zoology, and statistics are strongly recommended. Chemistry, including organic chemistry, and physics are required. Any deficiencies in these areas must be removed at the outset of graduate study.

Fields of emphasis include scarology, agricultural entomology, biological control, forest entomology, pest management, insect behavior, insect ecology, toxicology, insect morphology, insect pathology, insect physiology, insect vectors, medical entomology, parasitology, and insect physiology and biochemistry.

Excellent available research facilities include an outplant, an entomological museum, specialized laboratories, and an extensive library. Students also use insectary buildings, growth chambers, and greenhouses at the Oxford Tract and growth chambers, bioclimatic chambers, and greenhouses at the Gill Tract.

#### Food Science

This program, leading to the M.S. degree, is administered by an interdisciplinary group composed of representatives from the Departments of Nutritional Sciences, Chemical Engineering, and Public Health. A student may do research under the direction of a faculty member in any department represented in the group. Provision is available to include selected personnel from the Western Regional Research Laboratory of the U.S. Department of Agriculture as adjunct professors and to extend research to their laboratories.

Applicants must have completed the requirements for a B.A. or B.S. in the sciences or fields on which food science is based. Undergraduate preparation should include general, qualitative, and organic chemistry; preferably also physical chemistry; physics with laboratory; bacteriology with laboratory; and courses in nutrition and food science. Ideally, the undergraduate program will be comparable to the major in food, nutrition, and dietetics as offered on this campus.

Programs are designed to prepare students for industrial or teaching application of their education in such areas as emphasis on food chemistry, food production, food analysis, and quality control. The San Francisco Bay area is a major food processing and research center, and students are able to establish close contacts with these industries and product development groups.

### Forestry

The Master of Forestry degree is a graduate professional degree, granted through the Department of Forest Sciences.
An undergraduate major in genetics or its equivalent in the biological sciences is the standard preparation. However, students with undergraduate degrees in such fields as mathematics, psychology, and chemistry are welcome, with the understanding that subject matter deficiencies must be removed early in the graduate work.

In addition to laboratory and other facilities for research, many field stations of the University are available for students interested in natural populations; and working relationships have been established with the San Francisco Medical Center, the U.C. Davis Genetics group, the Institute of Forest Genetics at Placerville, the State Department of Public Health laboratories, the Biological group at San Diego State College, and the Organization for Tropical Studies in Costa Rica.

### Nutrition

Graduate study is supervised by an interdepartmental group representing the various departments at Berkeley interested in nutrition: Nutritional Sciences, Biochemistry, Anatomy and Physiology, Public Health, and Medical Physics. Programs are available at both the M.S. and Ph.D. levels. For admission the student should have a bachelor’s degree in one of the sciences on which nutrition is based. An undergraduate major or its equivalent in any of the nutritional sciences curriculum or related fields, such as biochemistry, chemistry, biological sciences, and physiology, will provide a strong background.

Graduate study in nutrition is intellectually challenging and offers opportunities to study a range of problems encompassing human, comparative, and cellular nutrition. Fields of emphasis include biochemical, biophysical, genetic, and functional aspects of nutrition; experimental nutrition; human nutrition; international nutrition; physiologic phenomena; and therapeutic nutrition.

Special facilities include a six-bed metabolic unit for the conduct of human investigations and an animal colony maintained for teaching and research purposes.

### Parasitology

This program is administered by an interdepartmental group composed of staff members drawn from a wide range of departments interested in parasitology. Graduate study as well as Ph.D. degrees are offered. Students with a bachelor’s degree in a biological science are welcome, with the understanding that subject matter deficiencies must be removed early in the graduate study.

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 in host-parasite interrelations. 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 men 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.

Facilities for study and research by graduate students are located in the administrative units of the faculty members of the group. These include the Department of Entomological Sciences, the Department of Zoology, and the School of Public Health on the Berkeley campus and the Department of International Health and the G.W. Hooper Foundation for Medical Research on the San Francisco campus.

### Plant Pathology

This program is administered by the Department of Plant Pathology and offers graduate education leading to the M.S. and Ph.D. degrees. Applicants should have a bachelor’s degree in plant pathology or in an equivalent field that includes a broad background in physical and biological sciences, including bacteriology, biochemistry, plant cell biology, and plant physiology.

The field is primarily concerned with the study of plant diseases and protection of a wide range of crop plants from disease losses. The subject area is exceptionally broad, embracing the response of the plant to the environment and to disease agents, such as bacteria, fungi, seeds, plants, and viruses, as well as their control.

This leads to research on fundamental problems such as host-parasite physiology or mode of action of fungi and diseases. It includes applied problems such as spray control programs or soil treatments. Areas of emphasis include biological deterioration of wood, epidemiology and diagnosis of plant diseases; forest pathology; physiology of pathogenic fungi and viruses; and the taxonomy, ecology, and behavior of pathogenic fungi.

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 and an herbarium are also maintained.

### Plant Physiology

This program is administered by an interdepartmental group consisting of faculty members from a wide range of departments, including Botany, Cell Physiology, Forestry and Conservation, and Soils and Plant Nutrition. Graduate study is available leading to the M.S. and Ph.D. degrees, offering students broad opportunities for work, study, and research on growth and development, hereditary potentials, effects of environmental conditions, and other aspects of plant physiology.

The program emphasizes fundamental training. Applicants should have prior preparation in the basic physical and biological sciences, although deficiencies can be removed during the early stages of graduate study. General subject requirements for admission to the M.S. or Ph.D. degree programs are similar.

In addition to conventional chemical laboratories, specialized equipment and facilities include controlled environmental growth chambers and glasshouse space as well as field, forest, and laboratory culture areas. Equipment for the analysis of developmental and physiological processes and their biochemical or biophysical aspects include computers, electron microscopes, atomic absorption spectrometers, gas chromatographs, and other modern instrumentation.

### Range Management

This program is administered by an interdepartmental group consisting of faculty members from the Department of Forestry and Conservation and related departments on the Berkeley campus. The program is designed to enable students with a B.S. degree in range management, forestry, in other range management fields, or in related disciplines to obtain advanced work in this field. Graduate study leads to the Master of Science degree and serves students with advanced professional interests as well as those wishing to specialize in a basic aspect of range management, such as grass or brushland ecology, forage in relation to livestock or wildlife management, or rangeland vegetation management.

Excellent laboratory and field facilities include several experimental range properties and large acreages of wildland ranges that are easily accessible from Berkeley. The staff is actively involved in both theoretical and practical research.

### Soil Science

Graduate study in soil science is supervised by an interdepartmental group drawn from the staff of the Department of Soils and Plant Nutrition and other departments in the University who have special qualifications and interest supervising research in soil science. Both M.S. and Ph.D. programs are available. For admission the student must have a bachelor’s degree in...
soil science or its equivalent in the biological and physical sciences. Previous completion of courses in mathematics, statistics, chemistry, biochemistry, and several fields of biology will enhance admission opportunities and reduce the time required to complete graduate programs in this field.

Graduate study in soil science offers opportunities to study problems of increasing food and fiber production, with emphasis on air, pot culture areas, environmental growth chambers, and several fields of biology will enhance admission opportunities and reduce the time required to complete graduate programs in this field.

Wildland Resource Science

This program is administered by the Department of Forestry and Conservation, with degree programs available at the M.S. and Ph.D. levels. The Ph.D. program is designed to develop the student's critical abilities and to expand the capacity to conduct research on forest ecosystems, and related renewable natural resources. It is concerned with wildland ecosystems and with the aggregates of vegetation, fauna, water, soil, climate, and social systems associated with them. It examines these ecosystems in terms of management and manipulation to achieve particular social purposes.

The master's level program is intended for the graduate in forestry, in other wildland resource fields, or in related disciplines who desires to specialize in some aspect of wildland resources such as biometrics, ecology, economics, photogrammetry, policy and planning, silviculture, soils, watershed management, or wildlife habitat management.

The Department has excellent facilities for instruction and research, including photogrammetric, physiological, and statistical laboratories as well as several forest properties where students may center their field studies.

Wood Science and Technology

This program is administered by an interdepartmental group drawn in chemistry, engineering, forestry, and 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 the chosen research fields or areas of specialization. To be considered for admission, students must have a bachelor's degree in a natural science, forestry, engineering, wood science, or wood technology.

Graduate study directs principal attention to an understanding of the anatomy, mechanics, physics, and chemistry of wood and the application of this knowledge to the utilization of wood for man's benefit. Specialization through additional study and thesis research is possible under the program in such areas as wood structure; wood physics, including wood moisture and wood density relations; timber mechanics and wood engineering; 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.

The facilities of the Forest Products Laboratory are available for both thesis and special research projects.
Conservation and Resource Studies (CRS)

Department Office, 112 Giannini Hall

Undergraduate Major Advisers: Conservation of Natural Resources: The Staff (Mr. Gersper in charge), Political Economy of Natural Resources: The Staff (Mr. Hanemann in charge).

LOWER DIVISION COURSES

CRS 23. World Resources for Food and Agriculture. (3) Three hours of lecture per week. Survey of man's interaction with the food production systems, processing, distribution, and utilization of food. Principles of agriculture including physical, biological, social, and institutional factors. The place of agriculture in national and world affairs. The outlook for world food supplies. 

Mr. Day, Mr. Waldron, Mr. Stokstad (W)

CRS 40. Environmental Chemistry. (3-4) Three hours of lecture and optional 1 1/2-hour discussion per week. Prerequisites: concurrent enrollment in course of laboratory per week. Prerequisites: concurrent enrollment in course of prerequisites: high school chemistry and consent of instructor. Lectures will provide an understanding of the character and consequences of the environment, especially how they relate to pollution and environmental degradation. Students with unsure backgrounds in chemistry should enroll for 4 units in stead of 3.

Mr. Doner, Mr. Huismann, Mr. Holmstead (W, Sp)

CRS 40L. Environmental Chemistry Laboratory. (2) One and one-half hours of laboratory per week. Prerequisites: concurrent enrollment in course of prerequisites: consent of instructor. Applications and problems of various aspects of chemical analysis as applied to environmental chemistry.

Ms. Young (W, Sp)

UPPER DIVISION COURSES

CRS 101. Urban Garden Ecosystems. (5) Three hours of lecture and four hours of discussion and demonstration per week. Study of urban garden and recreational ecosystems, with emphasis on basic ecological concepts and techniques for managing plant and animal systems. Prerequisites: Mr. Williams (F); Mr. Vlamis (W); Mr. Raabe (Sp)

CRS 110. Ecosystematology. (4) Three hours of lecture and one and one-half hours of laboratory per week. Prerequisite: any ecology course; or one quarter of Interdepartmental Studies 10, or consent of instructor. Concepts of ecosystems and the roles of populations and communities in large, complex ecosystems in which man is dependent component, planning agent, and observer: how to deal with complexity: the systems approach to problem solving: determining systems boundaries: ecological concepts: ecosystem management. 

Mr. Schultz (W)

CRS 115. Environmental Philosophy and Ethics. (3) Three hours of lecture per week. Prerequisite: consent of instructor. A critical analysis of human environments, especially within the context of large, complex ecosystems, with special emphasis on the role of ideologies, beliefs, attitudes, and behavior. Examination of contemporary environmental literature and the philosophies embodied therein. 

Mr. Petula (F)

CRS 118. Linear Models of Natural Resource Problems. (4) Three hours of lecture and 1 hour of discussion per week. Prerequisites: Math 16A and 16B and Statistics 2; or equivalent(s). An introduction to the use of linear deterministic and stochastic models in the analysis of natural resource problems. Methods include linear programming, input-output analysis, and simulation.

Mr. Just (F)

CRS 130. Resource Development Law and Administration. (4) Three hours of lecture and one and one-half hours of laboratory per week. Property rights, acquisition and management of land, water, and transportation development agencies, resource use conflicts, and the introduction of conservation programs. The Forest Service, Park Service, and other agencies.

Ms. Fairchild (Sp)

CRS 131. Environmental Law, Planning, and Administration. (4) Three hours of lecture and one and one-half hours of laboratory per week. Prerequisite: upper division standing and consent of instructor. Review of environmental laws and their planning and administration, with emphasis on the federal and California environmental impact processes. Legislation, court statements: organization, research, teamwork, writing, and problem solving. Preparation of interdisciplinary group processes and problem solving. Each section will produce an environmental impact report.

Mr. Harris (W)

CRS 140. Economics of Land Use. (4) Three hours of lecture and one hour of discussion per week. Prerequisites: ECON 100A or ECON 100B, and MATH 1A or MATH 16A; or consent of instructor. Neoclassical and post-neoclassical economic theories of land, labor, and capital markets. Externalities of land use: crowding, wildlife habitat, etc. Publicly supplied goods that influence land use: transportation and recreation. The urban-rural fringe problem. The taking issue in preservation and the Coase theorem.

Mr. Berck (W)

CRS 150. History of Resource Use in the United States from Colonial Times to Present. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: consent of instructor. Examination of the history of American resource use. Conservation of natural resources—land, water, agriculture, timber, minerals, and petroleum—in the United States. Elements of historical geography and the history of technology as well as political, economic, and social history are included.

Mr. Petula (W)

CRS 151. Economic and Political History of Resources in Twentieth Century United States. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: consent of instructor. Development of U. S. capitalism with respect to its impact on resources and environment. Examination of the emergence and evolution of public efforts to regulate excessive resource exploitation and environmental degradation from the Progressive Era, New Deal, the Great Society to the present. 

Mr. LeVeen (Sp)

CRS 160. Economics of Food and Nutrition. (3) Three hours of lecture per week. Prerequisite: consent of instructor. Role of nutrition and the conservation of natural resources—land, water, agriculture, timber, minerals, and petroleum—in the United States. Elements of historical geography and the history of technology as well as political, economic, and social history are included.

Mr. Petula (W)

CRS 161. Agriculture in Economic Development. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: consent of instructor. Role of agriculture in development and the impact of development on agriculture: food, population, and resources; the transformation of traditional agriculture into policies in rural development. Mr. de Janvry (W)

CRS 163. Economic Analysis of World Agricultural Problems. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: ECON 100A or ECON 100B, or PENR 100A, or equivalent. Socioeconomic factors in the organization and operation of world agriculture, with specific application to the problem of world hunger. Interactions between socioeconomic systems with population growth, resource scarcity, technology, international trade, economic development.

Mr. Sarris (Sp)

CRS 170A-170B. Sociology of Rural Development. (4-4) Three hours of lecture per week. Prerequisite: consent of instructor. Social organization and institutions and their relationship to rural development; values and goals of development, and role of agriculture in resource development in the rural environment; social reform movements affecting ownership and control of farming lands and other natural resources. 

Mr. McIntyre (W, Sp)

CRS 180. Internship in Conservation and Resource Studies. (12 or 15) Thirty-two or forty hours per week at placement location. Prerequisite: junior or senior standing, consent of adviser, faculty sponsor, and department. Intern placements relevant to the student's academic area of interest and offers opportunities to work with agencies, institutions, business, or organizations concerned with natural resources. Students will be responsible for substantial written analysis of the experience as well as assigned readings.

Mr. The Staff (Miller in charge) (F, W, Sp)

*CRS 191A. Environmental Values. (3) Three 1 1/2-hour lectures per week. Course will explore lectures, discussions, readings and research, aspects of environmental value formation. Issues to be discussed include environmental economics, impacts of philosophical dualism, culture and religion, science and technology on human attitudes toward the environment. To be offered 1978-79 only.

*CRS 191B. Environmental Biology. (4) Three hours of lecture per week. Prerequisites: one course in introductory college chemistry. Discussions of the biological, biochemical, and physiological basis of pollution and dependence on the environmental conditions in which it has been found. Exploration of environmental features by pollutants and the mechanisms by which these changes affect the functioning of organisms.

Mr. Alper (Sp)

*CRS 191E. Environment and the Media. (8) Three hours of lecture and ten hours of lab per week. Prerequisite: IDS 10A or 10B or 10C; consent of instructor for second quarter. The analysis, research and production of communication media on environment issues. Students will become a member of a research team on a particular environmental issue as well as part of a production team either in a print, radio, or video medium. May be repeated once for credit.

Mr. Petulla (F, W)

*CRS 191F. Environmental Education. (4) Four hours of lecture/discussion per week. Prerequisite: IDS 120 or equivalent field experience. Holistic environmental approach to education through lecture-demonstration, field trips, and the student's own field experience. Topics formally address the questions "What to teach?" and "How to teach it?" by examining instructional strategies, learning roles, ecological concepts, different environments.

The Staff (Mr. Hancock in charge) (W)

*CRS 191G. Directed Experience in Environmental Education. (2) Two hours of lab per week. Prerequisite: CRS 191F or consent of instructor. Advanced seminars to explore chosen topics of environmental education through the teaching and evaluation of environmental education as an individual or group projects. Different sections will be available each quarter according to student-faculty interest. Students with proposed sections should contact the professor in charge.

The Staff (Mr. Hancock and Mr. Hurst in charge) (F, W, Sp)

IDS 10A-10B-10C. Introduction to Environmental Issues. (4-4-4) See Interdepartmental Studies for the complete description of this course.

IDS 10L-10M-10N. Introduction to Environmental Issues—Special Projects. (2-2-2) See Interdepartmental Studies for the complete description of this course.

IDS 80. Introduction to Environmental Physics. (4) Formerly Physics 80. See Interdepartmental Studies for the complete description of this course.

IDS 120. Environmental Education and Design. (6) See Interdepartmental Studies for the complete description of this course.

Entomology (Ent.)

Department Office, 137 Giannini Hall

Undergraduate Adviser: John T. Doyen
LOWER DIVISION COURSES

Ent. 10. The Natural History of Insects. (4) Three 1-hour lectures per week and applications in pest control. Mr. Frankne (F)

PM 20. Introduction to the Philosophy, Ecology, and Economics of Pest Management. (4) Lectures, 4 hours per week, plus one 1/2-hour laboratory per week. Mr. Day, Mr. Doyen (F)

Ent. 101. Insect Classification. (4) Three hours of lecture and 6 hours of laboratory per week. Prerequisites: course 100 and 102. Mr. Doyen (F)

Ent. 102. Functional Insect Anatomy. (2) Two hours of lecture per week. Prerequisite: course 100. Mr. Pipa (F)

Ent. 103. Environmental Physiology of Insects. (2) Two hours of lecture per week. Prerequisite: course 100. Mr. Pipa (F)

Ent. 104. Systematic Entomology. (4) Two hours of lecture and one 3-hour laboratory per week. Prerequisite: course 103. Mr. Pipa (F)

Ent. 105. Insect Ecology. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: course 100 and 101. Mr. Heinrich (W)

Ent. 106. Field Entomology. (5) One hour of lecture and three hours of laboratory per week. Prerequisite: course 105. Mr. Powell (Sp)

Ent. 108. Aquatic Entomology. (5) Three hours of lecture and 6 hours of laboratory per week. Mr. Zivnuska, Mr. Wakimoto, Mr. Bartolome (Sp)

Ent. 117. Pesticide Chemistry and Toxicology. (4) Lecture, 4 hours per week. Mr. Hagen (F)

Ent. 117L. Laboratory in Pesticide Chemistry and Toxicology. (1) Laboratory, 3 hours per week. Prerequisites: Ent. 117 (may be taken concurrently) and Ent. 100. Mr. Casida, Mr. Gordon (Sp)

Ent. 130. Biological Control of Insect Pests and Weeds. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: course 100 and 101. Mr. van de Bosch, Mr. Holmstead (Sp)

Ent. 140. Insect Pathology. (5) Four hours of lecture and three hours of laboratory per week. Prerequisites: course 100 and 101. Mr. Hagen (F)

Ent. 150. Medical and Veterinary Entomology. (3) Two 1 1/2-hour lectures per week. Mr. Weirnmann (F)

Ent. 150L. Helminthology Laboratory. (4) Six hours of laboratory per week. Prerequisites: Ent. 150 (may be taken concurrently). Mr. Fredman, Mr. Anderson (W)

Ent. 172. Principles and Methods of Entomological Research. (4) Four hours of lecture per week. Mr. Sylvester (F)

Ent. 179A. Field Studies in Entomology. (1-5) Prerequisite: consent of instructor. Mr. Schlinger (F)

Ent. 179B. Field Study in Veterinary Medical Practice. (1-5) Prerequisite: consent of instructor. Mr. Schlinger (F)

Ent. 186. Directed Group Studies for Advanced Undergraduates. (1-5) The Staff (Mr. Schlinger in charge) (F, W, Sp)

Ent. 199. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations listed on page 136. The Staff (Mr. Schlinger in charge) (F, W, Sp)

IDS 138. Biological Deterioration of Wood. (3) See interdepartmental Studies for a complete description of this course.

FORESTRY

For. 10. Conservation of Forest and Wildland Resources. (4) Three hours of lecture per week. Prerequisites: use of management courses and other wildlands in relation to land use. Mr. McBrine, Mr. Teagarden, Mr. Zinke, Mr. Zivnuska, Ron H. Wakimoto, James B. Wallmo.

Upper Division Courses

For. 100-105. Field Study of Forest and Wildland Resources. (4-6) 408 hours of field instruction. Mr. Casida, Mr. Gordon (Sp)

For. 110. Destructive and Beneficial Arthropods. (3) Three hours of lecture per week. Mr. Heinrich (W)

For. 117L. Laboratory in Pesticide Chemistry and Toxicology. (1) Laboratory, 6 hours per week. Mr. Casida, Mr. Gordon (Sp)

For. 150. Medical and Veterinary Entomology. (3) Two 1 1/2-hour lectures per week. Mr. Weirnmann (F)

For. 150L. Helminthology Laboratory. (4) Six hours of laboratory per week. Mr. Fredman, Mr. Anderson (W)

For. 172. Principles and Methods of Entomological Research. (4) Four hours of lecture per week. Mr. Sylvester (F)

For. 179A. Field Studies in Entomology. (1-5) Prerequisite: consent of instructor. Mr. Schlinger (F)

For. 179B. Field Study in Veterinary Medical Practice. (1-5) Prerequisite: consent of instructor. Mr. Schlinger (F)

For. 186. Directed Group Studies for Advanced Undergraduates. (1-5) The Staff (Mr. Schlinger in charge) (F, W, Sp)

For. 199. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations listed on page 136. The Staff (Mr. Schlinger in charge) (F, W, Sp)

NOTE: For key to symbols, see page 36.
Gen. 131. Organic Evolution. (5) Four hours of lectures and one hour of discussion per week. Prerequisite: course 100 or 150. A general introduction to the multifaceted contributions to the field with emphasis on underlying genetic and ecological processes. Given in alternate years. (F)

Gen. 140. Cytogenetics. (4) Four hours of lectures per week and one hour of demonstration per week. Prerequisite: course 100 or 150. Chromosome rearrangements (including their relationship to rearrangements in DNA) and changes in chromosome number are discussed in regard to their stability, segregation, transmissibility, and effect on gene action. Evolutionary implications and unusual chromosome systems are also considered. (W)

Gen. 150. General Human Genetics. (5) Lectures, 4 hours per week; laboratory, 2 hours per week. Prerequisite: Biology 1A-IB or consent of instructor. Principles of genetics in man and other mammalian systems. Techniques of plant genetics, animal cell genetics, and microbial host plant interactions. Ms. Palmour (Sp)

Gen. 159L. Human Genetics Laboratory. (3) One hour per week. Prerequisite: course 150 and consent of instructor. An introduction to research and clinical laboratory techniques in human genetics. Contemporary methodology in karyotyping, electrophoresis, enzyme assay and cell culture will be emphasized; recent advances in prenatal and heterozygote carrier diagnosis will be studied. Ms. Palmour (Sp)

Gen. 170. Plant Cell Genetics. (4) Lectures, 3 hours per week; discussion, 1 hour per week. Prerequisites: Gen. 100 or 110 and consent of instructor. The biological basis for genetic manipulation of plants is developed through an integrated presentation of concepts and techniques of plant genetics, animal cell genetics, and microbial host plant interactions. Ms. Sung, Mr. Freeling, Mr. Panopoulos (F)

Gen. H180. Junior Seminar for Honors Program. (2) Two hours of lecture per week. Prerequisite: consent of Honors Adviser (based upon eligibility for honors program) introduction to honors program. Assigned topics of research, and research progress and individual student and discussion of class. Graded pass/not pass. Mr. Kelly (Sp)

Gen. H185. Research for Honors Thesis. (2-5) Variable hours of individual meetings. Prerequisites: course H180 or consent of Honors Adviser. Individual research of literature, or laboratory work, as arranged with Honors Adviser and individual faculty. Must be taken for at least two consecutive quarters to fulfill honors program requirements, for a maximum of 10 units. Mr. Kelly (F, W, Sp, Su)

Gen. H187. Honors Thesis Writing and Seminar. (2) Recitation 1 1/2 hours per week. Prerequisites: two or more terms of course H185. Final term of honors program. Provides opportunity to write and submit honors theses. Each student is required to present orally his thesis before committee and to submit by fellow honors students. Graded pass/not pass. Mr. Kelly (Sp)

*Gen. 191. Experimental Courses in Genetics. (2-5) Variable hours of lecture per week. Prerequisite: consent of instructor. Recent developments in genetics of special interest to the student and student-directed research for majors in genetics may be repeated for credit. The Staff (F, W, Sp)

*Gen. 196. Lectures in Advanced Genetics. (4) Four hours of lectures and one hour of discussion per week. Prerequisite: course 150 or consent of instructor. Selected topics in advanced genetics. May be repeated for credit. The Staff (W, Sp)

Gen. 196. Directed Group Study. (1-5) Prerequisite: consent of the instructor. The Staff (Mr. Thomson in charge) (F, W, Sp)

Gen. 199. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis.

The Staff (Mr. Thomson in charge) (F, W, Sp)

For graduate courses in Genetics, see Index.

Nutritional Sciences (NS) (Includes courses in Food Science, Nutrition, and Dietetics)

**LOWER DIVISION COURSES**

NS 10. Survey of Nutritional Sciences. (5) Formerly numbered Resource Sciences 16. Four and 1/2 hours of lecture and one hour of discussion per week. Prerequisite: primarily for non-majors. Broad aspects of nutritional sciences and food components and their importance to life and mankind. Mr. Stokstad, Mr. Briggs (F, W)

NS 23. Introduction to Microbiology of Natural Resources. (3) See Resource Sciences for a complete description of this course.

RS 23L. Introduction to Microbiology of Natural Resources—Laboratory. (2) See Resource Sciences for a complete description of this course.

**UPPER DIVISION COURSES**

NS 103. Introduction to Nutritional Sciences. (5) Four hours of lecture and one hour of discussion per week. Prerequisite: Chemistry BB; Psychology 1; Biochemistry 102 may be taken concurrently. Delivery of nutrients from food to cells; transport functions and interactions; metabolism; nutrition of cells, tissues and whole organisms; nutritional education; and food composition. Ms. Oace (F)

NS 106. Food Chemistry. (3) Two hours of lecture and one hour of discussion per week. Prerequisite: Chemistry 102B; Physiology 1; Biochemistry 102 (may be taken concurrently). Delivery of nutrients from food to cells; transport functions and interactions; metabolism; nutrition of cells, tissues and whole organisms; nutritional education; and food composition. Ms. Oace (F)

NS 107. Principles of Food Preservation and Processing. (3) Three hours of lecture and one hour of discussion per week. Prerequisite: course 106 and a course in microbiology. Control and utilization of microorganisms and enzymes in commercial preparation and preservation of food products. Nature and control of nonenzymatic chemical deterioration in processed foods. Development and status of various refining, manufacturing, and processing operations. Mr. Burr (W)

NS 110. Food Toxicology. (3) Three hours of lecture per week and one hour in physiology. Principles and problems in evaluating the wholesomeness and safety of foods, food components, and additives. Special emphasis on detoxication mechanisms, basic concepts and techniques of safety evaluation, and interpretation of biological data. Mr. Bjeldanes (Sp)

NS 111. Experimental Study of Food Properties. (5) Three hours of lecture and six hours of laboratory per week. Prerequisite: course 103 and 103L. Study of selected chemical and physical properties of classes of representative foods in relation to preparative procedures, effects of preparation and storage on sensory and nutritive attributes of foods. Mr. Kennedy (Sp)

NS 112. Food Chemistry and Toxicology Laboratory. (5) Two hours of lecture and nine hours of laboratory per week. Prerequisite: course 110 or equivalent (may be taken concurrently). Study of chemical and physical properties of food components and contaminants, and the changes which these substances undergo during processing and storage. Mr. Bjeldanes (Sp)

NS 135. Institutional Food Production, Service and Organization. (3) Three hours of lecture per week. Prerequisite: course 111; Business Administration 150 or equivalent (may be taken concurrently). Primarily for majors. Practical experience in dealing with typical problems in quantity food production, service, management, including production scheduling, quality control, sanitation, and personal interactions. The Staff (Sp)

NS 150. Experimental Nutrition. (4) Four hours of lecture and one hour of discussion per week. Prerequisite: course 103, Biochemistry 102, and a course in physiology. Biochemical and physiological interactions among the vitamins, carbohydrate, proteins, and fats and their relation to mammalian nutrition. Ms. Ostwald (Sp)

**CRS 160. Economics of Food and Nutrition**.

(See Conservation and Resource Studies for a complete description of this course.

NS 160. Human Nutrition. (6) Four and one half hours of lecture and two hours of discussion/dry lab per week. Prerequisite: NS 103 and Biochemistry 102 or equivalent. Primarily for majors. Dietetic and nutritional needs of normal individuals throughout the life cycle. Methods for assessment of nutritional status will be demonstrated. Mr. King (W)

NS 161. Therapeutic Nutrition. (5) Four hours of lecture per week. Prerequisite: course 160. Biochemical, physiological, and nutritional basis for therapeutic treatment of various conditions and diseases in man by dietary means. Ms. Hodgdon (Sp)

NS 161L. Therapeutic Nutrition Laboratory. (2) Two hours of lecture per week. Prerequisite: course 161 may be taken concurrently. Primary emphasis on dietary therapies and nutritional needs of normal individuals throughout the life cycle. Methods for assessment of nutritional status will be demonstrated. Mr. King (Sp)

NS 162. Applied Human Nutrition. (2-4) Lecture, one hour per week; laboratory, 3-9 hours per week. Prerequisite: course 160 with grade of C or better. Field experiences illustrating nutritive therapies in dietetic practice. Mr. Fitzpatrick (Sp)

NS 163. Applied Therapeutic Nutrition. (2) One hour of lecture and three hours of laboratory per week. Prerequisites: courses 161 and 161L, and 162 with grades of C or better. Field experiences illustrating use of nutritional therapy in disease states. Ms. Hodgdon (F, W, Sp)

NS 170. Experimental Nutrition Laboratory. (5) Two hours of lecture and four hours of laboratory per week. Prerequisite: course 150 or 160 (may be taken concurrently). Biochemistry 102L. Basic principles and techniques used in research, human studies, and clinical nutrition. Mr. Carpenter (W)

NS 190. Introduction to Research in Nutritional Sciences. (2) Two hours of lecture per week. Prerequisite: course 103, and 103L, or Chemistry 5. Honors in current research. Ms. Kennedy, Mr. Little (F, W, Sp)

NS 197. Field Study in Food and Nutritional Sciences. (1-5) May be repeated for credit. Supervised experience in off-campus organizations relevant to specific aspects of foods and nutritional sciences. Requires weekly meetings with supervisor and written reports required. The Staff (F, W, Sp)

NS 198. Directed Group Study. (1-5) Prerequisite: consent of instructor. The Staff (F, W, Sp)

NS 199. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. The Staff (F, W, Sp)

NS 400. The Profession of Dietetics. (1) Thirty hours of discussion and one hour of discussion per quarter. Prerequisite: open only to juniors in the dietetics curriculum. One week orientation and four meetings during the quarter relating to roles of dietetic specialists, professional goals, field trips to health care facilities. To be taken on a passed/not passed basis. Mr. Carroll (F)

**NATURAL RESOURCES (Undergrad.): Nutritional Sciences / 231**

**RS 23L. Introduction to Microbiology of Natural Resources—Laboratory. (2) See Resource Sciences for a complete description of this course.**

Mr. Stokstad, Mr. Briggs (F, W)

NOTE: For key to symbols, see page 36.
Pest Management (PM)

Department Office, 137 Gianni Hall
Undergraduate Adviser: Marjorie Hoy, William Waters, Borsyte Day

LOWER DIVISION COURSE

PM 20. Introduction to the Philosophy, Ecology, and Economics of Pest Management. (4) Formerly Entomology 20. Four hours of lecture per week. Introduction to the philosophy, ecology, and economics of pest management, including the philosophy, goals, ecological basis, strategies and tactics of integrated control. Consideration will be given to cropping systems, ecology, natural and artificial controls, and system interactions. Mr. Falcon, Mr. Day, Mr. Wilhelm (W)

UPPER DIVISION COURSES

PM 151. Weeds. (3) Two hours of lecture per week and field trips on alternate Saturdays. Prerequisite: Botany 144 or consent of instructor. Identification, life history, ecology, and principles of management of weeds of economic importance in agricultural, forest, range, aquatic, urban, and industrial environments. Mr. Day (Sp)

PM 152. Insect Pest Management. (6) Lectures, 60 hours total; laboratory and field trips, 100 hours total. Prerequisite: upper division standing and at least one course in agricultural entomology or insect ecology. A four-week summer field course in pest management principles and practices. Detection and sampling for pest and beneficial species and evaluation of damage. Experiments utilizing biological, chemical, and cultural control methods. Pre-enrollment required before end of preceding Spring Quarter. Mr. Leigh, Mr. Rice, Ms. Summers (Extracurricular)

PM 153A–153B. Pathobiology. (2–3) Prerequisite: Biology 1A–1B, RS 3 or consent of instructor. Nature and causes of plant and animal diseases, with comparative data illustrating diseases of plants and invertebrate and vertebrate animals; the rationale of disease management. Mr. Fitzpatrick (Fall), Mr. Sylvestre (Winter)

PM 153A. Etiology, Pathology, and Symptomatology. (2) One hour of lecture and three hours of laboratory per week. An introduction to pathology of invertebrates and animals, with emphasis on management of microbial agents for suppression of insect pests. Mr. Fitzpatrick (Fall), Mr. Sylvestre (Winter)

PM 153B. Vector Relationships. (3) Three-hour lectures per week. Discussion of vectors, origins of plants, invertebrates, and vertebrates to the arthropods and other agents which act as vectors in the spread of disease; arthropods as direct agents of disease. Mr. Fitzpatrick (Fall), Mr. Sylvestre (Winter)

PM 154A–154B–154C. Control Methods in Pest Management. (3–3–3) Three 1-hour lectures per week. Courses need not be taken in sequence. Mr. McCaffrey (Fall), Mr. McCaffrey (Winter), Mr. McCaffrey (Spring)

PM 154A. Chemical and Microbial Agents. (3) Prerequisite: course 20 and 153A. Entomology 100. Biology 1A–1B or consent of instructor. Discussion of biological control in pest management, techniques for use of parasites, predators, and microorganisms against pests; advantages and limitations. Mr. Falcon, Mr. Sylvestre (Winter)

PM 154B. Biological and Microbial Agents. (3) Prerequisite: course 20 and 153A. Entomology 100. Biology 1A–1B or consent of instructor. Discussion of biological control in pest management, techniques for use of parasites, predators, and microorganisms against pests; advantages and limitations. Mr. McCaffrey (Fall), Mr. McCaffrey (Winter), Mr. McCaffrey (Spring)

PM 154C. Cultural and Behavioral Methods. (3) Prerequisite: course 20; Entomology 100; Biology 150; Chemistry 8A–8B or equivalent; or consent of instructor. Chemical materials and techniques used in pest management; advantages and limitations. Mr. McCaffrey (Fall), Mr. McCaffrey (Winter), Mr. McCaffrey (Spring)

PM 155A. Insect Pest Management Systems. (4–4–4) Three hours of lecture and three 3-hour laboratories per week. Mr. McCaffrey (Fall), Mr. McCaffrey (Winter), Mr. McCaffrey (Spring)

PM 155B. Forest Pest Management. (4) Two hours of lecture and six hours of laboratory per week. Prerequisite: Entomology 100 or Plant Pathology 120; and Forestry 125, or consent of instructor. Forest ecosystems and the impact of people on these systems, natural roles of pests; diagnosis and evaluation of forest pest problems and methods of pest control. Mr. Parmenter, Mr. Wood, Mr. Waters (Sp)

PM 155C. Agricultural Pest Management. (4) Three hours of lecture and three 3-hour laboratories per week. Prerequisite: course 20; Entomology 100 and 101 or 110, or equivalent courses. An analysis of arthropods of medical and veterinary importance in urban, suburban, agricultural and recreational ecosystems, and of pest management systems for protection of public health and reduction of economic loss. Mr. Parmenter, Mr. Wood, Mr. Waters (Sp)

PM 155D. Plant Pest Management. (4) Three hours of lecture and three 3-hour laboratories per week. Prerequisite: course 20; Entomology 100 and 101 or 110, or equivalent courses. An analysis of arthropods of medical and veterinary importance in urban, suburban, agricultural and recreational ecosystems, and of pest management systems for protection of public health and reduction of economic loss. Mr. Parmenter, Mr. Wood, Mr. Waters (Sp)

PM 155E. Research in Pest Management. (2) One hour of lecture and one 3-hour laboratory per week. An introduction to research methods and techniques used in pest management, advantages and limitations. Mr. McCaffrey (Fall), Mr. McCaffrey (Winter), Mr. McCaffrey (Spring)

PM 198. Directed Group Study. (1–5) Prerequisite: consent of instructor. Special topics will be offered from time to time. Mr. McCaffrey (Fall), Mr. McCaffrey (Winter), Mr. McCaffrey (Sp)

PM 199. Supervised Independent Study and Research. (1–5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. Mr. McCaffrey (Fall), Mr. McCaffrey (Winter), Mr. McCaffrey (Sp)

(lower for graduate courses in Plant Nutrition, see Index.)

Plant Pathology (PP)

Department Office, 108 Hilgard Hall
Undergraduate Adviser: O. C. Huisman

LOWER DIVISION COURSE

PP 20. Plant Diseases and the Protection of Plant Resources. (3) Formerly Plant Pathology 114. Three hours of lecture per week. The causes and nature of plant diseases, their role in the ecosystem, their historical and present impact on man, the effects of man's activities on disease, and the problems of protecting wild and cultivated plants. Mr. Parmenter (Sp)

UPPER DIVISION COURSES

PP 120. Plant Diseases. (4) Two hours of lecture and six hours of laboratory per week. Prerequisite: Biology 1A–1B or consent of instructor. A general course on the nature, cause, and control of plant disease. Mr. Raabe (F), Mr. Morris (Sp)

PP 197. Field Study in Plant Pathology. (1–5) Supervised experience in off-campus organizations relevant to specific aspects of plant pathology. Regular individual meetings with faculty sponsor and written reports required. Mr. Weinhold (F), Mr. Weinhold (W), Mr. Weinhold (Sp)

PP 198. Directed Group Study. (1–5) Prerequisite: consent of instructor. Special topics will be offered from time to time. Mr. Weinhold (F), Mr. Weinhold (W), Mr. Weinhold (Sp)

PP 199. Supervised Independent Study and Research. (1–5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. Mr. Huisman (F), Mr. Huisman (W), Mr. Huisman (Sp)

IDS 136. Biological Deterioration of Wood. (3) See Interdepartmental Studies for complete description of this course. (2) For additional courses in plant pathogens, see Pest Management; for graduate courses in Plant Pathology, see Index.)
Political Economy of Natural Resources (PENR)

Department Office, 112 and 207 Giannini Hall
Undergraduate Advisers: James Boles, Alain de Janny, Richard Just, Bob Lee, Phil LeVeen, Aleco Sarra, Andrew Schmitz, Peter Berck, Michael Hanemann (in charge).

