FNR 539 Graduate Internship in Forest Resources (1–9)
Application of theory to the solution of problems of forest resources or related businesses in the field. Analyze specific management problems and perform general management assignments detailed in a contract between the student, the firm or organization, and the faculty advisor before the internship commences. Degree credit limited to 6 units. Prerequisite: Consent of internship instructor.

FNR 570 Selected Topics in Forest Resources (1–4)
Directed group study of selected topics for advanced students. Class Schedule will list topic selected. Total credit limited to 12 units. 1–4 seminars. Prerequisite: Graduate standing or consent of instructor.

FNR 571 Selected Topics in Forest Resources Laboratory (1–4)
Directed group laboratory of selected topics for advanced students. Class Schedule will list topic selected. Total credit limited to 12 units. 1–4 laboratories. Prerequisite: Graduate standing or consent of instructor.

FNR 575 Applications in Advanced Watershed Hydrology (2)
Techniques and applications in watershed hydrology to real-world projects. Projects could include water quality or quantity assessments, water quality or channel morphology monitoring, and structural and non-structural enhancements for channel and upland watersheds, culminating in a final report and presentation. 2 laboratories. Prerequisite: FNR 420 and graduate standing, or consent of instructor.

FNR 581 Graduate Seminar in Forestry and Environmental Sciences (3)
Student study and presentation of selected developments, trends and problems in the field of forest and natural resources. 3 seminars. Prerequisite: Graduate standing or consent of instructor.

FNR 599 Thesis (1–9)
Individual research in forest or natural resources management under the general supervision of faculty, leading to a graduate thesis. Degree credit limited to 9 units. Prerequisite: Graduate standing and consent of instructor.

FORL–FOREIGN LANGUAGE

FORL 101, 102, 103 Foreign Language I, II, III (4) (4) (4)
Organized group instruction arranged for students who wish to acquire basic skill in a foreign language indicated by subtitle. Laboratory drill required. Language taught in its cultural context. To be taken in numerical sequence. 3 lectures, 1 activity.

FORL 121, 122 Intermediate Foreign Language I, II (4) (4)
Review of grammar in a foreign language. Practice in writing, speaking and listening and oral expression within a cultural context. To be taken in numerical sequence. 3 lectures, 1 activity. Prerequisite: FORL 103 or consent of instructor.

FORL 200 Special Problems for Undergraduates (1)
Individual investigation, research, studies, or surveys of selected problems at the lower division level. Class Schedule will list topic selected. Total credit limited to 8 units per quarter. Prerequisite: Consent of instructor.

FORL 210 Introduction to Research Methods and Literary Criticism (4)
Methods and techniques of doing research. Critical thinking and library research in languages other than English. Introduction to the most important philosophical and theoretical schools of thought, as seen and applied in academic research. 3 lectures, 1 activity. Prerequisite: GE A1.

FORL 400 Special Problems for Advanced Undergraduates (1–2)
Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 8 units. Prerequisite: Consent of department head.

FORL 460 Senior Project (4)
Selection and completion of a project under faculty mentorship. Projects represent individual, well-defined problems and potential solutions that reflect pertinent scholarly activity in the field of modern languages and literatures, with special emphasis on one of the languages/cultures taught in the department. Total credit limited to 4 units. Prerequisite: FORL 210, advanced composition in primary or secondary language, senior status and consent of instructor.

FORL 470 Selected Advanced Topics (4)
Directed group study of selected topics for advanced students. Total credit limited to 8 units. 4 lectures. Prerequisite: Consent of instructor.

FR–FRENCH

FR 101, 102, 103 Elementary French I, II, III (4) (4) (4)
For beginners. Class practice and assigned outside work in pronunciation, sentence structure, reading, writing, and basic conversation. Laboratory drill required. Language taught in its cultural context. Credit not available for students who have completed FR 104. To be taken in numerical sequence. 3 lectures, 1 activity.

FR 121, 122 Intermediate French I, II (4) (4)
Review of French grammar and practice in writing and oral expression within a cultural context. To be taken in numerical sequence. 3 lectures, 1 activity. Prerequisite: FR 103 or consent of instructor.

FR 233 Critical Reading in French Literature (4) GE C1
Selected readings in French from major Francophone authors that illustrate the French literary tradition from the Middle Ages to the present in both France and other French-speaking countries. 4 lectures. Prerequisite: Completion of GE Area A, and FR 122.

FR 301 Advanced French Composition and Grammar (4)
Oral and written development of structural grammar, syntax and complex components of French. Expansion of vocabulary and idiomatic expressions through text study. Translation from English to French and written composition. 4 lectures. Prerequisite: Consent of instructor.

FR 302 Advanced French Conversation and Grammar (4)
Topics focus on culture and selected grammar points. Outlines and/or abstracts constitute written assignments. Individual presentations to elicit spontaneous response. Group presentations to allow cooperative research and preparation. 4 lectures. Prerequisite: Consent of instructor.

FR 305 Significant Writers in French (4) GE C4
Critical analysis and oral discussion of poetry, essays, novels, and plays by selected French and Francophone writers. Class Schedule will list topic selected. Total credit limited to 12 units. 4 lectures. Prerequisite: Completion of GE Area A, and FR 233. Modern Languages and Literatures majors will not receive GE C4 credit.

FR 322 French Food in France (4)
(Also listed as FSN 322)
Blend of French language, culture, food preparation techniques, and basic food chemistry and nutrition. Total immersion in language and cooking: preparation of French food while interacting in French with classmates and instructors, in lectures, discussion, and laboratory. 3 lectures, 1 laboratory. Prerequisite: FR 103 or consent of instructor.

FR 350 French Literature in English Translation (4) GE C4
Selected works to be read by students in English translation. Critical analysis, interpretation, and comparison of works by significant French and/or Francophone writers. Lecture in English. Class Schedule will list topics selected. Total credit limited to 8 units. 4 lectures. Prerequisite: Completion of GE Area A and one course in Area C1. Modern Languages and Literatures majors will not receive GE C4 credit.

FR 470 Selected Advanced Topics (1–4)
Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class Schedule will list topic selected. Total credit limited to 8 units. 1 to 4 lectures. Prerequisite: Consent of instructor.
FRSC–FRUIT SCIENCE

FRSC 123 Beekeeping (3)
Studies and exercises in the handling of European honey bees with special reference to pollination of commercial crops. Hive processing and marketing. Hive inspection and disease detection. 2 lectures, 1 laboratory.

FRSC 132 Pomology (4)
Management of tree canopies. Physiological response of trees to pruning and light interception. Strategies to maximize orchard efficiency in pome and stone fruit production. 3 lectures, 1 laboratory. Prerequisite: HCS 120.

FRSC 133 Pomology (4)
Effects of crop level on fruit species. Management strategies for nuts and small fruits. 3 lectures, 1 laboratory. Prerequisite: FRSC 132.

FRSC 202 Enterprise Project (2–4) (CR/NC)
Beginning field experience in management of orchards and vineyards or stone fruit production. 3 lectures, 1 laboratory. Prerequisite: FRSC 231 or consent of instructor.

FRSC 210 Viticultural Practices (2)
Propagation, layout and planting of a new vineyard, including irrigation and trellis system installations and pest control. Total credit limited to 4 units. 2 activities.

FRSC 220 Viticulture/Enology Seminar (1) (CR/NC)
Guest speakers series on selected viticulture and enology topics. Repeatable for a maximum of 2 units. 1 seminar.

FRSC 230 California Fruit Growing (4)
Interrelationship of climate and cultural techniques on orchard productivity. California’s place in the international production-marketing scheme. Field trip required. Not open to students with credit in HCS 120. 3 lectures, 1 laboratory.

FRSC 231 Viticulture I (4)
Understanding of internal and external factors affecting vine productivity. Historical and international perspectives on grape growing. Vineyard production strategies. 3 lectures, 1 laboratory.

FRSC 233 Viticulture II (4)
Factors influencing vine physiology and wine grape quality. Recent advances in irrigation strategies, canopy management, and pest control. Budgets for profitable operation and mechanized viticulture. 3 lectures, 1 laboratory. Prerequisite: FRSC 231.

FRSC 342 Citrus and Avocado Fruit Production (4)
World citrus and avocado production and marketing. Grove management techniques. Relationship of environment to species, cultivar, and rootstock selection. Field trip to a major California production area required. 3 lectures, 1 laboratory. Prerequisite: HCS 120 or FRSC 230, or consent of instructor.

FRSC 402 Enterprise Project Management (2–4) (CR/NC)
Advanced experience in production of orchards and vineyards. Development of a plan for field operations, a marketing plan, and a budget. Management decision-making. Project participation is subject to approval by the department head and the Cal Poly Foundation. Degree credit limited to 4 units. Credit/No Credit grading only. 1 lecture, variable practicum. Prerequisite: FRSC 202, and consent of instructor.

FRSC 415 Grapevine Physiology (4)
Understanding of grapevine physiology, including anatomy, taxonomy, physiological growth processes, growth cycle phenology, bud break, flowering, fruit set, berry ripening. 3 lectures, 1 laboratory. Prerequisite: FRSC 231, FRSC 331 or consent of instructor.

FRSC 422 Tropical and Subtropical Crop and Fruit Production (4)
(Also listed as CRSC 422)
Production, distribution and utilization of major agronomic, vegetable, fruit and nut crops of economic importance in tropical and subtropical areas. Weather systems, climates, soils, and cropping systems of tropical and subtropical areas. Field trip required. 3 lectures, 1 laboratory. Prerequisite: 100/200-level plant production course, or consent of instructor.

FRSC 581 Graduate Seminar in Crop/Fruit Production (3)
(Also listed as CRSC 581)
Group study of current problems, trends and research results pertaining to production or marketing of field, vegetable or fruit crops. 3 seminars. Prerequisite: Graduate standing.

FRSC 599 Thesis in Fruit Science (1–9)
Systematic research of a significant problem in Fruit Science. Thesis will include problem identification, significance, methods, data analysis, and conclusion. Students must enroll every quarter in which facilities are used or advisement is received. Degree credit limited to 6 units. Prerequisite: Graduate standing and consent of instructor.

FSN–FOOD SCIENCE AND NUTRITION

FSN 101 Orientation to Nutrition (1) (CR/NC)
Understanding the depth and breadth of the Nutrition program. Emphasis on curriculum and career planning. Nutrition students are required to complete this course within their first year in the major. Credit/No Credit grading only. 1 lecture.

FSN 121 Fundamentals of Food (4)
Theoretical aspects and practical applications of the principles of food science and food preparation. 3 lectures, 1 laboratory.

FSN 125 Introduction to Food Science (5)
Basic principles of food science. Chemical, physical, and microbiological properties of foods. Ingredient properties, preservation, and processing. Overview of the commercial food processing industry at state and national levels. 4 lectures, 1 laboratory.

FSN 200 Special Problems for Undergraduates (1–3) (CR/NC)
Individual investigation, research studies, or surveys of selected problems. Total credit limited to 6 units, with a maximum of 3 units per quarter. Credit/No Credit grading only. Prerequisite: Consent of instructor.