LOWER DIVISION COURSES
PENR 1. Introduction to Political Economy of Natural Resources. (4) Three hours of lecture and 1 hour of discussion per week. Prerequisites: 0 or equivalent for PENR 100A. PENR 100A is prerequisite to PENR 100B; PENR 100B is prerequisite to PENR 100C; consent of instructor. Economic explanations and applications of natural resources, and environmental management issues and their resolution. (F)

UPPER DIVISION COURSES
PENR 100A--100B--100C. Political Economy of Natural Resources. (5--5--5) Three hours of lecture and 2 hours of discussion per week. Prerequisites: seniors majoring in political economy and environmental sciences, or consent of instructor. Penalties and explanations of natural resource and environmental management issues and their resolution, social and environmental implications of existing and alternative legal, political, and social frameworks in which individual and social choices are made. 100A: Neoclassical micro-economic theory, welfare economics applied to resource/environment issues. 100B: Theories of economic growth and development with specific reference to resource allocation and environmental degradation; implications for the public sector. 100C: Political and sociological systems and their relationship to the economy; theories of public choice, evaluation of alternative political-economic systems. 100A: M. Hanemann (W) 100B: M. de Janny (Sp) 100C: M. LeVeen (F).

PENR 119SA--119SB--119SC. Undergraduate Practicum Project. (5--5--5) Field trips and discussions per week. Prerequisites: PENR 100A-100B-100C. Undergraduate Practicum Project (UPP): Political Economy of Natural Resources. *See course description.*

PENR 197. Field Study in Political Economy of Natural Resources. (5) Prerequisites: 100A and consent of instructor. Supervised experience in off-campus organizations relevant to specific aspects of political economy and environmental management. Regular individual meetings with faculty sponsor and written reports required.

The Staff (M. Hanemann in charge) (F, W, Sp)

PENR 198. Directed Group Studies for Advanced Undergraduates. (1--5) Prerequisite: consent of instructor.

The Staff (M. Hanemann in charge) (F, W, Sp)

PENR 199. Supervised Independent Study and Research. (1--5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. The Staff (M. Hanemann in charge) (F, W, Sp)

Resource Sciences (RS)

Department Office, 101 Giannini Hall
Undergraduate Major Advisers: Biology of Natural Resources: Animal Resource Sciences Emphasis: Mr. B. M. Feldmann, Bioenergetics Emphasis: Mr. Malkin, Mr. Buchanan; Bioresource Sciences Emphasis: Mr. R. Raabe, Ms. Sung; Entomology Emphasis: Mr. Doyen, Genetics Emphasis: Mr. Doner, Mr. Spieth; Plant Pathology Emphasis: Mr. Huisman; Soil and Plant Resource Emphasis: Mr. Terry; Food, Nutrition, and Dietetics: Students wishing information and counselling on this major should contact the Student Secretary, 127 Morgan Hall.

LOWER DIVISION COURSES
RS 18. The Soil and Its Significance to Man. (3) Three hours of lecture per week. Prerequisite: any upper division course in Chemistry 1A or 1B. 18A: Introductory level: laboratory, demonstrations, and field trips per week. Prerequisite: course 18 (may be taken concurrently).

Mr. Williams (F)

RS 23. Introduction to Microbiology of Natural Resources. (3) Three hours of lecture per week. Prerequisite: course in Biology, Chemistry 8B, or consent of instructor. A general survey, from the standpoint of natural resource utilization and conservation, of microorganisms, including bacteria, fungi, algae, viruses, and protozoa. Emphasis on their biological activities in relation to our natural resources and human welfare. Mr. Thomson (in charge) (W)

RS 23L. Introduction to Microbiology of Natural Resources--Laboratory. (2) Two hours of laboratory per week. Prerequisite: course 23 (may be taken concurrently), and consent of instructor. Experiments designed to acquaint students with techniques for handling viruses, bacteria, fungi, algae and protozoa, and effects of these microorganisms on foods, fiber, and human health. Designed for non-science course 23. Mr. Thomson (in charge) (W)

RS 80. Introduction to Problem Solving in Natural Resource Systems. (3) Lectures, 3 hours per week. Prerequisite: course 100A-100B-100C. An introduction to the tools and concepts which are most productive in natural resource problem solving. Emphasis on systems methodologies and the systems approach with applications of simple cause and effect relationships, conceptual and mathematical models. (Sp)

Soil Science (SS)

Department Office, 109 Hilgard Hall
Undergraduate Adviser: Norman Terry

LOWER DIVISION COURSES
SS 10. The Soil and Its Significance to Man. (3) See Resource Sciences for a complete description of this course.

Mr. Gersper (F)

SS 18L. The Soil and Its Significance to Man. (1) See Resource Sciences for a complete description of this course.

Mr. Williams (F)

UPPER DIVISION COURSES
SS 101. Soil Characteristics. (4) Three hours of lecture and three hours of laboratory per week, and one field trip per term. Prerequisite: Chemistry 1A-1B. Introduction to physical, chemical, and biological properties of soil. Mr. Day (F)

SS 101F. Development and Morphology of Soils. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: Geology 10, Chemistry 1A. Recommended: course 100. Climate, vegetation, geology, topography, and time as factors in development and chemistry of great world soil groups. Mr. Waldron (W)

SS 103. Soils of California and the Western United States. (4) Three hours of lecture and one hour of discussion per week, and two field trips to be arranged. Prerequisite: consent of instructor. Field study of soils, with emphasis on characteristics, morphology, and genesis. Field exercises in classifying and mapping soils, and preparation of soil survey reports. Practice in identifying and evaluating soils for agricultural, range, forest, and other use. Mr. Arkley (Sp)

SS 110. The Soil as a Medium for Plant Growth. (5) Five hours of lecture per week. Prerequisite: Chemistry 1A-1B, 8A or 1C. Chemistry of plant, soil, and microbiological relationships under acid, alkaline, and saline soil regimes; nutritional factors in productivity, reclamation, and conservation. Mr. Babcock (F)

SS 111. Soil Microbiology. (2) Two hours of lecture and three hours of laboratory per week. Prerequisite: Biology 1A-1B or Biology 11A-11B. An introduction to soil microorganisms; their diversity, their activities in relation to soil organic matter, soil properties, the rhizosphere, and biogeochrom cycling. Mr. Schneider (Sp)

SS 111L. Soil Microbiology Laboratory. (2) Six hours of laboratory per week. Prerequisite: concurrent enrollment in course 111. Laboratory work to acquaint the student with soil microorganisms, their isolation and handling and the measurement of their activities in soil. Planned to accompany lectures in course 111. Mr. Schneider (Sp)

SS 112. Soil Chemistry. (3) Two 1 1/2-hour lectures per week. Prerequisite: course 110. Physicochemical principles influencing the availability of elements in soils to plants. Mr. Doner (W)

SS 113. Soil Chemistry Laboratory. (3) Three 3-hour laboratories per week. Prerequisite: course 112. Liquid, solid, and gaseous phases of soils; cation exchange, solubility, buffering, salinity, reactions; chemistry of macronutrients and micronutrients. Mr. Doner (W)

SS 198. Directed Group Study. (1--5) Selected topics in soil science for advanced undergraduates.

The Staff (F, W, Sp)

NOTE: For key to symbols, see page 36.
Wood Science and Technology (WST)

Department Office, 145 Mulford Hall
Graduate Adviser: Arno P. Schniewind

LOWER DIVISION COURSE

WST 10. Wood as a Renewable Natural Resource: Concepts and Conflicts. (4) Three hours of lecture and one hour of discussion per week. Surveys the role of wood as a renewable, biodegradable resource in meeting needs of society for shelter and consumer products, and the effect of human activities on the supply of renewable and non-renewable resource systems, and properties and uses of wood relative to ecological and environmental considerations. Mr. Wilcox, Mr. Arbanbright (W)

UPPER DIVISION COURSE

WST 131. Anatomy and Physical Characteristics of Wood. (4) Two 1 1/2-hour lectures and one 3-hour laboratory per week. Prerequisite: course 131 and 12 units of general physics, general chemistry, and one-year calculus or consent of instructor. Gross and minute characteristics of wood in relation to identification and properties; identification of certain important commercial woods; relation of principal physical and mechanical properties to conditions of timber growth. (F)

WST 132. Mechanical Processing of Wood. (3) Two 1-hour lectures and one 1-hour discussion per week. Prerequisites: upper division & graduate students from other departments may be admitted with consent of instructor. Production methods for converting log to lumber, veneer and plywood; product requirements; relation of log quality to product quality. Mr. Klameneck (W)

WST 133. Physical Properties of Wood. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisite: course 131 and 12 units of general physics, general chemistry, and one-year calculus or consent of instructor. Physical, chemical, and mechanical properties as influenced by such factors as wood characteristics and moisture content; thermal, electrical, and acoustical properties of wood. Mr. Arganbright (F)

WST 134. Mechanics of Wood. (4) Three 1-hour lectures and one 3-hour laboratory per week. Prerequisite: course 131 and 12 units of general physics; upper division & graduate students from other departments may be admitted with consent of instructor. Strength and stiffness of wood and structural lumber, factors affecting strength, derivation of working stresses, structural elements of wood and wood composites. Mr. Schniewind (W)

WST 135. Chemical Processing of Wood. (3) Two 1 1/2-hour lectures and one 3-hour laboratory per week. Prerequisites: course 131 and 4 units of organic chemistry; upper division or graduate students from other departments may be admitted with consent of instructor. The technology and associated chemistry of processing of wood to produce pulp, paper, fiberboard and silvichemicals; chemical treatments of wood. Mr. Brink (S)

WST 137. Adhesion and Bonding of Wood. (4) Three hours of lecture and 3 hours of laboratory per week. Prerequisite: course 131 or 4 units of organic chemistry; upper division or graduate students from other departments may be admitted with consent of instructor. Introduction to the nature of adhesion; structure, properties, application and uses of adhesives in bonded wood products; testing and characterization of bonded wood products. Mr. Johns (Sp)

WST 138. Chemistry of Wood and Bark. (3) Two hours of lecture per week and three hours of laboratory per week. Prerequisites: course 131; 4 units of organic chemistry; upper division or graduate students from other departments may be admitted with consent of instructor. Chemical nature of wood and bark and the analysis and important reactions of their constituents, including cellulose, hemicelluloses, lignin, and associated materials. Mr. Zavarin (F)

WST 198. Directed Group Study. (1–5) Meetings to be arranged. Prerequisite: consent of instructor. Group study or investigation of special problems. The Staff (F, W, Sp)

WST 199. Supervised Independent Study and Research for Undergraduates. (1–5) Meetings to be arranged. Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. The Staff (Mr. Grub in charge) (F, W, Sp)

IDS 136. Biological Deterioration of Wood. (3) See Interdepartmental Studies for the complete description of this course.

Agricultural Chemistry

Administered By An Intercampus Group Office, 145 Mulford Hall
Graduate Adviser: Mr. Brink

299. Research in Agricultural Chemistry. (1–12) Agricultural chemistry group. Mr. Brink (in charge) (F, W, Sp)

Agricultural and Resource Economics

Department Office, 207 Giannini Hall
Chairman: James N. Boles
Graduate Advisers: Mr. Boles, Mr. Choppin de Janvry, Mr. Just, Mr. Schmitz

200A–200B. General Departmental Seminar. (1–1) One hour of lecture per week. May be repeated for credit. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

210. Quantitative Methods in Economics. (4) Four hours of lecture per week. Prerequisite: Statistics 131, 132. Introduction to simultaneous equation models and statistical estimation; mathematical programming models and optimization procedures. Mr. Boles (Sp)

211. Applied Econometrics. (4) Four hours of lecture per week. Prerequisite: course 210. Deterministic and stochastic programming. Optimal control and related problems. Estimation of equation systems. Mr. Just (F)

220. Economics of Resource Allocation. (4) Four and one-half hours of lecture per week. Prerequisite: Economics 210A and 210B or consent of instructor. Efficient allocation of resources, including efficient allocation over time, market failure, consumption and production externalities, second-best theory. Mr. Lee (F)

221. Economics of Trade and Location. (4) Four hours of lecture per week. Prerequisite: Economics 210A and 210B or consent of instructor. Economic theory of international and interregional trade and location of economic activity in the context of regional and national development. Mr. Schmitz (F)

230A–230B. Marketing and Trade. (3–3) Three hours of lecture per week. Development of analytical models for the study of economic and policy issues in international and interregional trade and in the location of specific producing and processing industries; market performance in relation to natural resource allocation and utilization. Mr. Schmitz, Mr. Sarris (W, Sp)

240A–240B. Domestic Rural Development. (3–3) Three hours of lecture per week. Concepts of development of the rural economy and society of the U. S. economic, sociological, and political approaches. Values and goals. Transformation of selected institutions of rural America. Critical analysis of past and potential government policies. Mr. LeVeen, Mr. McEntire (W, Sp)

250A–250B. Agriculture in Economic Development. (3–3) Three hours of lecture per week. Origins and nature of underdevelopment in agriculture. The place and role of agriculture in economic development. Rural development under alternative farming systems. Policy issues in agricultural development. Sectoral models of growth and development. Agricultural and regional planning. Mr. de Janvry (W, Sp)

260A–260B. Natural Resource Economics. (3–3) Three hours of lecture per week. Theory, methods of analysis and current literature in natural resource economics and policy. Mr. Hanemann, Mr. Berck (W, Sp)

290. Special Topics in Resource, Development, and Trade Economics. (1–3) One to three hours of lecture per week. Prerequisite: Economics 201A. Topics to be announced annually. May be repeated for credit. The Staff (F, W, Sp)

298. Special Study for Graduate Students. (1–6) All properly qualified graduate students who wish to pursue a special field of study may do so if their proposed program of study is acceptable to the member of the staff with whom they work. The Staff (Mr. Choppin de Janvry in charge) (F, W, Sp)

299. Individual Research. (1–9) The Staff (Mr. Choppin de Janvry in charge) (F, W, Sp)

601. Individual Study for Master’s Students. (1–8) Individual study in consultation with the major field adviser for qualified students to prepare for the various examinations required for the M.S. degree. May not be used for unit or residence requirements for the M.S. degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (Mr. Choppin de Janvry in charge) (F, W, Sp)

602. Individual Study for Doctoral Students. (1–8) 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. Must be taken on a satisfactory/unsatisfactory basis. The Staff (Mr. Choppin de Janvry in charge) (F, W, Sp)

Cell Physiology

Department Office, 313 Hilgard Hall
Acting Chairman: Bob B. Buchanan
Graduate Adviser: Mr. Buchanan

222. Unifying Concepts of Photosynthesis. (3) Two 1-hour lectures per week. 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. Mr. Buchanan, Mr. Arnon, Mr. Malkin (F)

299. Research. (1–12) Prerequisite: consent of instructor. The Staff (Mr. Buchanan in charge) (F, W, Sp)

602. Individual Study for Doctoral Students. (1–8) 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. Must be taken on a satisfactory/unsatisfactory basis. Mr. Buchanan in charge (F, W, Sp)

(For undergraduate courses in Cell Physiology see Biophysics.)

Entomological Sciences

Department Office, 137 Giannini Hall
Chairman: Evert I. Schlinger

298. Special Study for Undergraduates. (1-5) Meetings to be arranged. Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. The Staff (Mr. Grah in charge) (F, W, Sp)

299. Research In Agricultural Chemistry. (1–12) Agricultural chemistry group. Mr. Brink (in charge) (F, W, Sp)

601. Individual Study for Master’s Students. (1–8) 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 M.S. degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (Mr. Choppin de Janvry in charge) (F, W, Sp)

602. Individual Study for Doctoral Students. (1–8) 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. Must be taken on a satisfactory/unsatisfactory basis. The Staff (Mr. Choppin de Janvry in charge) (F, W, Sp)
Graduate Advisers: Entomology: Mr. Dahlsten, Mr. Oster, Mr. Pinnock, Mr. Purcell; Parasitology: Mr. Weinmann; Medical Entomology: Mr. Anderson

204. Principles of Systematic Entomology. (3-3-3) Lectures, 3 hours per week. Theory, philosophy, and methodologies of systematic entomology. Each offering may be taken separately for credit and in any sequence.

204A. Speciation in Insects. (3) Three hours of lecture per week. Prerequisite: Entomology 104 and an upper division course in genetics. Theory, philosophy, and methodologies of systemic entomology.


210. Principles and Problems in Agricultural Entomology. (3) Three hours of lecture per week. Prerequisite: Entomology 100 or 110. The principles of insect control, the side effects to plants and animals following insecticide usage; plot design and sampling techniques; legislative controls in agricultural entomology.

211. Insect-Crop Relationships. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: Entomology 100 or 110. Bionomics of important:213. Advances in entomological research from which they are derived. Mr. Casida, Mr. Dahlsten, Mr. Wood

217. Advanced Insect Physiology, Biochemistry, and Toxicology. (3) Three hours of lecture per week. Prerequisite: Entomology 102, 103, 117 or consent of instructor. Recommended: Biochemistry 102. Selected topics. May be taken twice for credit.

219. Physiological Mechanisms in Insect Behavior. (3) Three hours of lecture per week. Prerequisite: Entomology 100 or 110. The biology, behavior, and development of parasitoids. Emphasis is on field and laboratory analysis of host/parasite relationships of invertebrate, soil and plant nematodes. Special topics include nematodes as vectors of disease-producing agents; resistance, and chemical and biological control of nematodes.

260L. General Nematology. (1) Two hours of laboratory per week. Prerequisite: Entomology 101. To be offered in odd-numbered years. The distribution, biology, and control of nematodes. Special topics include nematodes as vectors of disease-producing agents; resistance, and chemical and biological control of nematodes. Mr. Poinar (W)

266. Insect Vectors of Plant Pathogens. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: Plant Pathology 120. To be given in odd-numbered years. Role of insects and arachnids in the transmission and causation of plant diseases; the relationship of the pathogens to their vectors and the approaches to control. Mr. Sylvester (Sp)

275. Immature Insects. (4) One hour of lecture and nine hours of laboratory per week. Prerequisite: Insect Population Ecology 120. To be given in odd-numbered years. The biology and classification of immature insects with emphasis on aquatic and holometabolous insects. Mr. Anderson, Mr. Daly, Mr. Powell, Mr. Tanada (Sp)

288. Seminar in Parasitology. (2) May be repeated for credit. Mr. Anderson, Mr. Furman, Mr. Weinmann (W, Sp)

289. Special Seminar Topics. (2) May be repeated for credit. The Staff (Mr. Schlinger in charge) (F, W, Sp)

292. Seminar in Insect Biochemistry and Toxicology. (2) May be repeated for credit. Mr. Falcon, Mr. Pinnock, Mr. Poinar, Mr. Tanada (F, Sp)

294. Seminar in Systematic Entomology. (2) May be repeated for credit. Mr. Daly, Mr. Doyen, Mr. Powell, Mr. Schlinger (W, Sp)

295. Seminar in Insect Ecology and Biological Control. (2) May be repeated for credit. Mr. Dahsten, Mr. Huffaker, Mr. van den Bosch (F, Sp)

296. Seminar in Forest Entomology. (2) May be repeated for credit. Mr. Dahsten, Mr. Wood (F)

299. Research in Entomology and Parasitology. (1-12) Original study on special topics in laboratory, field, and museum. Credit awarded according to work accomplished. The Staff (Mr. Schlinger in charge) (F, W, Sp)

601. Individual Study for Master's Students. (1-6) Individual study for the comprehensive or language requirements in consultation with the field adviser. Units may not be used to meet either unit or residence requirements for a Master's degree. Must be taken on a satisfactory/unsatisfactory basis.

The Staff (Mr. Schlinger in charge) (F, W, Sp)

602. Individual Study for Doctoral Students. (1-8) 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. Must be taken on a satisfactory/unsatisfactory basis. The Staff (Mr. Schlinger in charge) (F, W, Sp)

Staff Seminar in Entomology. (No credit) Biweekly meeting for presentation of special topics. The Staff (Mr. Schlinger in charge) (F, W, Sp)
Forest Science

201. Advanced Forest Mensuration. (3) Two 1 1/2-hour lectures/discussion meetings per week. Prerequisite: Forestry 101 or equivalent. Advanced topics in forest mensuration and forest inventory. Mr. Wensel (W)

202. Advanced Photographic Interpretation. (3) Two 1-hour lectures and one 2-hour discussion period per week. Prerequisite: a basic course in photography or photogrammetry. A survey of current research in forest photography and related fields. An analysis of the practical forestry applications of the multiband spectral reconnaissance. Practice in the interpretation of aerial photography and other imagery of forested areas. Mr. Coleson (W)

205. Seminar on Fire as an Ecological Factor. (3) Three hours of lecture per week. Mr. Wakimoto (W)

209. Seminar in Research Methods. (3) Two 1 1/2-hour seminars per week. Identification and statement of research problems; formulation of hypotheses; analytical methods applicable to forest and wildlife problems. Mr. Wensel (W)

211. Seminar in Analysis of the Forest Economy. (3) One 3-hour seminar per week. Prerequisite: 12 units of economic theory, resource economics, practical economics. Mr. McKillop (F)

212. Seminar in Economics of Forestry Enterprise. (3) Three 1-hour seminars per week. Prerequisite: Economics 101, 102 and 125 or equivalent. Case studies involving inventory, biological and physical environmental analysis, evaluation, and planning for wildland resource management. Mr. Colwell, Mr. Helms (W)

214A. Case Studies in Wildland Resource Management. (3) Two 1 1/2-hour meetings per week. Prerequisites: Forestry 170, 213, 214A and 225. Case studies involving inventory, biological and physical environmental analysis, evaluation, and planning for wildland resource management. Mr. Teeguarden, Mr. Zivnuska (W)

215. Seminar in Wildland Resource Policy. (3) One 2-hour seminar per week. Prerequisite: Forestry 101 or equivalent. Mr. Zivnuska (Sp)

217. Seminar in Sociology of Natural Resources. (3) Two 1 1/2-hour meetings per week. Prerequisite: Consent of instructor. Discussion of sociological theories to problems of managing wildland ecosystems. Students will examine topics of individual interest related to the management of wildland uses. Enrollment limited. (W)

218. Genetics of Forest Trees. (3) Two 1 1/2-hour meetings per week; occasional field trip locally, and one day-long trip to Institute of Forest Genetics. Open to senior undergraduates who have completed For. 100A, 101, 102 and 125 or equivalent. Advanced topics in genetics of forest tree improvement. Format combines lectures by instructor, student presentations on selected topics and general discussion. Mr. Zavarin (Sp)

219. Advanced Wood Anatomy. (3) One 1-hour lecture/discussion per week. Prerequisite: Wood Science and Technology 131 or equivalent and consent of instructor. Open to qualified graduate students from other departments. Review of current literature on gross and minute anatomy of wood and bark including ultrastructure of wood cell walls, reaction wood and micro- and substructure of wood and bark. Mr. Wilcox (F)

220. Advanced Wood Physics. (4) Three 1-hour lectures and one 1-hour discussion per week. Prerequisite: Wood Science and Technology 133 or equivalent. Advanced topics in wood as a porous soft material. Fluid flow in biological systems, diffusion and other processes with respect to moisture transfer in wood. Mr. Arganbright (W)

223. Advanced Wood Mechanics. (3) Two 1 1/2-hour lectures per week. Prerequisite: Wood Science and Technology 134, Civil Engineering 130 or equivalent. Deformation and fracture of wood, mechanics of the cell wall, current topics from the literature. Mr. Schniewind (Sp)

225A. Case Studies in Wildland Resource Management. (3) Three 1-hour meetings per week. Prerequisite: Forestry 213, 214A and 225. Case studies involving inventory, biological and physical environmental analysis, evaluation, and planning for wildland resource management. Mr. Teeguarden, Mr. Zivnuska (W)

233. Advanced Wood Mechanics. (3) Two 1 1/2-hour lectures per week. Prerequisite: Wood Science and Technology 134, Civil Engineering 130 or equivalent. Deformation and fracture of wood, mechanisms of the cell wall, current topics from the literature. Mr. Schniewind (Sp)

236. Systems Analysis in the Forest Products Industry. (1) Three hours of lecture and one 2-hour discussion periods per week. Prerequisite: Consent of instructor. Open to qualified graduate students from other departments. The course focuses on the study of problems using well-developed system analysis techniques. Mr. Klamecki (F, W, Sp)

238. Wood Adhesion and Adhesives. (3) One 1-hour lecture per week. Prerequisite: consent of instructor. Open to qualified graduate students from other departments. Current student research and reports in wood science and technology. Course may be repeated. Satisfactory/unsatisfactory basis. Mr. Dickinson (W, Sp)

239. Seminar in Wood Science and Technology. (1) One 1-hour lecture per week. Prerequisite: open to qualified graduate students from other departments. Current student research and reports in wood science and technology. Course may be repeated. Satisfactory/unsatisfactory basis. Mr. Dickinson (W, Sp)

240. Experimental Courses in Genetics. (2-5) Sections 1 to 5. Prerequisites: Genetics 101, 102 and 125 or equivalent. Recent developments in genetics of especial interest to the staff and students. The Staff (F, W, Sp)

242. Seminar in Range Ecology. (3) Three hours of lecture per week. Prerequisite: consent of instructor. Recent developments in the study of ranges in a variety of ecosystems. Topics will vary with staff. Mr. Johns (F, W, Sp)

244. Seminar in Range Ecology. (3) Three hours of lecture per week. Prerequisite: consent of instructor. Recent developments in the study of ranges in a variety of ecosystems. Topics will vary with staff. Mr. Johns (F, W, Sp)

245. Advanced Silviculture. (3) Two 1 1/2-hour lectures per week. Prerequisite: Forestry 125. Mr. Helms (F)

270. Seminar in Wildlife Biology and Management. (3) Three hours of lecture per week. Prerequisite: Forestry 170 and 175 or equivalent. Reading, conference, and discussion. Reports and discussion of recent studies in wildlife biology and management. Open to qualified graduate students from other departments. Mr. White (W)

278. Seminar in Freshwater Ecology. (3) Three hours of lecture per week. Prerequisite: knowledge of biology, taxonomy, and ecology. Discussions and student presentations on topics related to fisheries, aquatic ecology, and water pollution. Mr. Erman (F)

Special Studies

291. Individual Study. (1-7) Prerequisite: Consent of instructor and graduate adviser. Individual study in consultation with a member of the faculty directed to analysis and synthesis of the literature of a specialized subject area in forestry and conservation. Must be taken on a satisfactory/unsatisfactory basis.

298. Directed Group Study. (1-5) Sections 1 to 5. Prerequisite: consent of instructor. Recent developments in genetics of especial interest to the staff and students. The Staff (Mr. Grin in Charge) (F, W, Sp)

299. Individual Research. (1-12) Must be taken on a satisfactory/unsatisfactory basis.

302. Individual Study for Doctoral Students. (1-8) Individual study in consultation with a member of the faculty directed to analysis and synthesis of the literature of a specialized subject area in forestry and conservation. Must be taken on a satisfactory/unsatisfactory basis. The Staff (Mr. Grin in charge) (F, W, Sp)


Genetics

Department Office, 345 Mullford Hall
Chairman: Seymour Fogel

Graduate Advisers: Mr. Feiring, Mr. Fristrom

210. Developmental Genetics. (2) Two hours of lecture per week. Prerequisite: Genetics 100 or equivalent. Developmental biology. Mr. Fristrom (Sp)

235A–235B. Clinical Aspects of Human Genetics. (3) Three hours of lecture per week. Prerequisites: Genetics 159 and consent of instructor. The clinical delineation of human genetic diseases, including chromosomal abnormalities, genetic syndromes, and metabolic disorders. Mr. Zavala (F, W)

277. Genetics of Gene Regulation in Higher Organisms. (4) Three 1-hour lectures and one 1-hour discussion per week. Prerequisite: consent of instructor. The use of specific biochemically-accessible gene systems——especially of maize, Drosophila and mice—to better understand rules of gene control and evolution. Extensive reading and criticism of primary experimental and theoretical sources. Mr. Feiring (W)

280A–280B. (200A–200B). Graduate Seminar in Genetics. (1–4; 1–4; 1–4; 1–4; 1–4) One and one half hours of lecture per week. Prerequisites: Genetics 159 and consent of instructor. The study of a specialized area of genetics. The Staff (Mr. Grin in charge) (F, W, Sp, Sp, Sp, Sp)

280F. Origin Problems in Genetics. (1) One hour of seminar per week, Prerequisite: consent of instructor. Emphasis on rules rather than the mechanisms underlying evolutionary, developmental, and genetic phenomena. Topics will vary with staff. Mr. Bateman (Sp)

290A. Wildlife Science

270. Seminar in Wildlife Biology and Management. (3) Three hours of lecture per week. Prerequisite: Forestry 170 and 175 or equivalent. Reading, conference, and discussion. Reports and discussion of recent studies in wildlife biology and management. Open to qualified graduate students from other departments. Mr. White (W)

278. Seminar in Freshwater Ecology. (3) Three hours of lecture per week. Prerequisite: knowledge of biology, taxonomy, and ecology. Discussions and student presentations on topics related to fisheries, aquatic ecology, and water pollution. Mr. Erman (F)
291A. Topics in Advanced Genetics. (3) Three hours of lecture per week. Prerequisite: consent of instructor. An intensive concentration on selected topics in advanced genetics emphasizing reading, lectures and class discussion. Satisfactory/Unsatisfactory grading.

298. Directed Group Study. (1–6) Prerequisite: consent of instructor. The Staff (Mr. Freeling in charge) (F, W, Sp)

299. Research in Genetics. (1–12) The Staff (Mr. Freeling in charge) (F, W, Sp)

475. Supervised Field Work and Counseling in Human Genetics. (B, O) Variable units. Prerequisite: consent of instructor. Hall or full-time training and supervised field work for one quarter in a birth defects center. Primarily designed for Genetic Advising students but open to qualified graduate students. To be given on a satisfactory/unsatisfactory basis. Ms. St. Lawrence in charge (F, W, Sp)

601. Individual Study for Master's Students. (1–8) Individual study for the comprehensive or language requirements in consultation with the field adviser. Units may not be used to meet either unit or residence requirements for a Master's degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (Mr. Freeling in charge) (F, W, Sp)

602. Individual Study for Doctoral Students. (1–8) 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. Must be taken on a satisfactory/unsatisfactory basis. The Staff (Mr. Freeling in charge) (F, W, Sp)

290. Advanced Seminars in Nutritional Sciences. (1–2) One hour of lecture per week. Prerequisite: open to qualified graduate students. May be repeated for credit. More than one section may be taken simultaneously. Advanced study in various aspects of nutritional sciences. The following sections will be offered but not necessarily every quarter: 290C. Comparative Nutrition; 290F. Food Science; 290G. Nutritional Sciences, General; 290H. Human Nutrition; 290J. Journal Club; 290L. Lipids; 290M. Metabolism, General. The Staff (F, W, Sp)

299. Research in Food and Nutrition. (1–12) The Staff (F, W, Sp)

Staff Seminar in Genetics. (No credit) The Staff (F, W, Sp)

Other courses in genetics or in closely related subjects are given in the departments of Anthropology, Bacteriology, Biochemistry, Botany, Medical Physics, Molecular Biology, Psychology, Public Health, and Zoology.

Nutritional Sciences

Department Office, 119 Morgan Hall
Chairman: Doris H. Calloway
Graduate Advisers: Nutrition: Mr. Briggs, Ms. Osward; Food Science: Mr. Bjeldanes, Ms. Calloway

201A–201B–201C. Seminar in Nutrition. (1–1–1) One hour of lecture per week. Prerequisite: intended primarily for first-year graduate students. Introduction to literature research in food and nutritional sciences. The Staff, 201A (F), 201B (W); 201C (Sp)

204. Nutritional Aspects of the Metabolism of Carbohydrates and Lipids. (2) One hour of lecture and one hour of discussion per week. Prerequisite: Biochemistry 102 and a course in nutrition or consent of instructor. Emphasis on dietary and hormonal controls of metabolic pathways. Mr. Carpenter (F)

*205. Biochemical Aspects of Protein Nutrition. (2) Two hours of lecture per week. Prerequisite: Biochemistry 100A–100B or 100C, or 102, or consent of instructor. Nutrition of proteins relative to their structure and chemical properties. Mr. Carpenter (F)

206. Innovations in Food Processing. (2) Two hours of lecture per week. Prerequisite: Nutritional Sciences 106 and 107. Current and new methods of efficiently resolving requirements for improved nutrition; nonpolluted, more convenient and fresher tasting foods; pressures of competitive cost reduction; and increasing sanitary and wholesomeness regulations. Mr. Carpenter (F)

211. Research Methods in Nutritional Sciences, Instrumentation. (5) One hour of lecture and twelve hours of laboratory per week. Prerequisite: graduate standing and consent of instructor. Advanced physical and chemical techniques in food science and nutrition; application of chromatography, radioisotopes, ultracentrifugation, electrophoresis to individual problems in nutritional science research. Students may select special problems of their interest. The Staff (F)

212. Research Methods in Nutritional Sciences, Biochemistry. (2) Three hours of lecture and twelve hours of laboratory per week. Prerequisite: graduate standing and consent of instructor. Effects of nutrition on biochemical and physiological responses of various biological systems. Advanced techniques for metabolic experiments and their application to individual problems in nutritional research. Mr. Chang (Sp)

260. Advanced Human Nutrition. (3) Three hours of lecture per week. Prerequisite: Nutritional Sciences 160 or equivalent. An advanced course in human nutrition. In-depth analysis of important topics covering current areas of major interest, research, and controversy. Emphasis on the nutrition of normal individuals. Ms. Calloway (W)

290. Advanced Seminars in Nutritional Sciences. (1–2) One hour of lecture per week. Prerequisite: open to qualified graduate students. May be repeated for credit. More than one section may be taken simultaneously. Advanced study in various aspects of nutritional sciences. The following sections will be offered but not necessarily every quarter: 290C. Comparative Nutrition; 290F. Food Science; 290G. Nutritional Sciences, General; 290H. Human Nutrition; 290J. Journal Club; 290L. Lipids; 290M. Metabolism, General. The Staff (F, W, Sp)

299. Research in Food and Nutrition. (1–12) The Staff (F, W, Sp)

Staff Seminar in Nutrition. (No credit) The Staff (F, W, Sp)

Plant Pathology

Department Office, 147 Hilgard Hall
Chairman: A. R. Weinhold
Graduate Advisers: Mr. J. R. Parmenter, Jr., Mr. T. Jack Morris

201. Seminar in Plant Pathology. (1) One hour of lecture per week. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

*202. Biology of Plant Pathogenic Fungi. (4) Three hours of lecture and three hours of laboratory per week. Prerequisite: course 120 and 208, and a course in introductory mycology. Taxonomy, ecology, and behavior of plant pathogenic fungi with emphasis on problems in collection, cultivation and identification. Mr. Hancock (W)

*204. Bacteria in Relation to Plant Diseases. (4) Two hours of lecture and six hours of laboratory per week. Prerequisite: Plant Pathology 120; Biochemistry 102; Bacteriology 102 and 102L, or consent of instructor. Biology and pathogenesis of bacterial diseases of plants. Mr. Schroth (Sp)

206. Viruses in Relation to Plant Diseases. (2) Two hours of lecture and six hours of laboratory per week. Prerequisite: Plant Pathology 120 or consent of instructor. Characterization of viruses which cause plant disease; environmental factors relating to incidence and field spread of virus infections; approaches to control. Mr. Gold, Mr. Morris (F)

208. Research Methods in Plant Pathology. (4) Two 1-hour lectures and two 3-hour laboratories per week. Prerequisite: Plant Pathology 120. Microbial procedures; techniques used in research on disease and pathogen physiology; experimental design and data analysis; and scientific writing. Mr. Panopoulos, Mr. Schlegel (W)

*210. Plant Disease Control. (4) Two hours of lecture and six hours of laboratory per week. Prerequisite: Plant Pathology 120. Dosage response relations; graphic methods; control by exclusion, eradication, protection, immunization, and therapy. The Staff (F)

212. Advanced Plant Pathology. (3) Three hours of lecture per week. Prerequisite: Plant Pathology 120. Principles broadly applicable to fungus, bacterial, viral, and nutritional diseases of plants. Mr. Wilhelm (Sp)

218. Physiology of Plant Diseases. (3) Three hours of lecture per week. Prerequisite: Chemistry 5 and 5B, or equivalent. Recommended: Botany 140; Biochemistry 102. Physiology and biochemistry of host-parasite relations. Mr. Huisman (W)

*222. Epidemiology and Diagnosis of Plant Diseases. (4) Two hours of lecture and six hours of laboratories per week. Prerequisite: consent of instructor. Experience in field and laboratory diagnosis of plant diseases. Mr. Weinhold (Sp)

298. Directed Group Study. (1–6) The Staff (Mr. Weinhold in charge) (F, W, Sp)

299. Research in Plant Pathology. (1–12) Must be taken on a satisfactory/unsatisfactory basis. The Staff (Mr. Weinhold in charge) (F, W, Sp)

601. Individual Study for Master's Students. (1–6) Individual study for the comprehensive or language requirements in consultation with the field adviser. NOTE: For key to symbols, see page 36.
Soils and Plant Nutrition

Department Office, 108 Hilgird Hall
Chairman: K. L. Babcock
Graduate Advisers: Soil Science: Mr. McColl; Plant Physiology: Mr. Jacobson

Plant Nutrition

206. Seminar in Plant Physiology. (2) One 1 1/2-hour meeting per week. Prerequisite: qualified gradu- ate student and instructor member in charge. Problems of plant physiology in the field of botany, food science, forestry, plant nutrition, and soil science. Mr. Babcock, Mr. Gold, Mr. Jacobson, Mr. Stone.

298. Special Study for Graduate Students. (1–6)

299. Research in Soil Science. (1–12) Prerequisite: graduate standing and consent of instructor and graduate student. Mr. Day (Sp)

601. Individual Study for Master's Students. (1–8) Individual study for the comprehensive or language requirements in consultation with the field adviser. Units may not be used to meet either unit or residence requirements for a Master's degree. Must be taken on a satisfactory/unsatisfactory basis.

602. Individual Study for Doctoral Students. (1–8) Individual study in consultation with the major field ad- viser, intended to provide an opportunity for qualified students to prepare themselves for the various examin- ations required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

Staff Seminar in Soil Nutrition. (No credit)

Soil Science

203. Soil Resource Evaluation. (3) One 2-hour lec- ture per week and field work. Prerequisite: training in any of the following fields: soil science, forestry, range management, irrigation, land economics, geography. Survey data interpretations for appropriate land uses; cultivation, grazing, timber, watershed, and multiple use; tax and economic appraisals. Mr. Arley (W).

211. Advanced Soil Biochemistry and Soil Biolo- gy. (2) Two 1-hour lectures and discussions per week. Prerequisite: Soil Science 111 or equivalent. Offered in even-numbered years. Microbial activity at surfaces and in the rhizosphere; mineral nutrition of soil mi- croorganisms and the fate of agricultural chemicals in soil. Origin, nature, and properties of soil organic mat- ter. Mr. Babcock (W).

212. Advanced Soil Chemistry. (4) Two 1-hour and one 2-hour lectures per week. Prerequisite: Soil Science 110; Chemistry 109. Applications of ther- modynamics to soil systems. Mr. Babcock (W).

213. Pedochemistry and Mineralogy of Soils. (3) Three 1-hour lectures per week. Prerequisite: graduate standing in soil science or consent of instructor. Structure and colloid chemistry of soil clay minerals; application of principles of mineralogy and chemistry to a quantitative evaluation of soil formation. Mr. Barshad (F).

213L. Pedochemistry and Mineralogy of Soils. (5) Six to fifteen hours of laboratory per week. Prerequisite: course 211 or 213 (may be taken concurrently).

215. Soil Physics. (5) Three 1-hour lectures and two hours of group discussion per week. Prerequisite: course 102; Mathematics 1A–1B–1C. Statics and dy- namics of soil water, with development of general prin- ciples, applicable to saturated and unsaturated soils, both isotropic and anisotropic, with examples from hy- drology, irrigation practice, and drainage.

235. Seminar. (2) One 1/2-hour meeting per week. Prerequisite: graduate standing in soil science, plant physiology, and related subjects.

298. Research in Soil Science. (1–12) Prerequisite: graduate standing and consent of instructor. The Staff (F, W, Sp)

601. Individual Study for Master's Students. (1–8) Individual study for the comprehensive or language requirements in consultation with the field adviser. Units may not be used to meet either unit or residence requirements for a Master's degree. Must be taken on a satisfactory/unsatisfactory basis.

602. Individual Study for Doctoral Students. (1–8) Individual study in consultation with the major field ad- viser, intended to provide an opportunity for qualified students to prepare themselves for the various examin- ations required of candidates for the Ph.D. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

Staff Seminar in Soil Nutrition. (No credit)

School of Optometry

School of Optometry Office, 107 Minor Hall
Professors: Irving Fatt, Ph.D., Morton C. Piom, O.D., Ph.D., Monroe J. Hirsch, O.D., Ph.D., Robert B. Mandell, O.D., Ph.D.

Assistant Professors: Anthony J. Adams, O.D., Ph.D., Theodore Cohn, Ph.D., Ian L. Bailey, M.S., Jack R. Hobson, B.S., Emeritus, Julie J. Jose, O.D., Ph.D.

Assistant Professors: Sheldon S. Miller, Ph.D., Cliffon M. Schor, O.D., Ph.D., Robert G. Van Slufter, O.D., Ph.D.


Assistant Professors: Michael G. Harris, O.D., M.S., Kermit K. Kors, O.D., M.Opt. William J. Wedemeier, M.D.


Lecturers: Darrell B. Carter, O.D., Ph.D., Michael G. Harris, O.D., M.S., Kermit K. Kors, O.D., M.Opt. William J. Wedemeier, M.D.


Lecturers: Darrell B. Carter, O.D., Ph.D., Michael G. Harris, O.D., M.S., Kermit K. Kors, O.D., M.Opt. William J. Wedemeier, M.D.

Physiological Optics

An undergraduate program in physiological optics is offered which leads to the B.S. degree. The primary purpose of this program is to prepare students for the graduate program in physiological optics.

The graduate program in physiological optics is a field of study leading to the M.S. and Ph.D. degrees. The program is administered by the Group in Physiological Optics, representing faculty from the School of Optometry.

Those interested in this graduate program should familiarize themselves with the requirements of the Graduate Division and, in addition, should contact the adviser of the Group in Physiological Optics as early as possible.

Admission to this program requires a bachelor’s degree in physics, physiology, physiological optics, psychology or optometry, or a doctor’s degree in medi- cine or optometry.

For further details on the requirements for the B.S., M.S., and Ph.D., please consult the adviser of the Group in Physiological Optics, School of Optometry.

Letters and Science List: for regulations governing this list, see the Announcements of the College of Let- ters and Science.

Optometry

UPPER DIVISION COURSES

100. History of Optometry. (2) Two 1-hour lectures per week. Prerequisite: junior standing. The profession of optometry, its history and present status. Mr. Hirsch (F)

104. Ophthalmic Optics. (3) Two 1-hour lectures and one 2-hour laboratory per week. Prerequisite: Physics 106A. History of the development of lenses and spec- tacles; optical properties of lens materials; the theory and design of spectacle lenses; laboratory exercises in lens-cutting, edging, beveling, drilling, mounting, neutralization, and frame-fitting and adjusting.

Mr. Kors (F)
105. Ophthalmic Optics. (3) Two 1-hour lectures and one 3-hour laboratory per week. Prerequisite: course 104. Continuation of Optometry 104. Mr. Kors (W)

106. Ophthalmic Optics. (2) One hour of lecture and three 1/2-hour laboratories per week. Prerequisite: registered student in the first year of the optometry program. Discussion of the role of the optometrist in the overall health care of the patient, emphasizing their use. Mr. Hirsch, Mr. Wyley, Mr. Poise, Mr. Carter, Mr. Harris, Mr. Grisham, and Clinic Faculty (F, W, Sp)

127. Refraction of the Eye. (5) Three 1-hour lectures, two 2-hour laboratories per week. Prerequisite: Physiology 102. Optical and biological variables determining the refractive state of the eye. Lectures and laboratory assignments on subjective and objective techniques of measurement and methods of correcting refractive anomalies: skiascopy, keratometry, corneal topography, visual acuity, visual fatigue, subjective refraction, amplitude of accommodation. Mr. Harris (F)

128. Introduction to Pathology. (3) Two 1 1/2-hour lectures per week. Prerequisite: Anatomy 108A-108B & Physiology 102. Introduction to the study of human disease. Pathogenesis, manifestations, and characteristics of ophthalmic diseases. A correlated review of systemic disease. Mr. Cohn, Mr. Grisham, Mr. Bailey (W); Mr. Grisham (Sp)

130. Optometric Analysis. (5) Three 1-hour lectures and two 2-hour laboratories per week. Prerequisite: course 127. Routine examination and case analysis; interpretation of case histories; O.D.; O.S.; anterior segment, visual fields, peripheral vision, relative accommodation and the various techniques for the analysis of visual data. Introduction to clinical observations. Mr. Schoor (W)

131B. Clinical Manifestations of Disease. (3) Three hours of lecture per week. Prerequisite: course 128. A survey of disease processes and systemic disorders with special reference to ocular implications and manifestations. Mr. Stamper, Mr. Metz, Mr. Cavender (Sp)

133. Anomalies of Binocular Vision. (5) Four 1-hour lectures and four 1-hour laboratories; lectures: courses 127, 130, Detection, measurement, classification, etiology, symptomatology, signs and diagnosis of the anomalies of binocular vision. Mr. Cohn, Mr. Grisham, Mr. Bailey (W); Mr. Grisham (Sp)

139. Ocular Disease Instrumentation. (3) Two hours of lecture and three 1-hour laboratories per week. Lecture and laboratory course offered as a corequisite with course 140A: Clinical examination procedures for the detection and diagnosis of ocular disease. Mr. Cohn, Mr. Grisham, and course 140D: Ophthalmoscope, biomicroscopy, tonometry, and visual field testing. Mr. Poise and Staff (F)

140A. Principles of Pharmacology: General and Ocular. (4) Four hours of lecture and one 1/2-hour of laboratory per week. Prerequisite: course 128. Introduction to basic principles of drug action. Pharmacodynamics, mechanism of action, toxicology. Emphasis on those agents used in ophthalmic practice and principles governing their use. Ms. Jose (W)

140B. Ophthalmic Pharmacology. (3) Formerly 131A. One 1-hour lecture and two 1 1/2-hour laboratories per week. Prerequisite: course 140A. Course offers an opportunity for students to work in groups in the laboratory utilizing ophthalmic drugs used in clinical practice. Mr. Poise and Staff (Su)

150A. Ocular Disease. (5) Four hours of lecture or recitation and one 1 1/2-hour practicum per week. Prerequisite: Anatomy 131A, 131B, and 139. The role of the optometrist in detection of ocular and systemic disease. The nature of ocular disease — etiology, detection, diagnosis, referral criteria and management. Mr. Cohn, Mr. Grisham, Mr. Bailey (W); Mr. Grisham (Sp)

150B. Ocular Disease. (5) Four hours of lecture or recitation and one 1 1/2-hour practicum per week. Prerequisite: Optometry 150A. Continuation of Ocular Disease. Mr. Jose (Sp)

150C. Ocular Disease. (5) Four hours of lecture or recitation and one 1 1/2-hour practicum per week. Prerequisite: Optometry 150B. Continuation of Ocular Disease. Mr. Wolfer (W)

152. Advanced Geometric Optics. (5) One 2-hour lecture and two 1 1/2-hour laboratories. Prerequisite: Physics 105. Gaussian optics. Aberrations and dispersion, oblique astigmatism, “corrective curve” lenses, design and characteristics of ophthalmic instruments and equipment. Mr. Mandell (F)

158A-158B. Vision Rehabilitation. (4–4) Three 1-hour lectures and one 2-hour laboratory per week. Prerequisite: courses 127 and 453. Aniseikonia, low vision, rehabilitative optometry. Mr. Freeman, Mr. Grisham (Sp)

161. Contact Lenses. (3) Three 1-hour lectures and two 3-hour laboratories per week. Prerequisite: courses 105 and 454. Principles of contact lens wear. Contact lenses with lenses that adapt to the human eye, with emphasis on the anatomical and physiological implications. Mr. Salver (Sp)

177. Public Health Optometry. (4) Two 1 1/2-hour lectures and field trips. Lecture topics include: screening methods, establishment and evaluation of standards, importance in industry, schools and communities, eye safety programs, methods of supplying vision care by means of government assistance, in the armed forces, in health clinics and hospitals, group practices, and insurance programs. Mr. Neuman (W)

178. Applied Psychology for Optometrists. (2) Two 1-hour lectures per week. Prerequisite: senior standing in Optometry. Patient management and communication, oral and written, suggestion and hypnosis. Mr. Harris (Sp)

185. Practice Management. (4) Three 1-hour lectures per week and two field trips per quarter. Prerequisite: consent of instructor. Optometry 104. Examining and fitting contact lenses. Mr. Cohn, Mr. Grisham, Mr. Bailey (W); Mr. Grisham (Sp)

229. Physiological Optics

UPPER DIVISION COURSES

101. Anatomy of Eye and Orbit. (5) Three 1 1/2-hour lectures and one 2-hour laboratory per week. Prerequisite: Anatomy 102. The macular and microscopical anatomy of the orbit, its content and adjacent structures. The cranial nerves with ophthalmic parts and their innervation to the orbit and the cranial and orbital blood vessels. Mr. Cohn (F, W, Sp)

102. Dioptrics of the Eye. (5) Four 1-hour lectures and one 2-hour laboratory per week. Prerequisite: Physics 106A. The eye as an optical instrument; image forming properties, optical axis, image quality, image dimensions; optical constants, schematic eyes, cardinal points, ametropia, accommodation, retinal image size, blur circles, defraction, aberrations; wave theory, scatter, and absorption. Mr. Freeman (Sp)

125. Vegetative Functions of the Eye. (3) Three 1-hour lectures per week. Prerequisite: course 102. Consideration of the physiology of the cornea and lids; formation and function of lacrimal fluid; formation, function, and drainage of the aqueous humor; intracocular pressure; mechanics and circulation in the eye; physiology and biochemistry of the lens; iris and pupil; accommodation; photochemistry. Mr. Fav (F)

125L. Laboratory in Vegetative Functions of the Eye. (2) One 1/2-hour laboratory per week. Prerequisite: course 125 and 125 (may be concurrent). Laboratory experiments in vegetative functions of the eye. Mr. Fav (F)

126. Motility of the Eye. (5) Three 1 1/2-hour lectures and one 2-hour laboratory per week. Prerequisite: course 125L. Detailed consideration of ocular movements and deviation. Specialization of innervation as specified, line of sight, visual axes, center of rotation, primary position; kinematics of the eye. Listing’s Law; action of the extraocular muscles; gymnastics; binocular movement; reflexes, saccadic, pursuit, version, vergences, accommodation; accommodative-convergence, convergence accommodation. Mr. Stark (W)

NOTE: For key to symbols, see page 36.

OPTOMETRY / 239

Physiological Optics

104A–408B–408C. Clinical Internship (Advanced Optometry Clinic). (2–2–2) One hour of lecture and eleven hours of laboratory per week. Prerequisite: course 453C. Optometric examination, dispensing, care of patients admitted independently by students taken on a passed/not passed basis. Mr. Poise and Staff (F, W, Sp)

453A–453B–453C. Clinical Internship (Special Clinical Practice). (5–5–5) One hour of lecture and twenty hours of laboratory per week. Prerequisite: courses 455 and 161. Clinical practice in contact lenses, aniseikonia, low vision, rehabilitative optometry. Mr. Freeman, Mr. Grisham, Mr. Bailey (W); Mr. Grisham (Sp)

486A–486B. Clinical Colloquia. (2–2) One 2-hour seminar per week. Prerequisite: senior standing. Analysis and discussion of representative cases and experiences on clinical diagnosis, therapy, prognosis, treatment, referral, consultation and professional communication. Mr. Feld (W); Mr. Hirsch (W, Sp)

498. Advanced Summer Clinic. (1–6) One hour of seminar and 2 hours of clinical practice. Offered on a passed/not passed basis. Seminar and 16 hours of clinical practice per week. Prerequisite: consent of instructor and completion of 455 Optometric examination and diagnosis. The clinical care of patients taken on a passed/not passed basis. Mr. Poise and Staff (Su)

499. Group Studies, Seminars or Group Research. (1–8) One to eight hours of work per week. Prerequisite: consent of the instructor. Preclinical and clinical studies. Mr. Freeman, Mr. Cohn (F, W, Sp)

499. Special Study. (1–5) One hour per week. Prerequisite: senior standing in Optometry. Independent study in Optometry. Mr. Freeman, Mr. Cohn (F, W, Sp)
208. Neurosensory Physiology of Vision. (4) Two techniques, and biologist-oriented display programs. (F)

151. Monocular Sensory Processes of Vision. (3) Three 1/2-hour lectures and one 2-hour laboratory per week. Prerequisite: consent of instructor. Action of vision on the retina, visual pigments and phenomena. Light sensitivity; sensitivity, threshold, differential thresholds, luminosity curves. Effects of stimulation on periodic, critical frequency, flicker. Modulation: single and periodic, critical frequency, light and dark adaptation, after-images, spatial and temporal induction. Form sense: visual acuity. Perception theory. Mr. Marg (F)

160. Binocular Vision and Space Perception. (5) Three 1/2-hour lectures and one 2-hour laboratory per week. Prerequisite: consent of instructor. Binocular integration: horopter, correspondence, figure-ground relation, shape, size, shape, distance, motion, time, and complex patterns; information theory. Mr. Flom (W)

175. Recent Advances in Physiological Optics. (1) One-hour per week. Prerequisite: consent of instructor. Recent advances in physiological optics and optometry. Mr. Marg (Sp)

198. Group Studies for Advanced Undergraduates. (1-5) Group studies of selected topics. Mr. Freeman, Mr. Cohn (F, W, Sp)

199. Supervised Independent Study and Research. (1-5) Enrolled by registration with consent of instructor. Listed on page 36. Additional limitation: Optometry students must have a grade-point average of at least 3.0, a study or research in basic science relevant to physiological optics, and intentions of graduate study in physiological optics should take this course instead of Optometry 491. Must be taken on a passed/not passed basis. Mr. Freeman (in charge) (F, W, Sp)

GRADUATE COURSES

201A. Seminar in Physiological Optics. (2) One 2-hour seminar per week. Prerequisite: consent of instructor. Can be repeated for credit. Graduate seminar in physiological optics. Mr. Marg (F, W, Sp)

201B. Seminar in Physiological Optics. (2) One 2-hour seminar per week. Prerequisite: consent of instructor. Can be repeated for credit. Graduate seminar in physiological optics. Mr. Marg (F, W, Sp)

210C. Seminar in Physiological Optics. (2) One 2-hour seminar per week. Prerequisite: consent of instructor. Can be repeated for credit. Graduate seminar in physiological optics. Mr. Marg (F, W, Sp)

202. Applied Human Physiological Optics. (4) Four hours of lecture or recitation per week. Prerequisite: graduate standing in physiological optics, third or fourth-year level, and Physics and Physiology 491, or consent of instructor. Basic and technical problems and limitations of applications of human sensory perception of light and color to electronic and optical systems. Topics will cover the recording of bio-electric phenomena, transducers, signal averaging and other computer processing and displays, and computer interactive systems used in physiological optics and optometry. Mr. Adams (F, Sp)

601. Individual Study for Master's Students. (1-8) Prerequisite: consent of instructor. Individual study for comprehensive requirements in physiology, including the following: physiology of the retina, interpretation of electronic and computer techniques. Topics will cover the recording of bio-electric phenomena, transducers, signal averaging and other computer processing and displays, and computer interactive systems used in physiological optics and optometry. Mr. Adams (F, Sp)


206. The Oculomotor System. (4) Two 1-hour lectures and two 2-hour laboratories per week. Prerequisite: consent of instructor. Lectures and laboratory demonstrations on mechanical, physiological, sero-anatomical and behavioral aspects of pupil, accommodation and monocular and binocular eye movement responses. Mr. Stark (Sp)

207. Simulation of Visual Systems. (4) Two hours of lecture and six hours of laboratory per week. Prerequisite: graduate standing or permission of instructor. Analysis of eye movement and sensory visual systems from a control and systems approach is made available for non-engineers using computer simulation techniques, and biologist-oriented display programs. Mr. Stark (Sp)

208. Neurosensory Physiology of Vision. (4) Two 1-hour lectures and two 2-hour laboratories per week. Prerequisite: consent of instructor. Lecture and laboratory demonstrations on the neural mechanisms underlying the sensory and central processes of visual perception. Mr. Marg (Sp)

252. Neurophysiology of Visual Development. (2) Two hours of lecture per week. Prerequisite: consent of instructor. Single-unit studies of developing mammalian visual systems. Review of the effects of normal and altered visual experience including monocular or binocular deprivation, strabismus, astigmatism and anisometropia. Evaluation of innate and environmentally contributed to the development of the visual system. Mr. Falt (Sp)

250. Vegetative Physiology of the Eye. (4) Four hours of lecture per week. Prerequisite: graduate standing in physiology, and consent of instructor. The study of the vegetative functions of the eye. Mass and heat transfer in the cornea, sclera, lens, and vitreous body. The formation of aqueous humor and the relaxation of intraocular pressure to the rates of formation and drainage. Mr. Falt (Sp)

298. Group Studies, Seminars or Group Research. (1-8) One to eight hours of lecture per week. 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. Mr. Adams (F, W, Sp)

299. Research in Physiological Optics. (2-8) Prerequisite: consent of instructor. Research. Varied. Mr. Adams (F, W, Sp)

300A–300B–300C. Teaching Methods in Physiological Optics. (2-2-2) Two hours of class per week. Prerequisite: graduate standing in Physiological Optics, junior standing, consent of instructor. Teaching methods and materials, in physiological optics and optometry, observation of classes in session, practice teaching in classroom and laboratory. Can be taken more than once for credit. Mr. Flom (F, W, Sp)

401. Applications of Electronics and Computers in Physiological Optics and Optometry. (3) Formerly numbered 491. Two hours of lecture and two hours of laboratory per week. Prerequisite: graduate standing in physiological optics, optometry student, or consent of instructor. The student will study the application of electronic and computer techniques. Topics will cover the recording of bio-electric phenomena, transducers, signal averaging and other computer processing and displays, and computer interactive systems used in physiological optics and optometry. Mr. Adams (F, W, Sp)

Bioimmodal and Environmental Health Sciences

Department Office, 113 Haviland Hall

School of Public Health

Office of the Dean, 19 Earl Warren Hall

Dean: Warren Winkelman, Jr., M.D., M.P.H.

Associate Deans: Nicholas Parlette, M.D., Ph.D., Frances Saunders, M.P.H.

Graduate curricula in the School of Public Health provide preparation for positions of leadership in health agencies, and for research and teaching in the health sciences.

The professional degrees Master of Public Health (M.P.H.) and Doctor of Public Health (Dr.P.H.) are offered in the area of biomedical and environmental health sciences, including epidemiology and biostatistics, and in the area of social and administrative health sciences, including family health, public health education, health behavior sciences, and public health nutrition. Particular attention also may be given to special areas of concern such as population, environmental public health and health care delivery, community mental health, and forensic science.

Programs of study leading to the following academic degrees are administered by groups of faculty from the School of Public Health and other departments:

- Biostatistics, M.A., Ph.D.
- Comparative Pathology, M.S., Ph.D.
- Environmental Health Sciences, M.S., Ph.D.
- Epidemiology, M.S., Ph.D.

Students are encouraged, and in most programs are required, to begin studies in the fall quarter because of the order in which courses are scheduled. Separate applications for admission must be submitted to the Graduate Division of the University and to the School of Public Health no later than February 1 for admission the following fall quarter.

For further information consult the Announcement, School of Public Health, University of California, Berkeley, CA 94720.
Biomedical and Environmental Health Sciences

The Department of Biomedical and Environmental Health Sciences of the School of Public Health is concerned with the impact of environmental forces on the health of human populations. Areas of special interest include the study of arthropod-borne viral and bacterial diseases, and other infectious diseases; social-psychological factors in the chronic diseases; and parasitology, with biomedical applications.

The common theme of these activities is to better understand the causes of the major disease problems affecting human society in order that effective prevention programs can be developed. Since these problem areas require interdisciplinary approaches, students are encouraged to develop broad programs of study both within the School and on the campus.

A variety of degree programs are offered with specialization in biostatistics, environmental health sciences, epidemiology, medical microbiology, immunology, parasitology, and comparative pathology.

UPPER DIVISION COURSES

149. Introduction to Occupational Health and Industrial Hygiene. (3) Three 1-hour lectures per week. Survey of concepts and procedures in the recognition, evaluation and control of occupational health hazards. Defends the function of industrial hygiene within the context of occupational health.

150. Environmental Health Sciences. (3) Three 1-hour lectures per week. The elements of public health sanitation and of sanitary control of the environment. Survey of water, air, food, and other factors affecting man's environment.

151. Introductory Forensic Science: Laboratory. (2) Two 1-hour lectures and two 3-hour laboratories per week. Survey of current topics in criminalistics, with biomedical applications. Mr. Popendorf (F)

152. Trace Microanalysis. (2) Two 1-hour lectures and two 3-hour laboratories per week. Mr. Rappaport (F)

153. Instrumentation and Trace Analysis. (2) Two 1-hour lectures and two 3-hour laboratories per week. Mr. Rappaport (F)

154. Forensic Toxicology. (2) Two 1-hour lectures per week. Mr. Rappaport (F)

Schoolwide Public Health Courses

The following interdisciplinary courses involve faculty from both Departments of the School of Public Health.

290A. Area of Concern Seminar: Environmental Health. (1–4) One 2-hour seminar per week, and individual projects, field work, etc., to be arranged. Prerequisite: consent of instructor. Discussion of current topics such as prevention of drug abuse and alcoholism; community care of the mentally ill; health services in educational, penal, industrial, and religious institutions; etc. May not be offered each quarter. Mr. Cooper (F)

290B. Area of Concern Seminar: Disease Prevention and Control. (1–4) One 2-hour seminar per week, and individual projects, field work, etc., to be arranged. Prerequisite: consent of instructor. Discussion of current topics such as prevention of drug abuse and alcoholism; community care of the mentally ill; health services in educational, penal, industrial, and religious institutions; etc. May not be offered each quarter. Mr. Cooper (F)

290C. Area of Concern Seminar: Mental Health. (1–4) Two hours of seminar per week, and individual projects, field work, etc., to be arranged. Prerequisite: consent of instructor. Discussion of current topics such as prevention of drug abuse and alcoholism; community care of the mentally ill; health services in educational, penal, industrial, and religious institutions; etc. May not be offered each quarter. Mr. Cooper (F)
hour lecture per week for 2 units; 3 units with a 2-hour section. Prerequisites: prior background in biological sciences or consent of instructor. Basic principles of the host-parasite relationship, and the pathology, epidemiology, immunology and control of infectious diseases of humans. Mrs. Buehring (W), Mr. Elberg (Sp)

120. Medical Microbiology Laboratory. (Two) Two 1-hour laboratories per week. Prerequisite: course 180A (may be taken concurrently). Mrs. Buehring (W)

121. Microbiology Related to Health and Disease. (4) Two 1 1/2-hour lectures and one 2-hour discussion per week. Prerequisites: consent of instructor. Basic principles of the replication, pathogenesis and immunity in viral infections of man and animals. Mr. Hardy (F)

122. Introduction to Medical Virology. (3) Three 1-hour lectures per week. Prerequisite: elementary courses in biology and chemistry, including biochemistry, or consent of instructor. Basic principles of virology as they relate to health promotion and disease production. Mr. Hardy, Mrs. Buehring, Mr. Cooper, Mr. Tempalski (F).

123. Survey of General Pathology. (3) Three 1-hour lectures per week. Designed for students who have no background in the biological sciences. General principles of disease response of higher mammals to both infectious and noninfectious agents. Mr. Madin (Sp)

124. Introduction to Hematology. (4) One 1-hour lecture, one 2-hour lecture-discussion, and one 2-hour laboratory per week. Prerequisite: consent of instructor. Basic principles of hematology and clinical hematology. Analysis of formed blood elements including norms and abnormal characteristics. Mr. Burns (Sp)

125. Principles of Optics and Microscopy. (Two) One 1-hour lecture and one 2-hour laboratory per week. Principles of optics as applied to problems of image generation, the use of microscopy and optical techniques for the investigation of the structure of materials.

126. Biochemical Individuality. (3) Three 1-hour lectures per week. Prerequisite: an undergraduate biology course; upper division only. A discussion of the individuality, its genetic basis, its expression at the molecular level and its significance to the organism. Mr. Sensabaugh (W)

127. Biochemical Individuality Laboratory. (One) One 2-hour lecture-discussion and two 2-hour laborato ries per week. Prerequisite: course 185 to be taken concurrently or consent of instructor. Principles and techniques applied to the analysis of biochemical individuality. Mr. Sensabaugh (W)

128. Field Study in Public Health. (1-5) Supervised experience relevant to specific aspects of Public Health in off-campus settings. May be repeated for credit. Meetings with faculty sponsor and written reports required. The Staff (F, W, Sp)

129. Directed Group Study. (1-5) Presentation of special topics. The Staff (F, W, Sp)

130. Supervised Independent Study and Research. (1-5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. The Staff (F, W, Sp)

**Graduate Courses**

247A. Principles of Industrial Hygiene. (4) Two 2-hour lectures per week. Prerequisite: graduate standing in Environmental Health Sciences or consent of instructor. Review of selected occupational diseases and the recognition, evaluation and control of chemical and physical health hazards in the workplace. Intended for students specializing in industrial hygiene. Mr. Rappaport, Mr. Popondop (F)

247B. Industrial Hygiene: Physical Agent Hazards. (4) Two 2-hour lectures per week. Prerequisite: Course Bio. Env. 247A or consent of instructor. Survey of principles and techniques used to evaluate and control aerosols and physical agents in the occupational setting. Intended for students specializing in the industrial hygiene. Mr. Popondop (W)

247C. Industrial Hygiene: Airborne Chemical Hazards. (3) One 1-hour lecture and one 4-hour laboratory per week. Prerequisite: Course Bio. Env. 247A or consent of instructor. Survey of principles and techniques used to evaluate airborne chemical hazards in the occupational environment. Intended for students specializing in industrial hygiene. Mr. Rappaport (Sp)

248. Occupational Health Practices. (3) One 3-hour lecture-discussion per week. Prerequisite: consent of instructor. Advanced concepts in occupational diseases, occupational disease control and administration of the workplace. Mr. Madin (Sp)

249. Industrial Hygiene Practices. (3) One 2-hour lecture and one 4-hour laboratory per week. Prerequisite: course 247A or consent of instructor. Current practices and advanced techniques of industrial hygiene and environmental control. Mr. Popondop (W)

250. Environmental Health Sciences. (3) Three 1-hour lectures per week. Prerequisite: students who have taken course 251 or 253 may not take 250 for credit. A survey of the impact of biological, chemical, and physical agents in the environment on human health including means of monitoring, monitoring and control. Mr. Cooper, Mr. Wei (Sp)

251. Environmental Health Sciences: Biological Determinants of Health. (3) Two 1 1/2-hour lectures and one 2-hour discussion per week. Prerequisite: consent of instructor. A survey of the impact of biologic hazards in the environment which affect man's health, including means of monitoring, monitoring and control. Mr. Cooper, Mr. Wei (Sp)

**252. Mathematical Models in Environmental Health.** (3) Two 1 1/2-hour lectures per week. Prerequisite: Mathematics 16A and 16B or equivalent. Designed to enable the student to become aware of mathematical models useful in the study of time varying phenomenon of concern in the environmental health sciences. Applications to problems of concern in toxicology, environmental engineering, and industrial hygiene. Mr. Spear (Sp)

253. Environmental Toxicology. (4) Two 2-hour lectures per week. Prerequisite: course 251 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. Mr. Wei (F)

254. Noise in the Occupational Environment. (3) Two 1 1/2-hour lectures per week. Prerequisite: consent of instructor. Noise as an occupational hazard. Review of acoustics; discussion of auditory mechanism, noise measurements, noise controls, and damage-risk. Mr. Tempalski (Sp)

255. Industrial Safety. (2) One 2-hour lecture-discussion per week. Prerequisite: consent of instructor. Occupational accident research and its implications for accident prevention programs in industry. Mr. Popondop (W)

256. Air Pollution and Human Disease. (2) Formerly 191L. One 1-hour lecture per week. Prerequisite: course 253 and Engineering 150, the latter of which can be taken concurrently; consent of the instructor. Analysis and discussion of the relationship between continuous exposure to air pollution and disease from an epidemiological perspective, including both faculty and student developed presentations. Mr. Chiang (Sp)

257A. Biological Control Systems. (3) One 2-hour lecture and one 1-hour lecture-discussion per week. Prerequisites: Passing standing in Engineering, Biology, or Public Health. Systems of biological organisms for environmental control. Fundamental aspects of energy conversion, food production, water reclamation, and waste disposal in microbial ecological systems and their relationships to environmental control problems in a modern urban society. Mr. Oswald (W)

257B. Pondology. (3) One 2-hour lecture and one 1-hour lecture-discussion per week. Prerequisites: graduate standing in Environmental Health, or Public Health. Decision and application of biological control systems. This course will deal with the fundamental aspects and public health significance of designs for low cost waste and water management systems. Mr. Oswald (Sp)

258. Industrial Toxicology Laboratory. (3) Two 1-hour lectures and three hours of laboratory per week. Prerequisites: course 258A or consent of instructor. Experimental and technical methods and techniques for evaluation of workplace toxicities. Mr. Wei (Sp)

259. Applied Allogogy. (2) One 2-hour lecture and one 1-hour lecture-discussion per week. Prerequisites: graduate standing in Environmental Biology, or Public Health with background in Botany and Biochemistry. Lectures and field work involving application of algae to control the environment. The fundamental aspects and public health significance in designs for application of microalgae in low cost waste and water management systems and production of food, feed, fertilizer, and fermentable substances. Mr. Oswald (Sp)

**260A. Stochastic Processes in Biology and Health.** (4) Three 1-hour lectures per week. Prerequisite: course 260A or consent of instructor. Probability generating functions; branching processes and extinction of species; waiting lines and service times; frequency of illness; general birth processes; effect of migration on population growth; simple stochastic epidemics; birth-death processes; applications. Mr. Chiang (F)

**260B. Stochastic Processes in Biology and Health.** (4) Three 1-hour lectures per week. Prerequisite: course 260A or consent of instructor. Probability generating functions; Branching processes and extinction of species; Mutation; frequency of illness; death-death processes; multiple transition probabilities; multiple transition time; Chapman-Kolmogorov equation. Mr. Chiang (Sp)

**260C. Stochastic Processes in Biology and Health.** (4) Three 1-hour lectures per week. Prerequisite: course 260B or consent of instructor. Koopman-Liapounoff equation; semigroups; probability generating functions; general birth-death processes; applications. Mr. Chiang (Sp)

261A-261B-261C. Advanced Biostatistical Methods in Epidemiological and Medical Studies. (3-3-3) Three 1-hour lectures per week. Prerequisite: 261A: course 161C and 160C or equivalent; 261B: course 161B and 160C or equivalent; 261C: course 161A and 160A or equivalent. Mr. Tarter (W)

261A. Design, Conduct and Analysis of Clinical Trials. Prerequisite: 260B or consent of instructor. Mr. Tarter (W)

261B. Prospective studies, prognostic studies, ad hoc table studies. Mr. Brand (W)

261C. Retrospective studies, medical diagnosis, evaluation of diagnostic tests. Mr. Tarter (Sp)

262A. Biometrical Data Analysis I. (4) Two 1 1/2-hour lectures and one 2-hour laboratory per week. Prerequisite: course 161B or consent of instructor. The implementation of biostatistical procedures. Data simulation, packaged program utilization and assessment. Mr. Tarter (F)

262B. Biometrical Data Analysis II. (4) Two 1 1/2-hour lectures and one 2-hour laboratory per week. Prerequisite: course 262A or consent of instructor. Data modeling in large scale studies. Transformation of data, incomplete data, selection bias, failure randomization. Mr. Tarter (W)

262C. Biometrical Data Analysis III. (4) Two 1 1/2-hour lectures and one 2-hour laboratory per week. Prerequisite: course 262A or consent of instructor. Exploratory biometry. Graphical and analytical procedures for data exploration; automated diagnosis, mixture decomposition and taxonony. Mr. Tarter (Sp)

263. Theory of the Life Table and Competing Risks. (3) Three 1-hour lectures per week. Prerequisite: statistics 200A-200B-200C and course 161B or consent of instructor. Theoretical basis for a probabilistic analysis of life tables; applications of life tables. Mr. Tarter (Sp)

264A—265B—265C. Advanced Study in Biostatistics. (3-3-3) Three 1-hour lectures per
**270A. Principles of Human Pathology.** (4) Four hours of lecture and six hours of laboratory per week. Prerequisite: human histology, anatomy, physiology, biochemistry and consent of instructor. To provide an in-depth coverage of general and special pathologic responses to disease processes. Mr. Madin, Mr. Borowsky, Mr. McNeal, Mr. Poley, Mr. Sabella, Mr. Troxel, Mr. Vogeley (W). (Sp)

**270B. Principles of Human Pathology.** (4) Three hours of lecture and six hours of laboratory per week. Prerequisite: course 270A. To provide an in-depth coverage of general and special pathologic responses to disease processes. Mr. Madin, Mr. Borowsky, Mr. McNeal, Mr. Poley, Mr. Sabella, Mr. Troxel, Mr. Vogeley (W).

271. Forensic Pathology. (2) One 2-hour lecture per week. Prerequisite: attendance at two post-mortem examinations during quarter; senior or graduate standing. Lectures survey various aspects of medico-legal investigations. Topics include sudden and unexpected natural death, and understanding of the occurrence of disease in human populations. Mr. King (F).

272. Epidemiology of Neoplastic Diseases. (3) One 3-hour lecture-discussion per week. Prerequisites: courses 275A, 175 and section 3, or consent of instructor. Group discussion of epidemiological approaches to the study of the etiology of selected infectious and noninfectious diseases as well as summary analyses of the distribution of these diseases in the population and their implications. Mr. Winkelstein, Mr. Sabella, Mr. Troxel (Sp).

273. Epidemiology of Mental Disorders. (3) Formerly 291B. One 3-hour lecture per week. Prerequisite: course 175 or 275, or consent of instructor. Presentation and understanding of the major research methodologies and findings on mental disorders in population groups. Particular attention will be paid to research issues in the study of psychiatric and psychosomatic morbidity and mortality. Miss Cohen, Mr. Billings (Sp).

274. Epidemiology and Control of Infectious Diseases. (3) One 3-hour lecture-discussion per week. Prerequisite: one year of biology as a major or one year of Zoology 113, 181, Physiology 105 or equivalent. The interaction of genetics and environmental factors that contribute to the production of and recovery from viral and host factors that contribute to the production of and recovery from viral diseases of medical importance. Mr. Thornton (F).

275. Advanced Epidemiology. (3) One 2-hour lecture and one 2-hour laboratory per week. Prerequisite: prior doctoral degree in biomedical science or consent of instructor. Consent of instructor. Group discussion of topics in the history of epidemiology as a research discipline essential to the description and understanding of the occurrence of disease in human populations. Analysis of epidemiologic data including data reduction, interpretation, and preparation of summary analyses. (F)

278. Current Problems in Epidemiology. (3) One 3-hour lecture per week. Prerequisite: course 175A or 275A or equivalent. May be repeated for credit. Guest lecturers and staff present their research problems and research centers which contribute to public health workers, with emphasis on disease surveillance methods and prevention programs. Mr. Chin, Mr. Roberto, Mr. Winkerstein (W).

**275A. Advanced Epidemiology.** (3) One 2-hour lecture and one 2-hour laboratory per week. Prerequisite: prior doctoral degree in biomedical science or consent of instructor. Consent of instructor. Group discussion of topics in the history of epidemiology as a research discipline essential to the description and understanding of the occurrence of disease in human populations. Analysis of epidemiologic data including data reduction, interpretation, and preparation of summary analyses. (F)

278. Current Problems in Epidemiology. (3) One 3-hour lecture per week. Prerequisite: course 175A or 275A or equivalent. May be repeated for credit. Guest lecturers and staff present their research problems and research centers which contribute to public health workers, with emphasis on disease surveillance methods and prevention programs. Mr. Chin, Mr. Roberto, Mr. Winkerstein (W).

277. Epidemiology of Arthropod-Borne Diseases and Zoonoses. (3) One 3-hour discussion per week. Prerequisite: prior doctoral degree in biomedical science or consent of instructor. Group discussion of the transmission cycles and methods of laboratory and field investigations unique and pertinent to an understanding of these two groups of infectious diseases. Mr. Reeves, Mr. Emmons (Sp).

278. Epidemiology of Noninfectious Diseases. (3) One 3-hour discussion per week. Prerequisite: course 275A or consent of instructor. Analysis and discussion of selected topics illustrating the theory and practice of the application of epidemiologic methods to the study of noninfectious diseases. Class limited to the first 15 qualified students each quarter. Pre-enrollment required.

279. Genetics and Epidemiology. (3) Two 1 1/2-hour lectures per week. Prerequisite: courses in epidemiology, statistics, and genetics or consent of instructor. The interaction of genetics and environmental factors in the etiology and distribution of disease in human populations. Ms. King (F).

**280A. Pathology.** (4) Two 1-hour lectures and two 3-hour laboratories per week. Prerequisite: courses 180A, 180B, 186L, 186M, 182, 182L or equivalent, Physiology-Anatomy 209, Bacteriology 202A, 202B, and consent of instructor. Limited to 10 students. Studies of the pathological processes of infectious diseases. Mr. Madin (F).

**280B. Pathology.** (4) Two 1-hour lectures and two 3-hour laboratories per week. Prerequisite: courses 180A, 180B, 186L, 186M, 182, 182L or equivalent, Bacteriology 202A, 202B, and consent of instructor. Limited to 10 students. Studies of the pathological processes of infectious diseases with emphasis on animal models. Mr. Vedros (W).

**280C. Pathology.** (4) One 1-hour lecture and two 3-hour laboratories per week. Prerequisite: courses 180A, 180B, 186L, 186M, 182, 182L or equivalent. Bacteriology 202A, 202B, and consent of instructor. Review of research in microbial and cellular aspects of infectious diseases and cancer using cell culture systems. Mrs. Buiehring (Sp).