FSN 201 Enterprise Project (1–4) (CR/NC)
Post-harvest processing of a high quality food product. Project participation is voluntary and subject to approval by the department head and the Cal Poly Foundation. Total degree credit for FSN 201 and FSN 401 combined limited to 12 units. Credit/No Credit grading only. Prerequisite: FSN 125 or FSN 230 or FSN 401 and consent of instructor.

FSN 204 Food Processing Operations (4)
Applied food manufacturing and processing technology emphasizing unit operations. Water removal in foods (dehydration, spray drying, vacuum concentration), heat removal (refrigeration, freezing), and osmotic preservation. Students produce processed foods in a pilot plant. 3 lectures, 1 laboratory. Prerequisite: FSN 125 or FSN 230.

FSN 210 Nutrition (4)
Introduction to the science of human nutrition. Nutrient structure, metabolism, and function in body systems. Application of nutrition science principles to promote optimal health. 4 lectures.

FSN 230 Elements of Food Processing (4)
Principles of food processing operations covering thermal processing, freezing, dehydration, fermentation and raw material handling. Overview of food technology, food quality, spoilage, packaging and label requirements. For non-Food Science majors only. Field trip may be required. 3 lectures, 1 laboratory.
FSN 244 Cereal and Bakery Science (4)

FSN 250 Food and Nutrition: Customs and Culture (4) GE D4 USCP
Anthropological perspective of traditional and contemporary food customs and culture. Major emphasis on U.S. cultures including Native American, Hispanic American, African American, and Asian American. Past and future developments in organic foods, junk foods and industrial foods. 4 lectures.

FSN 263 Professional Practice in Applied Nutrition (2)
Understanding professional roles in applied nutrition settings, including dietetics and community nutrition. Discussion of relevant nutrition-related laws, regulations, and codes, including ethics. Development of professional portfolios. 2 seminars. Prerequisite: FSN 101, FSN 210, and sophomore standing.

FSN 264 Survey of Food Chemistry (4)
Basic application of chemistry to food products. Role of chemical components of food and beverage formulations with focus on grape, wine, fermented and distilled products as well as fruit, vegetable and cereal products. 4 lectures. Prerequisite: CHEM 111 or equivalent.

FSN 270 Food and Wine Plant Sanitation (4)
Operational management of a food and wine plant sanitation program. Chemical and physical control of insects, rodents, and birds. Microbial sanitation operations. Government and legal issues affecting operations. Chemistry of detergents, surfactants and sanitizers. Design and construction of plants. Certified organic USDA requirements. 4 lectures. Prerequisite: FSN 125 or FSN 230, or consent of instructor.

FSN 275 Principles of Food Safety and Hazard Analysis (4)
Chemical, microbiological, and physical aspects of food safety are addressed especially with regard to establishment of safety programs for the food industry. In-depth coverage of hazard analysis and critical control points (HACCP). 3 lectures, 1 activity. Prerequisite: FSN 125 or FSN 230, or consent of instructor.

FSN 285 Certified Organic Food Processing Operations (2)
Certification and legal requirements for the processing of fruit, vegetable, wine, beer and distilled spirits as well as muscle foods. Basic principles of certified organic handling and process operations. 2 lectures. Prerequisite: FSN 125, FSN 230 or consent of instructor.

FSN 304 Advanced Culinary Principles and Practice (4)
Chemistry of starch, fat and proteins and its impact on texture, taste, flavor and appearance of food. Effects of microorganisms on changes of food during preparation and storage. Strong emphasis on baking technology. 3 lectures, 1 laboratory. Prerequisite: FSN 121, CHEM 111, or consent of instructor.

FSN 310 Maternal and Child Nutrition (4)
Nutritional needs and issues during pregnancy and lactation. Role of nutrition in normal development, from conception through adolescence. Current nutrition issues in maternal and child nutrition. 4 lectures, Prerequisite: FSN 210; sophomore standing.

FSN 311 Sensory Evaluation of Food (4)
Designed to help the food scientist solve typical sensory problems occurring in the food industry by using simple difference and scaling test designs; select appropriate panelists for specific sensory tests; and conduct such tests, analyze, interpret the results and write a report. 3 lectures, 1 laboratory. Prerequisite: STAT 218; FSN 230 for non-majors.

FSN 315 Nutrition in Aging (4)
Nutrition issues in the middle and later years. Changes in organ systems, nutrient needs, functional status, and food preferences as adults age.

Nutrition and chronic disease. Nutritional assessment and screening. Nutrition-related health care and social services. 4 lectures. Prerequisite: FSN 210; sophomore standing.

FSN 319 Food Technology for the Consumer (4) GE Area F
Overview of the science and technology used to produce the foods consumed on a daily basis. Food science, biotechnology, food law, processing, preservation, ingredient functionality, package label information, and food safety information. 3 lectures, 1 activity. Prerequisite: Completion of GE Area B, and junior standing.

FSN 321 Culinary Management: Principles and Practice (4)
Principles involved in the choice, purchase, and preparation of foods in a variety of settings. Application of culinary management principles in the use of time, energy and money. Planning, preparing, and serving meals with emphasis on nutritional, aesthetic, economic and cultural aspects of food. 3 lectures, 1 laboratory. Prerequisite: FSN 121, FSN 210.

FSN 322 French Food in French (4)
(Also listed as FR 322)
Blend of French language, culture, food preparation techniques, and basic food chemistry and nutrition. Total immersion in language and cooking: preparation of French food while interacting in French with classmates and instructors in lectures, discussion, and laboratory. 3 lectures, 1 laboratory. Prerequisite: FR 103 or consent of instructor.

FSN 323 Statistical Quality Control (3)
Application of statistical methods in quality control programs and evaluation of design and production in the food industry. Emphasis on role of statistical quality control in total quality management. Computer software will be utilized in statistical quality control processes. 3 lectures. Prerequisite: STAT 218 for Food Science majors and FSN 230 for non-majors.

FSN 328 Advanced Nutrition I (4)
Metabolism of carbohydrates, fats and proteins as it applies to human nutrition. Integration of metabolic pathways. 4 lectures. Prerequisite: FSN 210, CHEM 313/371, BIO 111/151.

FSN 329 Advanced Nutrition II (4)
Continuation of FSN 328. Biochemical and physiological functions of vitamins and minerals and their interaction with other nutrients. Quantitative analysis of nutrients in foods and assay of nutrients and other constituents in body fluids. 3 lectures, 1 laboratory. Prerequisite: FSN 328.

FSN 330 Introduction to Principles of Food Engineering (4)
Introduction to principles of food engineering and basic calculations needed for food plant operations. Unit conversions, material balance, heat balance, steam heating, psychrometry, vacuum and pressure. Field trip may be required. 3 lectures, 1 laboratory. Prerequisite: FSN 125, MATH 118 or equivalent, and PHYS 104, or consent of instructor.

FSN 334 Food Packaging (3)
Function of food packaging in food processing and preservation. Packaging materials and forms. Regulations and testing of food packaging material. Oral presentation required. 3 lectures. Prerequisite: FSN 125 and FSN 204.

FSN 335 Food Quality Assurance (4)
Chemical, microbiological, and physical methods of analyses of foods used in food quality assurance and product development laboratories. Organization and management of quality assurance and control programs. Development of food production standards and interpretation of specifications. Packaging and container evaluation. 3 lectures, 1 laboratory. Prerequisite: FSN 125 or FSN 230, junior standing or consent of instructor.

FSN 341 Wines and Fermented Foods (4)
(Also listed as WVIT 341)
Processing, manufacturing, historical and bio-technical applications of fermentation technology for the production of food products focusing on wine. Wines of the world, distilled beverages, beers, fermented dairy, vegetable and meat products important to the post-harvest economy of
California. Field trip may be required. 4 lectures. Prerequisite: Junior standing and completion of GE Area B.

FSN 342 Sensory Evaluation of Wine (4) (Also listed as WIVT 342)
Evaluation of wines using the techniques in sensory evaluation. Difference and rating tests; descriptive analysis and pairing of wine and food. 3 lectures, 1 laboratory. Prerequisite: FSN 341, STAT 218 or STAT 221, age 21 or older.

FSN 343 Institutional Foodservice I (3)
Principles of equipment selection and floor planning with emphasis on sanitation and safety. 2 lectures, 1 laboratory. Prerequisite: FSN 121 and junior standing.

FSN 344 Institutional Foodservice II (3)
Economic principles and problems involved in planning and preparing food using institutional equipment to meet specific product standards for large groups. 2 lectures, 1 laboratory. Prerequisite: FSN 321, FSN 343.

FSN 354 Packaging Function in Food Processing (3)
Basic food spoilage and preservation mechanisms. The role of food packaging in food processing. Package and food compatibility. For non-Food Science majors. 3 lectures. Prerequisite: Junior standing.

FSN 364 Food Chemistry (4)
Chemical and biochemical properties of food components. Basic principles of food enzymology and the chemical and biochemical changes occurring in food systems as a function of different food processing conditions. Mechanisms of reactions affecting food quality and nutritional value. Laboratory focus on assessment of food chemical systems. 3 lectures, 1 laboratory. Prerequisite: FSN 125 or FSN 230, CHEM 313.

FSN 368 Food Analysis (4)
Principles of chemical and biochemical methods and techniques for measuring food protein, carbohydrates, lipids, water, vitamins, minerals and other components of foods, wine analysis. Application of AOAC approved methods for determining nutrients as they relate to nutritional labeling legal requirements. 3 lectures, 1 laboratory. Prerequisite: FSN 364.

FSN 374 Food Laws and Regulations (4)
Federal, state, and local laws and regulations affecting the production, processing, packaging, marketing, and distribution of food. Emphasis on FDA, USDA and California codes. 4 lectures. Prerequisite: FSN 125; FSN 230 for non-Food Science majors.

FSN 400 Special Problems for Advanced Undergraduates (1–4) (CR/NC)
Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 6 units, with a maximum of 4 units per quarter. Credit/No Credit grading. Prerequisite: Consent of instructor.

FSN 401 Advanced Enterprise Project (1–4) (CR/NC)
Leadership responsibility on enterprise projects. Lead students, under the supervision of instructor, will be accountable for all phases of the project: scheduling times, securing raw product, record keeping, and marketing of the product. Total degree credit for FSN 201 and FSN 401 combined limited to 12 units. Credit/No Credit grading only. Prerequisite: FSN 201 and junior standing and consent of instructor.

FSN 408 Food Composition Science and Product Development (4)
Chemical and physical properties of food ingredients. Functionality of water, carbohydrates, proteins, lipids, additives and other food ingredients used in the formulation, development, and processing of foods. Product development processes from idea generation to marketing. 3 lectures, 1 laboratory. Prerequisite: FSN 364, CHEM 313, senior standing or consent of instructor.