281. Public Health Immunology. (3) Three 1-hour lectures per week. Prerequisite: course 180A or equivalent. Immunologic bases underlying diagnostic procedures, active and passive immunization, problems of vaccine development and autoimmune disorders. Mr. Tempels (Sp).

**282. Advanced Medical Virology.** (3) Two 2-hour lecture-discussions per week. Prerequisite: course 182 or consent of instructor. Analysis of viral and host factors that contribute to the production of and recovery from viral diseases of medical importance. Mr. Hardy, Miss Schmidt, Miss Cremer, Miss Smith (Sp).

**283. Medical Mycology.** (3) Two 1-hour lectures and one 1-hour laboratory per week. Prerequisite: course 182 or consent of instructor. Basic mycology and host interactions of pathogenic fungi; pathogenesis of fungal diseases including immunity and treatment. Mr. Vedros (W).

284. Advanced Methods in Medical Microbiology. (3) One 1-hour lecture and two 3-hour laboratories per week. Prerequisite: course 180A-180B, 180L-180M or equivalent. Methods of isolation and identification of microorganisms. Theory and practice of current methods and techniques applicable to medical microbiology. Experiments will be conducted in full laboratory techniques, partial and complete centrifugation, disc electrophoresis and immunofluorescence. Mr. Tempels, Mr. Heckley (W).

285A. Advanced Forensic Science: Criminalistics. (4) One 2-hour lecture and three 1-hour laboratories per week. Prerequisite: courses 151, 152, 185 or equivalent. A detailed analysis of advanced procedural and interpretational problems in forensic science. Mr. Thornton (F).

**285B. Advanced Forensic Science: Forensic Bi- ology.** (4) One 2-hour lecture-discussion and three 3-hour laboratories per week. Prerequisite: course 188 or equivalent. A detailed analysis of advanced procedural and interpretational problems in forensic science. Mr. Thornton (F).


299. Individual Research. (1-8) Mr. Borowsky. Mr. McNeal, Mr. Poley, Mr. Sabella, Mr. Troxel, Mr. Vogeley (W). (Sp).

**M08. Medical Care Problems and Programs.** (2) One 2-hour lecture-discussion laboratory session per week. Introduction to health administration, focusing on organizational structure, budget, personnel, administrative behavior and processes, innovation, and inter-organizational relationships. Use of cases, games, and simulations. Four units may be earned by submitting a term paper.

**107. Introduction to Medical Care Administration.** (3) One 2-hour lecture-discussion laboratory session per week. Introduction to health administration, focusing on organizational structure, budget, personnel, administrative behavior and processes, innovation, and inter-organizational relationships. Use of cases, games, and simulations. Four units may be earned by submitting a term paper.

**108. Medical Care Problems and Programs.** (2) One 2-hour lecture-discussion per week. Review of current issues in organizing and financing medical care in the United States. Not open for students in the medical care or public health administration programs in the School of Public Health.

NOTE: For key to symbols, see page 36.
125A. Maternal Health. (2) One 2-hour lecture per week. Public health aspects of care before, during, and after pregnancy. Programs for maternal care. 
Mr. Thompson (W)

125B. Relationship of Human Growth and Development To MCH Programs. (2) One 2-hour lecture per week. Principles of human growth and development in public health programs. Mr. Baez (F)

125C. Mental Retardation and Associated Handicaps. (2) One 2-hour lecture per week. Needs of handicapped children and their families; community programs for these children. Mr. Lev (W, Sp)

126. Principles of Maternal and Child Health. (2) One 2-hour lecture per week. Health and social problems of mothers and children. Mr. Baez (Sp)

127. Health Programs for the School Age Child. (2) One 2-hour lecture per week. A general introduction to organized health service programs for preschool and school age children. Mr. Chang (Sp)

128. Health Problems of Adolescence. (2) One 2-hour lecture-discussion per week. Prerequisite: consent of instructor. Issues and problems in the physical and mental health of adolescents, and a critical study of current problems for this age group. Mr. Brown (W)

130A—130B. Selected Topics in Education. (2—2) One 2-hour lecture per week; field observations with scheduled conferences. Topics and laboratory demonstrations and field experiences will vary from year to year. Mrs. Tassan (F); Mr. Romano-V (Sp)

132. Planning Health Experiences for the School Age Child. (3) One 2-hour lecture-discussion per week. Emphasis on problems in the educational and mental health of preschool children. Mrs. Anderson (W), Mrs. Anderson (Sp)

134. Community Health Education. (2) One 2-hour lecture, one 2-hour laboratory per week. Prerequisite: fall quarter: limited to students in nutrition and food sciences; winter quarter: limited to undergraduates; spring quarter: limited to graduate public health students not specializing in public health education. A general introduction to the scope and nature of educational activities in a public health program. Mrs. D'Onofrio (F), Mr. Miller (W), Mr. Griffiths (Sp)

138A. Alcohol and Other Drugs: Behavioral Problems. (3) One 2-hour lecture per week and individual consultation. Prerequisite: upper division or graduate standing. Presentation of latest research findings on psychological, sociological, and physiological correlates of alcohol and drug problems. Mr. Seiden, Mr. Room (F)

138B. Alcohol and Other Drugs: Treatment Approaches. (3) One 2-hour lecture per week, and one-half day field visit on alternate weeks. Prerequisite: upper division or graduate standing. Orientation on the clinical manifestations of alcoholism and drug addiction, and on various methods of treatment, through visits to treatment and drug facilities, welfare agencies, and Skid Row missions. Mr. Seiden, Mr. Room (W)

138C. Alcohol and Other Drugs: Prevention and Social Policy Issues. (3) One 2-hour lecture per week, and four one-half day field visits per quarter. Prerequisite: upper division or graduate standing. A critical study of past and present preventive and treatment programs on local, state, and federal levels. Training in assessment of effectiveness of programs. Mr. Seiden, Mr. Room (Sp)

139A. Research Methods in the Behavioral Sciences. (3) Two 2-hour lectures and group discussions per week. Study of theory, logic, concepts, methods, and techniques of the behavioral sciences as they apply to public health. Mr. Bruvold, Mr. Seiden, Mr. Romano-V (F)

139B. Research Methods in the Behavioral Sciences. (3) One 2-hour seminar and one 2-hour tutorial session per week. Prerequisite: course 139A. Provides field experience in applying research methods as member of interdisciplinary team. Small group field studies are designed and conducted with faculty guidance. Mr. Bruvold, Mr. Seiden, Mr. Romano-V (W)

140. Introduction to Community Nutrition. (4) Two 1 1/2-hour lectures and one 1-hour discussion per week. Prerequisite: NS 160, NS 160L, NS 161, NS 161L, and Soc Adm 134 or Educ 101; or consent of instructor. Introduction to the need for and present organization of health and nutrition services in the community. Discussion of the psycho-social, economic and cultural determinants of food consumption which must be considered in effective food and nutrition programs. Concurrent field observation and project. Mrs. Groll (F)

144. Nutrition for the Individual and the Community. (3) Two 1 1/2-hour lecture-discussions per week. Prerequisite: consent of instructor. Basic nutrition concepts and their implications for community health. Miss Murai (Sp)

189. Directed Group Study. (1—5) The Staff (F, W, Sp)

199. Supervised Independent Study and Research. (1—5) Enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. The Staff (F, W, Sp)

**GRADUATE COURSES**

200A. A Systems View of Health and Health Care. (3—4) Three 1-hour lectures per week for 3 units; 4 units with additional 2-hour discussion section per week. Prerequisite: graduate standing in the School of Public Health or consent of instructor. An introduction to the dimensions of the health system in its socioeconomic and political context, using an ecologic systems approach. Mr. Blum (F)

*200B. New Frontiers in Community Health. (2) One 2-hour lecture-discussion per week. Prerequisite: graduate standing in the School of Public Health or consent of instructor. 200A is not prerequisite to 200B. Exploration of current major trends and problems with emphasis on the dimensions of poverty and its relationship to health. Includes analysis of social, political, economic, and organizational factors affecting the delivery of health care services, especially for the low income populations. The Staff (Sp)

**202. Advanced Theory in Health Administration. (3) Two 1 1/2-hour seminars per week. Prerequisites: course 102 or equivalent and consent of instructor. Study of current approaches to the theories of administration and complex organization as they relate to health administration. The Staff (Sp)

203A. Legal Basis for Health Administration. (2) One 3-hour lecture-discussion per week. Statutes, cases, and readings in the legal basis for public health and medical care administration. Mr. McKay (W)

203B. Legal Aspects of Hospital Administration. (3) Formerly 111. One 3-hour lecture-discussion per week. Prerequisite: for majors in hospital administration, or consent of instructor. Statutes, cases, and readings in law related to hospitals. Mrs. McKay (Sp)

204. Macroeconomics of Health Services. (3—4) Two 2-hour lecture/discussions per week. Prerequisite: Principles of macroeconomics or consent of instructor. Application of basic concepts of macroeconomics and public finance to the provision of health services. Alternative methods of financing health services from public and private sources are examined; use of cost-benefit analysis in comparing various health programs. Mr. Bailey (Sp)

205. Economics of the Health Services Industry. (3—4) Two 2-hour lecture-discussions per week. Application of basic concepts and principles of macro and micro economics to the production and consumption of health services in the U.S. Oriented to students with little prior preparation in economics. Credit received
Two 2-hour lecture-discussions per week. Prerequisite: course 207A or consent of instructor. Selected topics in methodology and practices of study of specific programs, and individual projects. Mr. Hayes-Baulista (W)

207B. Advanced Medical Care Administration. (3) Three 2-hour lecture-discussions per week. Prerequisite: course 207A or consent of instructor. Presentation of current issues and problems in the administration of health care organizations as seen by persons in the field; discussion and analysis of the economic, political, and social forces underlying these problems. Mr. Blum (H, W)

208A. Health Planning. (4) Two 1 1/2-hour lecture-discussions and one 2-hour laboratory per week. Prerequisite: consent of instructor. Theory and philosophy of planning for health and welfare problems of the public; application of technical planning tools to health issues. Miss A. Cohn (F).

208B. Planning Laboratory. (4) One 3-hour lecture-discussion per week and a field project. Prerequisite: course 208A. Study of critical aspects of health planning and the experiences derived from planning projects done in the field by multidisciplinary student planning teams. Mr. H. Blum (W).

209C. Health Services and Facilities Planning. (3) Three 2-hour lecture-discussions per week. Prerequisite: major in hospital and health administration and planning, or consent of instructor. Community and institutional planning for personal and public health; application of technical and political process to planning, analysis of cases. Mr. Starkweather (W).

210. Hospital Programs and Trends. (2) One 2-hour lecture-discussion per week. An introduction to current operations and trends in the hospital field and hospital relationships with public health. Mr. Starkweather, Mr. Sorensen (W). Mr. Emrick (Sp).

211. Advanced Study in Hospital Administration. (2) One 2-hour tutorial or small group discussion per week. Prerequisite: major in hospital administration or consent of instructor. Major study and selected topics. Will differ from quarter to quarter and may be repeated for credit. The Staff (W, Sp).

212A. The Hospital as a Social Institution. (4) Two 2-hour lecture-discussions per week. Prerequisite major in hospital administration or consent of instructor. Development of the hospital as a social institution, its role and functions in health care delivery; analysis of hospital structure and operations, including governance, professional services and administration; inter-professional relationships in the hospital. Mrs. Stimson (F).

212B. The Patient and Hospital Care. (2) Two 2-hour lecture-discussions per week. Prerequisite: major in hospital administration or consent of instructor. Organization of the hospital for patient care; an examination of the patient's needs and relationships with the hospital staff. Mrs. Stimson (Sp).

213A. Quantitative Analysis of Health Services Systems. (4) Two 2-hour lecture-discussions per week. Prerequisite: course 160A or equivalent. Application of statistical methods and operations research to problems in health services systems and facilities; introduction of selected quantitative techniques; emphasis on identifying and formulating problems that are amenable to solution through use of quantitative techniques. Mr. G. Romano-V. (W, Sp).

214A. Organization Theory and Health Institutions. (4) Two 2-hour lecture-discussions per week. Prerequisite: a course in organization theory; major in hospital and health administration, or consent of instructor. Study of structures in managing and administering health and medical care organizations; intraorganizational and interorganizational relationships; power and control; and change. Mr. Starkweather (W).

214B. Analysis of Administrative Practices in Health Services Organizations. (3) Two 2-hour lecture-discussions and one 3-hour laboratory per week. Prerequisite: course 214A. Major in hospital administration or consent of instructor. Presentation and analysis by students of case studies of administrative practices in hospitals and health care organizations. Mr. Derzon (W).

214C. Seminar on Administrative Research in Health Services Organizations. (2) Two 1-hour seminars per week. Prerequisite: course 292 or 299; major in hospital administration or consent of instructor. Application of selected concepts and methods of administrative research to problems of hospitals and other health services organizations through presentation and analysis of studies' independent studies. Mr. Bailey (W, Sp).

215. Health Policy. (4) One 2-hour lecture-discussion and one 3-hour laboratory per week. Prerequisite: course 208A or permission of instructor. Presentation of nature of policy formulation and implementation in health policy decisions, accompanied by nine weekly small group intensive discussions of specific applications. Mr. Starkweather, Mr. Emrick (Sp).

216A. Financial Management of Health Care Institutions. (4) Two 2-hour lecture-discussions per week. Prerequisite: Business Administration 125, 130, 1300, or equivalent. Major in hospital and health administration or consent of instructor. Financial analysis and management in health and medical care institutions, including financial statements, budgeting, cash flow, capital expansion-maintenance, income and tax allocation, and operating funds. Mr. Starkweather, Mr. Emrick (Sp).

216B. Advanced Financial Management and Regional Care Institutions. (4) Two 2-hour lecture-discussions and one 2-hour laboratory per week. Prerequisite: major in Administrative Health Sciences, SA216A or SA202C (depending on curriculum), or consent of instructor. Analysis of selected topics in financial management of health care institutions, including relationships between institutional financial policy and national health policy with regard to reimbursement, incentive systems, public regulation, and contributions. Mr. Millett (W, Sp).

217. Applied Theory of Maternal and Child Health. (2–8) One 2-hour seminar and 4–28 hours of field work per week. Prerequisite: Sociology 217 and 225A–225C or equivalent. Practicum in delivery of health care to mothers and children, with special emphasis on children with developmental disabilities and populations at risk due to poverty, minority status or special health problems. Miss Kohn, Miss Fraser (F, W, Sp).

218. Review of Maternal Health. (2) One 2-hour lecture per week. Prerequisite: similar to students in the Staff's course in maternal health. supervised. Miss Kohn, Miss Fraser, Mrs. Apte, Mrs. Titus (Sp).

221A–221B. 221C. Methods in Community Mental Health Intervention. (3–5–3) One 2-hour lecture-discussion plus concurrent field work per week. Prerequisite: A prerequisite to B, A–B sequence required, consent of instructor. Methods of social intervention in community mental health. Fall and Winter to promote and practice skills in community organization, consultation, training, methods of mental health professionals. Mrs. Leighton (W).

221A. Contemporary Social Analysis for Community Mental Health. (3) One 2-hour lecture and one 1-hour discussion per week. Social conflict theory, social policy formulation, decision-making, use of power in mental health system. Examination of the role of minimal mental health professional as change agent; consequences of change in society as it affects present and future populations. Mr. Minkler (F).

221B. Social Welfare and Public Health. (2) One 2-hour lecture-discussion per week. Designed primarily for M.P.H. students. Survey and analysis of social welfare problems, programs, and issues as related to public health problems, programs, and issues. Mr. Minkler (F).

221C. Selected Topics in Health Education. (2) One 2-hour lecture per week. Prerequisite: major in health education or consent of instructor. Analysis and application of educational approaches to public health problems with emphasis on the formulation of objectives, methodology, and evaluation in public health education. Mr. Fisher (W, Sp).

224A. Public Health Education: Programs, Planning and Evaluation. (2) One 2-hour seminar per week. Prerequisite: major in public health education or consent of instructor. Introduction to literature, theory, and current programs in health education. Mr. Griffiths (F, W, Sp).

224B. Public Health Education: Programs, Planning and Evaluation. (2) One 2-hour seminar plus one-half day of field visits per week. Prerequisite: major in public health education or consent of instructor. Planning of educational approaches to public health problems with emphasis on the formulation of objectives, methodology, and evaluation in public health education. Mr. Fisher (W, Sp).

224C. Selected Topics in Health Education. (2) One 1-hour lecture and one 1-hour discussion per week. Prerequisite: major in health education or consent of instructor. Analysis and application of educational approaches in selected areas of public health. The Staff (W, Sp).

227. Legislation and Organization for Health and Social Services. (2) One 2-hour lecture per week. Prerequisite: graduate standing in the School of Public Health or consent of instructor. Description and analysis of the principal U.S. health and social legislation; translation of legislation into organizational policy and implementation in health and social systems. Directed toward the health care of mothers and children. Miss Wallace, Mr. Jackson (F).

238. Advanced Study in Behavioral Sciences in Public Health. (2) One 2-hour lecture per week. Prerequisite: course 237. One 2-hour lecture per week. Prerequisite: course 237. Current research and advanced study in the behavioral sciences as related to the solution of public health problems. Mr. C. Chow, Mr. D. Y. S. Chen (Sp).

239A–239B. Seminar in Behavioral Sciences in Public Health. (3–3) One 3-hour seminar per week. Prerequisite: course 237. One 2-hour laboratory per week. Prerequisite: course 237. Development of the hospital as a social institution, its role and functions in health care delivery; analysis of hospital structure and operations, including governance, professional services and administration; inter-professional relationships in the hospital. Mrs. Stimson (F).

241. Current Developments in Public Health Nutrition. (3) Two 1 1/2-hour lecture-discussions per week. NOTE: For key to symbols, see page 38.
Prerequisite: previous course work in advanced nutrition or consent of instructor. Critical evaluation of current issues and health nutrition terms and implications for new programs and research.

Miss Groll (F)

242. Biochemical and Metabolic Aspects of Current Nutrition Problems (2) Three 1-hour lectures per week. Prerequisite: previous course work in biochemistry and nutrition. Course focuses on problems of current concern to the public and health professionals. Miss Shapiro (W)

243A-243B-243C. Public Health Nutrition. (3-4-4) Two 2-hour lecture-discussions per week; 243A: 2 hours of field work per week; 243B and 243C: 4 hours of individual field practice per week. Prerequisite: consent of admission to curriculum in public health nutrition or consent of instructor. Assessing problems and planning and evaluating solutions for public health nutrition. Miss Peck, Miss Shapiro (W, Sp)

244. Public Health Nutrition for Physicians. (2) One 2-hour lecture-discussion per week. Prerequisite: a medical degree. A review of current nutrition findings and their implication for physicians. Mrs. Groll (W)

245. Biochemical Evaluation of Nutritional Status. (2) Two 1-hour lectures per week. Prerequisite: Nutrition for Physicians or equivalent, or consent of instructor. Evaluation of the biochemical methods presently used to assess the nutrition status of individuals and other nutrients in humans, including accuracy of methods, specificity, ease of use, apparatus required, and applicability to nutritional assessment. Mr. Sauber (F, W, Sp)


291D. Power Relationships, Community Conflicts and Medical Care. (3) Three hours of lecture per week. Prerequisite: S. A. H. S., 107, 207, or 200. Development, change, influence and analysis of power relationships between community clinicians and other social institutions: legislative bodies, governmental health agencies, community boards, financial sources, planning boards, other providers. Legal, administrative, sociological and ethical considerations. To be offered 1978-79 and 1979-80. Mr. Duul (F)

291E. New Boundaries to Health. (4) One 3-hour lecture and one 1-hour discussion per week. Prerequisite: consent of instructor; graduate experience in health preferred. A general introduction to the concepts, practices and paradigms of old and new health care practices. Student presentations and research required. Mrs. Morin, Miss Peck, Ms. Droste (W, Sp, F)

291F. Perinatal Health Services. (2) One 2-hour lecture-discussion per week. Prerequisite: graduate standing in the School of Public Health or consent of instructor. Examination of the role of the perinatal health services as they apply to the needs of perinatal patients, and to the organization of these services. To be offered 1978-79 and 1979/80. Mrs. Irwin (W, Sp)

291G. The Patient as Consumer and Advocate. (3) One 3-hour lecture-discussion per week. Sociology of lay knowledge: substantive knowledge; compliance control and treatment modification; social relationships and the consultation; knowledge conflict; bargaining strategies and tactics; classification typologies; sick role theory; health based social movements; consumerism and institutional response. To be offered 1978-79 and 1979/80 only. Mr. Hayes-Bautista (Sp)

291H. Strategies for the Design and Implementation of Health Programs. (4) Two 2-hour seminars per week. Prerequisite: SA 207A or consent of instructor and field experience in health administration. Purpose is to integrate residency experiences in program and clinic management with concepts from planning, organizational theory, epidemiology, operations research, and implementation science in the development of health programs. To be offered 1978-79 only. Mrs. Bloom (W)

294U. Dynamics of Health Teams. (2) One 2-hour lecture-discussion per week. Prerequisite: consent of instructor. The course examines the roles and education of various health professionals and their function on health teams. The process of team functioning and the implications of using teams for the delivery of health services and utilization of health manpower are analyzed. Miss Peck, Mrs. Adler (W, Sp)

294V. Health Behavior: Individual and Community. (3) Two 1-hour lectures and one 2-hour discussion per week. An introduction to man, culture and society, with implications for the individual, the family, group and community dimensions of society and community, social behavior, process of and approach to behavioral change. Mr. Miller (F); Mr. Miller, Mr. Romano (Sp)

294W. Voluntary Health Agency Programs. (2) Two 2-hour lectures, one 4-hour field observation per week. A study of administrative structure and functions of voluntary health agencies. Special emphasis on review and analysis of major programs. Mr. Wedde (Sp)

294X. Issues in the School Health Program. (2) Three 1-hour lectures and two 1-hour seminar-discussions per week. Consideration of the nature and extent of mental illness and current concepts of prevention and treatment through community programs. Mr. Aple (Sp)

295. Seminars. (1-4) The Staff (F, W, Sp)

296. Special Study. (1-8) Designed to permit any qualified graduate student to pursue special study under the direction of a faculty member. The Staff (F, W, Sp)

297. Field Study in Public Health. (1-5) Supervised field experience relevant to the Public Health in off-campus organizations for graduate students. Regular individual meetings with faculty sponsor and written reports required. The Staff (F, W, Sp)

298. Group Study. (1-8) The Staff (F, W, Sp)

299. Individual Research. (1-8) The Staff (F, W, Sp)

601. Individual Study for Master's Students. (1-8) Individual study for the comprehensive or language requirements for the master's degree. May not be used to meet either unit or residency requirements for a master's degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

602. Individual Study for Doctoral Students. (1-8) Individual study in consultation with the major field adviser, intended to permit any qualified student to prepare themselves for the various examinations required of candidates for the Ph.D. (and other doctoral degrees). May not be used for unit or residency requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

Note: The following sections have been established for courses 197, 198, 199, 295 through 299, 601 and 602. Individual Study for Doctoral Students. (1-8) Individual study in consultation with the major field adviser, intended to permit any qualified student to prepare themselves for the various examinations required of candidates for the Ph.D. (and other doctoral degrees). May not be used for unit or residency requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis. The Staff (F, W, Sp)

A. Health Administration
C. Hospital Administration
E. Public Health Social Work
F. Maternal and Child Health
G. Public Health Education
H. Behavioral Sciences
J. Public Health Nutrition
M. Comprehensive Health Planning
R. Community Mental Health

IDS 175. Introduction to the Ethics and Values Aspects of Planning and Systems Design. (4) See Interdepartmental Studies for the complete description of this course.

IDS 203A-203B-203C. Concepts of Mental Dysfunction. (3-3-3) See Interdepartmental Studies for the complete description of this course.

Graduate School of Public Policy

Graduate School of Public Policy

Graduate School of Public Policy Office, 2607 Heavest Avenue

Professors: C. Barrington, M.A. (Dean) Percy H. Tannenbaum, Ph.D. Martin A. Trow, Ph.D.

Associate Professors: Eugene S. Bardach, Ph.D. Frank Levy, Ph.D. David L. Kirp, J.D. Henry E. Brady, M.A.

Assistant Professor: Lee S. Friedman, Ph.D.

Assistant Dean: Stephen Weiner, Ph.D.

Voting Professor: Paul Portney, Ph.D.

Lecturer: John Mendeloff, Ph.D.

A set of undergraduate courses dealing with current American public policy is available each year to interested students. Since the School does not offer an undergraduate major, these courses are not professional in nature and are designed for liberal arts and other students from diverse disciplinary backgrounds. Enrollment in these courses requires no prerequisites unless specifically noted otherwise in the course descriptions below.

The School offers two programs of graduate study. The professional degree, the Master of Public Policy, is designed to provide students with the knowledge, skills, and sensitivities required to conduct policy studies. The Ph.D. program is oriented toward the generation of new knowledge, theories, and methodologies for the analysis of public policy.

The two-year Master's degree program consists of a required first-year core curriculum, a summer internship, and a second year devoted to elective courses and an advanced Policy Analysis sequence. The first-year core includes courses in political and organizational analysis, applications of economic analysis, methodology and qualitative approaches, legal analysis, and a workshop which provides opportunities to perform policy studies on selected issues. The primary focus is on analysis of American domestic policy.

Students from diverse disciplinary backgrounds are accepted into this program so long as they wish to prepare to perform systematic work in public policy. Graduates from the professional Master's degree program will be qualified to take positions with federal, state and local governments and with policy research organizations. Many will become analysts while others may take administrative and political positions in which they will initiate and utilize policy studies.

The Ph.D. program is primarily designed to prepare students for careers in policy research in academic institutions, research institutes, or with government agencies. The program is small and admission into it is competitive. Students are expected to complete their studies within four years.
is highly selective. The educational program will include advanced methodological training, extensive research experience in one or more substantive policy areas chosen by the students, and theoretical work in the discipline directly related to the individual's central policy concerns.

Brochures and information on admission procedures and program content are available at the Graduate School of Public Policy, 2607 Hearst Avenue, Berkeley, CA 94720.

UNDERGRADUATE COURSES

174. Pollution and Public Policy. (5) Two 2-hour lectures per week. Prerequisite: consent of instructor. An introduction to the theory and practice of public policy. This course will examine the substantive policy areas of environmental goals and alternative means to achieve them. (5) Four hours of lecture per week. Prerequisite: Economics 100A and Statistics 2 or equivalent. Open to students who have received credit for course 108 prior to fall 1973. Summarizes the dimensions of the poverty and welfare problems in the United States, the major issues concerning welfare reform, the logic of welfare reform and the criteria for choices among alternative proposals. Discussion of both the political history of various initiatives and the analytical aspects of the problem including income dynamics and labor supply.

175. Policy Issues in Communication. (5) Four hours of lecture per week. An examination of communication as a distinctive activity of the human species, focusing on information processing capacity, intra-personal, interpersonal and mass media behavior, and their implications for public policy. Current policy issues, especially relating to new technologies, will be examined. Mr. Tannenbaum (F)

176. Quantitative Approaches to Policy Analysis. (5) Two 2-hour lectures per week. Prerequisite: consent of instructor. Introduction to the theory and practice of policy analysis. This course will examine statistical techniques selected from the discipline—econometrics, decision theory, operations research and substantive areas. The course presents an opportunity for students to sharpen critical eye for appropriate uses of these techniques.

177. Analysis of Social Surveys for Public Policy. (5) Two 2-hour lectures per week. Prerequisite: permission of instructor. Data gathered through social surveys are a major source of information in the development and evaluation of public policy. This course deals with problems in the analysis of survey data which have implications for public policies.

*178. Dilemmas of Policy in Higher Education. (5) Two 2-hour seminars per session. Prerequisite: limited to students who have had introductory work in the Social Sciences or the equivalent. This course will examine the interplay of values, interests and values which shape public policy in higher education in the U.S. and in other industrial societies.

179. Ethical Dilemmas in Public Policy. (5) Four hours of lecture per week. Prerequisite: permission of instructor. Selected policy dilemmas dealing with conflicting concepts of equal opportunity, reforms of the process, government intervention when faced with limited knowledge, and ethical constraints on re-taking advantage of opportunities will be the relevant problem of their choice.

180. Political Skill in the Making of Public Policy. (5) Two 2-hour lectures per week. Prerequisite: consent of instructor. Strategic considerations and the problems of policy design and advocacy. Special attention to neutralizing opponents, and to issues of "line" of communication in the context of the development of American legislative and bureaucratic structures. Focuses on professional and citizen activist roles.

181. Taxes, Politics and Public Policy. (5) Four hours of lecture per week. Prerequisite: consent of instructor. An introduction to the politics of taxation at both federal and local levels. This course will examine public policy tactics for getting taxes and revenue, tax reform and public tax preferences.

182. Problem Solving in the Public Sector. (5) Two hours of lecture, two hours of discussion, and one hour of faculty supervised research. Prerequisite: limited to upper-division students who have had introductory work in Political Science and/or Economics. A seminar examining public sector performance in responding to social problems. Economic, political, and organizational decision processes controlling resource allocation and its effectiveness will be surveyed. Attempts to improve performance (e.g., increasing budget, changing rules, justice, education) will be analyzed. Open to students who have received credit for course 214 prior to spring 1976. Mr. Friedman (Sp)

*183. An Introduction to the Politics of Policy Ad- vising. (5) Four hours of lecture per week. Starting with an overview of policy-making processes in the United States, the course examines in detail the advising role which provides it to whom, the conditions under which it is accepted or rejected and the political and bureaucratic environment of policy advising. Mr. Meltsner (F)

186. Legal Processes and Public Policy. (5) Two

187. Legal Processes and Public Policy. (5) Two 2-hour lectures per week. Prerequisite: consent of instructor. May be taken as first quarter of a sequence with course 271. Open to both graduate and undergraduate students. Emphasizes such issues as opinion making by courts which involves decisions, the interactions between judge-made law and law legislated by administrative agencies, and other implications of this mode of decision-making. Stresses analytical skills appropriate for policy analysis and law. Mr. Kipr (Sp)

188. Poverty and Welfare Reform. (5) Three hours of lectures per week. Prerequisite: Economics 100A and Statistics 2 or equivalent. Open to students who have received credit for course 108 prior to fall 1973. Summarizes the dimensions of the poverty and welfare problems in the United States, the major issues concerning welfare reform, the logic of welfare reform and the criteria for choices among alternative proposals. Discussion of both the political history of various initiatives and the analytical aspects of the problem including income dynamics and labor supply.

189. Policy Issues in Communication. (5) Four hours of lecture per week. An examination of communication as a distinctive activity of the human species, focusing on information processing capacity, intra-personal, interpersonal and mass media behavior, and their implications for public policy. Current policy issues, especially relating to new technologies, will be examined. Mr. Tannenbaum (F)

190. Directed Group Study. (1-5) Meetings to be arranged. Prerequisite: consent of instructor. Group study of a selected topic or topics in Public Policy. The Staff (F, W, Sp)

191. Supervised Independent Study and Re- search. (1-5) Prerequisite: upper division standing. Open to students who wish to pursue special study and research under the direction of a member of the staff. Enrollment is restricted by regulations. Mr. Friederich (W, Sp, F)

192. Quantitative Approaches to Policy Analysis. (4-4-4) Two 2-hour seminars per week. Prerequisite: consent of instructor. This introductory course will integrate various social science disciplines and apply these perspectives to problems of public policy. Students will apply knowledge of politics, economics, sociology, and quantitative methods in the analysis of increasingly complex public issues. Topics covered will include the end of the "A" portion, an IP grade at the end of the "B" portion and a letter grade at the completion of the entire sequence (the "C" portion). Mr. Portney (F, W, Sp)

193. Advanced Policy Analysis. (4-4) Three hours of lecture per week. Prerequisite: open only to students who have completed the core curriculum. Each student will conduct a thorough analysis on a major policy question. In this research, students will apply the interdisciplinary methods, approaches, and perspectives studied in the core curriculum.

The Staff (F, W, Sp)

194. Professional Development Seminar. (2-2) One and 2 hours of lecture per week. Prerequisite: Open only to majors who have completed the core curriculum. Provides area for examining persisting and evolving evaluation of individual professional development. Specific materials providing substance: 1) preparation and performance of 48-hour and 7-day analyses, 2) selection of individual topics for the major APA analysis, 3) critique of the central issues that arise in the performance of analytical studies. Must be taken on a satisfactory/unsatisfactory basis. Mr. Sandler (F, Sp)

210A-210B. The Economics of Public Policy Analysis. (4-4) Three hours of lecture per week. Credit and grade will be assigned upon completion of the sequence.

The Staff (F, W, Sp)

210C-210D. Organizational Strategies and Public Policy Analysis. (4-4) Three hours of lecture per week. Prerequisite: consent of instructor. Analysis of public policy implementation and the strategies for implementing public policy. Emphasizes the decision making problems involved in addressing public policy problems, the implementation strategies for dealing with social problems and ongoing evaluation of an adopted policy. Open to graduate students with a special interest in public policy analysis. Mr. Tannenbaum (W)

220. Legal and Public Policy. (4) Two 1 1/2-hour sessions per week. Prerequisite: open only to students enrolled in the Graduate School of Public Policy. Focuses on current legal aspects of exposing students to primary legal materials, including court decisions and legislative and administrative regulations. Students will examine decisions and develop Relationships among law-making agencies and between law and policy are explored through case-centered studies. Mr. Kirp (W)

220A-220B. Political Decision Making and Quantitative Methods in Policy Analysis. (4-4) Two 2-hour sessions per week. Prerequisite: consent of instructor. This course will examine the political and organizational factors involved in developing new policies, choosing among alternatives, gaining acceptance, assessing implementation, and coping with unanticipated implications of policy decisions. Students will include case studies, theoretical, empirical, and interpretive works from several disciplines. Credit and grade will be assigned upon completion of the sequence. Mr. Meltsner, Mr. Sandler (F, W, Sp)

240A-240B. Decision Analysis, Modeling and Quantitative Methods in Policy Analysis. (4-4) Two 2-hour sessions per week. Prerequisite: consent of instructor. An integrated course on the use of quantitative techniques in public policy analysis: statistical and mathematical techniques, including regression, simulation, optimization and decision analysis. Development of formal models with decision theory, mathematical programming and simulation techniques. Emphasis on the use of quantitative techniques through involvement in a variety of policy applications. Mr. Brady (W, Sp)

244A-244B. Research Methods in Public Policy Analysis. (4-4) Three hours of lecture per week. Prerequisite: permission of instructor. Examination of various research methods, including survey design, development of formal models based on decision theory, and mathematical programming and computer simulation. Emphasis on the use of quantitative techniques through involvement in a variety of policy applications. Mr. Meltsner, Mr. McGuire (W, Sp)

251A-251B. Microeconomic Organization and Policy Analysis. (4-4) One 2-hour seminar and one hour of conference per week. Prerequisite: Business Administration 101G or Economics 200A or an equivalent. An introduction to the development of public policy analysis based on microeconomic theories of organization. First term requires analysis of institutional alternatives for providing public services or exercising public control (e.g., contracting out, regulatory agencies, quasi-public bodies, municipal bonds). Second term includes review of the policy problems selected by students and critique of particular models of the organization of public service delivery. Mr. Tannenbaum (W)

252. The Politics of Policy Advising. (4) Three hours of seminar and one hour of conference per week. An examination of the political environment surrounding the formulation of public policy and the role of the professional advisor. The course prepares students to make effective contributions to the study of the question of “policy making” by exploring the interactions of clients and advisors, engineers, planners, policy analysts and other professionals. The course explores the question of the respondent role of the policy maker. Mr. Meltsner (W)

253A-253B. Methods of Policy Evaluation. (4-4) Three hours of seminar and one hour of conference per week. Prerequisite: consent of instructor. The seminar will consider a range of available and potential evaluation techniques for dealing with social problems and ongoing evaluation of an adopted policy. Open to graduate students with a special interest in public policy analysis. Mr. Tannenbaum (W)

254. Organizational Strategies and Public Pol- icy. (4) Three hours of lecture per week. Prerequisite: permission of instructor. An introduction to the political and organizational strategies for changing, maintaining, building, shrinking, creating, and dissolving public organizations. Emphasis on the strategic design of public policy and their connection to alternative organizational response strategies, particularly under conditions of uncertainty. Mr. Tannenbaum (Sp)

255A-255B. Advanced Quantitative Models in Policy Analysis. (4-4) Three hours of lecture and one hour of conference per week. Prerequisite: consent of
instructor. Examination and assessment of the application of static and dynamic models to allocation, organization, and implementation problems in the public sector. Instructor and student interests will determine specific applications. Students will choose substantive issues for individual research and analysis.

Mr. McGuire (W, Sp)

256A–256B. Advanced Applications of Economic Analysis to Public Policy. (4–4) Three hours of lecture per week. Prerequisite: consent of instructor. Examines theoretical issues bordering on economics and policy including: 1) collective choice, private preferences, and public interest, 2) voting schemes, 3) organization of governmental services, decentralization, externalities, and information, 4) market allocation of government services, directive allocation, and original cost pricing, 5) public goods. Mr. Portney

257. Implementation and the Policy Process. (4) Three hours of lecture per week. Prerequisite: consent of instructor. The process of implementing any new public policy is often attended by delay, the distortion of goals, and minimal results from maximal effort. This course examines the political and organizational factors producing these problems and considers strategies for countering them. Mr. Bardach (Spd)

**261. Policy in Higher Education. (4)** Three hours of lecture per week. Prerequisite: consent of instructor. This seminar will explore current problems and issues in American higher education with special attention to the forces that shape public policy in this area. Topics will include the history and structure of higher education, political context, finance, function, and governance.

Mr. Trow

262A–262B. Seminar in Mass Communication Policy. (4–4) Three hours of lecture per week. Prerequisite: consent of instructor. Examination of selected public policy issues involving in the regulation and operation of the mass media. Particular attention will be directed at policy questions stemming from recent technological innovations. During 1978-79, the seminar will examine alternative systems for accommodating diverse interests and differences among the general T.V. audience. Credit and grade will be awarded upon completion of the full sequence.

Mr. Tannenbaum

264A–264B. Issues in Mental Health Policy. (4–4) Three hours of lecture per week. Prerequisite: consent of instructor. A research seminar examining selected policy problems in mental health. Special emphasis on political, organizational, and fiscal problems. Students are encouraged to do field research. Mr. Bardach

265. Policies for Youth. (4) Three hours of lecture per week. Prerequisite: consent of instructor. This seminar deals with the transition between youth and adulthood in advanced industrial societies. The seminar will consider some of the problems associated with this transition and efforts that are being made or might be made by public and private agencies to deal with these problems in the U.S. and abroad.

**271. Law and Social Change. (4)** Formerly 271A–271B. Three hours of lecture per week. Prerequisite: limited to graduate and undergraduate students who have taken course 187 and have the consent of instructor. Examines the interrelationship of law (including legislation, administrative regulation) and policy making. Case studies, drawn from such diverse fields as public education, welfare, and environmental reform, will illustrate the role of law in translating, implementing, and thwarting policy decision. Specific topics to be covered will change from year to year. Recent topics have included "discretion," "compliance," and the law and "procedural justice." Mr. Kirp

272. Sex Discrimination, Public Policy and the Law. (4) Three hours of lecture and conference per week. Prerequisite: consent of instructor. Examination of the major policy, political and legal issues in the transition between youth and adulthood. Mr. Kirp

278. Social Policy and the Law. (4) Three hours of lecture and conference per week. Prerequisite: consent of instructor. A series of courses will examine different policy issues. Origins of the issues, differing perspectives on the major policy area, political feasibility and feasibility estimates will be analyzed. Class efforts will include designing implementable policy strategies.