FSN 410 Nutritional Implications of Food Industry Practices (4)
Methods for assessing nutritional quality of foods/diets. Nutrient databases for raw and processed foods. Effects of food industry practices (e.g., processing, fortification, new product development, biotechnology) on nutritional quality of foods/diets. Evolution of public policy. 4 seminars. Prerequisite: FSN 210; FSN 230 or one course in food processing; senior standing; or consent of instructor.

FSN 415 Nutrition Education and Communications (4)
Application of appropriate behavior and learning theories to bring about positive health outcomes in population groups. Use of effective techniques and materials. Computer-based technology to augment learning activities. 3 lectures, 1 laboratory. Prerequisite: FSN 328 and senior standing, or consent of instructor.

FSN 416 Community Nutrition (4)
Federal, state and local nutrition assessment activities and program services for at-risk populations. Emphasis on health promotion and disease prevention concepts. Develop skills in assessing community nutrition problems and planning service interventions. 4 lectures. Prerequisite: FSN 329 and senior standing, or consent of instructor. Recommended: FSN 310, FSN 315.

FSN 417 Nutrition Counseling (4)
Communication, behavioral, and counseling theories as they relate to nutrition counseling. Emphasis on development of skills to promote healthy eating behaviors. Examination of eating disorders and obesity, including preventative and therapeutic interventions. 4 lectures. Prerequisite: FSN 415, PSY 201/202.

FSN 420 Critical Evaluation of Nutrition Research (2)
Nutrition research terminology and methods, including the strengths and weaknesses of in vitro, animal, human observational, and human intervention studies. Critical evaluation and interpretation of nutrition research. Case studies of research supporting or refuting diet/health links. 2 seminars. Prerequisite: FSN 329, STAT 218, and senior standing.

FSN 426 Food Systems Management (4)
Principles of successful organization and management with their application to the effective operation of food service. Administrative responsibilities of the food service manager. Management theories and practice. Labor relations. Discipline and performance appraisal. 4 lectures. Prerequisite: FSN 344, or consent of instructor.

FSN 429 Clinical Nutrition I (4)
Application of the nutritional care process to physiological disorders which may alter nutritional requirements or require dietary modifications. Nutritional, hematological and immunological assessment. GI disorders, diabetes mellitus, electrolytes, acid-base balance, hydration and enteral and parenteral nutrition. 3 lectures, 1 laboratory. Prerequisite: FSN 328, ZOO 331, 332 (transfer equivalent ZOO 240, 241) and senior standing.

FSN 430 Clinical Nutrition II (4)
Application of the nutritional care process to physiological and metabolic disorders which may alter nutritional requirements or require dietary modifications. Respiratory diseases, burns, cancer, inborn errors of metabolism, pregnancy, cardiovascular disease, liver disease, AIDS, renal disease, and bariatric surgery. 3 lectures, 1 laboratory. Prerequisite: FSN 429.

FSN 440 Internship (1–12)
Career experience with private or public agencies. For Nutrition majors only. Total credit limited to 12 units. Maximum of 8 units may be applied toward degree requirements. Prerequisite: FSN 329, FSN 415 (or concurrent) and junior standing and consent of instructor.

FSN 444 Engineering Concepts in Food Processing (4)
Engineering concepts relevant to food processing. Heat transfer, evaporation, dehydration and refrigeration calculation principles. 4 lectures. Prerequisite: FSN 330, FSN 204; FSN 230 for non-Food Science majors.

FSN 461, 462 Senior Project I, II (2-3) (2-3)
Selection and completion of research related to the student's area of interest. Project requires a formal report which must follow departmental guidelines. Minimum of 120 hours required (Nutrition majors) or 180 hours (Food Science majors). Prerequisite: ENGL 148 and senior standing; also FSN 329 for Nutrition majors.
FSN 463 Undergraduate Seminar (1) (CR/NC)
Exploration of students' career opportunities and factors to be considered in career decisions. Credit/No Credit grading only. 1 seminar. Prerequisite: Junior standing.

FSN 464 Wine Chemistry and Analysis (4)
Chemical and biochemical analysis of wines using certified methods. Comparative analysis for alcohol, ash, reducing sugars, volatile acidity, color, anthocyanin, tannins, sulfur dioxide by spectrophotometric, gas chromatography and titration methods. 3 lectures, 1 laboratory. Prerequisite: FSN 264 for non-Food Science majors; FSN 364 for Food Science majors; or consent of instructor.

FSN 470 Selected Advanced Topics (1–4)
Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class Schedule will list topic selected. Total credit limited to 8 units. 1–4 lectures. Prerequisite: Senior standing.

FSN 471 Selected Advanced Laboratory (1–4)
Directed group laboratory study of selected topics for advanced students. Open to undergraduate and graduate students. Class Schedule will list topic selected. Total credit limited to 8 units. 1–4 laboratories. Prerequisite: Senior standing.

FSN 474 Advanced Food Processing (4)
Advanced topics in processing operations with emphasis on thermal processing. Non-traditional processing technology such as microwave, ionizing radiation, and Pascallization. Oral presentation required. 3 lectures, 1 laboratory. Prerequisite: FSN 444.

FSN 485 Cooperative Education Experience in Food Science and Nutrition (6) (CR/NC)
Part-time work experience with an approved Food Science or Nutrition firm engaged in production or related business, industry or governmental agency. Positions are paid and usually require relocation and registration in course for two consecutive quarters. Formal report and evaluation by work supervisor required. Total credit limited to 16 units. Degree credit limited to 6 units. Credit/No Credit grading only. Prerequisite: Sophomore standing and consent of instructor.

FSN 495 Cooperative Education Experience in Food Science and Nutrition (12) (CR/NC)
Full time work experience with an approved Food Science or Nutrition firm engaged in production or related business, industry or governmental agency. Positions are paid and usually require relocation and registration in course for two consecutive quarters. Formal report and evaluation by work supervisor required. Total credit limited to 16 units. Degree credit limited to 6 units. Credit/No Credit grading only. Prerequisite: Sophomore standing and consent of instructor.

FSN 500 Individual Study (1–6)
Advanced independent study planned and completed under the direction of a member of the department faculty. Total credit limited to 6 units. Prerequisite: Graduate standing, consent of supervising faculty member and graduate advisor.

FSN 501 Lipid Metabolism and Nutrition (3)
Digestion, absorption and metabolism of lipids with emphasis on lipoprotein metabolism, regulation of lipid metabolism, essential fatty acid requirements and functions. 3 seminars. Prerequisite: Graduate standing or consent of instructor.

FSN 540 Dietetic Internship Supervised Practice (10) (CR/NC)
Supervised practice at various nutrition therapy, foodservice management, and community nutrition sites. Total credit limited to 30 units, with a maximum of 10 units per quarter. Credit/No Credit grading only. Prerequisite: Acceptance into the Cal Poly, San Luis Obispo Dietetic Internship, a special session program in Continuing Education.

FSN 541 Dietetic Internship Seminar (2) (CR/NC)
A forum for dietetic interns to make presentations and share their experiences in their supervised practice. Total credit limited to 6 units. Credit/No Credit grading only. 2 seminars. Prerequisite: Acceptance into the Cal Poly, San Luis Obispo Dietetic Internship, a special session program in Continuing Education.

FSN 542 Dietetic Internship: Current and Emerging Issues (2) (CR/NC)
Presentation of various hot topics and emerging issues in nutrition therapy, foodservice management and community nutrition for enrichment of the internship experience. Credit/No Credit grading only. 2 lectures. Total credit limited to 6 units, with a maximum of 2 units per quarter. Prerequisite: Acceptance into the Cal Poly, San Luis Obispo Dietetic Internship, a special session program in Continuing Education.

FSN 570 Selected Topics in Food Science and Nutrition (1–4)
Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class Schedule will list topic selected. Total credit limited to 12 units. 1 to 4 seminars. Prerequisite: Graduate standing or consent of instructor.

FSN 571 Selected Advanced Laboratory in Food Science and Nutrition (1–4)
Directed group laboratory study of selected topics for advanced students. Open to undergraduate and graduate students. Class Schedule will list topic selected. Total credit limited to 8 units. 1–4 laboratories. Prerequisite: Consent of instructor.

FSN 581 Graduate Seminar in Food Science and Nutrition (3)
Current findings and research problems in the field and their application to food science and nutrition. Class Schedule will list topic selected. Total credit limited to 6 units with approval of advisor. 3 seminars. Prerequisite: Graduate standing or consent of instructor.

FSN 599 Thesis (1–6)
Individual research in food science and nutrition under faculty supervision leading to a graduate thesis of suitable quality. Total credit limited to 6 units. Prerequisite: Graduate standing and consent of instructor.

GEOG–GEOGRAPHY

GEOG 150 Introduction to Cultural Geography (4) GE D3
The interplay of cultures, places, and environments, with emphasis on the diversity, interrelationships, and spatial features of global cultures. Topics include characteristics and patterns of population, ethnicity, agriculture, geopolitics, language, religion, urbanization, industry, and folk and popular culture. 4 lectures.

GEOG 250 Physical Geography (4)
(Also listed as ERSC 250)
Addresses the origins and patterns of the earth's diverse assemblage of climates, landforms, biota and soils. A major focus on relationship between human cultures and these earthly environments. 4 lectures.

GEOG 300 Geography of the United States (4) GE D5
The population (including origin, ethnicity, migration, and distribution), land utilization, and economic development viewed against the background of the physical environment. Topically and regionally organized. Pervading themes include landscape evolution and alteration, regional cultural distinctiveness, and current problems. 4 lectures. Prerequisite: Completion of GE Areas A, D1 and D3. Social Sciences majors will not receive GE Area D5 credit.

GEOG 301 Geography of Resource Utilization (4) GE D5
A multicultural, world view of the interconnections of the following resource systems: food, energy, water, and non-fuel minerals. A pervading theme is the sustainability of these systems. 4 lectures. Prerequisite: Completion of GE Areas A, D2 and D3. Social Sciences majors will not receive GE Area D5 credit.

GEOG 308 Global Geography (4) GE D5
A regional examination of the interrelationships of global human cultures with their biophysical environments and with each other. Emphasis is placed on the origins of contemporary cultural landscapes and on their
utility for the understanding of international differences, interactions, and current events. 4 lectures. Prerequisite: Completion of GE Area A and two courses from Areas D1, D2, D3, D4. Social Sciences majors will not receive GE Area D5 credit.

**GEOG 317 The World of Spatial Data and Geographic Information Technology (4)**

GE Area F

(Also listed as BIO/FNR/LA 317)

Basic foundation for understanding the world through geographic information and the tools available to utilize spatial data. Application of Geographic Information Systems (GIS) and related technologies, including their scientific basis of operation. 3 lectures, 1 activity. Prerequisite: A course in computer science, completion of Area B, and junior standing.

**GEOG 318 Applications in GIS (3)**

(Also listed as LA/FNR 318)

ARC/INFO and ArcView Geographic Information System (GIS) computer software to explore environmental, natural resource, social and economic issues using spatial data. Develop and apply data base and software management competencies. 1 lecture, 2 laboratories. Prerequisite: Junior standing, computer literacy or consent of instructor.

**GEOG 325 Climate and Humanity (4)**

(Also listed as ERSC 325)

Geographic perspective on the interrelationships between climate and human cultures. Effects of people on climate and the influence of climate and weather upon human activities and behavior. Focus on global human conditions which are responsible for the alteration of climate and in turn are vulnerable to climate change. 4 lectures. Prerequisite: Junior standing or consent of instructor.

**GEOG 328 Geographic Applications in Remote Sensing (4)**

Introduction to the use of satellite imagery to analyze natural and human features on the earth. Geographic applications in geology, water, climate, vegetation, agriculture, and urban land use. Fundamentals of processing digital satellite images. Emphasis on bridging the earth and social sciences. 3 lectures, 1 activity. Prerequisite: GEOG 250 or consent of instructor.

**GEOG 333 Human Impact on the Earth (4)**

(Also listed as ERSC 333)

Global assessment of the impact of humans on the earth's vegetation, animals, soil, water and atmosphere. Emphasis on problems stemming from the interactions of human attitudes, technologies, and population with natural resources. 4 lectures.

**GEOG 340 Geography of California (4)**

Geographic analysis of the land and people of California. Patterns of physical environment, natural resources, history, settlement, ethnicity, economy, politics, and urban growth. Current issues in a national and global context. 4 lectures. Prerequisite: Junior standing.

**GEOG 360 Geography of Europe (4)**

The population, land utilization, and economic development viewed against the background of the physical environment. Topically and regionally organized. Pervading themes include landscape evolution and alteration, regional cultural distinctiveness, and current problems. Emphasis on Western Europe. 4 lectures. Prerequisite: Junior standing.

**GEOG 370 Geography of Latin America (4)**

Geographic analysis of Mexico, Central America, and South America. The patterns of physical environment, culture, economy, and development. The issues (local, regional, and global) that shape Latin America. 4 lectures. Prerequisite: Junior standing or consent of instructor.

**GEOG 414 Climatology (4)**

(Also listed as ERSC 414)

The earth's pattern of climates and the physical processes that account for them. Focus on interrelationships between climate and the physical/biological and cultural environments. Special emphasis on modern climate changes and their consequences. 3 lectures, 1 laboratory. Prerequisite: GEOG 250 or consent of instructor.

**GEOG 440 Geo-Social Applications in GIS (4)**

Applications in Geographic Information Systems (GIS) emphasizing research, methodologies, and career fields to geography, earth sciences, and the social sciences. 2 lectures, 2 laboratories. Prerequisite: GEOG/FNR/LA 318 or consent of instructor.

**GEOG 470 Selected Advanced Topics (1–4)**

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class Schedule will list topic selected. Total credit limited to 12 units. 1–4 lectures. Prerequisite: Consent of instructor.

**GEOL–GEOGRAPHY**

**GEOL 102 Introduction to Geology (4)**

GE B3

Processes responsible for the Earth's minerals, rocks, and structure surface features. Volcanism; mountain building; plate tectonics; weathering. Erosion and deposition by streams, glaciers, wind and waves. Geological resources, earth hazards, and interaction of man with global processes. 4 lectures.

**GEOL 200 Special Problems for Undergraduates (1-2)**

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisites: Consent of department chair.

**GEOL 201 Physical Geology (3)**

Processes responsible for the Earth's rocks, structural surface features, geologic hazards, and natural resources, with emphasis on interactions with human activities. 3 lectures. Prerequisite: MATH 119 or equivalent.

**GEOL 203 Fossils and the History of Life (4)**

GE B5


**GEOL 204 Geologic History of California (3)**

Development of California through geologic time. Where and why the rocks appeared. Movement on faults, and mountain building. Geologic processes at work today and yesterday. Relationship of California geology to the rest of the world. 3 lectures. Recommended prerequisite: GEOL 102 or GEOL 201.

**GEOL 205 Earthquakes (4)**

GE B3


**GEOL 206 Geologic Excursions (1) (CR/NC)**

Field trips to places of geologic interest. Class Schedule will indicate destinations. Students must provide their own transportation, food, and camping equipment. May be repeated for a maximum of 3 units provided field trips are taken to different locations. Credit/No Credit grading only. 1 laboratory. Recommended prerequisite or concurrent: GEOL 102 or GEOL 201 or GEOL 204.

**GEOL 207 Geology of the National Parks (3)**

Development through time of the rocks, structures, and landforms that are the major scenic elements of our national parks. Emphasis on national parks of the western states. 3 lectures. Recommended prerequisite: GEOL 102 or GEOL 201.

**GEOL 241 Physical Geology Laboratory (1)**

Properties and identification of minerals and rocks. Topographic maps and landform analysis. Geologic maps and interpretation of rock structure. 1 laboratory. Prerequisite or concurrent: GEOL 102 or GEOL 201.

**GEOL 305 Fundamentals of Seismology (4)**

GE B6

Theory of plate tectonics. Elastic waves in layered media. Principle of the seismometer. Seismic properties, structure and composition throughout the Earth. Intensity, magnitude, and seismic moment and energy calculations. Major California faults and earthquakes. Paleoseismology, forecasting and...
prediction. Analysis of ground motion. Resonance. Effects of ground shaking on structures and bodies of water. Earthquake safety. 3 lectures, 1 recitation. Prerequisite: PHYS 132.

GEOL 400 Special Problems for Advanced Undergraduates (1-2)
Individual investigations, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Consent of department chair.

GEOL 401 Field-Geology Methods (4)
(Also listed as ERSC 401)
Collecting and interpreting field-geologic data. Description of sedimentary rocks and construction of stratigraphic columns. Mapping geologic structures in the field. Surficial geologic stratigraphy and surficial geologic mapping. Understanding geologic processes through field study. Communicating results of field study. 1 lecture, 3 activities. Prerequisite: GEOL 102 or GEOL 201, GEOL 241, SS 223, SS 323.

GEOL 402 Geologic Mapping (4)
(Also listed as ERSC 402)
Bedrock geologic mapping on topographic maps and aerial photos. Surficial geologic mapping on topographic maps and aerial photos. Correlating and defining surficial geologic map units on the basis of soil development. Understanding landscape evolution using soil development activities. Prerequisite: ERSC/GEOL 401.

GEOL 415 Structural Geology (4)
Recognition, interpretation, and depiction of geological structures. Understanding rock deformation through the study of faults and folds. 3 lectures, 1 laboratory. Required weekend field trips. Prerequisite: GEOL 201, GEOL 241, ERSC/SS 223.

GER–GERMAN

GER 101, 102, 103 Elementary German I, II, III (4) (4)
For beginners. Class practice in pronunciation, sentence structure, reading, writing and basic conversation using the communicative approach. Laboratory drill required. Language taught in its cultural context. To be taken in numerical sequence. 3 lectures, 1 activity.

GER 121, 122 Intermediate German I, II (4) (4)
Review of German grammar and practice in writing and oral expression within a cultural context. To be taken in numerical sequence. 3 lectures, 1 activity. Prerequisite: GER 103 or consent of instructor.

GER 233 Critical Reading in German Literature (4) GE C1
Selected readings from major German authors that show the German literary tradition from the Middle Ages to the present in Germany, Austria, Switzerland, and or foreign writers in Germany. 4 lectures. Prerequisite: Completion of GE Area A, and GER 122.

GER 301 Advanced German Composition and Grammar (4)
Oral and written development of structural grammar, syntax and complex components of German. Vocabulary expansion and idiomatic construction. Written compositions. Translations to examine linguistic and semantic differences. 4 lectures. Prerequisite: Consent of instructor.

GER 302 Advanced German Conversation and Grammar (4)
Topics focus on culture and selected grammar points. Individual and group presentations and interaction using videos. 4 lectures. Prerequisite: Consent of instructor.

GER 305 Significant Writers in German (4) GE C4
Critical analysis and oral discussion of poetry, essays, novels, and plays. Class Schedule will list topic selected. Total credit limited to 12 units. 4 lectures. Prerequisite: Completion of GE Area A, and GER 233. Modern Languages and Literatures majors will not receive GE C4 credit.

GER 350 German Literature in English Translation (4) GE C4
Selected works to be read by students in English translation. Critical analysis, interpretation, and comparison of individual works by outstanding German, Austrian and Swiss writers. Lecture in English. Class Schedule will list topics selected. Total credit limited to 8 units. 4 lectures. Prerequisite: Completion of GE Area A, and one course in Area C1. Modern Languages and Literatures majors will not receive GE C4 credit.

GER 470 Selected Advanced Topics (4)
Directed group study of selected topics for advanced students. Open to undergraduates and graduate students. Class Schedule will list topic selected. Total credit limited to 8 units. 4 lectures. Prerequisite: Consent of instructor.

GRC–GRAPHIC COMMUNICATION

GRC 101 Introduction to Graphic Communication (3)
Graphic communication history, theory, processes, management and industry segments. Reproduction technology from a systems concept showing fundamental relationships between art and copy preparation and reproduction of print and digitally-imaged products and services. 3 lectures.

GRC 200 Special Problems for Undergraduates (1–2)
Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Consent of instructor.

GRC 201 Electronic Publishing Systems (3)
Significance, terminology, and components of electronic publishing systems. Current options for hardware and software used in the graphic communication industry and the advantages and disadvantages of the various options. PostScript and its role in electronic publishing. Evaluating and specifying an electronic publishing system. 2 lectures, 1 laboratory.

GRC 202 Image Capture and Manipulation (3)
Conventional and digital methods of image capture and manipulation for print and electronic media. Digital photography, scanning, photo-retouching, and color proofing. Photographic materials and equipment for graphic communication. Densitometry, light sources, exposure control, and color management systems. 2 lectures, 1 laboratory. Prerequisite: GRC 101 and either GRC 201 or GRC 377.

GRC 203 Electronic Prepress (3)
Terminology, materials, equipment, facilities and methods used in electronic prepress. File formats, fonts, imposition, trapping, screening, and platemaking. 2 lectures, 1 laboratory. Prerequisite: GRC 202.

GRC 204 Introduction to Printing Management (3)

GRC 211 Substrates, Inks and Toners (4)
Technical aspects of paper, other substrates, inks and toners used in the printing industry. Manufacture, application and interaction of these materials are examined in relation to particular processes and end use requirements. Hands-on use of computerized densitometers, spectrophotometers and performance testing equipment. 3 lectures, 1 laboratory. Prerequisite: GRC 101.

GRC 212 Substrates, Inks and Toners: Theory (3)
Technical aspects of paper, other substrates, inks and toners used in the printing industry. Manufacture, application, and interaction of these materials are examined in relation to particular processes and end use requirements. Credit not allowed for GRC majors. 3 lectures. Prerequisite: GRC 101.