Mr. Kirp

280A–280B–280C. Strategies for Emerging Public Policies. (4–4–4) Three hours of lecture per week. Prerequisite: consent of instructor. A series of courses will examine different policy issues. Origins of the issues, differing perspectives on the major policies, political feasibility and feasibility estimates will be evaluated. Class efforts will include designing implementable policy strategies.

Mr. Kirp

281. Public Policies Protecting Health and Safety. (4) Two hours of lecture and one hour of discussion per week.

Prerequisite: consent of instructor. An analysis of public programs for protecting public health and safety (except the provision of medical care.) Topics will include workplace hazards, consumer protection, air pollution, control of toxic substances (including pesticides, chemicals), and the reform and implementation of the programs and evidence of their success will be scrutinized. To be offered 1978-79 only. Mr. Mendellof

292. Directed Advanced Study. (1–12) Prerequisite: consent of instructor. Examination of selected public policy issues under direction of a member of the faculty. The Staff (F, W, Sp)

602. Individual Study for Doctoral Students. (1–4) 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.

Mr. Kirp (F, W, Sp)

Related Courses in Other Departments


Mr. McGuire


Mr. Kirp

Law 237. Education Policy and Law. See Law 237. See the complete description of this course.

Mr. Kirp


Mr. Kirp, Mr. Mnookin

School of Social Welfare

School of Social Welfare Office, 1209 Haviland Hall

Professors:

- Neil Gilbert, Ph.D.
- Ralph M. Kramer, D.S.W.
- James R. W. Leiby, Ph.D.
- Henry Miller, D.S.W.
- Harry Specht, Ph.D. (Acting Dean)
- Kenneth T. Wittse, D.S.W.
- Martin Wolins, D.S.W.
- Merlin Chinn, Ph.D. (Emeritus)
- Ruth Cooper, D.S.W. (Emeritus)
- Robert Pruger, D.S.W.
- Steven Segal, Ph.D.
- Lorraine R. Snowden, Jr., Ph.D.

Assistant Professors:

- Lawrence H. Boyd, Jr., Ph.D.
- Charlene Brown, D.S.W.
- Weller Friedlander, Ph.D. (Emeritus)
- Ernest Greenwood, Ph.D. (Emeritus)
- Davis McEntire, Ph.D. (Emeritus)
- Margaret Meckney, Ph.D. (Emeritus)
- Margaret Schubert, Ph.D. (Emeritus)
- Gertrude Wilson, M.A. (Emeritus)

Lecturers:

- Andrew Currie, M.S.S.A.
- Robert C. Jackson, M.S.W.
- M.P.H.
- Marianne Pennekamp, D.S.W.
- Charles E. Goble, M.A.
- Barbara Wees, M.S.W.

Coordinator of Field Work:

Dorothy Turner, M.S.W.

Lecturer—Field Work Consultant:

- Mildred Alexander, M.S.
- Franklin Bauer, M.A.
- Mary Jeffress, M.S.W.
- Kermit T. Wlltse, D.S.W.
- Harry Specht, Ph.D. (Emeritus)
- Mary O'Day, M.S.W.
- Franklin Bauer, M.A.
- Davis McEntire, Ph.D. (Emeritus)
- Ernest Greenwood, Ph.D. (Emeritus)
- Margaret Schubert, Ph.D. (Emeritus)

School of Social Welfare degree in preparation for the professional practice of social work. Applicants must have completed the major group in social welfare in the College of Letters and Science, or an equivalent major, or undergraduate study in other social and behavioral sciences judged by the faculty as adequate preparation for graduate study in the School.

A program offered jointly by the School of Public Health and the School of Social Welfare provides persons with a master's degree and a master's degree in public health for practice in administrative, research, and consultative positions in community health and medical care settings. Additional information about this program may be obtained by writing to the Public Health Social Work Program, School of Public Health.

Applications for admission to any of these programs should be submitted as early as possible beginning in September and no later than February 1, for admission in the following academic year. Admission to the School is contingent on admission to graduate standing; for details see the booklet Admission to Graduate Study.

The Department of Social Welfare administers an undergraduate major group in social welfare in the College of Letters and Science.

For further information, consult the Announcement of the School of Social Welfare, available from the School Office, 1209 Haviland Hall.

Undergraduate Group Major, L&S

The group major in social welfare, leading to the degree of Bachelor of Arts in the College of Letters and Science, offers a social welfare sequence of general interest to liberal arts students. It provides students with an opportunity to test their career interest in social work prior to pursuing graduate professional education and prepares them for community service positions beginning directly upon graduation with the bachelor's degree. Applications to the major are considered in Fall on a first-come/firsr-served basis. Number of units and prerequisite courses completed are considered for admission.

Major Requirements

Lower Division. Psychology 1, Sociology 1A, and Statistics 2. Recommended: Anthropology 3, Economics 1, Political Science 1.

Upper Division. Social Welfare 102A–102B (3–3), 103A–103B (2–2), 110A–110B (5–5); and a minimum of five courses chosen from the following list, with three of these courses taken in one department and two selected from the other departments: Anthropology 140, 142, 144, 145, 150, 152, Economics 100A, 100B, 133, 134, 155, 157, Political Science 102, 103, 181, 182, 183, 189; Psychology 130, 140, 150, 151, 160; Public Policy 181, 182, 184, 185, 186, Sociology 120, 130, 140, 142, 157, 160, 162, 163.

Honor Program. Eligible social welfare majors, upon recommendation of their advisers, may enroll in
an honors program. A candidate for honors must complete an honors seminar in social welfare and social work programs (Social Welfare H155A-H155B-H155C). A senior essay is part of the work of the final quarter of the seminar. The essay which will be of a creative and integrative nature, will be the culmination of an individual library research project on a topic of special interest. The student prepares a research paper that will deal with aspects of the function of medium to mass media in social change and social action. The Staff (F, W)

200A-200B. Development of the Person. (2-2) One 1 1/2-hour session per week. Physical, psychological, and social development and adaptations of the person, as related to social welfare. Sequence beginning (F). The Staff (F, W, Sp)

201A-201B. Social Organization and Social Welfare. (2-3) One 1 1/2-hour session per week for 2 units; an additional 1 1/2 hours every other week for students who elect an additional unit. Structure and dynamics of communities, organizations, groups and families, as related to social welfare. Credit and grade will be assigned upon completion of the sequence. Sequence beginning (W). The Staff (F, W, Sp)

202. Development of the Social Deviant. (2) One 1 1/2-hour session per week. The social work process in dealing with clients for whom 200A-200B or consent of instructor. Deviant behavior and welfare implications of minority status, educational and economic dislocations, and occupational devaluation, and identity problems of the nonconforming members of society. The Staff (Sp)

210A-210B. Psychodynamics and Psychopathology. (2-2) Prerequisite: course 200A or consent of instructor. Psychiatric symptomatology and psychopathology and their implications for the profession. Sequence beginning (W). The Staff (W, Sp)

211. Seminars in Human Development and Pathology. (2) One 1 1/2-hour session per week. Prerequisite: course 200A-200B or consent of instructor. The welfare implications of selected problems in human development and adaptation in situations involving physical illness, psychopathology, or stressful social conditions. Seminar topics will be announced annually. The Staff (Sp, W, W)

220A-220B. Social Policy and Social Welfare. (2-2) One 1 1/2-hour session per week. Prerequisite: consent of instructor. Analysis of selected problems in social policy and social welfare. Seminar topics will be announced annually. The Staff (Sp)

222A-222B. Social Welfare Policy in Community Mental Health. (2-2) One 1 1/2-hour session per week. Prerequisite: graduate standing.

222A. Issues in Mental Health and Social Policy. Major factors influencing the provision of mental health services to individuals, families, groups and communities; implications of different help oriented models for mental health intervention programs; reciprocal relationships between mental health policy and social work practice.

222B. Designing Solutions to Mental Health Problems. How mental health problems are defined, how optimum systems of services are designed, and the roles of community mental health workers.

230. Social Welfare Programs and Policies. (2) Formerly 230A. One 1 1/2-hour session per week. Prerequisite: course 230B or consent of instructor. Generic and specific components of social policy in different fields of practice, including correctional, family and child welfare, medical, psychiatric, public welfare, and school social work. The Staff (F)

231. Poverty as a Social Welfare Problem. (2) One 1 1/2-hour session per week. Prerequisite: graduate standing. The distribution and changing map of poverty in the United States; analysis of alternative ways to define poverty. Social welfare programs that reflect one or more of these alternative definitions.

232. Comparative Welfare Institutions and Practice. (2) Three 1 1/2-hour sessions per week. Comparative analysis of welfare policies and provisions in selected countries in cultural and ideological context. Countries or regions to be dealt with will be announced in advance each time the course is offered. The Staff (W, Sp)

234. The "Benevolent Asylum" and Social Welfare. (2) One 1 1/2-hour session per week. A general survey of the practice of institutional care for a broad range of populations. Substantial use of international materials. Mr. Wolfe (W)

235. The Voluntary Agency and the Human Service Profession. (2) Three 1 1/2-hour sessions per week. Analysis of organizational character of different types of voluntary social welfare agencies. Possibilities and constraints on their functions of provision, social change and citizen participation. Professional

236. Social Gerontology and Social Welfare Policy. (2) Three 1 1/2-hour sessions per week. U.S. social welfare policies and policy programs for the aging are analyzed with respect to the knowledge required to assess the needs for social work practice. An overview of the delivery of the social services.

240A-240B. Social Work Methods With Special Population Groups. (2-2) One 1 1/2-hour session per week. Basic principles of social work practice with individuals, families, and groups of special population groups such as aged or minority groups.

244. Introduction to Community Planning and Organization. (2) Formerly 244A. One 1 1/2-hour session per week. An overview of the field, issues and models of professional practice. Mr. Gilbert, Mr. Kramer, Mr. Specht (F)

245. Development of Social Service Programs. (3) Three 1 1/2-hour sessions per week. Principles and methods of building organizations for social action and planning. Mr. Specht (W)

245A-245B. Social Work Practice in Community Mental Health. (2-2) One 1 1/2-hour session per week. Prerequisite: admission to the predoctoral program or consent of instructor. Analysis of the historical, philosophical, and practical aspects of social work practice with individuals, groups, organizations, and communities. Mr. Miller (F, W)

250. Advanced Social Casework. (2) One 1 1/2-hour session per week. Analysis of models, sociopolitical and technical tasks and professional roles. Mr. Kramer (Sp)

254A-254B. Social Welfare Administration. (2-2) One 1 1/2-hour session per week. Administrative processes and problems in social welfare organizations. Methods and techniques in the management of human service organizations. Mr. Kramer, Mr. Pruger (F, W)

255A-255B. Social Work Practice in Public Health. (2-3) Three 1 1/2-hour sessions per week. Prerequisite: primarily for social workers in the School of Public Health and for others with the consent of instructor. An introduction to the role and context of public health and health care programs. Analysis of the issues affecting the delivery and implementation of social work services in selected settings. Emphasis is given to skills in training, consultation, program planning and evaluation. Mrs. Wilson (F, W)

256A-256B. Media and Methods in Social Work. (2-2) One 1 1/2-hour session per week. Uses the School's educational media laboratory, especially video and audio, as part of the professional functioning and to teach utilization of new media in social work practice. The relation of medium to media, visual, aural, and written, is discussed and demonstrated. Mrs. Wilson (F, W)

NOTE: For key to symbols, see page 38.
257. The Good Bureaucrat. (2) One 1 1/2-hour session per week. Graduate standing. Analytical study of the problems and opportunities faced by the professional service giver in a bureaucracy. Prerequisite: consent of instructor. Mr. Pruger (F)

258. Methods of Supervision in Social Work. (2) One 1 1/2-hour session per week. Prerequisite: second-year standing in the M.S.W. program or consent of instructor. (W)

**259A-259B-259C. Seminars in Social Work Theory. (3-3-3) Two seminar hours and one consultation hour per week. Primarily for doctoral students. Sequence beginning (W)**

259A. Analysis of selected theories, social work practice, 259B analysis of selected social problem in the light of theory, 259C principles of media of publication and preparation of manuscripts. Graded on a satisfactory/unsatisfactory basis.

260. An Introduction to the Profession of Social Work. (2) One and 1/2 hours of lecture per week. Study of the material relating to the origins, values, and functions of the profession of social work. The focus is on the profession of social work rather than the institution of social welfare. Mr. Miller (F, W, Sp)

279A-279B-279C. Seminars in History and Philosophies of Social Welfare. (3-3-3) Two seminar hours per week. Primarily for doctoral students. 279A. A review of efforts to conceptualize the field of social welfare and to analyze its tendencies. 279B. Historical research and writing and selected topics. 279C. Values in social work practice, combining a review of the literature and an empirical inquiry into decisions that seem value-laden.

282A-282B-282C. Social Welfare Research Theory and Practice. (2-2-2) At least one 1 1/2-hour session per week in lecture and/or laboratory. Primarily for M.S.W. students. A three-quarter research sequence designed to introduce students to the logic, methods, and techniques of research in social welfare and give them some experience in their application to research problems. Credit and grade will be assigned upon completion of the sequence in even-numbered sections and upon completion of each quarter's work in odd-numbered sections. The Staff (F, W, Sp)

**286. Policy Analysis and Research in Social Welfare. (3) Two seminar hours and individual meetings with faculty. Prerequisite: consent of instructor. Review of the policy making process in social welfare. Research requirements. Utilization of research knowledge for policy formation. The role of scholarship and research in policy making.** (Sp)

287. Library Research in Social Welfare. (1) One 1 1/2-hour session per week. Primarily for doctoral students. A systematic introduction to tasks and tools of library research in social welfare: reference works, finding and bibliographic aids. Attention to historical sources, current data flow and storage, and the students' own arrangements for collecting and retrieving information. Graded on a Satisfactory/Unsatisfactory basis. Mr. Leiby (F)

288. Report Writing and Editing. (1-2) One or two seminar hours per week, depending upon units, and individual meetings with faculty. Primarily for doctoral students. Supervised practical experience in planning, researching, writing, editing reports, articles, or student papers. Attention to formal organization, style, selection of methods of publication, and preparation of manuscripts. Graded on a Satisfactory/Unsatisfactory basis. Mr. Leiby (Sp)

289A-289B-289C-289D. Research Methods and Techniques in Social Welfare. (4-4-4-4) 289A-289B-289C, three hours of lecture and one and a half hours of laboratory per week. 289D. Two hours of lecture and three hours of discussion. Primarily for doctoral students.

289A. Introduction to probability theory, the logic of social research, and basic statistics. Mr. Boyd (F)

289B. Continuation and expansion of the logic of social research. Topics include: rationale and procedure of research design, hypothesis testing, measurement and data analysis. Mr. Boyd, Mr. Miller (W)

289C. Introduction to the general linear model and its application to social welfare problems. Mr. Boyd, Mr. Miller (Sp)

289D. Workshop in applied research and statistics with special reference to social welfare. Mr. Boyd (F)

296. Individual Study for Graduate Students. (1-9) Designed to permit any qualified graduate student to pursue special study in a subject of his own choosing under the direction of a faculty member. The Staff (F, W, Sp)

298. Group Study for Graduate Students. (1-9) The Staff (F, W, Sp)

299. Individual Research for Graduate Students. (1-9) Designed to permit any qualified graduate student to pursue research in a subject of his own choosing under the direction of a faculty member. The Staff (F, W, Sp)

**PROFESSIONAL COURSES**

401. Field Instruction. (2-14) Four units of credit per quarter for two days in the field, variable units for block placement. First-year requirement: 12 units spread over three quarters. Second year: 14 to 18 units spread over one, two or three quarters. Supervised practice in social agencies. Graded on a satisfactory/unsatisfactory basis.

402. Laboratory in Social Work Practice and Social Welfare Agencies. (1-2-1) One-half or one full day per week introduces the student to the range of professional roles and services in social welfare through a series of visits, interviews, observations, and participation in a social work student's program concentration. Graded on a satisfactory/unsatisfactory basis.

Mr. Britt, Mrs. O'Day, Mrs. Weiss (F, W, Sp)

602. Individual Study for Doctoral Students. (1-8) 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 D.S.W. May not be used for unit or residence requirements for the doctoral degree. Must be taken on a satisfactory/unsatisfactory basis.

Mr. Miller (F, W, Sp)

IDS 175. A Nontechnical Introduction to Operations Research. (4) See interdepartmental studies for the complete description of this course.

IDS 190A-190B-190C. Principles and Applications of Psychology in Social Welfare. (3-3-3) See interdepartmental studies for the complete description of this course.

IDS 172. Ethnological Perspectives on Health Issues: Bioethics. (3) See interdepartmental studies for the complete description of this course.

IDS 215. A Nontechnical Introduction to Operations Research. (4) See interdepartmental studies for the complete description of this course.

IDS 220. Ethnological Perspectives on Health Issues: Bioethics. (3) See interdepartmental studies for the complete description of this course.

IDS 232A–232B–232C. Interdisciplinary Course for Key Personnel in Day Care. (2–2–2) See interdepartmental studies for the complete description of this course.


**Special Studies**

**Collegiate Seminar Program**

**Collegiate Seminar Program Office, Building T-9**

Professors:

Robin Lakoff, Ph.D. (Linguistics)
Charles Sellers, Ph.D. (History)

Charles Muscatine, Ph.D.

Valerie Berenblum, Ph.D. (History)

Peter D. Scott, Ph.D. (English)

Assistant Professors:

Theo W. Laquer, Ph.D. (History)
Raymond Litchet, M.S.M.A., M.C.P. (Architecture)

“Strawberry Creek College” (the Collegiate Seminar Program) offers freshmen and sophomores an opportunity to work intensively and closely with faculty on the analytical, writing, and speaking skills that are essential in their other college work and in their professional lives. The College has a student-teacher ratio of 12:1 and enrolls about 100 students each quarter. It is located in its own small building at the center of the campus and has a lounge and library as well as classrooms and faculty offices. Here College members get together to share social as well as intellectual life. Part of the academic program is a weekly meeting of the entire College for discussion of matters of general intellectual interest, often involving presentations by guest speakers or by members of the College. Students take an active part in governing the College.

The academic work of the College is carried on through a series of small 10-unit seminars on topics in the humanities, social sciences, and natural sciences as they affect human and social questions. Focusing on topics of contemporary relevance approached from a variety of disciplines and points of view, the seminars are usually taught by instructors from different disciplines. Since the seminars are taken for 10 units (Strawberry students normally take, in addition, a single 5-unit course outside the College), there is time to explore a topic deeply and to develop an independent and original independence of thought and scholarship.

The seminars are offered currently. Inquire at the College office (Building T-9, Room 16; Telephone: 842-2811) or write to the Director, Strawberry Creek College, University of California, Berkeley, CA 94720.
Energy and Resources Program

(Interdisciplinary Advisory Program and Graduate Group)

Office (642-1640) and Library (642-1004); 3326 Dwinelle Hall

Administered by the Campus Energy and Resources Office (642-1640) and Library (642-1004);

This campus-wide program offers graduate degrees in Energy and Resources, undergraduate and graduate interdisciplinary courses in the broad area of energy and the resources associated with energy, and information about other energy-related courses, degree programs, and research activities throughout the Berkeley campus. The Energy and Resources Group, which coordinates these efforts, consists of some fifty faculty members from many departments, two faculty and the resources associated with energy, and information about other energy-related courses, degree programs, and research activities throughout the Berkeley campus. The Energy and Resources Group, which coordinates these efforts, consists of some fifty faculty members from many departments, two faculty members attached full-time to the Program, and representatives from the Lawrence Berkeley and Livermore Laboratories.

The degrees of M.S. and M.A. in Energy and Resources require 60 units of study, to include 24 units in a single energy-related discipline, 18 units in a complementary field, and a 6 unit research project. For details about the Ph.D. degree, consult the Energy and Resources Program office.

UPPER DIVISION INTERDISCIPLINARY COURSES

100. Energy and Society. (4) Formerly IDS 50. Four hours of lecture per week. Energy sources, uses, and impacts; an introduction to the technology, politics, economics and environmental effects of energy in contemporary society; energy and well-being, energy in international perspective, origins and character of the energy crisis. Energy and Resources: Mr. Holdren (F)

120. Quantitative Aspects of Global Environmental Problems (Environmental Studies 102). (4) Three hours of lecture and one hour of discussion per week. Prerequisite: Physics 4D or 5D; or Physics 6C plus Biology 150: consent of instructor. Input-output and cost benefit analysis applied to energy; exhaustion theory and economics of energy supply; patterns of energy use; trade-offs in energy conservation; the effect of energy policy on the supply demand curves; projecting future energy use. Energy and Resources: Mr. Holdren (Sp)

120. Energy and Power (Engineering 160). (4) Four hours of lecture per week. Prerequisite: upper division standing in Engineering or Letters and Science; Physics 55, or Engineering 1. Energy sources, conversion, transmission, and requirements for energy in human society, concentrating on electric power. Thermodynamic principles, Fossil fuels, nuclear fission and fusion, and hydroelectric power generation. Geothermal, tidal, and solar power. Direct energy conversion. Ecological and social problems. Taught by members of three Engineering departments. (W)

170. Resources for Energy. (4) Three hours of lecture per week. Comparison of physical (mainly geologic), and economic approaches to estimation of resources. Consideration of how technologies, economics, and policies affect availability. Focus on energy resources (exhaustible and renewable), and on materials used in conversion of energy to useful forms. (F)

180. Economics of the Energy Supply Industries. (4) Three hours of lecture per week. Prerequisite: Econ 100 or equivalent: Econ 100A or equivalent: either prerequisite or concurrent registration. A survey of the economic and industrial structure of the oil, gas, coal, uranium, “alternative sources” and electric power industries. Cost and demand estimates for each source will be examined. Major public policy issues will be treated. (W)

189. Directed Group Studies for Advanced Undergraduates. (1–5) Prerequisite: Upper division standing. These courses may be selected to fit the requirements of the student by the instructor for each group. Group studies of selected topics. Energy and Resources Staff. Mr. Christensen in charge.

260. Critical Issues in Energy Technology. (3) Formerly Engineering 260. Three hours of lecture per week. Prerequisite: Engineering 160 or equivalent. Quantitative examination of selected issues in energy technology combining analytical approaches and inputs from several disciplines. Issues include the technology of energy conservation, expanded use of coal, safety and siting of nuclear reactors, uranium supply, short-term solar energy, and energy storage. Energy and Resources: Mr. Holdren (Sp)

280. Economic Aspects of Energy Use. (4) Three hours of lecture per week. Prerequisite: E & R 100 or equivalent: Econ. 100A or equivalent: basic calculus or linear algebra. Input-output and cost benefit analyses applied to energy; exhaustion theory and economics of energy supply; patterns of energy use; trade-offs in energy conservation; the effect of energy policy on the supply demand curves; projecting future energy use. Energy and Resources: Mr. Holdren (Sp)

290. Group Seminar. (1-3) Two hours of lecture per week. Prerequisite: graduate standing in the Energy and Resources Group. Graduate student presentations and faculty-student discussions of advanced topics in interdisciplinary energy research. Energy and Resources: Mr. Holdren, Mr. Christensen

299. Individual Research in Energy and Resources. (1-8) Investigation of problems in energy and resources from an interdisciplinary perspective. Energy and Resources: The Staff

Ethnic Studies

Department Office, 3326 Dwinnelle Hall

Group Major in Ethnic Studies

The Group Major in Ethnic Studies, leading to a Bachelor of Arts degree, represents the joint commitment of the Asian American Studies Program, the Chicano Studies Program, and the Native American Studies Program to provide a core curriculum whose educational objectives are as follows:

1. Development of a sensitivity and commitment in students to the understanding of the situations affecting Third World people and their communities.

2. Development of a methodology emphasizing comparative analysis of the histories and contemporary positions of Third World peoples.

3. Development of research capabilities in students that will allow them to compile information and analyze it from a Third World perspective.

4. Development of expertise in areas that will allow students to pursue professional training so that they may provide services to Third World communities and effect positive social change.

Major in Ethnic Studies

In addition to the general university requirements regarding residence, satisfactory GPA, Subject A and American history and Institutions, the Group Major in Ethnic Studies includes a Breadth Requirement and a Major Requirement. In fulfilling these requirements, students will be expected to work closely with an academic advisor and select an area of emphasis. The areas of emphasis are defined as follows:

1. Social Sciences, comprising subject matter roughly corresponding to the organization of knowledge in courses offered in the Division of Social Sciences in the College of Letters and Science.

2. Humanities, comprising subject matter roughly corresponding to the organization of knowledge in courses offered in the Division of Humanities in the College of Letters and Science.

3. Community Service, comprising subject matter roughly corresponding to the organization of knowledge in the Professional Schools.

4. Special Area of Emphasis, which is to be worked out by the student with a committee of no fewer than three faculty members, and which may include a program of study or project outside the regular boundaries, i.e., Women’s Studies, which could include subject matter from the social sciences, humanities, and community service as these relate to the women’s experience.

Breadth Requirements

1. Demonstrated proficiency in reading and composition.

2. Demonstrated proficiency in alternate systems for the structure and conceptualization of knowledge, which may be met by completing A of the following and either B or C: (A) Demonstration of competence in a language other than English (B) Completion of two courses in such fields as mathematics, statistics, linguistics, computer science, logic; (C) Completion of two courses in such fields as aesthetics, art criticism, literary theory.

3. Satisfactory completion of an introductory course in at least four Ethnic Studies Programs (including Afro-American Studies).

4. Satisfactory completion of six courses outside the student’s declared Area of Emphasis.

Major Requirements

1. Completion of 20 units of common core courses which are: E.S. 20, Introduction to Ethnic Studies; E.S. 21, Comparative Survey of Third World Experience; E.S. 130, Comparative Analysis of Racism in America: An Historical Perspective; E.S. 170: Selected Issues in Methodology for Third World Research.

2. Completion of two additional upper division courses in Ethnic Studies.

3. Completion of six additional upper division courses which form the basis of the declared Area of Emphasis.

COURSES IN ETHNIC STUDIES

20. Introduction to Ethnic Studies. (5) Five hours of lecture per week. An overview of the interdisciplinary and multidisciplinary nature of ethnic studies, its relationship to corporate structures, legislative bodies, community people, and specifically Third World people will be analyzed. The University’s values will be critically examined. The history of Ethnic Studies programs in this country, their development and struggles will be examined. (Sp)

21. A Comparative Survey of Third World Experiences in the United States: An Introduction. (5) Three and one-half hours of lecture per week and one and one-half hours of discussion per week. Prerequisite: none. A comparative analysis of the political, social, economic, and cultural status of Third World people in the United States. (W)

100. Third World Literature. (5) Five hours of lecture per week. Prerequisite: none. The purpose of this course is to explore through the literary works (poetry, novel, short story, oral tradition) the views that various Third World Authors present of different life styles, religious philosophies, aspirations and oppression from within their borders. (W)

130. A Comparative Analysis of Racism in America: An Historical Perspective. (5) Three hours of lecture and one and one-half hours of discussion per week. Prerequisite: none. Satisfies American History requirement. A comparative and historical analysis of the different forms of oppression in America. Study of

NOTE: For key to symbols, see page 36.
Asian American Studies Program

Program Office, 3407 Dwinelle Hall

Associate Professor: Ronald Takaki, Ph.D. (Coordinator)
Assistant Professor: Sucheng Chan, Ph.D.

Ling-chi Wang, Ph.D.

Undergraduate Program

The Asian American Studies Program offers an 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 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 experiences of Asians in America. In doing so, it provides the four-hour tutorials with thorough instruction in the experience of Asians in the United States, and prepares students for graduate work in their own and allied fields. Third, the program broadens the curriculum at Berkeley to include instruction which reflects the conditions of Asians and other Third World people living in America.

The Major

The student seeking to major in the Asian American Studies Program shall either satisfy or be in the process of satisfying the following: (1) the University requirement in Reading and Composition; (2) proficiency in an Asian American community language, such as Cantonese, Japanese, or Tagalog; and (3) Asian American Studies 20A.

The major shall consist of not less than ten courses, normally 50 units, of which four or 20 units will be the following core courses: Asian American Studies 120, 140A-140B and Ethnic Studies 130. The remaining courses in the major must be upper division courses, two of which must be outside the Asian American Studies Program, with a concentration in community studies, social science, or humanities.

For more detailed information about the Asian American Studies Program major, consult the Program Adviser in the Program Office, 3407 Dwinelle Hall.

LOWER DIVISION COURSES

6A. Basic Reading and Composition. (5) Formerly 120A. Four hours of lecture and 1 hour of discussion per week. A reading and composition course examining the selected literary, socio-political, and historical works related to the Asian American experience. Students will read, discuss and write about such topics as Asian American culture, values, racism, the form and function of communication.

E.H. Kim in charge (F, W, Sp)

6B. Ethnic American Reading and Composition. (5) Formerly 120B. Four hours of lecture and 1 hour of discussion per week. Prerequisite: Completion of Subject A or its equivalent. A reading and composition course examining the literature of the Third World experience in America. Representative works from Asian, Black, Chicano, Native American and White literature will be examined not only for their literary significance, but also for their social, cultural, political and psychological impact.

E.H. Kim in charge (W)

6C. Third World Reading and Composition. (5) Formerly 20C. Four hours of lecture and 1 hour of discussion per week. Prerequisite: Completion of English 1A or its equivalent. A reading and composition course based on the selected Third World literary works. Readings from every genre will be examined as art and as cultural, psychological and political statements about developing nations. The significance of Third World writings to American and other Third World minorities will be discussed, and the special

problems and challenges facing Third World artists will be examined in depth and detail.

E.H. Kim in charge (Sp)

12A–12B–12C. Community Cantonese. (5–5–5) Formerly 50A–50B–50C. Five hours of recitation and 2 hours of language lab per week. Prerequisite: consent of instructor. Focus on the development of conversational and written skills in the language most commonly used in Chinese American communities. Includes an examination of historical, social and cultural aspects of the Chinese American community and its influence on Chinese Americans. 12A (F, W, Sp), 12B (W, Sp), 12C (Sp)


18A–18B–18C. Community Pilipino. (5–5–5) Formerly 52A–52B–52C. Five hours of recitation and 2 hours of language lab per week. Emphasis on the development of conversational and written skills in the language most commonly used in Pilipino and Filipino American communities. Includes discussion of Filipino in historical, social and cultural aspects of the Pilipino American community and its influence on the Pilipino and Filipino communities. 18A (F, W, Sp), 18B (W), 18C (Sp)

20A–20B. Introduction to the Asian American Experience. (5–5) Formerly 20 and 40. Three hours of lecture and 2 hours of discussion per week. Prerequisite: as needed. Satisfies Asian American History Requirement. Introductory comparative analysis of the Asian American experience from 1850 to present. Topics include the history of the Asian American experience, the role of immigration, anti-American racism, labor, political and social history. 20B. Community. Introduction to Asian American communities covering the evolution of social, economic and political institutions of Asian American communities and their relationships to one another.

L. Wang (F), 20A; L. Wang, R. Takaki (W, Sp), 20B (W, Sp)

UPPER DIVISION COURSES

120. Comparative History of Asian Experience in America. (5) Three hours of lecture and two hours of discussion per week. Satisfies Asian American History requirement. Prerequisite: course 20. Analysis of the similarities and dissimilarities of the Asian experience in America, methods of comparative approach to Asian American History, community history, as well as immigration issues such as immigration, labor, economic development, race relations, community institutions and development, and occupational patterns will be analyzed and compared.

L. Wang (F)

121A–121B. Chinese American History. (5–5) Three hours of lecture and two hours of discussion per week. Prerequisite: completion of course 20. Satisfies Asian American History requirement. Prerequisite: Asian American Studies 20A. A two-quarter sequence covering Chinese American History, 1848 to present. Topics include immigration, anti-Chinese racism, labor, concentration camps, agriculture, art and literature, and personality and culture. 121A, 121B (F, W, Sp)

122. Japanese American History. (5) Three hours of lecture and two hours of discussion per week. Satisfies Asian American History requirement. Prerequisite: Asian American Studies 20A. This course is either 20A recommended. A course in Japanese American history emphasizing the development of social, political, and economic patterns within the Japanese American community. (W, Sp)

123. Korean American Historical and Contemporary Issues. (5–5) Three hours of lecture and two hours of discussion per week. Prerequisite: Asian American Studies 20A recommended, or consent of instructor. Koreans in America from 1876 to present. Course will cover: comparative immigration and settlement patterns; labor and socioeconomic life; political activities; community mobilization, and issues related to the contemporary population influx. 123A, 123B (F, W, Sp)

124–124B. Pilipino American History. 1988: Present. (5–5) Three hours of lecture and 2 hours of discussion per week. Prerequisite: Asian American Studies 20A or equivalent. Topics include: consequences of the Spanish-American War on Pilipino emigration; conditions in
Hawaii and California and the need for Filipino labor; community development and changing relation between the U.S. and the Philippines; effects of independence movement and World War II on Filipino Americans; and contemporary issues. (W, Sp)

140A. Asian American Community. (5-6) Formerly 131 and 137. 140A: four and one-half hours of lecture per week. Prerequisite: AsAmSt 20A–20B. 140A: analysis of Asian American communities in their relationship to the development of American society and contemporary world history. (W)

140B: approaches to research in the Asian community with emphasis on the San Francisco Bay Area. Problems of research design, measurement, and data collection, processing and analysis, will be considered. (F, W, Sp)

145. Social Institutions in the Asian American Communities. (5) Three hours of lecture and two hours of discussion per week. Prerequisite: AsAmSt 20A or consent of instructor. A comparison of the institutions of education, health, law, social welfare, and other social institutions and their impact on Asian American communities. Students will have an opportunity to focus on particular institutions in discussion sections. (F, W)

146. Selected Topics and Issues in the Asian American Community. Three hours of lecture and one hour of discussion per week. (W, Sp)

146A. Law. (4) Prerequisite: AsAmSt 145. This course will examine the nature, structure and operation of selected legal institutions as they affect Asian American communities and will attempt to analyze the roles and effects of law, class and race in American society. 146B. Mental Health. (4) Prerequisite: AsAmSt 145. This course will require the student to master the basic understanding of the concepts relevant to the mental health of Asian Americans with particular emphasis on the race/ethnicity and gender aspects. It will focus on the ethnic and cultural complexity of the Asian American communities in the area.

146C. Housing. (4) Prerequisite: AsAmSt 145. This course focuses on the role and overall performance of housing-related institutions in minority communities by studying their formal/informal structures and by explaining some of the underlying assumptions that permeate their policies and programs. Primary emphasis will be placed on analyzing how HUD housing and urban renewal policies have come to bear on Bay Area Asian communities projects.

146D. Health Care. (4) Prerequisite: AsAmSt 145. In this course we will analyze problems within Asian ghetto communities, the American Health Care System (delivery and financing), and the interaction between these two spheres within the framework of American society. With this analysis we will study trends for the future within health care and their impact on working-class and poor people.

146I. Media. (4) Prerequisite: AsAmSt 145. Study of impact of mass media in Asian American community; economic and social conditions and community relations of Bay Area television and radio stations, newspapers, books and magazines; rules and regulations of Federal Communication Commission will be analyzed and applied to promote community access and media change.

148R. Religious Institutions. (4) One 3-hour lecture and one half hour of discussion per week. Prerequisite: AsAmSt 145. Historical and social roles of religious institutions in Asian American communities; overview of Asian American Religious History; methodological approaches; response of Asians and social issues, with emphasis on the present situation.

150. Asian American Family and Personality. (5) Four hours of lecture and one hour of discussion per week. Prerequisite: AsAmSt 20A or consent of instructor. Deals with the influence of cultural legacy, ethnic background, immigration history, community structure, class and economic status, and racism on the sociological and psychological dynamics of the Asian American family. (W, Sp)

151. Asian Women in America. (5) Four hours of lecture and 1 1/2-hours of discussion per week. Prerequisite: one of the following: AsAmSt 6A, 6B, 6C, 20A, 20B, 30, or consent of instructor. Asian American women’s history: events, forces and movements affecting Asian women in America drawing from material in literature, history, philosophy, political science and other fields. Readings, reports, papers and discussions.

160. Asian American Literature. (5) Three and one-half or four hours of lecture and one hour of discussion per week. Prerequisite: AsAmSt 20A, 6A, 6B, 6C or consent of instructor. Survey of Asian American literature and its background. Special emphasis on poetry, short stories, plays, etc. that focus on socio-economic struggles of the Asian American community and peoples. (W)

191A. Creative Writing. (5) Three hours of lecture and 2 1/2 hours of writing workshop per week. Prerequisite: AsAmSt 160 or consent of instructor. Asian American writing as an expression of and contribution to Asian American culture: a study of issues facing minority American and Third World writers. Interpretation of themes, symbols, language, characterization and community portrait in literary works. Practice in forms and techniques of verse and prose writing. (E.H. Kim (F)

19145A–19165B, Asian American Art. (5–4) Two quarter series. 1915A: 3 hours of lecture and 3 hours of studio per week. 1915B: 9 hours of studio per week. Prerequisite: drawing experience and at least one previous Asian American Art course. (Examples of artwork required at first session). Two quarter sequence for students with artistic experience in the area of housing. Field placement will be with housing organizations located in Bay Area Asian American communities. Completion of a specific project and/or paper required in conjunction with AsAmSt 145A.

191A. Field Study in Asian American Communities: Mental Health. (1–6) One to three hours of meetings and two to twelve hours of field work per week. Prerequisite: Must be taken concurrently with AsAmSt 145B. May be repeated up to 10 units. Supervised experience in the area of mental health. Field placement will be with mental health organizations located in Bay Area Asian American communities. Completion of a specific project and/or paper required in conjunction with AsAmSt 145A.

191B. Field Study in Asian American Communities: Mental Health. (1–6) One to three hours of meetings and two to twelve hours of field work per week. Prerequisite: Must be taken concurrently with AsAmSt 145B. May be repeated up to 10 units. Supervised experience in the area of mental health. Field placement will be with mental health organizations located in Bay Area Asian American communities. Completion of a specific project and/or paper required in conjunction with AsAmSt 145A.

191C. Field Study in Asian American Communities: Health Care. (1–6) One to three hours of meetings and two to twelve hours of field work per week. Prerequisite: Must be taken concurrently with AsAmSt 145B. May be repeated up to 10 units. Supervised experience in the area of health care. Field placement will be with health care organizations located in Bay Area Asian American communities. Completion of a specific project and/or paper required in conjunction with AsAmSt 145B.

191D. Field Study in Asian American Communities: Health Care. (1–6) One to three hours of meetings and two to twelve hours of field work per week. Prerequisite: Must be taken concurrently with AsAmSt 145B. May be repeated up to 10 units. Supervised experience in the area of health care. Field placement will be with health care organizations located in Bay Area Asian American communities. Completion of a specific project and/or paper required in conjunction with AsAmSt 145B.

1917. Supervised Independent Field Research (1–5) Three hours of field research and 1/2 hour of conference per week. Prerequisite: Must be taken concurrently with AsAmSt 145B. May be repeated up to 10 units. Supervised experience in the area of health care. Field placement will be with health care organizations located in Bay Area Asian American communities. Completion of a specific project and/or paper required in conjunction with AsAmSt 145B.