GRC 218 Digital Typography and Electronic Copy Preparation (4)
History, development and application of typography in electronic text and display applications for cross media publishing. Type and electronic art preparation for offset, flexography, gravure, screen printing, digital and electronic means of publishing communication. 3 lectures, 1 laboratory. Prerequisite: GRC 101 and either GRC 201 or GRC 377.

2005-2007 Cal Poly Catalog
GRC 260 Introduction to Research Methods in Graphic Communication (3)
Introduction to research methods for preparing scholarly and defensible papers and projects, and in conducting qualitative and quantitative evaluations, testing and research in graphic communication. Methods covered include the Scientific Method, historical and descriptive research, questionnaires, Elite and Specialized Interviewing, content analysis, and sampling. Design of research projects for each method taught. 2 lectures, 1 activity. Prerequisite: GRC 101.

GRC 316 Flexographic Printing Technology (3)
Analysis of flexographic printing technology for newspapers, flexible packaging, label printing, folding and corrugated cartons. Applications of computers to the management and technical function of flexographic printing technology. 2 lectures, 1 laboratory. Prerequisite: GRC 211.

GRC 320 Implementing Quality Systems in the Graphic Arts (4)
Theory and practices of quality systems in the graphic arts industry. Emphasis on Deming Systems Thinking, Lean Manufacturing, Six Sigma, ISO, and Malcolm Baldrige. Quantifying customer expectations, specifications, standard operating procedures, SPC tools, and employee empowerment in the graphic arts. 3 lectures, 1 laboratory. Prerequisite: GRC 315 or GRC 328, and STAT 217.

GRC 322 Advanced Digital Typography (3)
Typography principles relating to print and electronic media. Electronic composition and font management with consideration for multimedia requirements. Technical problem solving related to browser and multiple viewing platforms. 2 lectures, 1 laboratory. Prerequisite: GRC 218 and GRC 338.

GRC 324 Binding, Finishing, and Distribution Processes (3)
Imposition techniques, cutting, and folding. Stitch, case and perfect binding techniques and applications. Operational and aesthetic uses of die cutting, scoring, creasing, foil stamping and embossing techniques. Fulfillment and mailing operations. Applications of computers to the management and technical function of binding; finishing and distribution. 2 lectures, 1 laboratory. Prerequisite: GRC 101.

GRC 325 Binding and Finishing Processes: Theory (2)
Imposition techniques, cutting, folding, book and publication binding. Stitch, case and adhesive binding techniques and applications. Technology and aesthetic uses of die cutting, scoring, creasing, foil stamping and embossing. Fulfillment and mailing operations. Applications of computers to the management and technical function of binding; finishing and distribution. Credit not allowed for GRC majors. 2 lectures. Prerequisite: GRC 101.

GRC 328 Sheetfed Printing and Platemaking (4)
Theory, practice and application of sheetfed lithographic printing and platemaking technology to commercial, book, advertising, catalog, packaging and reprographic segments of the printing industry. Computerized press controls and color measurement. Planning for lithographic plates. Step and repeat techniques for imposition. 3 lectures, 1 laboratory. Prerequisite: GRC 211.

GRC 329 Press Methods and Procedures for Web Offset and Gravure (3)
Introduction to web offset and gravure printing materials and equipment for newspapers, packaging, magazines, books, catalogs and commercial products. Planning and preparation of image carriers for gravure and web lithographic printing. Preparation and use of various lithographic plates and gravure cylinders. 2 lectures, 1 laboratory. Prerequisite: GRC 328.

GRC 331 Color Management and Quality Analysis (4)
Color perception, color measurement, and color management for print and digital media. Application of systems engineering concepts to color reproduction in the digital imaging and printing industry. Development of print quality judgment skills, with particular emphasis upon understanding market-dependent aspects of optimum color quality. 3 lectures, 1 activity. Prerequisite: GRC 202 and PSC 101.

GRC 337 Consumer Packaging (3)
Problem-solving strategies for package printing that integrate concepts from management, design and technology. Package manufacturing, function, quality, visual appeal, and economics are addressed. Consumer packaging industry. 2 lectures, 1 laboratory. Prerequisite: Junior standing or consent of instructor.

GRC 338 Digital Content Management and Variable Data Printing (4)
Advanced application of type arrangement, digital illustration, image capture and page layout. Digital content management strategies for print and electronic media including file management, database principles, archiving, document formats, variable data publishing, workflow analysis and repurposing. Technical and creative problem-solving for content production and management in print and web publishing. 3 lectures, 1 laboratory. Prerequisite: GRC 203.

GRC 339 Digital Design and Production for Multiple Media (3)
In-depth understanding of design and production as it relates to print and on-line digital media. Advanced production techniques in image editing and multimedia applications. Preparation and evaluation of computer-generated images. 2 lectures, 1 laboratory. Prerequisite: GRC 338.

GRC 357 Specialty Printing Technologies (3)
Specialty printing technologies as related to niche markets including garment decorating, signage, point of purchase displays, decals, and various forms of packaging. Digital file preparation and printing using special processes including screen printing, pad printing, and wide-format printing. 2 lectures, 1 laboratory. Prerequisite: GRC 101.

GRC 361 Marketing and Sales for Print and Digital Media (4)
Marketing and sales management for print and digitally-imaged products and services. Graph color communication market determination, market strategy, and implementation. Strategic sales management, personal selling, forecasting and planning. 3 lectures, 1 laboratory. Prerequisite: GRC 101.

GRC 377 Web and Print Publishing (4) GE Area F
Web and print publishing technology and its impact on society. The technologies of scanning, typography, graphics, layout, and design for print and World Wide Web publishing. Decision-making considerations. The application of scientific and mathematical principles to web and print publishing technologies. 3 lectures, 1 laboratory. Prerequisite: Completion of Area B and junior standing.

GRC 400 Special Problems for Advanced Undergraduates (1–2)
Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Consent of instructor.

GRC 402 Digital Printing and Emerging Technologies in Graphic Communication (3)
Application of digital printing including the study of marking engines, RIPs, and related technologies. Emerging graphic communication technologies that are impacting the methods and procedures of producing and distributing print media. Technological transitions and how to manage technological change. 2 lectures, 1 activity. Prerequisite: GRC 201.

GRC 403 Estimating for Print and Digital Media (4)
Estimating the cost of various kinds of print and digital products and services. Development of budgeted hour costs and production standards. Cost estimating methods for Print on Demand, VDP, sheetfed lithography, web site development, and wide-format output. Analysis of material, labor and other cost factors. 3 lectures, 1 laboratory. Prerequisite: GRC 315 or GRC 328.

GRC 411 Pricing, Costing and Web Print Estimating (4)
Graphic communication industry market trends. Marketing and pricing strategies for printing and digital products. Cost estimating for web printing. Company profitability using ratio analysis. Cost-effective techniques for graphic communication companies including data collection systems, management information systems, and innovative management practices. 3 lectures, 1 activity. Prerequisite: GRC 316.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
<th>Description</th>
<th>Prerequisites</th>
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<tbody>
<tr>
<td>GRC 421</td>
<td>Production Management for Print and Digital Media (4)</td>
<td></td>
<td>Production planning, scheduling, and control for print and digitally-imaged products. Equipment and inventory planning, resource optimization, and the application of quality management principles to the printing industry. 3 lectures, 1 activity. Prerequisite: GRC 315 or GRC 328, and MATH 117, MATH 118, or MATH 120.</td>
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<tr>
<td>GRC 422</td>
<td>Supervision and Personnel Issues for Print and Digital Media (4)</td>
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<td>Supervising employees and its application to human factors in the graphic communication profession. A total quality management approach is utilized emphasizing policy development, training, safety, motivation, quality specifications, ergonomics, ethical and legal issues in the printing industry. 3 lectures, 1 laboratory. Prerequisite: GRC 421.</td>
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<tr>
<td>GRC 429</td>
<td>Digital Media (3)</td>
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<td>Current digital media and electronic publishing systems, including CD ROM and Internet publishing. Industry standards such as XML, HTML, PostScript, and PDF. Multimedia authoring; current issues in digital media production and distribution. 2 lectures, 1 laboratory. Prerequisite: GRC 338.</td>
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<tr>
<td>GRC 431</td>
<td>Printing Plant Layout Analysis (3)</td>
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<td>Elements of printing plant site selections, equipment planning, inventory planning, and workflow optimization. Design and layout of printing plants for effective space utilization. Organization of plant services. 2 lectures, 1 activity. Prerequisite: GRC 421.</td>
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<tr>
<td>GRC 432</td>
<td>Imaging Systems Management (4)</td>
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<td>Management issues associated with the introduction and use of computerized electronic prepress systems. Strategic, technical, marketing, financial, production, operational, and personnel aspects of color prepress work in a capital-intensive environment. 4 lectures. Prerequisite: GRC 338.</td>
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<tr>
<td>GRC 439</td>
<td>Book Design Technology (4)</td>
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<td>Advanced creative problem-solving strategies associated with the technologies used in book design and production. Advanced techniques in page layout, design, typography, type specification and image manipulation as they relate to output technology. Content, format and distribution of print and electronic books. 3 lectures, 1 laboratory. Prerequisite: GRC 438.</td>
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<tr>
<td>GRC 440</td>
<td>Magazine and Newspaper Design Technology (4)</td>
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<td>Concept development of magazine and newspaper design technology. Design and technical considerations as they relate to output and rendering technology. Application of organizational structures such as grids, formatting and sequential design. Advanced techniques in digital information and image manipulation. Content, format and distribution of print and electronic magazines and newspapers. 3 lectures, 1 laboratory. Prerequisite: GRC 439.</td>
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<tr>
<td>GRC 451</td>
<td>Management Topics in Graphic Communication (3)</td>
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<td>Current trends and practices in select graphic communication management topics. Open to undergraduate and graduate students. Class Schedule will list topic selected. Total credit limited to 12 units. 3 lectures. Prerequisite: GRC 101 and GRC 201.</td>
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<tr>
<td>GRC 452</td>
<td>Emerging Digital Topics in Graphic Communication (3)</td>
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<td>Current trends and practices in select graphic communication emerging digital topics. Open to undergraduate and graduate students. Class Schedule will list topic selected. Total credit limited to 12 units. 3 lectures. Prerequisite: GRC 101 and GRC 201.</td>
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<tr>
<td>GRC 453</td>
<td>Design Reproduction Topics in Graphic Communication (3)</td>
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<td>Current trends and practices in select graphic communication design reproduction topics. Open to undergraduate and graduate students. Class Schedule will list topic selected. Total credit limited to 12 units. 3 lectures. Prerequisite: GRC 101 and GRC 201.</td>
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<td>GRC 454</td>
<td>Research Methods in Graphic Communication (2)</td>
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<td>Research methods for preparing scholarly and defensible papers and senior projects, and in conducting qualitative and quantitative evaluations, testing, and research in graphic communication. Methods covered include statistical, historical, descriptive, questionnaires, interviewing, and sampling. 1 lecture, 1 activity. Prerequisite: Senior standing and STAT 217.</td>
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<tr>
<td>GRC 461</td>
<td>Senior Project (3)</td>
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<td>Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in formal report. Minimum 90 hours total time. Prerequisite: GRC 460.</td>
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<td>GRC 470</td>
<td>Selected Advanced Topics (1–4)</td>
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<td>Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class Schedule will list topic selected. Total credit limited to 8 units. 1–4 lectures. Prerequisite: Consent of instructor.</td>
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<tr>
<td>GRC 472</td>
<td>Applied Graphic Communication Practices (2)</td>
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<td>Application of theories and practices to University Graphic Systems as they apply to commercial printing, publication printing, digital media and newspaper industries. Major credit limited to 4 units; total credit limited to 18 units. 2 lectures. Prerequisite: GRC 101.</td>
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<tr>
<td>GRC 473</td>
<td>Applied Graphic Communication Management Practices (2)</td>
<td></td>
<td>Management theories and practices in the graphic communication industry. Application of theories and practices to University Graphic Systems as they apply to commercial printing, publication printing, digital media and newspaper industries. Major credit limited to 6 units; total credit limited to 18 units. 2 lectures. Prerequisite: GRC 472 and consent of instructor.</td>
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<tr>
<td>GRC 474</td>
<td>Cooperative Education Experience (6) (CR/NC)</td>
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<td>Part-time work experience in business, industry, government, and other areas of student career interest. Positions are paid and usually require relocation and registration in course for two consecutive quarters. Formal report and evaluation by work supervisor required. Total credit limited to 16 units. Credit/No Credit grading only. Prerequisite: Sophomore standing and consent of instructor.</td>
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<tr>
<td>GRC 475</td>
<td>Cooperative Education Experience (12) (CR/NC)</td>
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<td>Full-time work experience in business, industry, government, and other areas of student career interest. Positions are paid and usually require relocation and registration in course for two consecutive quarters. Formal report and evaluation by work supervisor required. Total credit limited to 16 units. Credit/No Credit grading only. Prerequisite: Sophomore standing and consent of instructor.</td>
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<tr>
<td>GRC 500</td>
<td>Special Problems in Document Systems Management for Graduate Students (2)</td>
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<td>Investigation, research, studies of problems in document systems management. Repeated course over four quarters working with University Graphic Systems, the Graphic Communication Institute at Cal Poly, and with individual faculty. Total credit limited to 8 units. Prerequisite: Second year MBA student, GRC 101 and GRC 201 or advisor approval.</td>
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<tr>
<td>GRC 505</td>
<td>Independent Study (2)</td>
<td></td>
<td>Advanced study planned and completed under the direction of the Director of Graduate Programs. Open only to graduate students who have demonstrated ability to do independent work. A formal written proposal must be accepted by the Associate Dean of OCOB Graduate Programs before work begins. Prerequisite: Graduate standing and formal petition with approval from the Associate Dean of OCOB Graduate Programs.</td>
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GSB 501 Individual Research (1-4)
Advanced individual research planned and completed under the direction of a member of the college faculty. Designed to meet the needs of qualified students who wish to pursue investigations which cannot be followed effectively in regularly offered elective courses. A formal written proposal must be accepted by the Associate Dean of OCOB Graduate Programs before work begins. Prerequisite: Graduate standing and formal petition with approval from the Associate Dean of OCOB Graduate Programs.

GSB 503 Collaborative Industry Project (1-8)
Collaborative business project with a client organization that allows graduate level students the opportunity to apply knowledge, skills and competencies to address a business problem. Small teams work in collaboration with a client organization and a faculty advisor. A formal written proposal must be accepted by the Associate Dean of OCOB Graduate Programs before work begins. The project may last up to one year. Prerequisite: Graduate standing and formal petition with approval from the Associate Dean of OCOB Graduate Programs.

GSB 511 Accounting for Managers (4)
Emphasis on development of the ability to read and interpret public and internal financial reports. Public reporting responsibilities of companies and management’s responsibilities for developing and maintaining effective internal control systems. 3 lectures, 1 activity. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 512 Quantitative Analysis (4)
Focus on a variety of statistical techniques that help to transform data into useful information that can be used to make informed business predictions and decisions. 3 seminars, 1 laboratory. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 513 Organizational Behavior (4)
Application of behavioral, social and organizational science concepts to management. Individual, team and organizational levels of analysis, including such topics as expectations, perception, motivation, communications, creativity, leadership, cultural and ethical behavior, group dynamics, team effectiveness, work design, organization change and development. 4 seminars. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 514 The Legal and Regulatory Environment of Business (4)
Legal and regulatory environment in which business operates. Consideration of historical, societal, and global perspectives reflecting political, social and/or economic beliefs and values. Strong emphasis on fundamental concepts of law and analytical tools to understand interaction between law, ethics and management decisions. 4 seminars. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 515 Organizational Information Systems (4)
Overview of information technology trends and implications. Information systems (IS) functions and organization. Strategic planning for information systems. Integration of IS plan with corporate strategy. IS administration and control. Management of IS development and computer operations. IS issues in a multinational environment. 3 lectures, 1 activity. Prerequisite: GSB 522 and graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 522 Advanced Management Information Systems (4)
Set of tools to ensure understanding of the strategies, tactics, and operations employed by managers to assimilate technology across their firms. Critical topics include alignment, partnership, technology, human resources, governance, communications, and metrics. 3 lectures, 1 activity. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 523 Managerial Economics (4)
Managerial economics, or microeconomics, focuses on private markets. Choices made by firms and consumers within topics that include demand, supply, efficiency, marketing structure, and government intervention. Development of an analytical framework for analyzing how these topics are important for managers. 4 lectures. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 524 Marketing Management (4)
Introduction to marketing management. Concepts and principles necessary to plan, direct and control the product, promotion, distribution and pricing strategies of the firm. 4 lectures. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 525 Project Management (4)
Focus on project management tools and processes required to establish priorities for and management of projects within normal and abnormal scope, money and time constraints. Planning, organizational and resource challenges common to a variety of project types. Product life cycle, normal operational, new product introduction and profit oriented product family projects reviewed in service and production environments. 3 lectures, 1 laboratory. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 526 Knowledge Management and Business Intelligence (4)
Relationships among knowledge management (KM), knowledge organizations and knowledge workers. Mapping of the field of knowledge management and exploration of the nature and key features of KM. Discussion of knowledge management and business intelligence central themes using case studies; alternative ways to design, implement and improve KM systems in organizations; business intelligence, decision support systems and data warehousing. Integration of querying, reporting, OLAP, data mining and data warehousing functions. 3 lectures, 1 activity. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 527 Management of Information Security (4)
Topics of information security and the need for security from a managerial perspective. Legal, ethical and professional information security issues. Planning for security and contingency considerations. Business policies and programs for organizational security. Risk management and control as mechanisms for protection. Examples of information security issues and practices implemented in today’s business environment. 3 lectures, 1 activity. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 531 Managerial Finance (4)
Theories, practices and tools of corporate financial decision making. Topics include valuation of fixed income securities and stocks, capital budgeting, capital structure, dividends, and an overview of financial markets and institutions. Introduction to valuation of derivative securities, market efficiency, and agency costs. 4 seminars. Prerequisite: GSB 511 and graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 532 Strategic Information Systems (4)
Overview of information technology trends and implications. Information systems (IS) functions and organization. Strategic planning for information systems. Integration of IS plan with corporate strategy. IS administration and control. Management of IS development and computer operations. IS issues in a multinational environment. 3 lectures, 1 activity. Prerequisite: GSB 522 and graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 533 Aggregate Economics Analysis and Policy (4)
Development of the theoretical and empirical framework of the macroeconomy in which businesses must operate. Topics include GDP, inflation, unemployment, interest rates and monetary and fiscal policies. The dynamics of the macroeconomic environment over time. 4 lectures. Prerequisite: GSB 523 and graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 534 Production and Operations Management (4)
Introduction to the operations function and its interaction with other areas in an organization. Emphasis on strategic and tactical decisions to achieve competitive advantage in cost, delivery speed and reliability, quality, flexibility, and product innovation through manufacturing and services. 4 seminars. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 535 Advanced Accounting Process Analysis and Risk Assessment (4)
Contemporary topics associated with documenting and assisting risk, controls, and business processes. Topics include business objectives and organizational performance, risk identification and assessment, application...
of assessment techniques, and the role of accounting information systems in controlling transaction authorization. 3 seminars, 1 activity. Prerequisite: GSB 511 and graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 536 Advanced Financial Reporting Issues (4)
Comprehensive coverage of selected advanced financial accounting and reporting topics. Topics include restructuring charges, accounting for income taxes, pensions, leases, accounting charges, and consolidated statement topics. 4 seminars. Prerequisite: GSB 511 and graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 537 Corporate Governance in Ethical Organizations (4)
Coverage of mechanisms, at the firm level, that contribute to more effective corporate governance and ethical climate at publicly traded corporations. Topics include role of boards of directors, audit committees, structures and systems that affect ethical climate in organizations. 4 lectures. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 539 Graduate Internship in Business (2-8) (CR/NC)
Correlation of experience and academic knowledge. Placement in a supervised business or public organization. A formal written proposal must be accepted by the Associate Dean of OCOB Graduate Programs before work begins. Credit/No Credit grading only. Prerequisite: Graduate standing and formal petition with approval from the Associate Dean of OCOB Graduate Programs.

GSB 541 Federal Income Tax for Business (4)
An introduction to the principles of business taxation. Emphasis of the role taxes play in financial and managerial decision making and how taxes motivate people and institutions to engage in certain transactions and activities. 4 lectures. Prerequisite: GSB 511 and graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 554 Negotiation for Managers (4)
Negotiation concepts and practice in two-party and multiple-party situations faced by practicing managers. 4 seminars. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 560 Derivative Markets and Instruments (4)
Introduction to derivative markets and their key instruments. Application of financial theory to the problems of valuing derivative securities and the management of business risks with derivative instruments. Principal securities considered include forwards, futures, options, and swaps. 4 lectures. Prerequisite: GSB 531 and graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 562 Seminar in General Management and Strategy (4)
Changes, effective Spring '07. See Updates.
Application of interdisciplinary skills to business and corporate strategy formulation and implementation. Analysis of interdependence between external environments and internal systems. Focus on responsibilities, tasks, and skills of general managers. Case studies, group problem solving. Integrating course of MBA core curriculum. Course satisfies comprehensive examination requirement. 4 seminars. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 564 Entrepreneurial Finance (4)
The process of financing new and fast-growing firms. Preparation of pro forma financial statements for a new venture. Readings on the venture capital process, from seed capital through the initial public offering (IPO). Valuation of firms seeking venture capital, and those planning their IPO. Valuing convertible securities. Real options valuation. 4 lectures. Prerequisite: GSB 531 and graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 565 Services Marketing (4)
Service organizations such as financial services firms, professional services firms, and health care organizations. The distinctive approaches required for marketing strategies unique to service organizations and other business entities which define themselves from a services perspective. 4 seminars.