199. Directed Group Study for Advanced Undergraduates. (1–6) Prerequisite: at least one upper division Asian American Studies course and consent of instructor. Enrollment is restricted by regulations listed on page 36. Must be taken on a pass/no pass basis. (E.H. Kim (F, W, Sp)

Chicano Studies Program

Program Office, 3404 Dwinelle Hall
Assistant Professors: Lila Gonzalez, Ph.D. Carlos Munoz, Ph.D.

Chicano Studies is an interdisciplinary field of academic study that examines the Chicano people in dynamic relationship to the socio-economic cultural forces which historically have affected and continue to influence them. As an academic unit, Chicano Studies presents a well integrated curriculum the educational objectives of which are to develop academic skills in the field of study so that students may do advanced work and/or become skilled and professional facilitators of social change and to generate and disseminate knowledge necessary for an understanding of the Chicano experience.

Chicano Studies Major

The Bachelor of Arts degree in Chicano Studies will be awarded upon fulfillment of the following requirements:

1. Completion of 180 units, at least 60 units of which must be in upper division courses.

2. Maintenance of at least a C average in all courses undertaken at the University and a grade of C in all courses in the major program.

3. Completion of the general University requirements regarding senior residence, Subject A, American History and Institutions.

4. Demonstrate proficiency in reading and composition (Chicano Studies 1A and 1B — English Reading and Composition for Native Speakers of Spanish or equivalent).

NOTE: For key to symbols, see page 38.
5. Demonstrate proficiency in Spanish, i.e., Chicano Spanish 5A, 6B or 6C (dependent upon language proficiency examination given at the beginning of each quarter).

6. Completion of 15 units of common core courses which are: 20, Introduction to Chicano Culture; 50, Introduction to Chicano History; and 70, Chicanos in American Society.

7. Completion of the requirements in either the social science or humanities emphasis.

8. The Social Science emphasis requirements include: one upper division course from the humanities emphasis (see courses below); one course from the Department of Ethnic Studies (e.g., Asian American Studies, Native American Studies, Group Major in Ethnic Studies, or Afro-American Studies); Chicano Studies 101A and 101B; and four additional courses in the social science emphasis. One upper division course must be in Spanish.

9. The humanities emphasis requirements include: one upper division course in social science emphasis; one course from the Ethnic Studies Department. Chicano Studies 130 and 143; and four additional courses from the humanities emphasis. One upper division course must be in Spanish.

Note: For further information, please consult the Chicano Studies Divisional Office, 3404 Drivelle Hall.

1A. English Reading and Composition for Native Speakers of Spanish. (5) Four hours of lecture per week. Prerequisite: Subject A and consent of instructor. To acquaint Chicano and bilingual students with methods of written and oral discourse. Emphasis on expository writing, beginning with sentence and paragraph structures, with an emphasis on unity, coherence, and overall organization. An upper division course.

1B. English Reading and Composition for Native Speakers of Spanish. (5) Five hours of lecture per week. Prerequisite: Subject A and Chicano Studies 1A. Described as an introduction to the study of the research paper form of expository discourse. Study includes methods for assembling, organizing, and incorporating a unified composition of a particular subject within the Chicano experience.

6A. Chicano Spanish. (5) Formerly 25A. Five one-hour lectures per week. Designed and systematically structured to develop confidence in the Chicano student’s ability to communicate effectively through an emphasis on spoken language. Incorporates individual and group presentations, lectures, movies, and selected readings.

6B. Chicano Spanish. (5) Formerly 25B. Five 1-hour lectures per week. Prerequisite: Subject 25A. An upper division course designed to expand upon the material and concepts covered in 6A. Newly-acquired confidence in and facility with the Spanish language is developed through individual and group presentations, written and oral reports, and researched topics.

6C. Spanish for Chicanos. (5) Formerly 25C. Five one-hour lectures per week. Prerequisite: CS 6A and 6B. This course is designed to introduce the Chicano student to representative authors (Spanish and Calo) and to critical analyses of a variety of their writings.

20. Introduction to Chicano Culture. (5) Four hours of lecture and one hour of discussion per week. A multidisciplinary approach to the Chicano experience as it is expressed in the forms of its culture, in everyday life and in popular art. Ms. Gonzalez (W)

40. Introduction to Chicano Literature in English. (5) Four hours of lecture and one hour of discussion per week. No knowledge of Spanish is required. This course will introduce students to modern Chicano literature written in English, and will provide necessary background for understanding more specialized courses in the area. Ms. Gonzalez (F)

50. Introduction to Chicano History. (5) Four hours of lecture and one hour of discussion per week. This course provides a general overview of the Chicano historical experience in the United States. Topics include origins of Chicano culture, Spanish colonial patterns, economic development, natural resources, immigration patterns, land concentration, impact of Mexican traditional cultural values on Chicano social and political institutions.

70. Chicanos in American Society. (5) Four hours of lecture and one hour of discussion per week. To encourage critical thinking and a multidisciplinary approach to the study of the effects of U.S. institutions on Chicano life. To explore the relationship between social class, the nature of social structures and the nature of social relations in American life. Mr. Trujillo (F)

101A. Models for Research in Chicano Studies. (5) Four hours of lecture and one hour of discussion per week. Prerequisite: CS 50. The course will examine various theoretical and directional issues currently pending in Chicano Studies research. The main focus will be on the major theoretical approaches that have been used in social science research on the Chicano experience.

101B. Research in the Chicano Community. (5) Three hours of lecture and two hours of discussion per week. Prerequisite: CS 101A or equivalent. A sequence to CS 101A concentrating on an analysis of the various research methods applied to Chicano communities. Methods used in studying the Chicano community. Topics include: research problem definition, data collection (e.g., census data, demographic data, etc.), measurement, processing, and analysis, and various field methods (e.g., participant observation, oral history, survey questions, etc.). Discussion will also include the social and ethical implications of Chicano community research.

130. Introduction to Chicano Art. (5) Three hours of lecture and one hour of discussion per week. Prerequisite: Course 20 or equivalent. The course will focus on bicultural aspects of our art through the historical development of the Chicano creative experience.

131. Chicano Images in Art: The Chicano Poster. (4) Four hours of lecture per week. Prerequisite: Chicano Studies 101A and Consent of Instructor. To give students an historical perspective of the Mexican mural Renaissance in Mexico from the 1920’s to the present mural art in the Southwest. Mr. Trujillo (Sp)

135. The Chicano Popular Cultural Expressions. (5) Four hours lecture and one hour discussion per week. Prerequisite: consent of instructor. An ethnographic/literary introduction to the development of Chicano imagery and its relationship to historical development of the Chicano creative experience. Mr. Trujillo (F)

136. The Chicanos and Their Music. (5) Four hours lecture and one hour discussion per week. Prerequisite: consent of instructor. A survey of the history, socio-economic and cultural significance of the music of Mexican-Americans as manifested in their music. The course will survey Mexican and Chicano music from pre-conquest times to the present, with emphasis on the historical ballad, “The Corrido.”

141B. Chicano Poetry. (5) Four hours of lecture and one hour of discussion per week. Prerequisite: completion of Chicano Studies 40 and consent of instructor. A comprehensive examination of the Chicano poster art of the 60’s and future directions in Chicano poster art.

152. Chicano Labor History. (5) Four hours of lecture and one hour of discussion per week. Prerequisite: Chicano Studies 50 or consent of instructor. An in-depth study of two topical areas of the Chicano labor force, both rural and urban, and the participation of Chicano labor organizations, such as unions, which dates back to the nineteenth century.

160A. Political Economy of La Raza. (5) Three hours lecture and two hours discussion per week. Prerequisite: course 70 or equivalent. To provide an understanding of the relationship of Chicanos and other Spanish-speaking peoples to the political and economic institutions responsible for historic and contemporary conditions of economic underdevelopment in Chicano and other Latino communities in the U.S., political economy of the U.S. border.

160B. The Political Economy of the Southwest. (5) Three hours lecture and two hours discussion per week. Prerequisite: course 70 or equivalent. To examine the relationship of Chicanos and other Spanish-speaking peoples to the political and economic institutions responsible for historic and contemporary conditions of economic underdevelopment in Chicano and other Latino communities in the U.S., political economy of the U.S. border.

170. Institutional Racism in the Chicano Community. (5) Four hours of lecture and one hour of discussion per week. An examination of the manner in which institutional structures and processes produce discrimination against Chicanos. The course will examine the economic institutions (corporations, labor markets, unions) and political institutions (state, political parties) and their interaction. The relationship between institutions and assimilation will also receive some attention.

171A. Chicano Political Organization. (5) Three hours lecture and two hours discussion per week. Prerequisite: course 70. An introduction to political development of Chicanos in the United States; Mexican American War of 1846 to post-World War II; impact of unions on political organization; role of Chicanos in two party system; alternatives to two party system; community organizations; formal and informal organizations; grassroots activism; community organization.

171B. Chicanos and Political Change. (5)Formerly 187. Three hours lecture and two hours of discussion per week. Prerequisite: course 171A or equivalent. This course will study Chicanos in the United States; the making of a poltical movement; the role of the Chicano activist in society. The student will also participate in and contribute to the Campus Political Action Committee.

173. The Chicano Families. (5) Previously 147. Four hours of lecture and one hour of discussion per week. Prerequisite: Chicano Studies 20. Course will study Chicano families with emphasis on the evolution and understanding of the heterogeneous experience of Chicano families. Topic areas include origin and function of families, family life and family structure, Chicano family life, family and society, family roles, and the role of the Chicano artist in society. The student will also have the opportunity to contribute to the Campus Political Action Committee.

174A. Chicano, Law and Criminal Justice. (4) Four hours of lecture and one hour of discussion per week. Prerequisite: Consent of instructor. To acquaint students with concepts and issues in the study of Chicano law and the legal system. To acquaint Chicano and bilingual students with the legal system as it is expressed in the forms of its culture, in everyday life and in popular art. Ms. Gonzalez (W)

175A. History of the Southwest: Spanish and Mexican Mexico. (5) Four hours of lecture and one hour of discussion per week. Prerequisite: Spanish 20 or equivalent. Focus of the course is on the impact of the Spanish colonization of Mexico and its territories, and the shaping of Chicano culture and the development of the Southwest.

175B. History of the Southwest: Mexican-United States War to Present. (5) Four hours of lecture and one hour of discussion per week. Prerequisite: Chicano Studies 150A. Focus of the course is on the period that begins with Mexican-United States War of 1846 and on U.S. expansionism and its impact on Chicanos and their ancestors.

176. Chicano Labor History. (5) Four hours of lecture and one hour of discussion per week. Prerequisite: Chicano Studies 50 or consent of instructor. An in-depth study of two topical areas of the Chicano labor force, both rural and urban, and the participation of Chicano labor organizations, such as unions, which dates back to the nineteenth century.

180A. Institutional Racism in the Chicano Community. (5) Four hours of lecture and one hour of discussion per week. An examination of the manner in which institutional structures and processes produce discrimination against Chicanos. The course will examine the economic institutions (corporations, labor markets, unions) and political institutions (state, political parties) and their interaction. The relationship between institutions and assimilation will also receive some attention.

181A. Chicano Political Organization. (5) Three hours lecture and two hours discussion per week. Prerequisite: course 70. An introduction to political development of Chicanos in the United States; Mexican American War of 1846 to post-World War II; impact of unions on political organization; role of Chicanos in two party system; alternatives to two party system; community organizations; formal and informal organizations; grassroots activism; community organization.

181B. Chicanos and Political Change. (5)Formerly 187. Three hours lecture and two hours of discussion per week. Prerequisite: course 181A or equivalent. This course will study Chicanos in the United States; the making of a poltical movement; the role of the Chicano activist in society. The student will also participate in and contribute to the Campus Political Action Committee.

183. The Chicano Families. (5)Previously 147. Four hours of lecture and one hour of discussion per week. Prerequisite: Chicano Studies 20. Course will study Chicano families with emphasis on the evolution and understanding of the heterogeneous experience of Chicano families. Topic areas include origin and function of families, family life and family structure, Chicano family life, family and society, family roles, and the role of the Chicano artist in society. The student will also have the opportunity to contribute to the Campus Political Action Committee.
The Native American Studies Program

Program Office, 3415 Dwinelle Hall

Associate Professor:
Clara Sue Kidwell (Chippewa-Chocktaw), Ph.D.

Assistant Professors:
J. Youngblood Henderson (Choctaw), Ph.D.
Ann R. Metcalfe, Ph.D.
Terry Wilson (Potowatomis), J.D.

The Native American Studies Program exists to provide a point of academic focus and identity for Native American students and to broaden the understanding of other students interested in the history, culture, and contemporary situations of Native Americans.

The curriculum has been structured to provide courses that deal with both historical and cultural issues. The focus of Native American cultures and contemporary legal and social institutions that affect Native American life. The Program stresses not only sound academic preparation in the classroom but also allows students the flexibility to take part in community-oriented education through field work or studies directed toward community situations and problems. Ongoing projects with Native American inmates at the California Medical Facility at Vacaville and at San Quentin are examples of this kind of community concern.

All courses reflect a Native American perspective in their interpretation of information and their attempt to give students critical and analytical ability to deal with information and situations concerning Native Americans, both past and present.

The Major

The major program in Native American Studies leads to a B.A. degree. Admission to the program requires prior successful completion of Native American Studies 50 and an interview with the Academic Adviser who will help work out an appropriate program of study (all study lists are subject to the approval of the Academic Adviser). The interview should be held no later than the first quarter of the junior year. Students will be required to outline their academic and professional goals.

The degree of Bachelor of Arts in Native American Studies will be granted on the following conditions:

1. Completion of 180 units, at least 40 of which must be in upper division courses.
2. Maintenance of at least a C average in all courses undertaken at the University and in all courses in the major program.
3. Completion of general University requirements as to senior residence, Subject A, and American History and Institutions.
4. Completion of 25 core units—at least 20 upper division, which involve the following:
   A. Native American Studies 50—The Native American in Contemporary Society (S).
   B. Native American Studies 110—Introduction to Research Problems of Native American Communities (S).
   C. Native American Studies 103—American Indian Sovereignty (S).
   D. Research Methods (10).*  
   5. Completion of an additional 25 units in Native American Studies, at least 20 of which must be in upper division courses.
   6. Completion of at least 12 units in courses that have significant Native American content but are offered by divisions or departments other than Native American Studies.

Note: Changes, effective Fall Quarter 1977, are expected regarding prerequisites to the major and major requirements. Inquiries should be directed to the Academic Adviser, 3415 Dwinelle Hall.

SPECIAL STUDIES: Ethnic Studies (Native American) / 255 Letters and Science List: for regulations governing Specialist courses and other requirements. Inquiries should be directed to the Academic Adviser. The ten units of research methods may be taken within Native American Studies or other acceptable courses, with the consent of an instructor. The program will provide an opportunity for a student to undertake a significant research project under the supervision of a professor of the student's choice.

LOWER DIVISION COURSES

1A. Native American Studies Reading and Composition. (5) Four and one-half hours of lecture per week. Prerequisite: satisfaction of Subject A requirement and course 70 or equivalent. Analysis of the development and function of law, the organization and administration of criminal justice and its effects in the Chicano community, recent legal developments by and for Native Americans. Mr. Trujilo (W).

174B. Chicano and Correctional Institutions. (5) Four hours of lecture and one hour of discussion per week. Prerequisite: course 174A and course 70 or equivalent. Analysis of the organization and function of correctional institutions in society; theories of criminal behavior; personality; rehabilitation and treatment models; socio-psychological and cultural implications of Chicano incarceration; Chicano cultural orientation groups; and alternatives to correctional facilities. Mr. Trujilo (Sp).

175. La Chicana. (5) Formerly 139. Five hours of lecture per week. Prerequisite: upper division standing or consent of instructor. Psychological, socio-cultural and political experience of Chicana women in the United States. The role of the Chicana will be examined in an historic and contemporary context. Mr. Trujilo (Sp).

176. Chicano and Mental Health. (5) Five hours of lecture per week. Prerequisite: C S 70 or consent of instructor. Mental health issues as they relate to the Chicano community. Emphasis will be placed on the examination and understanding of the concept of mental health as defined by Chicanos.

178. Chicanos and Health Care. (5) Replaces Chicanos 145A. Four hours of lecture and one hour of discussion per week. Prerequisite: upper division standing or consent of instructor. Psychological, socio-cultural and political experience of Chicanos in the United States. The role of the Chicano will be examined in an historic and contemporary context. Mr. Trujilo (Sp).

190. Advanced Seminar in Chicano Studies. (5) Four hours of lecture and one hour of discussion per week. Prerequisite: consent of instructor or ES 130 or CS 170, upper division standing. Advanced seminar in Chicano Studies with topics to be announced at the beginning of each quarter. May be repeated for credit. Possible topics are history of land grants in the Southwest, drugs and the Chicano, and the Chicano movement. Staff (F, W, Sp).

197. Field Work in Chicano Studies. (1-5) Meetings to be arranged. Prerequisite: upper division standing and consent of instructor. Supervised independent field experience in the community relevant to specific aspects of Chicano Studies. Regular meetings with field sponsor and written reports required. Offered on a passed/not passed basis only. Mr. Martinez (F, W, Sp).

198. Directed Group Study. (1-5) Meetings to be arranged. Prerequisite: upper division standing and consent of instructor. Directed group study in Chicano Studies for advanced students. Regular meetings with faculty sponsor and written reports required. Offered on a passed/not passed basis only. Mr. Martinez (F, W, Sp).

199. Supervised Independent Study and Research. (1-5) Meetings to be arranged. Prerequisite: upper division standing and consent of instructor. Supervised independent study and research in Chicano Studies. Regular meetings with faculty sponsor and written reports required. Offered on a passed/not passed basis only. Mr. Martinez (F, W, Sp).

10. Ideology of Native American Studies. (2) Two hours of seminar per week. Prerequisite: consent of instructor. A theoretical and philosophical course including the meaning and content of the existence of Native American Studies within a university structure. This course is especially designed for prospective majors and should be taken on a pass/no pass basis. The Staff (F).

20. Native American Education. (5) Formerly 85. Four and one-half hours of lecture per week. Prerequisite: course 71A or consent of instructor. A study of the historical development of American Indian Education and proposed solutions to selected problems of education for American Indian students. During the latter part of the quarter, emphasis will be given to the contemporary period. (F).

50. The Native American in Contemporary Society. (5) Formerly 93. Four hours of lecture per week. Prerequisite: upper division standing and consent of instructor. Psychological, socio-cultural and political experience of American Indians. Satisfies American Institutions requirement. An analysis of the development of proficiency in expository writing. Topics to be discussed: the Bureau of Indian Affairs, the United States Public Health Service, the relocation system, the reservation system, discrimination, urban life, Indian organizations, stereotypes, the "New Indian." J. Kidwell (F, W, Sp).

71A. History of Native Americans in North America. (5) Formerly 171. Four and one-half hours of lecture per week. Prerequisite: upper division standing and consent of instructor. Survey of the history of native people in North America, discussion on the diversity of Native American cultures and commonly of value systems in those cultures, and consideration of the impact of European contact on Native American people to 1776. J. Youngblood Henderson (F).

71B. History of Native Americans in North America. (5) Formerly 171. Four and one-half hours of lecture per week. Prerequisite: upper division standing and consent of instructor. Survey of the history of native people in North America, discussion on the diversity of Native American cultures and commonly of value systems in those cultures, and consideration of the impact of European contact on Native American people to 1776. J. Youngblood Henderson (F).

101. Survey of Native American Tribal Government and Policy. (5) Four and one-half hours of lecture per week. Prerequisite: course 70 or consent of instructor. An analysis of the development of tribal government and policy through examination of various American Indian nations. Topics to be considered will include an analysis of federal-tribal agreements, tribal self-governance, tribal economic alliances, and the effect of European contact on tribal policies. Mr. Henderson (W).

102. Native American Community Development. (5) Formerly 111. Three and one-half hours of lecture per week. Prerequisite: course 70 or consent of instructor. Investigation and analysis of the relationship between Native American Indians and non-Indians in contemporary society with special emphasis on existing programs. Programs originating from these programs, and possible solutions. Mr. Henderson (W).
103. Native American Sovereignty. (Formerly 130) Three hours of lecture and one and one-half hours of discussion per week. Satisfies American History requirement. Prerequisite: course 71A–71B or consent of instructor. An analysis of the legal, political, social, and economic rights of Native Americans as a product of the history of Anglo-American thought. The course will examine property rights, political assumptions in research. (W)

104. Introduction to Research Problems of Native American Communities. (Formerly 110) Three hours of lecture and three hours of field work per week. Prerequisite: consent of the instructor. This course is designed to establish a familiarity with the methods and logic of scientific inquiry through developing a research proposal. Each topic will have a research paper written on it. (W)

110A. Introduction to Research Problems of Native American Communities. (Formerly 110) Three hours of lecture and one and one-half hours of discussion per week. Prerequisite: course 110A or consent of instructor. This course is designed to emphasize defining topic or thesis in research, alternative approaches to the acquisition of knowledge. (W)

110B. Introduction to Research Problems of Native American Communities. (Formerly 110) Four and one-half hours of lecture per week. Prerequisite: course 110A or consent of instructor. This course is designed to emphasize defining topic or thesis in research, alternative approaches to the acquisition of knowledge. (W)

122. Contemporary Native American Education. (5) Four and one-half hours of seminar per week. Prerequisite: course 50, 71B, 85, or consent of instructor. Advanced study of recent innovations in American Indian education. Developments at the Rough Rock Demonstration School, Navajo Community College, and D.-Q. University will be emphasized. (Sp)

141. The Native American and the Reservation. (5) Four and one-half hours of seminar per week. Prerequisite: course 50, 71B, 85, or consent of instructor. A study of the historical development of the Reservation System and an analysis of what it means to be a Reservation Indian in the modern America. (W)

142. The Native American in Urban America. (5) Four hours of seminar per week. Prerequisite: course 71A or consent of instructor. A study of the historical development of Native American communities within urban areas and an analysis of what it means to be an "Urban Indian" in the Indian education. Developments at the Rough Rock Demonstration School, Navajo Community College, and D.-Q. University will be emphasized. (W)

143. The Native American and Penitentiary Institutions. (5) Four and one-half hours of seminar per week. Prerequisite: course 71A or consent of instructor. An analysis of the criminalization and bureaucratization of the penitentiary institutions, and law enforcement on the federal, state, and local level; and a study of rehabilitation programs, halfway houses, culturally oriented prison groups, and other programs. The underlying factors involved in Indian criminality will be examined. (W)

151. Native American Philosophy. (5) Four hours of lecture per week. Prerequisite: course 71A or consent of instructor. Open to students who have received credit for course 155 prior to Fall 1974. A study of the philosophical, theological, and historical aspects of Native American views, with emphasis on systems of knowledge, explanations of natural phenomena, and relations of the individual to nature through ritual and ceremonial observances. (W)

152. Native American Literature. (5) Four hours of lecture per week. Prerequisite: although not required, course 151 desirable. An analysis of the written and oral tradition developed by Native Americans. Emphasis will be placed on a multifaceted approach (aesthetic, linguistic, phenomenological, historical, and cultural) in examining American literature. (W)

155. Medical Theories and Practices of Native American Cultures. (5) Four hours of lecture per week. Prerequisite: course 151 desirable. Enrollment of the medical practices that derive from those theories; precontact conditions will be compared to postcontact conditions. Herbal remedies will be discussed within the context of curing practices. Ms. Kidwell (W)

158. Native Americans and the Cinema. (5) Four hours of lecture per week. Prerequisite: course 50 or consent of instructor. Focuses on the psychological, sociological, historical, and cultural aspects of Hollywood's stereotyping of the American Indian through the history of film. The format will include representative Indian films, lectures, and guest speakers from the movie industry. (F)

159. Native American Women. (5) Four hours of lecture per week. Prerequisite: consent of instructor. An overview of the role of women in traditional Indian societies and in the modern world. Changes in Indian society with contact with Europeans and how these changes have altered sex role definitions will be examined. (W)

160. Native Americans and the United States Public Health Service. (5) Four hours of seminar per week. Prerequisite: consent of instructor. An analysis of the historical development of the United States Public Health and the Indian Health Service and an investigation of the current relations with the Native American Community. (Sp)

165. Seminar in Child Development in Native American Communities. (5) Four hours of seminar per week. Prerequisite: course 110. Four and one-half hours of seminar per week. Prerequisite: course 71A–71B or consent of instructor. Focuses on the psychological growth and development of children in Native American communities by investigating the theories of the major theorists and the relationships of children to their families and tribes. Analysis of the effects of Western society on those developmentally deprived. (W)

175. History of Native Americans in California. (5) Three hours of lecture and two hours of discussion per week. Prerequisite: course 71A–71B or consent of instructor. An analysis of the historical development of the United States and its relations with the United States Government. Attention will be given to the background and evolution of acculturation up to the present day. (Sp)

176. History of Native Americans in the Southwest. (5) Three hours of lecture and two hours of discussion per week. Prerequisite: course 71A–71B or consent of instructor. An historical analysis of the Native American Nations of the southwestern United States. (F)

181. Native American Arts and Contemporary Development. (5) Four and one-half hours of discussion per week. Prerequisite: none. Painting, sculpture, crafts—traditional and contemporary—with emphasis given to the history of Indian arts and its development to the present period. The Native American artist-craftsmen point of view and approach will be emphasized. (Sp)

184A. Native American Traditional Art. (3) Three hours of lecture and three hours of discussion per week. Prerequisite: course 184A or consent of instructor. An introduction to the Native American arts and crafts of North American Indians from both an art historical and practical viewpoint. Major art forms of Native Americans will be studied through lecture presentations and applied studio work. (F)

184B. Native American Studio Art: Intermediate. (3) Two three-hour studio classes per week. Prerequisite: course 184A or consent of instructor. A course designed to instruct students already schooled in the basic techniques of drawing, emphasis on illustration, landscape, and composition, using all media. Designed to bring the student to the point of beginning to paint. (W)

184C. Native American Studio Art: Painting. (3) Two three-hour studio classes per week. Prerequisite: course 184A or consent of instructor. A course designed to teach students the basics of painting. The course will be offered in color and figure. We will explore techniques and methods of painting, as well as an analysis of composition in illustrations from traditional and modern materials. (Sp)

190. Seminar on Advanced Topics in Native American Studies. (5) Four seminar hours per week. Prerequisite: consent of the instructor. Advanced seminar in Native American studies. Topics to be announced at the beginning of each quarter. May be repeated for credit. (W, Sp)

190B. Mythic Tribal Literature. (5) Three and one-half hours per week. Prerequisite: course 50. Chronicles and commentaries on published texts and the problems of tribal literature in translation. The cult of cultural tribal artifacts in contrast to the verbal art of showing dreams and telling mythic tales. Perusal of historic speeches, trickster narratives, oratordial and prophetic tribal epics.

*190C. Origin & Prehistory Theories of the New World. (5) Four hours of seminar per week. Prerequisite: NAS 71A and NAS 71B. The course will investigate the paleoethnological and paleontological structure undergirding Western Civilization's attempts to confront the essential nature of human society and its beginnings by comparing the intellectual response of native societies to the claims of an off-campus setting. Group discussion, research, and reporting on topics by students. The Staff (the Coordinator in charge) (F, W, Sp)

199. Supervised Independent Study and Research. (1-5) Individual conferences to be arranged. Prerequisite: consent of instructor and upper division standing preferred. Supervised experiences relevant to specific aspects of the Native American community in off-campus settings. Group discussion, research, and reporting on topics by students. The Staff (the Coordinator in charge) (F, W, Sp)

Field Studies Program

Field Studies courses involve up to twenty students per course in a coordinated program of internships in community agencies and weekly small-group seminars directly related to a topical area.

Courses currently offered include: Child Care and Society, Community Mental Health, Urban Dilemmas, Criminal Justice, Consumer Protection, Public Advocacy, Field Studies in Media, Issues in Contemporary Schooling, and Women Emerging. Students are placed as members of such service-oriented environments as Child Care Centers, Alameda County Legal Aid, and Contra Costa Social Services.

Field Studies courses require an extra-quarter commitment of at least ten hours of field work per two-hour seminar week, or five units per quarter or ten units per course.

Emphasis in both class and field is on responsible individual and peer-group involvement in the educational experience, designed to help students make more realistic career choices, test their personal competencies, and develop the skills in the world beyond the campus, and find personal relevance in their academic learning.

See Interdepartmental Studies for the complete description of IDS 196 course offerings.

Health Arts and Sciences

(Administered by the Health and Medical Sciences Program and the Council for Special Curricula)

Program Office, Room 221, Building T-7
The Program

Health and Arts Sciences is an undergraduate program designed to teach students to identify and analyze critically contemporary health problems. The program is based on the assumption that students should have an understanding of the complexity of health issues before pursuing scholarly or professional specialization. Courses emphasize that health problems are complex and that to be understood and solved they must be analyzed from the perspectives of many disciplines, in addition to the traditional biomedical sciences. Such disciplines include economics, law, political science, and sociology. Further, students learn how narrow analyses and implicit values of investigators restrict the understanding of policy issues and affect resulting policy decisions.

Health and Arts Sciences courses are open to students from all schools and colleges who are interested in contemporary health problems, in developing intellectual skills necessary to pursue health-related professions, and in effecting social change in the area of health. Students are given responsibility for establishing and accomplishing their own educational agendas. In this way, the program attempts to foster in its students an independent approach to work.

The Major

For students with an especially high interest in pursuing an individual investigation of a substantive health problem, Health and Arts Sciences offers an undergraduate major leading to the degree of Bachelor of Arts in Health and Arts Sciences. The major serves as preparation for law, medicine, public policy, city and regional planning, and other professional programs, and for Ph.D. programs in a variety of academic disciplines. Those majors who go on to professional training will have an understanding of how their fields affect health. The broad perspective of health problems presented by Health and Arts Sciences will be particularly valuable for those students who become health professionals working in the community. In addition, the major attempts to provide students with the research, analytical, and writing skills necessary for success in postgraduate professional or scholarly programs. In order to ensure a basic level of disciplinary knowledge, students in the major are required to complete an academic minor, equivalent to fifteen upper-division units, or a second departmental major.

A sequence of courses, HAS 112, HAS 140, and HAS 196 forms the nucleus of the major. In HAS 112 (not restricted to majors) students develop analytic skills through intensive library research of a specific health problem. In HAS 140, students in the major use these skills to formulate, execute, and evaluate group research projects in community health. HAS majors usually spend three to five quarters doing project work, examining health problems and developing recommendations for change; they are encouraged to work with students in other disciplines and internships. In the senior year, each student prepares a formal, written senior thesis in HAS 196. The thesis is usually based on the project work with the addition of a thorough discussion of the past. This course is limited to seniors and only upon completion of the full sequence. Serves to permit. Finally, in the last two quarters of the senior year, students are advised to contact the department office before the beginning of each quarter to confirm course offerings.

LOWER DIVISION COURSE

99. Supervised Independent Study and Research. (1–3) Prerequisite: consent of instructor. Limited to freshmen and sophomores. Must be taken on a pass/not pass basis. The Staff (F, W, Sp).

UPPER DIVISION COURSES

112. Health Problems in Modern Industrial Societies. (110) Three hours of lecture and two hours of discussion per week. May be repeated once for credit. Students examine the social, political and economic context of industrialization and the effects on health and illness of many major health problems in America. Each discussion section focuses on a contemporary health problem, such as urban air pollution, occupational health, and safety. General lectures cover how to define a research question, use library resources, and conduct a literature search. Students present term papers. (W).

191 A. Three hours of lecture per week. Prerequisite: consent of instructor. Some background in health and medical sciences is assumed (e.g. biology, public health, genetics, health arts and sciences). The central focus of this seminar is active discussion of an array of issues and ideas around the theme: the context of the interface between ethical concerns and health and medical issues. (W)

140A–140B–140C. Field Projects in Community Health. (140A: 3; 140B: 8; 140C: 8) Three hours of seminar and one hour of Project Group per week. Prerequisite: 140A: course 112 and admission to major; 140B: 140A; 140C: Field Project combined with weekly analytical seminars will be employed to educate students in the use of intellectual resources for the analysis and solution of contemporary community health problems. Must be taken on a pass/not pass basis. (F, W, Sp)

162. Health, Medicine, and Society in History. (4) Prerequisite: consent of instructor. Some background in history or a health related discipline would prove helpful, but is not required. Origins of the medical profession. Medical schools in Europe, 1000–1700. The conflict between the ancients and the moderns. The formation of public health services. Economic, statistical, demographic factors in historical perspective. (1–3) Prerequisite: consent of instructor. (W).

144. Cross Disciplinary Seminar in Health Topics. (2) Two hours of lecture per week. Prerequisite: consent of instructor. Topics to be announced at the beginning of each quarter. In each quarter a topic in health and medicine. Must be taken by HAS majors four times for credit. Lectures by visiting faculty and community professionals and group discussion of contemporary health issues, oral and written presentations of student project research. Must be taken on a pass/not pass basis.

196A–196B. Senior Thesis. (4–4) Individual conferences with the advisor to be arranged. Prerequisites: Open only to students in the Health and Arts Sciences Major. Completion of all lower division prerequisites for the major and consent of advisor. Must be taken for a grade. The senior thesis will be written while a student is enrolled in this course. Credit and grades assigned only upon completion of the full sequence. Serves to integrate and synthesize the principle theme common to the student's program. (F, W, Sp).

197. Field Study in Health Arts and Sciences. (1–5) Individual conferences to be arranged. Prerequisites: course 112 and consent of instructor. Students must declare an undergraduate major in Health Arts and Sciences. Supervised experience in application of Health Arts and Sciences to off-campus organizations. Regular individual meetings with faculty sponsor and written reports required. The Staff (F, W, Sp).

198. Directed Group Study for Undergraduates. (1–5) Prerequisite: consent of instructor. Seminars for the group study of selected topics, which will vary from year to year. Student initiative in the choice of subjects is solicited and welcomed. (F, W, Sp).

199. Supervised Independent Study and Research. (1–6) Prerequisite: consent of instructor. Must be taken for a grade. Enrollment limited by regulations listed on page 36. The Staff (F, W, Sp).

Health and Medical Sciences Graduate Program

Program Office, Room 106, Building T-7
The Graduate Program in Health and Medical Sciences

NOTE: For key to symbols, see page 36
is built on a network of relationships—on campus, with departments, professional community, faculty, administrative units and, in the community, with physicians, hospitals, and other health facilities—all combining their efforts to develop an experimental program for health career education and training not available on this campus. Four graduate options are offered in the Program for which different sets of prerequisites and curricula exist. All students are awarded the Master of Science in Health and Medical Sciences degree upon satisfactory completion of the Berkeley phase of their studies. The Dual Degree option is for students currently enrolled (or who have already been accepted) in a department of the Graduate Division of the University who wish to integrate their major disciplinary work with health concerns that cannot be satisfied by existing mechanisms (minimum of 50 units). The Genetic Counseling option offers the student preparation in human genetics, methods of counseling, and intensive field work experiences (two years). The UCSB-USCF Joint Medical Program is a five-year M.D. program focusing on medicine in its social context. After satisfactory completion of the Berkeley portion of the first two years at UCB) combines major biological, psychological and social science coursework with extensive clinical training, leading to the new professional doctoral degree (Doctorate of Mental Health).

For a more specific description of the Program, as well as of the different options within it, contact the Program Office, Room 106, Building T-7, University of California, Berkeley, CA 94720; telephone 642-5671 or 642-5479.


**Interdepartmental Studies**

**LOWER DIVISION COURSES**

1. Technology and Society. (4) Three hours of lecture per week and one and one-half hours of discussion per week. 10A is not prerequisite to 10B. 10B is not prerequisite to 10C. Taught by faculty in the College of Engineering.

10A—10B—10C. Introduction to Environmental Issues. (4—4—4) Three hours of lecture and one and one-half hours of discussion per week. Taught by faculty in the College of Engineering.

10A. Ecosystems, Their Maintenance and Disruption. Man’s relationship to the natural environment; case studies of ecosystem maintenance and disruption. CRS: The Staff (Ms. Carr in charge) (F)

10B. Global Problems and Alternate Systems. Issues of economic development, population, energy, resources, technology, and alternative systems. CRS: The Staff (Ms. Little in charge) (W, Sp)

10C. The San Francisco Bay Ecosystem. Physical, biological, socioeconomic analysis of the San Francisco

Bay area. Major emphasis on projects and field work. CRS: The Staff (Ms. Little in charge) (Sp)

10L—10M—10N. Introduction to Environmental Issues—Special Projects. (2—2—2) One and one-half hours of discussion per week. Prerequisite: concurrent enrolment in 10A—10B—10C. Projects on individual or group projects related to the environmental issues discussed in the corresponding IDS 10 lecture series. CRS: The Staff (F, W, Sp)

80. Introduction to Environmental Physics. (4) Formerly Physics 88. Three hours of lecture and one hour of discussion per week. Elementary concepts of physics, with special emphasis on energy, pollution, biology, geology. Specific examples of the role of physics in contemporary social issues. CRS and Physics: Mr. Harte (W)

**UPPER DIVISION COURSES**

102. Efficient Use of Energy. (3) Three hours of lecture and three hours of laboratory per week. Prerequisite: upper division standing; Physics 5A—5B—5C. Lectures (25%) emphasize 2nd law energy efficiency and availability, applied to the potential for energy conservation in buildings, transportation, energy conversion and industrial processes. Labs (75%) provide direct experience with a number of everyday devices and with instruments measuring energy. Energy and Resources: Mr. Rosenfeld (Sp)

103. Introduction to Modern Art (for Non-Majors). (5) Two hours of lecture and two hours of discussion per week. An introduction to the world of art for students with no previous study of the visual arts. Specifically recommended for students with some scientific background. The background of the developments in the visual arts from c. 1860 to the present, taking account of the intellectual effects of scientific discoveries and theories offered by technological advances. Selected problems analyzed in terms compatible with modern theories of perception. Two short written examinations and a final critical essay. History of Art: Mr. Wright

106. Literature and Art in Eighteenth Century England. (5) Four hours of lecture per week. Taught by Professor Shin. Emphasis on the civilization of nature and the visual arts in eighteenth-century England, concentrating on major figures such as Hogarth, Pope, Swift, Defoe, Walpole, and Bourgeois. No fundamentals required. Enrollment limited to twenty students majoring in English or History of Art. Admission by consent of the instructor. English: Mr. Ettlinger

111. Introduction to Neurobiology. (3) Three hours of lecture per week. Prerequisite: Biology 1A or equivalent. Development of the basic principles of neurobiology: sensory mechanisms, transmission, and action of neurons. Integration of information in simple and complex systems. Neural specificity and plasticity in learning and control systems and control of motor output. Electrical Engineering and Computer Sciences: Mr. Barlow, Mr. Caldwell (W, Sp)

115. Music and Poetry of the English Renaissance. (4) Formerly English 115 and Music 115. Four hours of lecture per week. Prerequisite: major in English or musical training. The poetic and musical hall from the carol to the madrigal and "recitative music." and English poetry, from medieval forms to the sonnet and the masque, will be studied to explore their relationships. Music: Mr. Brett; English: __________

117. Music and the Philosophers. (4) Four hours of lecture per week. Prerequisite: major in French or Music or consent of instructor. Development of theoretical developments in music, philosophy, and art, as exemplified by Diderot’s Neveu de Rameau and Rousseau’s Deux ans de Voyage. English: Mr. Heath; Music: Mr. Reid

120. Environmental Education and Design. (5) Group discussions, visitor presentations: two 1/2-hour lectures per week, student-selected field experience. Prerequisite: consent of instructor. Curriculum and resource development. Environmental education in schools, and not in schools, both natural and man-made. Teaching methods. An experiential process of shared learning. May be repeated for credit. Education and Design: Mr. Kay; Political Science—Mr. Starn; Sociology—Mr. Savage (F)

122. Animal Behavior. (6) Four hours of lecture, one hour of demonstration, and one hour of discussion per week. Prerequisite: intermediate biology (Biology 1, or 11 or Zoology 1, or Entomology 100). Strongly recommended: Genetics 100 and Zoology 110. May not be taken for credit by students having completed either Psychology 115 or Zoology 3. An introduction to comparative animal behavior and behavioral physiolog-
190A–190B–190C. Principles and Applications of Psychoanalysis. (3–3–3) Two hours of lecture per week. Prerequisite: open to all upper division and graduate students. 190A is prerequisite to 190B and 190B is prerequisite to 190C. A comprehensive survey of the theories, techniques and applications of psychoanalysis. Includes a critical examination of the major theories of the social sciences, arts and humanities, and rehabilitation. Credit and grade for 190A–190B–190C may be applied to a major or minor in Psychology.

191A. Introduction to Oral Literature. (Formerly Humanities 110) Three hours of lecture and one hour of discussion per week. An introduction to the forms and principles of oral literature through folktales, heroic songs, and ballads from various traditions, ancient, medieval, and contemporary.

191L. Concepts and Strategies of Health Promotion. (5) Two hours of seminar and twelve hours of fieldwork per week. Prerequisite: Two hours of work in social sciences and one hour of discussion per week. Prerequisite: Mathematics 10, Chemistry 10, Biology 20, and English 201. Cellular Mechanisms Underlying Nervous Activity. (3–3) Three one-and-one-half hour lectures per week. Prerequisites: Chemistry 10, Mathematics 10, Biology 20, and English 201. Berkeley: The University of California.

192A–192B. Child Care: Practices, Policies and Theories. (3–3) Two hours of seminar and twelve hours of fieldwork per week. Prerequisite: Two hours of work in social sciences and one hour of discussion per week. Prerequisite: Mathematics 10, Chemistry 10, Biology 20, and English 201. Berkeley: The University of California.

193A–193B. Urban Dilemmas. (5–5) Formerly numbered 193A–193B. Two hours of seminar and twelve hours of fieldwork per week. Prerequisite: Two hours of work in social sciences and one hour of discussion per week. Prerequisite: Mathematics 10, Chemistry 10, Biology 20, and English 201. Berkeley: The University of California.
201L. Laboratory Cellular Mechanics Underlying Nervous Activity. (5) One hour of discussion and two 6-hour laboratories per week. Prerequisite: 200L. 201L may be taken concurrently; advanced laboratory work and preparation. Examination of excitability membrane biophysics and receptor physiology. Prospective students should consult instructors before considering the course. 

202. Neural Integration and Coordination. (4) Three 1 1/2-hours of lecture per week. Prerequisite: IDS 200L, 201L, or consent of instructor. Examination of neurons into functional aggregates; human psychophysiology and the physiological mechanisms of sensation perception, coordination and motor control in vertebrates. The organization of reflex activity, rhythmic and patterned behavior, correlative discharge. Developmental neurophysiology. 

202L. Advanced Laboratory in Neural Integration and Coordination. Three hours of laboratory per week. Prerequisite: IDS 200L, 201L, or consent of instructor. Advanced laboratory involving use of electrophysiological and physiological techniques in the investigation of neural integration and coordination. Prospective students should consult instructors before considering this course. 

203A-203B-203C. Concepts of Mental Dysfunction. (3-3-3) Three hours of lecture per week. Prerequisite: Graduate standing in the Health and Medical Sciences Program or consent of instructor. Basic theory of Mental Dysfunction presented from the perspectives of developmental lines and developmental interferences, symptom formation and specific syndromes. 

204. Animal Behavior Research Reviews. (1) One and one-half hour of lecture per week. Prerequisite: graduate standing, basic course in animal behavior, and consent of instructor. Reports and discussions of original research or views, completed or in progress. Not all participants need report, but all are expected to attend and participate. Meetings start in early September, meeting Fall and Spring will be at the Animal Behavior Field Station. 

205A-205B-205C. Physical Diagnosis. (2-2) Two 1 1/2-hour lecture and one and one-half hour laboratory per week. Prerequisites: IDS 200L, 201L, and 203A, consent of instructor. Examination of symptoms and signs and their relation to diagnostic procedures and the theory of disease. Attention to the major systemic diseases; correlation with research data and observations from biology, anatomy, and physiology, in clinical situations. Direct 1:1 supervision. To be offered 1978/79 only. 


206D-206E-206F. Introduction to Clinical Medicine: Problem-Solving Approach to Clinical Disease. (3-3-3) Three 3-hour periods of lecture per week. Prerequisite: IDS 205A-205B-205C and graduate standing in the Medical Option of the Health and Medical Sciences Program. Concurrent enrollment in IDS 206A. Application of interviewing techniques and correlation of patho-physiological principles, from biochemistry, anatomy, and physiology, to stress situation. Direct 1:1 supervision. To be offered 1978/79 only. 

207A-207B-207C. Theoretical Concepts in Mental Health. (3-3-3) Three hours of lecture per week. Prerequisite: Graduate standing in Mental Health Option or consent of instructor. Basic theory of mental health and human behavior presented within a psychoanalytic framework. Unified overview will integrate theoretical conceptions of the psychic apparatus, of unconscious mental activity and conflict, of adaption and motivation with research data and observations from biological, anthropological, psychological, and sociological perspectives. 

208A-208B. Developmental Concepts in Mental Health. (3-3) Three hours of lecture per week. Prerequisite: Graduate standing in the Mental Health Option or consent of instructor. Basic principles of human development and the life cycle presented within a psychosocial framework. Emphasis will be placed on material derived from sociology, psychology and clinical psychoanalysis; infant and child observations and experimental situations to study normal development. 

210. Physical Basis of Radiology and Nuclear Medicine. (2) One 1 1/2-hour lecture per week with occasional discussions. Prerequisite: standing in the Health and Medical Sciences Program or consent of instructor. Provides the basic in radiation physics necessary for understanding, and evaluation of clinical services given by radiologists and nuclear medicine clinicians. Topics: fundamental radiological physics, radiation protection, effects of ionization, introduction to physical basis of nuclear medicine, clinical diagnostic and therapeutic radiology. 

211. Geological and Engineering Factors in Environmental Planning. (3) Four hours of lecture and discussion and one hall-day field trip per week. Prerequisite: consent of instructor. Consideration of the influence of geology and hydrogeology on urban land use. Field trips and discussions of procedures for incorporating geologic and engineering considerations into plans to avoid landslides, flood, and earthquake damage. Term paper required. 

212A-212B. Physical Diagnosis: Psychiatric and Medical Dimensions. (2-2) One 1 1/2 hour lecture per week. Prerequisite: Graduate standing in the Mental Health Option of the Health and Medical Sciences Program. Correlation of principles of anatomy, physiology, psychology, and related medical history-taking and physical examination be offered 1978/79 only. 

214A-214B-214C. Law and Society. (4-4-4) Four hours of lecture per week. Prerequisite: limited to law students. Graduate students must register in IDS 206A and 206B, concurrent enrollment in IDS 206A. Application of interviewing techniques and correlation of patho-physiological principles, from biochemistry, anatomy, and physiology, to stress situation. Direct 1:1 supervision. To be offered 1978/79 only. 

215A-215B. Faunal Analysis in Archeology. One hour lecture, one 3-hour laboratory, and three half-day field trips per week. Prerequisite: Second year graduate standing. Participant observations in various settings illustrate normal and pathological development. Two-hour observation period including didactic presentation and interviewing followed by a one-hour discussion. Students must register with IDS 206A-206B concurrently. 

220. Ethical Perspectives on Health Issues: Bioethics. (3) Three hours of lecture per week. Prerequisite: is taken concurrently: consent of instructor. Consideration of ethical concerns in the development of health sciences (e.g., biology, genetics, public health, mental health, etc.) is assumed. Prior work in philosophy not required. The course is to identify and discuss cases and issues in health where it is clear that philosophical (and specifically, ethical) concerns are interwoven with biomedical issues in the world of social policy. 

221A-221B. Developmental Concepts in Mental Health. (3-3) Three hours of lecture per week. Prerequisite: Second year graduate standing in Health Sciences Program/Mental Health Option or consent of instructor. Development of health sciences. Discussions of research and development in the field. 


223A-223B. Mental Health Practicum. (3-3) Three hours of lecture per week. Prerequisite: Graduate standing in Health Sciences Program/Mental Health Option, or consent of instructor. A practicum approach to a study of human development. Participants observe and participate in the assessment and treatment of individuals in normal and pathological development. Two-hour observation period including didactic presentation and interviewing followed by a one-hour discussion. Students must register with IDS 206A-206B concurrently. 

223C. Mental Health Practicum. (3) Three hours of lecture per week. Prerequisite: Second year graduate standing in Health Sciences Program/Mental Health Option or consent of instructor. Further development of the practicum approach to a study of human development. Participant observations in various settings illustrate normal and pathological development. Two-hour observation period including didactic presentation and interviewing followed by a one-hour discussion. After the first quarter, students conduct their own interviews. 

224. Cooperative Research Workshop in Transportation Economics. (3) Prerequisite: Economics 201A-201B, or equivalent, plus consent of instructor. Consideration of the relationship between transportation and economic activity. 

225A-225B. Experimental Design Project in Solid Waste Management. (4-4) Four hours of lecture per week. Prerequisite: consent of instructor. Offers topic oriented group design experience for students from varied disciplines who desire to focus on a particular problem or issue in solids waste management. 

227A-227B. Introduction to the Clinical Process. (3-3) One and a half hours of lecture and one and a half hour lab per week. Prerequisite: Graduate standing.
226. Analysis of Sex-Role Assumptions Influencing Behavior of Health Professionals. (2) Two hours of lecture per week. Prerequisite: Enrollment in Health and Medical Sciences Program or consent of instructor. Definitions of sex-role stereotypes and sex-role theses of health-care workers; the impact of societal attitudes and expectations; analysis of current educational and practice models; recommendations for improving relationships among health-care professionals. Selected readings, projects. Mr. Baker (Sp)

238. Environmental Design, Stress and Health. (3) Three hours of lecture-discussion per week. Prerequisite: limited enrollment, consent of instructor. Introduction to the use of design in solving environmental problems, and to the study of the physical and social environment on health. Among topics to be discussed are density and crowding, noise, industrialization, and stress as they influence health and disease. Public Health: Mr. Syme (Sp) Architecture: Mr. Margen (Sp)

239. Cities and Religion. (4) One 3-hour seminar per week. Prerequisite: graduate standing or consent of instructor. Comparative and interdisciplinary approach toward understanding trends in urban religion and human behavior. To be taken on a satisfactory/unsatisfactory basis.

Paleontology: Mr. Savage

229. Psychosomatics: An Integrative Approach. (3) Three hours of lecture per week. Prerequisite: Graduate standing in Health and Medical Sciences Program, 302A-302B, 302C-302D, or consent of the instructor. Exploration of the clinical and theoretical aspects of the human body and the mind. Focus is on development of observational, interpersonal-communication and information-gathering skills. Credit and grade to be awarded on completion of full sequence. Health and Medical Sciences: Mr. Rappaport

273C. Introduction to the Clinical Process. (3) One 1 1/2-hour lecture and one 1 1/2-hour laboratory per week. Prerequisite: graduate standing in the Health and Medical Sciences Program or consent of the instructor. An interdisciplinary approach to basic knowledge and skills necessary for health professional-client interaction. Focus is on development of observational, interpersonal-communication and information-gathering skills. Credit and grade to be awarded on completion of full sequence. Health and Medical Sciences: Mr. Rappaport

228. Human Evolution, Prehistory and Paleoenvironment. Three hours of lecture per week. Prerequisite: consent of instructor. A seminar course devoted to consideration of current research in Paleontology and related subjects. To be taken on a satisfactory/unsatisfactory basis.

Paleontology: Mr. Savage

Psychology: Mr. Isaacs (W)

292A–292B. Social Welfare: Mr. Wiltse (F, W, Sp)

292C. Social Welfare: Mr. Appleyard (Sp)

292D. Social Welfare: Mr. Smith (F, W, Sp)

292E. Social Welfare: Mr. Appleyard (Sp)

300A–300B. Urban Environmental Planning. (4) Two 1 1/2-hour lectures and one 1 1/2-hour laboratory per week. Prerequisite: consent of instructor. Urban environmental planning and decision-making. Focus is on development of observational, interpersonal-communication and information-gathering skills. Credit and grade to be awarded on completion of full sequence. Health and Medical Sciences: Mr. Rappaport

312A–312B–312C. Principles and Practice of Genetic Counseling. (3–3–3) Three hours of lecture per week. Prerequisite: consent of instructor. Units of human heredity and their significance to counseling, family planning, and other implementation techniques in planning for environmental quality. City and Regional Planning: Mr. Appleby, Landscape Architecture: Mr. Applebyard, Mr. Dickert (Sp)

322A–322B–322C. Interdisciplinary Seminar in Day Care and Child Development. (2–2–2) Two hours of seminar per week. Prerequisite: permission of instructor. Selected readings and discussions related to the growth and development of children; the role of the child in society; the psychological, sociological, and social dimensions of health and disease. Health and Medical Sciences: Mr. Rappaport

323L–323M–323N. Laboratory in Day Care. (1–3) Formerly IDS 231A. One hour of session and five to fifteen hours of field work per week. Prerequisite: admission to Interdisciplinary Program for Key Person Program. Exposure to agencies whose work relates to day care and related child development and health services. Must be taken concurrently with 323M. Credit is not given for IDS 231A and 231B upon completion of 231B. Readings in and discussion of the theories and techniques of genetic counseling. Emphasis on family dynamics, role playing and the analysis of genetic counseling interviews.

Ms. Tiktinsky (F, W, Sp)

323A–323B–323C. Legislation, Administrative Regulation, and Land Planning. (4) Two 2-hour meetings per week. Prerequisite: consent of instructor. A study of problems of local government in the context of legislation and regulations, and the legal and administrative contexts of planning and design decisions. National and local land-use planning practices at local, regional, state and federal levels.

Mr. Heyman, Mr. Twiss (W, Sp)


Mr. Bardach, Mr. Kagan (F, W)

252A. Stellar Structure and Evolution. (3) Three hours of lecture per week. Prerequisite: Physics 137A–137B, 137C, 112, 110A–110B. Advanced topics in stellar structure and evolution. Physics: Mr. Chiao

Astronomy: Mr. Arons (W)

252B. Stellar Structure and Evolution. (3) Three hours of lecture per week. Prerequisite: consent of instructor. A review of atomic and molecular spectroscopy and the nuclear theories of radiative stellar structure. Application to line formation in stellar spectra, H I and H II regions in the interstellar medium, interstellar molecular clouds, interstellar mass, and intergalactic medium.

Physics: Mr. Chiao; Astronomy: Mr. Phillips (F)

254. High Energy Astrophysics. (4) Three hours of lecture and one hour of discussion per week. Prerequisite: Physics 110A–110B or equivalent. Basic physics of high energy reaction processes in an astrophysical environment. Cosmic ray production and propagation,cascade processes in the galaxy, cosmic-ray sources, supernovae, interstellar medium, intergalactic medium, extragalactic radio sources, quasars, and big-bang cosmology.

Physics: Mr. McKee; Astronomy: Mr. Arons (Sp)

272. Neuropsychology of Language. (4) Four hours of lecture per week. Prerequisite: graduate standing; consent of instructor. Language and thought in neuroanthropology and related subjects. To be taken on a satisfactory/unsatisfactory basis. The study of the theoretical astrophysics.

Physics: Mr. McKee; Astronomy: Mr. Arons; Mr. Smith (F, W, Sp)

290A–290B–290C. Seminar In Advanced Genetic Counseling, (3–3–3) Three hours of lecture per week. Prerequisite: IDS 231A–231B–231C or consent of instructor.course for advanced graduate students in IDS 290A and 290B upon completion of 290B. Ongoing case discussion and analysis of genetic counseling field experiences. Primarily designed for students preparing to work as genetic counselors. Mr. Kessler (F, W, Sp)

299A–299B. Psychology and Aesthetics. (5–5) One 2-hour lecture per week. 299A is prerequisite to 299B. A study of the relationship between psychological and philosophical approaches to aesthetics. Specific attention is given to the interactions between the arts, etc. Primary emphasis on the visual arts. Advanced undergraduates may enroll with consent of instructor. Philosophy: Mr. Appleyard (Sp)

298. Directed Group Study. (1-10) Prerequisite: graduate standing in Health and Medical Sciences Program or consent of sponsoring Health and Medical Sciences Program faculty member. Sections 1-6 offered on a satisfactory/unsatisfactory basis only. Other sections offered on a letter-grade or Satisfactory/ Unsatisfactory basis.

299. Independent Study and Research In Health and Medical Sciences. (1-12) Prerequisite: graduate standing in Health and Medical Sciences Program or consent of sponsoring Health and Medical Sciences Program faculty member.

300. Techniques of Teaching for Teaching Assistants. (2) Two hours of seminar per week. Prerequisite: T.A.'s must be teaching during quarter of enrollment. Two hours of seminar. Techniques for classroom management, a variety of methods of facilitating learning are investigated and evaluated, common classroom problems are discussed, and videotapes of effective teaching are analyzed.

Miss Napell (F, W, Sp)

497A–497B–497C. First Year Field Placement for Genetic Counseling. (3, 5, 5) Three hours of lecture per week. Prerequisite: limited to graduate or advanced non-graduate students. Concurrent enrollment in IDS 231 series is required. One unit for each four hours per week scheduled a placement. Minimum nine units required for academic year. Various of field placements in health care settings. Field work moves from observation to work with clients. Weekly seminar and video analysis of each experience in Nursing and Option counseling course and counseling course instruction.
Aerospace Studies

Department Office, 10 Callaghan Hall
Adjunct Professor:
Edward L. Claiborn, Ph.D., Col., USAF (Chairman)

Adjunct Assistant Professors:
John T. Knight, M.S., MBA, Captain, USAF
Harold J. Commacono, Jr., M.A., Captain, USAF

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 degree requirements. Two and four-year ROTC programs are available: entering freshmen may elect the General Military Course or, for those 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 four-year 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 Program. Entering freshmen interested in competing for one of these four-year scholarships should consult their high school counselors at the beginning of their senior year. A limited number of scholarships is also available to students already enrolled in their freshman college year.

Students who do not enroll in the General Military Course are still eligible for membership in 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. Graduating and transfer students may also be considered for membership. Scholarships are available. 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 $100 per month living allowance while they are active in their program. Application for the Professional Officer Course should be made no later than March of the year preceding the student's last years of University enrollment.

Both the two-year and the four-year AFROTC programs emphasize student participation and involvement. Classes are conducted as seminars which call for active student discussion. In addition, there is a weekly one-hour Leadership Laboratory that is mandatory for all students.
all AFROTC cadets. In this laboratory period, students participate in projects, field trips, and visits to Air Force bases. Those students who are designated to enter Air Force pilot training are provided with basic pilot instruction at a nearby airport during their senior year.

Aerospace Studies courses can also be taken through University Extension or through cross-enrollment arrangements with various local colleges and universities. For further information on enrollment requirements and procedures, contact the Department Staff at 10 Callaghan Hall, or phone (415) 642-3972.

LOWER DIVISION COURSES


2. The U.S. Air Force Today. (1) Formerly 1B-1C. One hour lecture/discussion per week. An investigative study of the roles of the components of the United States Air Force. The total force structure of the Air Force is related to the national organization of defense. Major commands are examined individually. Mr. Camacho (Sp)

21A-21B-21C. The Growth and Development of Air Power, (1-1-1) One hour of lecture/discussion per week. A trace of the historical evolution of air power, concepts, doctrine, and application; it identifies technological and societal changes which affected this evolution and seeks to define their impact on the development of strategy and strategic air power concepts. Approved for 1978/79, 1979/80, 1980/81 only. Mr. Camacho (F, W, Sp)

UPPER DIVISION COURSES

135A-135B-135C. Aerospace-Management and Leadership. (3-3-3) Formerly 141A-141B-141C. Two 1/2-hour pro-seminar meetings per week. Prerequisite: Upper division standing and component assignment. A comparative study of contemporary and Air Force management. Subjects include human and group behavior, functions and theories of management, systematic decision making, the communication process, case analysis, leadership theories, managerial ethics, personnel administration, and the organizational environment. Mr. Knight (F, W, Sp)

145A-145B-145C. National Security Forces in Contemporary American Society. (3-3-3) Two 1/2-hour pro-seminar meetings per week. Prerequisite: Upper division standing and component assignment. A comparative study of the Armed Forces as an integral element of American society via survey and seminar discussions on contemporary issues in civil-military relations and the socio-political environment in which U.S. defense policy is formulated and implemented. Approved for 1978/79 only. Mr. Earp (W)

442. Light Aircraft Operations. (3) Three hours of lecture per week. Prerequisite: Designation by Professor of Aerospace Studies, AFROTC, or approval of instructors. Preparation for qualification as Federally Licensed Private Pilot. Studies cover Federal Aviation Regulations, basic meteorology for pilots, navigation by compass, dead reckoning and pilotage, radio and radio navigation, elementary aerodynamics and aircraft structures. Approved for 1978/79 only. Mr. Claiborn (Sp)

199. Supervised Independent Study and Research. (1-6) Prerequisite: Upper division standing, consent of instructor. Enrollment is restricted by regulations listed on page 36. Supervised independent study and research are open to (1) Prior to December 1 of their Senior year.) Students are also paid for attendance at the basic and advanced camps, as well as transportation to and from those camps. Veterans can continue to receive their GI Bill financial assistance to help defray the cost of ROTC benefits. Service obligation for scholarship students is four years active duty. All others incur a two-year obligation (which may be reduced to 3 months).

Military Science courses are open to all students, male and female, with the permission of the instructor. Military Science programs through compression of courses and credit requirements through a four-year, two-year, or special programs. In the four-year program, students enter as freshmen and complete course work progressively until graduation. To qualify for the two-year program, students must have two years of resident work (undergraduate or graduate) remaining at the University and must attend a basic six-week camp unless they have active duty experience. Application for the two-year program must be submitted by April 1 annually. Special programs through compression of courses and credits for related academic work in other departments is possible on approval of the Department Chairman. Veteran students are eligible for the two years of ROTC and can enter the program as a junior without attending the basic camp.

Students seeking a commission normally complete Military Science courses in a pre-arranged sequence to be determined by the Department. Not all courses are offered every year, nor may the concurrence of the Chairman of Military Science, a required course may be replaced by another course in the Department. In addition, appropriate university courses from other departments may be substituted. The minimal requirement for freshmen military students to be considered for a commission is the successful completion of Military Science 435.

Throughout the academic year a mandatory leadership lab will be conducted for all ROTC cadets. It consists of a two-hour session per week of applied leadership and professional training in military skills. All will time training is required of all cadets before they are commissioned. The training lasts five weeks and is conducted at Fort Lewis, Washington. The purpose of summer training is to offer a real life situation in which the theoretical approaches of management and leadership are practically applied. Students are paid a $210 allowance and cadet pay (50% of 2nd Lieutenant's pay) for the duration of this course.

Students planning to attend graduate school are commissioned and routinely deferred from active service until their graduate training is completed (at no expense to the government).

Students who qualify may train as pilots at government expense during the junior and Senior years, ($100 monthly for up to 10 months a year) and are eligible to apply for a three-, two-, or one-year scholarship awarded in nationwide competition. These scholarships pay all university fees, tuition, books, and a $100 monthly living allowance during the school year. High school seniors interested in a four-year scholarship should contact the Department prior to December 1 of their Senior year.) Students are also paid for attendance at the basic and advanced camps, as well as transportation to and from those camps. Veterans can continue to receive their GI Bill financial assistance to help defray the cost of ROTC benefits. Service obligation for scholarship students is four years active duty. All others incur a two-year obligation (which may be reduced to 3 months).

Military Science courses are open to all students, male and female, with the permission of the instructor. Military Science courses can also be taken through University Extension or through cross-enrollment from East Bay community colleges.

For more information concerning ROTC or the Military Science program, call the Chairman of the Department—Phone: 642-3974.

LOWER DIVISION COURSES

20. Theory and Evolution of Warfare. (2) Two hours of lecture per week. Historical survey of the causes and nature of war. The development of military strategy and tactics. Prerequisites: four credits of college history. Credit does not satisfy the requirements for related academic work in other departments is possible on approval of the Department Chairman. Veterans are eligible for the two years of ROTC and can enter the program as a junior without attending the basic camp.

21. Evolution of American Warfare: 1607-1865. (4) Two 1 1/2-hour lectures and one 1-hour discussion section per week. Historical survey of the evolution of American warfare from the colonial period through the Revolutions to the Civil War. Social, economic, and political influences are examined, tracing the evolution of American military thought. Effects of American institutions on organizational structures, technology, and the practice of warfare are emphasized. Approved for 1978/79 only.

UPPER DIVISION COURSES

121. Evolution of American Warfare: 1865-1970. (4) Two 1 1/2-hour lectures and one 1-hour discussion section per week. Historical survey of modern revolutionary warfare as a form of political violence. Prerequisites: consent of instructor. Credit does not satisfy the requirements for related academic work in other departments is possible on approval of the Department Chairman. Veterans are eligible for the two years of ROTC and can enter the program as a junior without attending the basic camp.

132. Management Theory. (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 integration and application within the military organizational structure. Review of literature pertaining to power and authority, responsibility, motivation, role theory and ethics. Mr. Taylor (F)

144. Military Law. (2) Two 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, rules for search and seizure, non-judicial punishment, administrative boards and investigations, and the Law of War. (W)

145. Contemporary Issues and the Military Officer. (2) Two hours of lecture per week. Course focuses on constitutional provisions which serve as a basis for the military's role in contemporary society. Contemporary issues are examined in relation to their impact on the rights, privileges and responsibilities of the armed forces personnel. The rules of land warfare, race relations and the use of drugs. Approved for 1978/79 only.


171. Evolution of Recent American Warfare: Korea and Vietnam. (2) Two 1 1/2-hour lectures per week. Historical survey of modern revolutionary warfare as a means of influencing political and social change. Emphasis is placed on historical theorists on revolutionary

197. Field Study in Military Leadership. (1-5) One to five hours of lecture per week. Prerequisite: upper division standing and consent of instructor. Department Chairman and the off-campus military organization. Supervised experience relative to specific aspects of military leadership in off-campus organizations. Regular individual meetings with faculty sponsor and written reports required. The Staff (F, W, Sp)

199. Supervised Independent Study and Research. (1-5) One to five hours of lectures per week. Prerequisite: enrollment is restricted by regulations listed on page 36. Must be taken on a passed/not passed basis. Supervised independent study and research for undergraduates who desire to study topics of their own selection. The Staff (F, W, Sp)

TEACHING COURSE

302. Theory of Instruction. (2) One 2-hour lecture per week. Prerequisite: designed for students interested in college teaching, military instruction, and Adult Education. An introduction to the fundamentals of educational psychology, methodology, philosophy of instruction, principles of motivation, and methods of evaluation. Topics to be explored include instructional methods and techniques, instructional planning, audiovisual aids, instructional psychology, and program evaluation. Introductory course in instruction. Approved for 1978/79 only. Mr. Iverson (W)

PROFESSIONAL COURSES

431. Fundamentals of Terrain Representation and Analysis. (2) Two hours of lecture per week. Introduction to the use of topographic maps and aerial photographs. Emphasis on development of cartographic skills necessary to construct topographic maps for land navigation purposes. Topics include map coordinate systems, scale and distance transformations, intersection and rescaling, depiction of elevation, relief, and basic photo interpretation. One field trip. (Sp)

432. Concepts of Military Operations. (2) Two hours of lecture per week. Introduction to basic military tactics. Emphasis is on squad and platoon operations, to include offensive and defensive operations, patrolling, and the use of resource planning techniques and operations orders. (W)

433. The Combined Arms Concept. (2) Two hours of lecture per week. This course examines the relationships among the various branches of the Army as found within the Combined Arms Concept. Coverage will be based on these branches working together on company and battalion level operations. Topics include battalion staff organizations and responsibilities, division organizations and responsibilities, and various combined arms operations. (Sp)

435. Leadership Laboratory. (0) Two hours per week. Required of third and fourth year Military Science cadets. Optional for all first and second year cadets. Practical exercises in military leadership skills. Approved for 1978/79 only. The Staff

Naval Science
Department Office, 25 Callaghan Hall

Adjunct Professor:
Frank T. Watkins, Jr., M.S., Captain, U.S. Navy (Chairman)

Adjunct Associate Professor:
Frank M. Hunt, Jr., M.S., Commander, U.S. Navy

Adjunct Assistant Professor:
Paul R. Hopspe, M.S., Lieutenant Commander, U.S. Navy

Lecturers:
Edward S. Kraft, Jr., Ph.D., U.S. Navy
Phil C. Ruhi, Lieutenant, U.S. Navy

The Department of Naval Science offers several programs of instruction for men and women leading to regular or reserve commissions in the U.S. Navy or U.S. Marine Corps as elected by the student.

1. Naval ROTC College Program: This is a four-year, non-scholarship program open to physically qualified men and women between the ages of 17 and 21. Freshmen, and sophomores in a five-year baccalaureate program, are the most likely candidates for this program. Students receive a $100 per month stipend in their junior and senior years, and complete one summer training cruise after their third year. Upon graduation, the student will receive a commission, U.S. Navy Reserve or Second Lieutenant, U.S. Marine Corps Reserve. A three-year active duty obligation is incurred. Application should be made early in the fall quarter. Scholarship opportunities are offered to highly qualified College Program students.

2. NROTC Two-Year Program: This program is open to men and women who will be entering their junior year of undergraduate study this fall. Scholarship opportunities are sought from U.C. Berkeley students as well as incoming junior college transfers. After a six-week summer training period at the Naval Science Institute, students enroll in the NROTC Unit as juniors, with the same obligations and privileges as in the College Program described above. U.S. citizenship is required, and the age limit is 27 1/2 years at the time of graduation. Applicants should contact the Department of Naval Science no later than April 1st of their sophomore year of study.

3. Two-Year Scholarships: These programs are open to academically and physically qualified male students in their second year of undergraduate study, who have had some background in college physics and calculus. As with the Two-Year Program described above, candidates will attend a summer Naval Science Institute before their junior year. They will receive full tuition, fees, book expense, and $100 per month during their last two years. Upon graduation, they will receive Regular Navy commissions and enter nuclear power training or other Navy fields as Ensigns. Applications should be made by April 1st, usually in the sophomore year.

4. NROTC Scholarship Program: This is a nationwide competition open to physically qualified men and women between the ages of 17 and 21. U.S. citizenship is required. High school seniors and students enrolled in the NROTC College Program are eligible to apply. Successful applicants receive $100 per month for four years, plus full payment for tuition, fees, and book expenses. Three summer training cruises are required. Upon graduation, the student receives a commission in the Regular Navy or Marine Corps, with a four year active duty obligation. November 15th is the application deadline.

For further information, direct inquiries to the Chairman of Naval Science, 25 Callaghan Hall.

LOWER DIVISION COURSES

1. Naval Ship's Systems. (4) Four hours of lecture per week. Prerequisite: Mathematics 1A, 1B or 16A, 18B; Physics 5A or 6A; Physics 5B or 6B being taken concurrently. A study of the theoretical principles necessary to the design, construction, and operation of ships. Emphasis on description and analysis of ship stability and agility; ship propulsion, thermodynamic cycles in marine propulsion plants, and of auxiliary machinery systems. (Sp)


UPPER DIVISION COURSES

151A. Evolution of Warfare. (3) Formerly course 151. Three hours of lecture per week. This course is an examination of warfare as but one instrument of political action throughout history and its interaction with diplomacy, economic competition, international law, religious and social reform from classical antiquity through the 18th century. Approved for 1978/79 only.

151B. Evolution of Warfare. (3) Formerly course 152. Three hours of lecture per week. Prerequisite: NUS 151A. This course is a continuation of NS 151A from the 18th century to the present. Approved for 1978/79 only.

154. The History of Littoral Warfare. (3) Three hours of lecture per week. An analysis of the historical evolution and impact of man's projects to project sea-power. The scope of this course includes an in-depth examination of each major development in littoral warfare from Greek classical antiquity to the modern era. Approved for 1978/79, 1979/80, 1980/81 only. (F, W, Sp)

401. Naval Ship's Systems (3) Three hours of lecture per week. Prerequisite: NS 1, Physics 5C or 6C taken concurrently. A study of physical theory of acoustic and electromagnetic wave generation, propagation and detection; design and use of electro-mechanical and hydro-pneumatic systems as they apply to detection and motion analysis of objects sharing and traversing common environments.

411. Naval Operations. (2) Two hours of lecture and one hour of laboratory per week. Prerequisite: courses 1, 401. A study of Naval Operations. Vector solution to shiphandling and underway replenishment, tactical maneuvering, and communication techniques in combination with naval message, radiotelephone, and visual methods. Mr. Hodson (F)

Personalized System of Instruction

A number of self-paced courses, also known as Keller Plan or PSI (Personalized System of Instruction) courses, are currently offered at Berkeley. Students who do not need the motivation imposed by deadlines are likely to profit from these courses. While each course is unique, they typically have the following characteristics:

1. Few lectures are given. Students learn the material through study guides, workbooks and textbooks. In some language courses, laboratory attendance may be required.

2. Students complete the work at their own pace.

3. Students must demonstrate mastery of the material covered, usually through a quiz or assignment, before proceeding to more advanced topics.

4. Students meet periodically with the instructors or tutors to ask questions or discuss problems.

5. Variable amounts of credit may be granted. For example, if a student completes half of the assignments required by a 4 unit course, 2 units of credit are assigned.

This method of instruction is most popular in introductory language and science courses. The following courses are currently taught through this format: Astronomy 105; Computer Science 1S, 3S, 101S, 103S; English 40A, 14A, 14B, 14C, 14D; Italian 14A, 14B, 14C, 14D; Latin 11A, 11B; Mathematics 5S, 1S, 16S; Physics 5A, 5B, SCI 5D, SCI 6A, 6B, 6C; Physiology 1; Spanish 14A, 14B, 14C.
Professional Development Program

Program Office, 230B Stephens Hall
The Professional Development Program (PDP) is a honors level program designed to increase the access of gifted minority and women students to higher education, particularly in the fields of science, mathematics, business and engineering, where they are particularly under-represented. PDP serves gifted secondary school minority and women students as well as UCB undergraduates and graduates. High school students with outstanding academic ability are brought to the Berkeley campus, given an 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 UCB undergraduates special academic assistance and counseling and the opportunity to participate in faculty supervised laboratory research in a broad range of academic disciplines. The program for undergraduates maximizes access to the wealth of educational resources at Berkeley through: individual faculty advising and curriculum planning in the student’s major; workshops, 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 additionally provided with intensive instruction designed to familiarize them with the methodology of graduate work in their disciplines. PDP provides graduate students with individualized faculty orientation workshops, seminars and lectures by distinguished minority and women scholars. PDP helps students to locate jobs that will advance their professional careers. For further information, please contact the Program Office or call 642-5881.

University Research Expeditions Program

The University Research Expeditions Program (UREP) was recently 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 that involve 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.

Projects planned for 1978-79, each of approximately three weeks duration, include: (1) an anthropological study of Carnival in three Brazilian cities; (2) an archaeological excavation of the medieval African town of Begho, Ghana; (3) a primatology study of three species of monkeys in a Kenyan forest. Other projects taking place in Africa, South America and the U.S. in the fields of biology, botany, entomology and paleontology are also planned.

For further information, please contact the University Research Expeditions Program; University of California; Berkeley, CA 94720; Telephone, 642-6586.

Officers of Administration

The Regents of the University of California

Regents Ex Officio

Edmund G. Brown, Jr. Governor of California and President of The Regents
Mervyn M. Dymally Lieutenant Governor of California
Leo T. McCarthy Speaker of the Assembly
Wilson Riles State Superintendent of Public Instruction
Cheryl F. Biles President of the Alumni Association of the University of California*
Forrest A. Plant Vice President of the Alumni Association*
David S. Saxon President of the University

Appointed Regents

Edward W. Carter
William K. Coblenz
DeWitt A. Higgs Vice Chairman of the Board
Glenn Campbell
William French Smith
Robert O. Reynolds Chairman of the Board
Dean A. Watkins
Joseph A. Moore
John H. Lawrence, M.D.
William A. Wilson
Gregory Bateson
Vilma S. Martinez
Verne Orr
John F. Henning
Stanley K. Sheinbaum
Yori Wada
Renee P. Turkel

*Lee B. Wenzel and George D. Kieffer are Regents-designate (non-voting).