GSB 566 Product Management (4)
Issues which confront brand/product managers: includes content needed to design new product/brand marketing development programs. Appropriate for students pursuing product career paths in consumer/business/service sectors. 4 seminars. Prerequisite: GSB 524 and graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 567 Advanced Seminar in International Business Management (4)
Changes, effective Spring '07. See Updates.
Integration of management concepts within complex multinational organizations. Interdisciplinary approach to identifying and assessing multinational and global competitive environments and strategies; structuring and managing interdependent multinational operations; addressing conflicts between domestic and international policies and practices in multinational enterprises. Case studies, simulations, group analysis and problem solving. Course satisfies the culminating experience through the comprehensive examination option. 4 seminars. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 569 Managing Technology in the International Legal Environment (4)
Practical legal decisions required to conduct business for or with high technology companies. Methods to protect high technology developments in international markets, including copyrights, patents, trade secrets, trademarks and contracts. 4 seminars. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 570 Entrepreneurial Finance (4)
The steps in the marketing research process which include formulation of the research problem, situation analysis, qualitative data collection, questionnaire design, data collection and data analysis. 4 seminars. Prerequisite: GSB 524 and graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 571 Seminar in Labor-Management Relations (4)
The impact of unionized labor on management practice. Three challenges to management; namely, the organizing challenge, the negotiation challenge, and the grievance/arbitration challenge. 4 seminars. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.
of linear programming, simulations, network models, inventory models, 
PERT/CPM, and forecasting techniques. 3 seminars, 1 laboratory. 
Prerequisite: GSB 512 and graduate standing or approval from the 
Associate Dean of OCOB Graduate Programs.

GSB 578 International Business Management (4)
Managerial concepts and techniques appropriate for analysis and decision 
making within international businesses. Environmental and organizational 
factors influencing multinational operations. Assessing international market 
opportunities and entry modes. Complexities of multinational management 
strategy, structure and systems. 4 seminars. Prerequisite: Graduate standing or 
approval from the Associate Dean of OCOB Graduate Programs.

GSB 579 Manufacturing Strategy (4)
Strategic role of manufacturing in the overall corporate competitive 
strategy. Matching manufacturing capabilities and marketing needs, 
capacity planning, matching process technology with product requirements. 
Developing flexible capabilities, central to developing and implementing an 
effective manufacturing strategy. 4 seminars. Prerequisite: GSB 534 and 
graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 581 Advanced Marketing Seminar (4)
Product, branding, and pricing strategies: an in-depth understanding of new 
product development processes and strategy; analysis of the strategies and 
policies pursued by firms to build and sustain successful brands; an 
integrative framework for pricing decisions. 4 seminars. Prerequisite: GSB 
524 and graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 582 High-Technology Marketing (4)
Marketing as applied to high technology products, and the impact of high 
technology on the marketing effort. 4 seminars. Prerequisite: GSB 524 and 
graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 583 Management of Human Resources (4)
An overview of the major functional and support activities in the 
personnel/human resource field, including strategic human resource 
planning, job analysis, recruitment, selection, performance appraisal, 
compensation, employee rights, and employee safety and health. 4 
seminars. Prerequisite: Graduate standing or approval from the Associate 
Dean of OCOB Graduate Programs.

GSB 584 Corporate Financial Policy (4)
An overview of the factors that affect corporate financial decisions, 
including firms’ financing, investment and hedging policies. Factors 
included: taxes, transaction costs, contracting (between managers and 
shareholders, and between shareholders and other claimholders such as 
bondholders), and asymmetric information. 3 seminars, 1 activity. 
Prerequisite: GSB 531 and graduate standing or approval from the 
Associate Dean of OCOB Graduate Programs.

GSB 585 Investments and Portfolio Management (4)
The application of financial theory to the problems of investment 
management. Topics cover the valuation of basic financial instruments, 
portfolio optimization, risk management, asset allocation, the CAPM, 
and market efficiency. Required use of optimization software and writing 
spreadsheet programs. 4 seminars. Prerequisite: GSB 531 and graduate 
standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 586 Financial Markets and Instruments (4)
The form and function of major types of financial institutions and markets. 
Exposure of financial institutions to a wide variety of risks, the successful 
management of which is important for the growth and survival of these 
institutions (liquidity risk, interest rate risk, market risk, credit risk, off-
balance-sheet risk, and operating risk). In-depth exploration of the 
measurement and management of these risks. 4 seminars. Prerequisite: GSB 
531 and graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 587 International Financial Management (4)
The international aspects of corporate finance and investing. Balance of 
payments, foreign exchange with emphasis on exchange rate determination, 
external risk, hedging, and interest arbitrage, international money and 
capital markets, international financing, and international banking. 4 
seminars. Prerequisite: GSB 531 and graduate standing or approval from the 
Associate Dean of OCOB Graduate Programs.

GSB 589 Accounting Policy (4)
Role of management in establishing and directing accounting policy. 
Coverage includes the impact of management decisions on external 
reporting and taxes and the impact of financial reporting requirements on 
management decisions. 4 seminars. Prerequisite: GSB 511 and graduate 
standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 590 Designing and Managing Sociotechnical Systems (4)
Sociotechnical Systems (STS) thinking and methods, which examine the fit 
between the technical systems used by an organization and its human 
(social) system. Techniques for analyzing work in both routine and non-
routine business systems. 4 seminars. Prerequisite: Graduate standing or 
approval from the Associate Dean of OCOB Graduate Programs.

GSB 594  Management of Human Resources (4)
An overview of the major functional and support activities in the 
personnel/human resource field, including strategic human resource 
planning, job analysis, recruitment, selection, performance appraisal, 
compensation, employee rights, and employee safety and health. 4 
seminars. Prerequisite: Graduate standing or approval from the Associate 
Dean of OCOB Graduate Programs.

GSB 595 Managing Change (4)
The knowledge and the elementary skills/competencies needed to intervene 
in an organization in order to improve its effectiveness. Design and use of 
actions to improve organizational effectiveness. 4 seminars. Prerequisite: 
Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

GSB 596 Economic Forecasting (4)
Applications to business planning of selected economic forecasting 
techniques. Classical time series analysis, Box-Jenkins (ARIMA) models, 
leading indicators and input-output analysis. 3 seminars, 1 laboratory. 
Prerequisite: GSB 523, 533 and graduate standing or approval from the 
Associate Dean of OCOB Graduate Programs.

GSB 597 Seminar in Selected Economic Problems (4)
Selected economic problems analyzed at an advanced level in a particular 
field, such as international trade, public finance, urban, industrial 
organization or transportation. 4 seminars. Prerequisite: GSB 533 and 
graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

HCS–HORTICULTURE AND CROP SCIENCE

HCS 110 Orientation to Horticulture and Crop Science (2) (CR/NC)
Understanding the depth and breadth of horticultural and field crops, and 
plant protection. Examination of curricula within the department, including 
potential career opportunities. Introduction to both student and professional 
organizations and affiliations. Agricultural equipment and chemical safety. 
Required of all Horticulture and Crop Science students. Credit/No Credit 
grading only. 2 activities.

HCS 120 Principles of Horticulture and Crop Science (4)
Introduction to horticulture and crop science. Basic plant processes, 
classification, anatomy, physiology, and biotechnology. Effect of 
environment on plants and how we control it. Introduction to plant growth 
including propagation, media, irrigation, nutrition, management, harvest, 
and post harvest handling. People’s use of plants. Field trip required. 3 
lectures, 1 laboratory.

HCS 124 Plant Propagation (4)
Plant propagation practices with emphasis on understanding why practices 
are used, how they work, and how applied in commercial horticulture. 3 
lectures, 1 laboratory. Prerequisite: HCS 110, HCS 120, and BOT 121.
HCS 200 Special Problems for Undergraduates (1–4)
Individual investigation, research, studies, or surveys of selected problems. Total graduation credit limited to 4 units, with a maximum of 4 units per quarter. Report required. Prerequisite: Consent of department head.

HCS 304 Plant Breeding (4)
Principles and techniques used to develop new plant varieties. Sexual reproduction, inheritance, selection and biotechnology methods useful in breeding of plants. 3 lectures, 1 laboratory. Prerequisite: CRSC 131 and BIO 303.

HCS 327 Abiotic Plant Problems (3)
Diagnosis of physiological disorders associated with environmental and nutritional factors. Particular emphasis on the systematic inquiry process. Case histories, multimedia use. 2 lectures, 1 laboratory. Prerequisite: HCS 120, EHS 123, HCS 124, EHS 231, EHS 232, BOT 121, CHEM 111, SS 121.

HCS 339 Internship in Horticulture and Crop Science (1–12) (CR/NC)
Selected horticulture and crop science students will spend up to 12 weeks with an approved agricultural firm engaged in production or related business. Time will be spent applying and developing production and managerial skills and abilities. One unit of credit may be allowed for each full week of completed and reported internship. Degree credit limited to 6 units. Credit/No Credit grading only. Prerequisite: Consent of internship instructor.

HCS 400 Special Problems for Advanced Undergraduates (1–4)
Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 4 units per quarter. Report required. Prerequisite: Junior status or consent of department head.

HCS 410 Applied Plant Ecophysiology (4)
Ecological and physiological interactions associated with the production of agronomic and horticultural plants. Biochemical and physiological processes that elucidate the mechanism of whole plant and community performance. 3 lectures, 1 laboratory. Prerequisite: HCS 120; BOT 121, or BIO 325; and CHEM 312.

HCS 421 Postharvest Technology of Horticultural Crops (3)
Respiration, ethylene, ripening and senescence; survey of postharvest techniques to maximize commodity shelf-life. 3 lectures. Prerequisite: One production class in fruits, vegetables or ornamentals, or consent of instructor. Concurrent enrollment in HCS 425 required for Crop, Fruit and Environmental Horticulture Science majors only.

HCS 425 Postharvest Technology of Horticultural Crops Lab (1)
Determining maturity; measurement of respiration, ethylene, humidity; packaging effects on commodity shelf-life; half-cooling time; chilling injury; maintaining quality of floral crops. Field trip to commercial postharvest facility required. 1 laboratory. Prerequisite: Concurrent enrollment in HCS 421.

HCS 461 Senior Project I (2)
Selection of a project under faculty advisor approval. Initial research and data gathering period for project information. Projects typical of problems which graduates must solve in their fields of study or employment. Project results are presented in a formal written report completed in HCS 462. Contract drawn up with approval of advisor. Minimum 60 hours. Prerequisite: All 100–200 level courses in curriculum; 135 units; ENGL 134, completion of GE Area A.

HCS 462 Senior Project II (2)
Continuation of Senior Project development. Write-up of rough draft and formal draft of project. Completion of formal written report under advisor supervision. Minimum 60 hours. Prerequisite: Completion of HCS 461 with a grade of C or better.

HCS 463 Senior Seminar (1)
Oral presentations by students and guest speakers on current topics in horticulture and crop science. 1 activity. Prerequisite: HCS 461.