Principal Officers of The Regents

Donald L. Reidhaar
General Counsel
Herbert M. Gordon
Treasurer
Miss Marjorie J. Woolman
Secretary

Faculty Representative to The Regents

William R. Frazer

Systemwide Administrative Officers

David S. Saxon
President of the University
William B. Fetter
Vice President of the University
Donald C. Swain
Academic Vice President
Archie Kleingartner
Vice President—Academic and Staff Personnel Relations
James B. Kendrick, Jr.
Vice President—Agriculture and University Services
Lowell J. Paige
Special Assistant to the President for Governmental Relations
Dorothy E. Everett
Assistant President—Coordination and Review

Administrative Officers, Emeriti

Charles J. Hitch
President of the University, Emeritus, and Professor, Emeritus, of Economics
Clark Kerr
President of the University, Emeritus, and Professor, Emeritus, of Business Administration
Claude B. Hutchison
Vice President of the University, Emeritus, and Dean of the College of Agriculture, Emeritus
Frank L. Kidner
Vice President of Educational Relations, Emeritus, and Professor, Emeritus, of Economics
John A. Perkins
Vice President of Business and Finance, Emeritus, and Professor, Emeritus, of Political Science
Robert M. Underhill
Vice President, Emeritus, and Secretary and Treasurer of The Regents, Emeritus
Harry R. Wellman
Vice President of the University, Emeritus, Professor, Emeritus, of Agricultural Economics, and Agricultural Economist, Emeritus

Thomas J. Cunningham
General Counsel of The Regents, Emeritus

Effective September 1, 1978
Chancellors of the Campuses

Albert H. Bowker
Chancellor at Berkeley

James H. Meyer
Chancellor at Davis

Daniel G. Aldrich, Jr.
Chancellor at Irvine

Charles E. Young
Chancellor at Los Angeles

Ivan Hinderaker
Chancellor at Riverside

William D. McElroy
Chancellor at San Diego

Francis A. Sooy
Chancellor at San Francisco

Robert A. Huttenback
Chancellor at Santa Barbara

Robert L. Sinsheimer
Chancellor at Santa Cruz

University Professors

Murray Krieger
Department of English and Comparative Literature, Irvine

Glenn Seaborg
Department of Chemistry, Berkeley

Neil Smelser
Department of Sociology, Berkeley

Charles Townes
Department of Physics, Berkeley

Sherwood Washburn
Department of Anthropology, Berkeley

Melvin Calvin (Emeritus)
Department of Chemistry, Berkeley

Josephine Miles (Emeritus)
Department of English, Berkeley

Edward Teller (Emeritus)
Department of Physics, Berkeley

Harold Urey (Emeritus)
Department of Chemistry, San Diego

Lynn White, Jr. (Emeritus)
Department of History, Los Angeles

General Administrative Officers, Berkeley

Albert H. Bowker, Ph.D.
Chancellor

Ira Michael Heyman, LL.B.
The Vice Chancellor

Robert F. Kerley, B.S.
Vice Chancellor—Administration

George J. Mastich, B.S.
Provost of Professional Schools and Colleges

Owsley B. Hammond
Treasurer of The Regents, Emeritus

Chancellors of the Campuses

Albert H. Bowker
Chancellor at Berkeley

James H. Meyer
Chancellor at Davis

Daniel G. Aldrich, Jr.
Chancellor at Irvine

Charles E. Young
Chancellor at Los Angeles

Ivan Hinderaker
Chancellor at Riverside

William D. McElroy
Chancellor at San Diego

Francis A. Sooy
Chancellor at San Francisco

Robert A. Huttenback
Chancellor at Santa Barbara

Robert L. Sinsheimer
Chancellor at Santa Cruz

University Professors

Murray Krieger
Department of English and Comparative Literature, Irvine

Glenn Seaborg
Department of Chemistry, Berkeley

Neil Smelser
Department of Sociology, Berkeley

Charles Townes
Department of Physics, Berkeley

Sherwood Washburn
Department of Anthropology, Berkeley

Melvin Calvin (Emeritus)
Department of Chemistry, Berkeley

Josephine Miles (Emeritus)
Department of English, Berkeley

Edward Teller (Emeritus)
Department of Physics, Berkeley

Harold Urey (Emeritus)
Department of Chemistry, San Diego

Lynn White, Jr. (Emeritus)
Department of History, Los Angeles

General Administrative Officers, Berkeley

Albert H. Bowker, Ph.D.
Chancellor

Ira Michael Heyman, LL.B.
The Vice Chancellor

Robert F. Kerley, B.S.
Vice Chancellor—Administration

George J. Mastich, B.S.
Provost of Professional Schools and Colleges

Roderic B. Park, Ph.D.
Provost and Dean of the College of Letters and Science

Errol W. Mauchian, M.A.
Assistant Chancellor—Budget and Planning

Richard E. Erickson, M.B.A.
Assistant Chancellor and Executive Director—U.C. Berkeley Foundation

Glen H. Grant, Ed.D.
Assistant Chancellor—Executive Assistant

Donald A. Riley, Ph.D.
Associate Vice Chancellor—Academic Development

Theodore H. Chenoweth, A.B.
Associate Vice Chancellor—Business Affairs

Lowel Smith, Ed.D.
Associate Vice Chancellor—Business Affairs

(To be announced)
Assistant Vice Chancellor—Student Affairs

Michael R. Smith, J.D.
Assistant Vice Chancellor—Legal Affairs

G. Cardenas, Ph.D.
Assistant Vice Chancellor—Student Affairs

F. X. (Pete) Small, B.A.
Assistant Vice Chancellor—Employee Affairs

Andrew G. Jameson, Ph.D., Dr. d'Université (Paris)
Assistant Vice Chancellor

Norman M. Mundell, M.S.
Assistant Vice Chancellor—Accounting Affairs

Gaetano P. Russo, B. Arch.
Assistant Vice Chancellor—Facilities Management

Austin J. Thompson, M.S.W.
Assistant Vice Chancellor—Community Affairs

Garb B. Wilson, Ph.D.
Special Assistant to the Chancellor—Public Ceremonies

Robert L. Bailey, Ed.D.
Director, Office of Admissions and Records

Gerald Brown, A.M.
ASUC Executive Director

(To be announced)
Director of Career Planning and Placement Center

Jack E. Campbell, B.A.
Administrator, Cowell Memorial Hospital

Jane Moorman, Ph.D.
Director of Counseling and Psychological Services

John I. Danielson, M.A.
Director of Financial Aid

W. Sheridan Warrick, M.A.
Director of Foreign Student Services and Executive Director of International House

Alcesta T. Pappas, Ph.D.
Director of Housing and Child Care Services

Ed B. Hendricks, M.S.
Housing and Food Services Business Manager

William A. McCormack, Ph.D.
International Education Director

(To be announced)
Director, Intramural and Recreational Sports

(To be announced)
University Librarian

Richard P. Hafner, Jr., M.J.
Public Affairs Officer

Lynn R. Baranco, M.P.A.
Director, Office of Relations with Schools

Roland J. Maples, B.A.
Director of Students Activities and Programs

Austin C. Frank, Ph.D.
Director of Student Affairs Research

James R. Brown, M.D.
Director, Student Health

G. James Lemmon, A.B.
Director of Student Information Center

Kurt Lauridsen, Ph.D.
Director of Student Learning Center

John T. Wheeler, Ph.D.
Summer Sessions Director

Milton R. Stern, M.A.
Dean of University Extension

Deans of the Colleges, Schools, and Graduate Division

Earl F. Cheit, Ph.D., LL.B., L.H.D.
School of Business Administration

Norman E. Phillips, Ph.D.
College of Chemistry

(To be announced)
School of Education

Ernest S. Kuh, Ph.D.
College of Engineering

Richard Bender, M.Arch.
College of Environmental Design

Sanford S. Elber, Ph.D., L.H.D., h.c.
Graduate Division

Edwin R. Bayley, B.A.
School of Journalism

Sanford H. Kadish, B.S.S., LL.B.
School of Law

Roderic B. Park, Ph.D.
College of Letters and Science

Michael K. Buckland, Ph.D.
School of Library and Information Studies

David E. Schlegel, Ph.D. (Acting)
College of Natural Resources

Irving Fatt, Ph.D. (Acting, W&Sp)
School of Optometry

Warren Winkelstein, M.D., M.P.H.
School of Public Health

Allan P. Sindler, Ph.D.
Graduate School of Public Policy

Harry Specht, Ph.D.
School of Social Welfare
Correspondence Directory
University of California, Berkeley, CA 94720

Office of the President
714 University Hall
for University policy matters

Office of the Chancellor
200 California Hall
for campus policy matters

Admissions: Undergraduate
Office of Admissions and Records
120 Sproul Hall
School of Optometry
Office of the Dean
107 Minor Hall

Admissions: Graduate
Graduate Admissions
1 California Hall
(except School of Law)
School of Law
Office of Admissions
220 Boalt Hall

Admissions and Records, Office of
120 Sproul Hall
for undergraduate admissions, all academic records, registration fees and expenses, veterans (and dependents of veterans) education benefits, social security benefits, Railroad Retirement, Public Employees Retirement Systems, Civil Service Commission, State Teachers' Retirement System, and veteran's pensions. (see pages 10 to 12)

ASUC
(Associated Students of UC)
211 Eshleman Hall
(see page 32)

Career Planning and Placement Center
Building T-6 & 111 Wheeler Hall
for (a) careers in education, business, government, and other fields, and (b) for student employment (see page 29)

College or School, Office of the Dean
for academic matters (see Colleges and Schools section, page 35)

Financial Aid, Office of
201 Sproul Hall
for grants, loans, scholarships, prizes, undergraduate scholarships and honors, work-study (see page 28)

Foreign Student Services
International House
2299 Piedmont Avenue
(see page 29)

Graduate Division
1 California Hall
for graduate admission, fellowships and scholarships, graduate minority program, regulations and requirements governing the master's and doctor's degrees, petitions and other matters pertaining to graduate students (see pages 18 to 27)

Housing and Child Care Services,
Office of
2401 Bowditch Street
(see page 29)

International Education
Room 104A, Building D
2537 Channing Way
(see pages 25 and 34)

Relations with Schools, Office of
407 Eshleman Hall
for E.O.P. and general information
(see page 12)

Residence Matters, Attorney in
590 University Hall, for residence status
(see Appendix)

Student Activities and Programs, Office of
103 Sproul Hall
(see page 29)

Student Health Service
Cowell Memorial Hospital
(see page 27)

University Extension
2223 Fulton Street
(see pages 9 and 21)

Publications

General Catalog, Berkeley
Complete information about the academic programs on the Berkeley campus—admission requirements, curricula, course descriptions, degrees conferred, regulations and requirements for degrees, financial aids for students, the academic calendar, extracurricular student activities—and general campus information.

Office of Admissions and Records,
120 Sproul Hall. (Price $1.50 if purchased directly at the ASUC or other local bookstores; $2.50 by mail, from the Office of Admissions and Records with checks made payable to The Regents of the University of California.)

Undergraduate Admissions Circular
A complete statement of the University's requirements for admission as an undergraduate.

Office of Admissions and Records,
120 Sproul Hall. (No charge.)

Admission to Graduate Study, Berkeley
A brief description of the graduate programs, including procedures and dates for filing applications, degrees offered, fields of study available, fees and expenses, financial aids, living accommodations, and sources of additional information. Course descriptions are not included.

Dean of the Graduate Division,
1 California Hall. (No charge.)

College and School Announcements
Information about requirements and regulations in the respective colleges and professional schools, issued by:

Colleges of Chemistry, Engineering, Environmental Design, Letters and Science, Natural Resources.
Schools of Business Administration, Graduate School of Business Administration, Education, Journalism, Law, Library and Information Studies, Optometry, Public Health, Social Welfare.

The Dean of the School or College.
(No charge.)

Schedule of Classes
Lists time and place of meeting for specific classes, names of instructors, and units of credit awarded. Also contains a directory of departmental offices and officers of instruction.

Office of Admissions and Records,
120 Sproul Hall. (Price: 25¢; 50¢ by mail.)

Summer Session Bulletin
Complete information about summer sessions instruction.

Office of the Summer Sessions,
22 Wheeler Hall. (No charge.)
## Academic Calendar, 1978/79

### Admission to Undergraduate Status:

Application packets are available one month prior to the date shown for the beginning of the application filing period.

California high school and community college students should obtain packets from their counselors; others, in person at or by writing to any University of California Office of Admissions and Records. Written requests may be made as early as six weeks in advance of the filing date in order to meet the release date for application packets. All applications filed during the first month of the filing period are accepted for consideration. After the first month the deadline will vary. Each college and school has enrollment quotas that limit the number of new freshmen and advanced standing students that may be admitted. Once quotas have been filled, additional applications cannot be accepted. The application may be re-directed to another University campus where enrollments are still open.

These dates apply to applicants for regular, limited, or special status; a second bachelor's degree; or intercampus transfer.

In order to give time for necessary correspondence and for due notice to applicants who may be required to take examinations for admission, transcripts of records should be forwarded to the Office of Admissions and Records at the earliest possible date.

### Fall 1978 | Winter 1979 | Spring 1979
---|---|---
Readmission* to Graduate Status: Dec. 1, 1978 through March 29, 1979 | Feb. 1, 1979 through March 29, 1979 | School of Law, final date for students to file petitions to add or drop courses. Fee thereafter, $3.
Final dates for filing credentials and applications with the Dean of the Graduate Division for admission or readmission to graduate standing: Jan. 3, 1979 through March 29, 1979 | Feb. 1, 1979 through March 29, 1979 | At the discretion of the Dean, grade F may be assigned in discontinued courses.
Final dates for filing applications with the Office of Admissions and Records for readmission to undergraduate status: April 24—Aug. 4, 1979 | Nov. 1—Nov. 14, 1978 | Final date to file petition and complete work for course with incomplete grade received Fall Quarter, 1977.
Registration by mail for graduate and undergraduate students:* July 1—Aug. 25, 1979 | Nov. 6—28, 1978 | Final date for entering and continuing graduates, including Law students, to file application for graduate fellowships and scholarships for 1979-80 or any quarter/semester thereof.**
School of Law, registration of students: Aug. 21—Aug. 25, 1979 | Mar. 2, 1979 | Final date for entering undergraduate status; to file for undergraduate scholarship consideration for 1979-80 or any quarter/semester thereof.**
School of Law, term begins: Sept. 4, 1979 | Jan. 8, 1979 | Final date for entering undergraduate students; to file for financial aid only; for continuing undergraduates to apply for undergraduate scholarships and financial aid; for Graduate Minority Program applicants to file for financial aid; deadline is for 1979-80 or any quarter/semester thereof.**
Academic and Administrative Holiday: Aug. 21—Sept. 4, 1979 | Jan. 8—Jan. 22, 1979 | Final date for entering undergraduate and entering and continuing graduate students, including Law students, to file for financial aid only; for continuing undergraduates to apply for undergraduate scholarships and financial aid; for Graduate Minority Program applicants to file for financial aid; deadline is for 1979-80 or any quarter/semester thereof.**
School of Law, instruction begins: Sept. 5, 1979 | Jan. 22, 1979 | Study-list filing. See Instructions to Students received at time of Monday—registration for details. Fee for late filing, $10.
School of Law, study-list filing: Sept. 18, 1979 | Mar. 28, 1979 | Study-list filing. See Instructions to Students received at time of Monday—registration for details. Fee for late filing, $10.
School of Law, final date to register: Sept. 8, 1979 | March 30, 1979 | Study-list filing. See Instructions to Students received at time of Monday—registration for details. Fee for late filing, $10.
School of Law, final date to register: Sept. 8, 1979 | March 30, 1979 | Study-list filing. See Instructions to Students received at time of Monday—registration for details. Fee for late filing, $10.

*Approved applications for readmission filed with the Office of Admissions and Records by July 15 for Fall Quarter; September 15 for Winter Quarter, and December 15 for Spring Quarter will enable you to register by mail.

**Final dates are subject to change without notice; consult the Office of Financial Aid for further information.

1Registration forms may be obtained beginning May 15 for students registered in Spring Quarter who will continue in the same status for Fall Quarter. Students registered in Spring Term in the School of Law who will continue in the same status for Fall Term may pick up registration forms beginning April 24.

§Except School of Law.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall 1978</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final date to register.§</td>
<td>Oct. 13,</td>
<td>Jan. 26,</td>
<td>April 20,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Friday</td>
<td>Friday</td>
<td>Friday</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final date for filing applications of candidacy for all master's degrees to be</td>
<td>Oct. 6,</td>
<td></td>
<td>April 13,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>conferred in 1978-79; Office of the Dean of the Graduate Division, 1 California</td>
<td>Friday</td>
<td></td>
<td>Friday</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hall. All signatures required on these applications must be obtained in advance.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Last date for filing without fee announcements of candidacy for any bachelor's</td>
<td>Oct. 9,</td>
<td>Jan. 22,</td>
<td>April 16,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>degree or the Doctor of Optometry degree to be conferred 1978-79. Fee thereafter,</td>
<td>Monday</td>
<td>Monday</td>
<td>Monday</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final date for filing announcements of candidacy for the bachelor's degree.</td>
<td>Oct. 13,</td>
<td>Jan. 26,</td>
<td>April 20,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Friday</td>
<td>Friday</td>
<td>Friday</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final date for filing applications of candidacy for all doctoral degrees to be</td>
<td>Oct. 13,</td>
<td></td>
<td>April 20,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>conferred in 1978-79; Office of the Dean of the Graduate Division, 1 California</td>
<td>Friday</td>
<td></td>
<td>Friday</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hall. All signatures required on these applications must be obtained in advance.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With the exception of undergraduate students enrolled in the College of Letters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and Science, final date to file petitions to add and/or drop courses and to make</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>changes in the option of enrolling in courses on a passed/not passed or letter-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>graded basis. Thereafter, special approval to make any changes in the study list</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>is required for undergraduates from the Dean of the College or School and for</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>graduates from the Dean of the Graduate Division. For those who receive approval</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>there is a $3.00 fee.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduates not in the College of Letters and Science:</td>
<td>Oct. 13,</td>
<td>Jan. 26,</td>
<td>April 20,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Friday</td>
<td>Friday</td>
<td>Friday</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduates:</td>
<td>Oct. 20,</td>
<td>Feb. 2,</td>
<td>April 27,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Friday</td>
<td>Friday</td>
<td>Friday</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduates enrolled in the College of Letters and Science:</td>
<td>Oct. 13,</td>
<td>Jan. 26,</td>
<td>April 20,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final date to file petition and complete work for course with incomplete grade</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>received Winter Quarter, 1978.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduates enrolled in the College of Letters and Science:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final date to file petitions to drop courses; thereafter, special approval of</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>the Dean is required.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final date to file petitions to drop courses without fee. Fee thereafter, $3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final date to make changes in the option of enrolling in courses on a passed/not passed or letter-graded basis.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Winter 1979</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Spring 1979</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix

Student Persistence and Degree Completion at U.C. Berkeley

The number of students at large public universities nationally who begin bachelor degree programs and continue with them through graduation is uncertain; estimates suggest that between 20% and 65% of all entering freshmen remain to earn degrees at the campuses at which they have initially enrolled, while close to 70% earn bachelor degrees at one school or another.

U.C. Berkeley data indicate that up to 65% of each year's entering freshmen eventually complete a degree at the Berkeley campus, but not all do so in four years. Many undergraduates transfer to Berkeley after having begun college work elsewhere; of those entering at the junior level, up to 80% complete a degree at Berkeley, although some require three years of residence to do so. More students at Berkeley who complete bachelor's degrees continue to complete Ph.D.'s than students at any other college or university in the nation.

At the graduate level, where Berkeley offers more than 100 degree programs, over 70% of all entering students receive one or more graduate degrees before leaving campus. More Ph.D.'s are earned at Berkeley than at any other university in the country.

In the academic year 1976-77, Berkeley awarded 5283 bachelor's degrees, 2435 master's degrees and 811 doctorates. In total, 8960 degrees and certificates were awarded in the 1976-77 academic year out of a total enrollment of approximately 28,000 students.

Nondiscrimination Policy

The University of California, in compliance with Titles VI and VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972 (45 CFR 86), and Sections 503 and 504 of the Rehabilitation Act of 1973, does not discriminate on the basis of race, color, national origin, religion, sex, or handicap in any of its policies, procedures, or practices; nor does the University, in compliance with the Age Discrimination in Employment Act of 1967 and Section 402 of the Vietnam Era Veterans Readjustment Act of 1974, discriminate against any employees or applicants for employment on the basis of their age or because they are disabled veterans or veterans of the Vietnam era. This nondiscrimination policy covers admission, access, and treatment in University programs and activities, and application for and treatment in University employment.

In conformance with University policy and pursuant to Executive Orders 11246 and 11375, Section 503 of the Rehabilitation Act of 1973, and Section 402 of the Vietnam Era Veterans Readjustment Act of 1974, the University of California is an affirmative action/equal opportunity employer.

Inquiries regarding the University's equal opportunity policies may be directed to the Office of the Chancellor, 200 California Hall, University of California, Berkeley, California 94720.

Access to Records

Each student is entitled by law and University policy to examine and challenge most of the records maintained by the University on that student. These records are confidential, and in most circumstances may be released to third parties only with the prior consent of the student. Such matters are detailed in the Berkeley Campus Policy Governing Disclosure of Information from Student Records, available in the Office of the Director of Student Activities, 103 Sproul Hall.

Refund Procedure

New Undergraduate Students: Prior to Day 1, Registration Fee paid is refunded except for the $50 Acceptance of Admission Fee, and other fees paid are refunded in full. Day 1 and after, the $50 Acceptance of Admission Fee is withheld from the Registration Fee, and the Schedule of Refunds is applied to the balance of fees assessed.

All Continuing and Readmitted Students

There is a service charge of $10.00 for cancellation of registration or withdrawal before the first day of instruction. After the first day of instruction the Schedule of Refunds is applied to the total of fees assessed.

Schedule of Refunds

Tuition, Educational Fee, University Registration Fee, and Other Student Fees

<table>
<thead>
<tr>
<th>Period</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-14 days</td>
<td>80%</td>
</tr>
<tr>
<td>15-21 days</td>
<td>60%</td>
</tr>
<tr>
<td>22-28 days</td>
<td>40%</td>
</tr>
<tr>
<td>29-35 days</td>
<td>20%</td>
</tr>
<tr>
<td>36 days and over</td>
<td>0%</td>
</tr>
</tbody>
</table>

California Residency and the Nonresident Tuition Fee

Students who have not been residents of California for more than one year immediately prior to the residence determination date for each term in which they propose to attend the University are charged, along with other fees, a non-resident tuition fee of $635 for the quarter or $952.50 for the semester. The residence determination begins at the last of the University of California campuses to open for the quarter, and for schools on the semester system, the day instruction begins for the semester.

General

California residence is established by an adult who has relinquished prior residence and is physically present within the state with the intent to make California the permanent home. California residence must be established more than one year prior to the term for which resident classification is requested. Indicia of California residence include, but are not limited to: registering and voting in California elections; designating California as the permanent address on all school and employment records, including military records if one is in the military; personal qualifications of the individual, and employment conditions at the time of job entry.

Salary and Employment Information/University of California

<table>
<thead>
<tr>
<th>FIELD OF STUDY</th>
<th>AVERAGE MONTHLY SALARY OF GRADUATES</th>
<th>PROBABLE OR DEFINITE JOB COMMITMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree Level:</td>
<td>Bachelor's $960-1,374</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Master's $1,065-1,513</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Doctorate $1,437-1,954</td>
<td></td>
</tr>
<tr>
<td>Engineering</td>
<td>85.3%</td>
<td></td>
</tr>
<tr>
<td>Humanities</td>
<td>73.9</td>
<td></td>
</tr>
<tr>
<td>Life Science</td>
<td>77.9</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>90.3</td>
<td></td>
</tr>
<tr>
<td>Physical Science</td>
<td>77.1</td>
<td></td>
</tr>
<tr>
<td>Social Science</td>
<td>74.0</td>
<td></td>
</tr>
</tbody>
</table>

1. Source: A 1976 national survey of a representative group of colleges conducted by the College Placement Council, representing the 50 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.

2. Source: The Schedule of Refunds refers to calendar days, beginning with the first day of instruction. Percentages listed (days 1-35) should be applied respectively to each Tuition, Educational Fee, University Registration Fee, and other student fees. The effective date for determining a refund of fees is the date on which the Notice of Withdrawal is first presented for endorsement, and it is presumed that no University services will be provided to the student after that date.
military service; obtaining a California I.D. card or driver's license; obtaining California vehicle registration; paying California income taxes as a resident; establishing an abode where one's permanent belongings are kept; licensing for professional practice in California, etc. Conduct inconsistent with the claim of California residence includes, but is not necessarily limited to: maintaining voter registration and voting in person or by absentee in another state; obtaining a loan requiring residence in another state; maintaining out-of-state driver's license and vehicle registration, etc.

As a general rule, students seeking resident classification must perform all acts of intent which are applicable to their particular circumstances within the one year durational period. In addition, a substantial number of these acts must be performed when the student first comes to California or very shortly thereafter. If they are not, the duration period for reclassification is extended until both presence and intent have been demonstrated for one year. The student must petition to have his or her status changed at the Office of the Registrar at the campus attended, and documentation of residence (driver's license, voter registration receipt, etc.) may be requested at that time.

Students who are within California for educational purposes only do not gain the status of resident regardless of the length of their stay in California.

The residence of the parent with whom an unmarried minor (under age 18) maintains his or her place of abode is the residence of the unmarried minor. When minors live with neither parent their residence is that of the parent with whom they maintained their last place of abode. Minors may establish their residence when both parents are deceased and a legal guardian has not been appointed. The residence of unmarried minors who have a parent living cannot be changed by their own act, by the appointment of a legal guardian, or by relinquishment of a parent's right of control.

A man or a woman establishes his or her residence. A woman's residence shall not be derivative from that of her husband, or vice versa.

Exceptions
1. Students who remain in this state after their parent, who was theretofore domiciled in California for at least one year prior to leaving and has, during the student's minority and within one year immediately prior to the residence determination date, established residence elsewhere, shall be entitled to resident classification until they have attained the age of majority and have resided in the state the minimum time necessary to become a resident so long as, once enrolled, they maintain continuous attendance at an institution.

2. Nonresident students who are minors or 18 years of age and can evidence that they have been totally self-supporting through employment and actually present within California for the entire year immediately prior to the residence determination date and have evidenced the intent to make California their permanent home may be eligible for resident status.

3. Students shall be entitled to resident classification if immediately prior to the residence determination date they have lived with and been under the continuous direct care and control of any adult or adults other than a parent for not less than two years, provided that the adult or adults having such control have been California residents during the year immediately prior to the residence determination date. This exception continues until the student has attained the age of 18 and has resided in California the minimum time necessary to become a resident student, so long as continuous attendance is maintained at an institution.

4. Exemption from payment of the nonresident tuition fee is available to the natural or adopted child, stepchild, or spouse who is a dependent of a member of the United States military stationed in California on active duty. Such resident classification may be maintained until the student has resided in California the minimum time necessary to become a resident. If a student is enrolled in an institution and the member of the military is transferred on military orders to a place outside of the United States immediately after having been on active duty in California, the student is entitled to retain residence classification under conditions set forth above.

5. Students who are members of the United States military stationed in California on active duty, except members of the military assigned to educational purposes to a supported institution of higher education, shall be entitled to resident classification until they have resided in the state the minimum time necessary to become a resident.

6. Students who are adult aliens are entitled to resident classification if they have been lawfully admitted to the United States for permanent residence in accordance with all applicable provisions of the laws of the United States and have thereafter established and maintained residence in California for more than one year immediately prior to the residence determination date.

A student who is an adult alien shall be entitled to resident classification if the student is a refugee who has been granted parolee, conditional entrant or indefinite voluntary departure status in accordance with all applicable laws of the United States; provided that the student has lived in the state for one year immediately prior to the residence determination date. (Effective until June 30, 1980.)

7. Students who are minor aliens shall be entitled to resident classification if they and the parent from whom residence is derived have been lawfully admitted to the United States for permanent residence, provided that the parent has had residence in California for more than one year after acquiring a permanent resident visa prior to the residence determination date for the term.

A student who is a minor alien shall be entitled to resident classification if the student is a refugee who has been granted parolee, conditional entrant or indefinite voluntary departure status in accordance with all applicable laws of the United States; provided that the student has lived in this state for one year immediately prior to the residence determination date. (Effective until June 30, 1980.)

8. Children of deceased public law enforcement or fire suppression employees, who were California residents, and who were killed in the course of law enforcement or fire suppression duties, may be entitled to resident classification.

Procedures
New and returning students are required to complete a Statement of Legal Residence. The student's status is determined by the Attorney in Residence Matters' Deputy who is located in the Office of Admissions and Records.

Students are cautioned that this summation is not a complete explanation of the law regarding residence. They should also note that changes may have been made in the rate of nonresident tuition and the residence requirements between the time this catalog statement was published and the relevant residence determination date. Regulations have been adopted by The Regents, a copy of which is available for inspection in the Office of Admissions and Records.

All students classified incorrectly as residents are subject to reclassification and to payment of all nonresident fees not paid. If incorrect classification results from false or concealed facts by the student, the student also is subject to University discipline. Resident students who become nonresidents must immediately notify the Attorney in Residence Matters' Deputy.

Inquiries from prospective students regarding residence requirements for tuition purposes should be directed to the Attorney in Residence Matters; University of California; 590 University Hall; Berkeley, California 94720. No other University personnel are authorized to supply information relative to residence requirements for tuition purposes. Any student, following a final decision on residence classification by the Residence Deputy, may make written appeal to the Attorney in Residence Matters at the above address within 120 days after notification of the final decision by the Residence Deputy.
Index

Absences, 16
Academic disqualification, 16
Academic probation, 16
Academic residence, 20
Academic Senate, 9

degrees for members of, 21

Admissions, living, 29
Academic Senate, 9

Absences. 16
Academic residence, 20
Academic probation, 16

Advisers, faculty; see your college, school,

Afro-American Studies, department of, 96

Air Force ROTO Program, 29, 262

Alumni Association, 34
American History and Institutions requirement, 17
Anatomy; see Physiology-Anatomy, department of

Ancient History and Mediterranean Archaeology, 22, 98
Anthropology, department of, 98

Applicants, faculty; see your college, school,

department, or program listing of advisers (which
follows faculty roster)

for foreign students, 13

graduate, 19
Aerospace Studies, department of, 29, 262

AlfaDelta, 170
Alumni Association, 34
American History and Institutions requirement, 17
Anatomy; see Physiology-Anatomy, department of

Architecture, department of, 82
Architecture, Landscape, 88
Architecture, Naval, department of, 57, 79

Army ROTC Program, 29, 263
Art, Practice of, and History of Art, 102

Practice of Art, department of, 102
History of Art, department of, 103
Art Galleries, 105

Art Museum, University, 31, 105

Arts and Lectures, Committee for, 33
Asian American Studies Program, 252
Asian Studies, Group in, 22, 105

Assistantships, research or teaching, 26

Associations, 25
Astronomy, department of, 107

ASUC, 32
Athletic Privilege Cards, 35

Bachelor of Arts degree, university requirements, 17
college and school requirements, 18
Bacteriology and immunology, department of, 108

Bancroft Library, 30
Berkeley campus, 9

Bibliography, 219
Bioengineering, 58
Biochemistry, Comparative, Group in, 22, 225

Biochemistry, department of, 110
Bioenergetics Program, 227
Biogeography, Tropical, 27

Biology, department of, 111
Biology of Natural Resources Program, 223

Biostatistics, Group in, 22, 225

Biophysics Program, College of Natural Resources,
222, 225

Biophysics, Bioradiology, and Medical Physics, Group in, 22
Bioresource Science; see Biology of Natural Resources Program

Biosatistics, Group in, 22, 113
Botany, department of, 113

Buddhist Studies; see Religious Studies

Buddhist Studies, Group in, 22, 115
Business Administration, School of, 35, 38

research unit, 34

Calendar, 268
California Legal Residence, 12, 20, 270
Cancer Research Laboratory, 216
Candidacy
declaration of (undergraduate), 16
notice of intention (doctoral), 23
advancement to (master's), 21
 Candidates' (doctoral) degrees, 22

Career Planning and Placement Center, 29
Cell Physiology, department of, 222, 234

Ceramics; see Materials Science and Mineral

Engineering
Certificate in Russian and East European Studies,
Committee for, 23
Chancellors, 9, 266

Change of major, 16

Charter Day, 9
Chemical Engineering, department of, 43
Chemistry, Agricultural, Group in, 22, 222, 225, 234

Chemistry, College of, 35, 43
Chemistry, department of, 45, 115

Chicano Studies Program, 253
Child Care, 29
Chinese, 169

Christian Studies; see Religious Studies
City and Regional Planning, department of, 65
Civil Engineering, department of, 53, 60

Classical Studies in Rome, Intercollegiate Center for,
110

Classics, department of, 115
Clubs, special interest, 33
College of California, 9
College Entrance Examination Board, 10
Colleges, Schools, and Special Studies, 35

Collegiate Seminar Program, 250
Community Projects Office, 33
Comparative Biochemistry, Group in, 22, 225
Comparative Literature, department of, 119

Comparative Pathology, Group in, 22
Computer Services and Computer Facilities and
Operations, 30
Computer Science, division of, 53, 69, 121

Conduct, Student, 16
Conservation of Natural Resources Program, 223,
227

Conservation and Resource Studies, department of,
221, 228

Counseling Center, 28

Course numbering, explanation of, 37
Courses and Curricula, 37

Courses, repetition of, 14

Courses and units, 13

Cowell Memorial Hospital, 28
Credit, 15
by examination, 15, 21
passed or not passed, 15

transfer from other institutions, 21
satisfactory or unsatisfactory, 15, 21

Cuneiform, 166

Dance; see Dramatic Art

Dance, Lectures, Music, Drama, Debate, 33

Deans, 266

Debate, Lectures, Music, Drama, Debate, 33
Declaration of major, 16

Defense Language Institute at Monterey, 24

Degrees; see bachelor's, master's, doctor's,

for Academic Senate members, 21
declaration of candidacy, 16
duplication of higher degrees, 21
graduate, 21

progress toward, 16

residence requirement for, 16

university requirements, 17

Design, Visual, Program in, 90
Design and Lighting; see Dramatic Art

Development Studies, 122

Dietetics, 224

Dining facilities, 30

Directing; see Dramatic Art

Dismissal, academic, 16

Dismissal for academic deficiencies (graduate), 20
Doctoral Program, Ad Hoc Interdisciplinary, 227

Doctor's degree; see also requirements in various
departments, 21

Drama, Lectures, Music, Dance, Debate, 33

Dramatic Art, department of, 122

Dravidian, 207

Dutch Studies, 125, 144, 145

Earth Science, 140

Earthquake Engineering, 58

East European Studies, 125, 200

East European Studies, Committee for Certificate in

Russian and, 23

Earthquake Engineering, 58
East European Studies, 125, 200
East European Studies, Committee for Certificate in
Russian and, 23
Immunochemistry, Bacteriology and, department of, 108
Immunology, Group in, 22
Indian Civilization; see South and Southeast Asian Studies
Indonesian/Malay, 208
Industrial Engineering and Operations Research, department of, 55, 71
Intercampus Exchange Program, 24
Intercampus transfers, 11
Interdepartmental Studies, 258
Interdisciplinary Doctoral Program, Ad Hoc, 227
Interdisciplinary Groups, 22
International Education, 262
International House, 29
Internship/Study Opportunities in Professional Programs, 25
Iranian, Persian and, 167
Islamic Studies; see Religious Studies
Italian, department of, 149
Japanese, 170
Jewish Studies; see Religious Studies
Joint doctoral programs, 27
Journalism, School of, 35, 90
Korean, 170
Laboratories, centers, institutes, 9, 33
Landscape Architecture, department of, 88
Language Laboratory, 30
Language, foreign (Graduate), Training in, 23
Languages and Literatures, Romance, Group in, 23
Latin, 117
Latin American Studies, Sponsoring Committee for, 23
Latin, 117
Law, School of, 35, 92
research units, 34
Lawrence Berkeley Laboratory, 31, 34
Lawrence Hall of Science, 31
Lectures, Music, Drama, Dance, Debate, 33
Legal residence, 12, 20
Legal studies, 150
Letters and Science, College of, 35, 95
research units, 34
Libraries, 29, 30
Library and Information Studies, School of, 35, 219
research units, 34
Limited status admission, 12
Linguistics, department of, 151
Lithuanian; see Slavic Languages and Literatures, department of, 200
Living accommodations, 29
Logic and the Methodology of Science, Group in, 22, 152
Lost and found service, 35
Lowie Museum of Anthropology, 32
Minor, declaration and change of, 16
Minor, The, and The Department, 16
Malay/Indonesian, 208
Marine Corps ROTC Program, 29, 264
Master's degree see also various departments, 21
Materials Science and Mineral Engineering, department of, 56, 73
Mathematics, department of, 153
Mechanical Engineering, department of, 56, 76
Medical Physics, division of, 158
Medieval Studies, 159
Medieval Studies, Committee on, 22
Mediterranean Archaeology, Ancient History and, 22, 98
Metallurgy: see College of Engineering
Microbiology, Group in, 22
Midterm and Final Examinations, 15
Military Affairs, 262
Military Officers' Education Program, 29, 262
Military Science, department of, 263
Minimum Scholarship Requirements, 16
Minority Program, Graduate, 26
Moffitt Library, 30
Molecular Biology, department of, 159
Morrison Library, 30
Museum, Lowie, of Anthropology, 32
Museum of Paleontology, 171
Music, Lectures, Drama, Dance, Debate, 33
Music, department of, 160
National Defense Education Act Fellowships, 25
Native American Studies Program, 255
Natural Resources, College of, 35, 221
research units, 34
departments and programs
Ad Hoc Interdisciplinary Doctoral Program, 227
Agricultural Chemistry, Group in, 22, 222, 225, 234
Agricultural and Resource Economics, department of, 222, 225, 234
Bioenergetics, 227
Biological Science, department of, 222, 234
Biophysics Program, 222, 225
Cell Physiology, department of, 222, 234
Comparative Biochemistry Program, 22, 225
Conservation of Natural Resources Program, 223, 227
Conservation and Resource Studies, department of, 221, 228
Entomological Sciences, department of, 222, 225, 234
Food, Nutrition, and Dietetics Program, 224
Food Science Program, 225
Forestry Program, 224, 229
Forestry and Conservation, department of, 222, 235
Forestry and Resource Management, department of, 221
Genetics, department of, 137, 222, 230, 236
Graduate Advisers, 227
Nutritional Sciences, department of, 222, 226, 231, 237
Parasitology Program, 226
Parasitology, Plant, department of, 222, 226, 232, 237
Persian and Iranian, 167
Pest Management Program, 224, 232
Pet Clinic, 29
Philology, Romance, Group in, 23
Philosophy, department of, 172
Physical Education, department of, 174
Physical Science, field major in, 175
Physically Disabled Students Program, 29
Physics, department of, 176
Physiological Optics, 239
Physiological Optics, Group in, 22
Physiology-Anatomy, department of, 179
Plant Nutrition Program, 232
Plant Nutrition, Soils and, department of, 223, 236
Plant Pathology, department of, 222, 226, 232, 237
Plant Physiology, Group in, 22, 223, 226
Playwriting; see Dramatic Art
Police, University, 34
Political Economy of Industrial Societies, 181
Political Economy of Natural Resources, 224, 233
Political Science, department of, 182
Portuguese, department of Spanish and, 208
Postdoctoral Fellows and Visiting Scholars, 24
Press, University, 34
Preventive Veterinary Program, 224
Psychiatry, 28
Psychology, department of, 187
Public Affairs; see Public Policy
Public Health, School of, 35, 240
research unit, 34
Wildland Resource Science Program, 227
Wood Science and Technology Program, 225, 227, 234
Naval Architecture, department of, 57, 79
Naval Science, department of, 29, 264
Navy ROTC Program, 29, 264
Near Eastern Religions, 25, 164
Near Eastern Studies, department of, 163
Neurobiology, Group in, 22, 168
Nondiscrimination policy, 270
Nonresidents, 10
Admission in advanced standing, 11
Tuition, 35
Ocean Engineering, 59
Ombudsperson, Office of, 28
Operations Research, Industrial Engineering and, department of, 55, 71
Optometry, School of, 35, 238
Optometry Clinic, 28
Organizations and activities, student, 32
Oriental Languages, department of, 169
Paleontology, department of, 171
Paleontology Museum, 171
Parasitology Program, 226
Parasitology, Group in, 22
Passed or not passed grades, 15
Pathology, Comparative, Group in, 22
Pathology, Plant, department of, 223, 226, 232, 237
Persian and Iranian, 167
Pet Management Program, 224, 232
Pet Clinic, 29
Philology, Romance, Group in, 23
Philosophy, department of, 172
Physics, department of, 174
Physical Education, department of, 174
Physical Science, field major in, 175
Physically Disabled Students Program, 29
Physics, department of, 176
Physiological Optics, 239
Physiological Optics, Group in, 22
Physiology-Anatomy, department of, 179
Plant Nutrition Program, 232
Plant Nutrition, Soils and, department of, 223, 236
Plant Pathology, department of, 223, 226, 232, 237
Plant Physiology, Group in, 22, 223, 226
Playwriting; see Dramatic Art
Police, University, 34
Political Economy of Industrial Societies, 181
Political Economy of Natural Resources, 224, 233
Political Science, department of, 182
Portuguese, department of Spanish and, 208
Postdoctoral Fellows and Visiting Scholars, 24
Press, University, 34
Preventive Veterinary Program, 224
Psychiatry, 28
Psychology, department of, 187
Public Affairs; see Public Policy
Public Health, School of, 35, 240
research unit, 34
In preparing this GENERAL CATALOG, the Berkeley Office of Publications attempts to present information in a form that will satisfy the needs of the majority of recipients. If you would care to offer comments on how better to present this information, please send your suggestions to:

Senior Editor
Office of Publications
University of California
2120 Oxford Street
Berkeley, California 94720