HCS 470 Selected Advanced Topics (1–4)
Directed group study of selected topics for advanced students. Class Schedule will list topic selected. Total credit limited to 8 units. 1 to 4 lectures. Prerequisite: Consent of instructor.

HCS 471 Selected Advanced Laboratory (1–4)
Directed group laboratory study of selected topics for advanced students. Open to undergraduate and graduate students. Class Schedule will list topic selected. Total credit limited to 8 units. 1 to 4 laboratories. Prerequisite: Consent of instructor.

HCS 500 Individual Study in Horticulture and Crop Science (1–3)
Advanced independent study planned and completed under the direction of a member of the Horticulture and Crop Science faculty. Total credit limited to 6 units; may be repeated in same term. Prerequisite: Consent of department head, graduate advisor and supervising faculty member.

HCS 511 Ecological Biometrics (4) (Also listed as PPSC 511)
General survey of current analytical methodology available to ecological researchers to evaluate effects and assess the underlying mechanisms that drive natural and cultivated ecosystems. Methodology includes general linear models, ordination, survival analysis, multivariate analyses, and computer simulations. Student research used as a basis for instruction. Total credit limited to 8 units. 3 seminars, 1 activity. Prerequisite: Any one of the following statistical methods courses: CRSC 411, STAT 212, STAT 218, STAT 313, STAT 512, STAT 513 or consent of instructor.

HCS 539 Graduate Internship in Horticulture and Crop Science (1–9)
Application of theory to the solution of problems of agricultural production or related business in the fields of horticulture and crop science. Analyze specific management problems and perform general management assignments detailed in a contract between the student, the firm or organization, and the faculty advisor before the internship commences. Degree credit limited to 6 units. Prerequisite: Consent of internship instructor.

HCS 570 Selected Topics in Horticulture and Crop Science (1–4)
Directed group study of selected topics for advanced students. Class Schedule will list topic selected. Total credit limited to 12 units; may be repeated in same term. 1-4 seminars. Prerequisite: Graduate standing or consent of instructor.

HCS 571 Selected Topics Laboratory in Horticulture and Crop Science (1–4)
Directed group laboratory of selected topics for advanced students. Class Schedule will list topic selected. Total credit limited to 12 units; may be repeated in same term. 1-4 laboratories. Prerequisite: Graduate standing or consent of instructor.

HIST–HISTORY

HIST 110 Western Civilization: Ancient to Renaissance (4)
Beginnings of western civilization from the river valley societies of the Middle East, circa 3,000 BCE to the Renaissance in Western Europe to 1550 CE. Political, economic, social, intellectual, and artistic development of that period. 4 lectures.

HIST 111 Western Civilization: Reformation to Twentieth Century (5)
Development of western civilization from 1550 CE to 1900 CE. Comparison of liberal modernization of the West with the retarded, conservative modernization in Central, East and Southeast Europe. Development of political, economic, social, intellectual, and artistic developments of that period. Particular attention to understanding dynamics that produce pluralistic mass societies in the West and authoritarian mass societies elsewhere. 5 lectures.

HIST 200 Special Problems for Undergraduates (1–2)
Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Consent of department chair.
HIST 206 American Cultures (4)  GE D1  USCP
The social, cultural, constitutional, and political history of African American, Asian American, Native American, European American, and Latino/a men and women. 4 lectures.

HIST 207 Freedom and Equality in American History (4)  GE D1  USCP
The multiple and conflicting ways in which various Americans (defined in terms of race, class and gender) have struggled to formulate and promote their own understandings of freedom and equality, from the pre-conquest era to the present. 4 lectures.

HIST 213 Modern Political Economy (4)  GE D2
The relationship between states and economies in the modern period. Themes of modernization, industrialization, and colonial expansion. The major theories of political economy, especially liberalism and socialism. 4 lectures.

HIST 214 Political Economy of Latin America and the Middle East (4)  GE D2
Comparative examination of socio-economic structures of the Middle East and Latin America in the framework of global economy. Analysis of the historical context of integration of these two regions in the international economic system and the local reactions to the effects of global forces on national structures. 4 lectures.

HIST 215 Comparative World History (4)  GE D3
Interaction of selected traditional and modernizing non-Western cultures with Western industrial imperialism and its attendant economic, political, and cultural forces. Within this context, evaluation of both the nature of industrial imperialism and the way in which it influenced or interfered with the host culture. 4 lectures.

HIST 300 Junior Seminar (4)
Historical analysis of selected problems and topics for undergraduates. Seminar format; intense discussion of readings and issues. Class Schedule will list topic selected. Total credit limited to 8 units. 4 seminars. Prerequisite: Completion of GE Area A. Completion of two courses in lower-division Area D (preferably D2 and D3). Junior standing or consent of instructor.

HIST 303 Research and Writing Seminar in History (5)
Designed to develop student's ability to research and write an interpretive paper on a specific topic. Seminar participants practice the skills of library research, historical and historiographical analysis, and writing and revising. Paper in lieu of final examination. Class Schedule will list topic selected. 4 lectures and research project. Prerequisite: Completion of GE Areas A1 and A3, and junior standing or consent of instructor.

HIST 304 Historiography (4)
Theoretical approaches used to study the past, including scholarship on history and memory, the influence of interdisciplinary studies, the significance of race and gender as categories of analysis, and the place of history and the historian in contemporary society. 3 seminar meetings and research project. Prerequisite: HIST 303; junior standing or consent of instructor; and History major.

HIST 305 History of American Agriculture (4)
Agricultural development with emphasis upon economic, political and social implications. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 306 The Witch-Hunt in Europe, 1400-1800 (4)  GE D5
A history of the development of witchcraft ideas, persecutions, and skepticism in the western world from 1400 to 1800, focusing on the legal, economic, social, and intellectual currents that produced, fired, and eventually ended the phenomenon. 4 lectures. Prerequisite: Completion of GE Area A and two courses from Areas D1, D2, D3, D4. History majors will not receive GE Area D5 credit.

HIST 307 European Thought, 1800-2000 (4)  GE D5
Intellectual and cultural history of Europe from the nineteenth century to the present. Liberalism, radical thought, feminism, evolutionary theory, psycho-analysis, structuralism, existentialism, and postmodernism. 4 lectures. Prerequisite: Completion of GE Area A and two courses from Areas D1, D2, D3, D4. History majors will not receive GE Area D5 credit.

HIST 308 The Trans-Atlantic Slave Trade (4)  GE D5
The African, Islam and Euro-American dimensions of the trans-Atlantic slave trade, with focus on its varying roots, organization and impact on cross-cultural and global levels. 4 lectures. Prerequisite: Completion of GE Area A and two courses from Areas D1, D2, D3. History majors will not receive GE Area D5 credit.

HIST 309 Cultures of West Africa and the African Diaspora (4)  GE D5
The cultures of West African and the African Diaspora, with special attention to the intersection of Animist, Islamic and Western cultures, and the survival of African cultures in the Americas as manifested in the artistic, religious, literary, and other humanistic legacies of the African Diaspora. 4 lectures. Prerequisite: Completion of GE Areas A, D1 and D3. History majors will not receive GE Area D5 credit.

HIST 310 East Asian Culture and Civilization (4)  GE D5
The pre-modern and modern histories of China and Japan. Focus on the traditional era, the transition to modernity, cultural uniqueness within East Asian civilization, and western images of Asia. 4 lectures. Prerequisite: Completion of GE Area A and two courses from Areas D1, D2, D3, D4. History majors will not receive GE Area D5 credit.

HIST 311 Early Britain (4)
History of the British Isles from the reconstruction of Celtic history to the end of the Medieval epoch. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 312 Early Modern Britain (4)
History of the British Isles from the end of the Medieval epoch to the era of the American revolution, from Richard III to George III. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 313 Modern Britain: Industry, Empire and War (4)
History of the British Isles from the loss of the American colonies through the era of the World Wars and the dissolution of the British Empire. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 314 The Middle East (4)
Political, social, and economic development of the Middle Eastern countries in the context of regional history and international politics since the birth of Islam. Particular attention to the resurgence of religious movements and their connection with nationalism and anti-colonialism in the region. 3 lectures and research project. Prerequisite: Junior standing.

HIST 316 Modern East Asia (4)  GE D5
Modern histories of China, Japan and Korea: great disruptions of modernity that have transformed these societies, common characteristics of modernity in East Asia, great differences between Chinese, Japanese and Korean histories, and the mutually constitutive nature of these East Asian histories. 4 lectures. Prerequisite: Completion of GE Area A. Completion of two courses in lower-division Area D (preferably D2 and D3), or consent of instructor.

HIST 320 Colonial and Revolutionary America (4)  GE D5
Settlement and evolution of British America, background to the imperial dispute, events leading to the Revolution, Articles of Confederation, Constitution, the national economy, roles of and impact on African-Americans, women, Native Americans and Loyalists. 4 lectures. Prerequisite: Completion of GE Area D1 and completion of Area D2, Area D3, or Area D4. History majors will not receive GE Area D5 credit.
HIST 321 Civil War America (4)  GE D5
The experiences of nineteenth-century Americans. Focus on industrialization, antebellum reform, slavery, the Civil War battlefield and homefront, Reconstruction, and the creation of a New South. 4 lectures. Prerequisite: Completion of GE Area D1 and completion of Area D2, Area D3, or Area D4. History majors will not receive GE Area D5 credit.

HIST 322 Modern America (4)  GE D5
American history since 1900. Focus on domestic and foreign policy interactions, struggle of disenfranchised groups for social and political equality, and changes in culture and identity. 4 lectures. Prerequisite: Completion of GE Area D1 and completion of Area D2, Area D3, or Area D4. History majors will not receive GE Area D5 credit.

HIST 323 Versions of the Past: Novels, Comics and Movies (4)  GE D5
An introduction to historical novels, comics, movies, memoirs and autobiographies as forms of historical representation in the contemporary U.S. Exploration of the vision of American history that each work presents and the truth-claims made for that particular vision. 4 lectures. Prerequisite: Completion of two courses in lower-division GE Area D and completion of Area A; junior standing or consent of instructor.

HIST 324 The Historical Novel in the United States, 1960s to the Present (4)  GE D5
An introduction to the historical novel as it has developed in the United States since the 1960s. Exploration of how historical novels typically represent the past and the ways in which they change our notion of what counts as “history.” 4 lectures. Prerequisite: GE D1 and any other lower-division Area D course. History majors will not receive GE Area D5 credit. Change effective Winter 2007.

HIST 325 Industrialization and City Life: Nineteenth and Twentieth Centuries (4)  GE D5
The experiences of nineteenth and twentieth century. Historical development of economic structure and socio-political and cultural institutions in the region. 3 lectures and research project. Prerequisite: Junior standing.

HIST 326 Industrialization and City Life: Nineteenth and Twentieth Centuries (4)  GE D5
The experiences of nineteenth and twentieth centuries. Historical development of economic structure and socio-political and cultural institutions in the region. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 327 Medieval Europe (4)
Medieval Europe from the fall of Rome to the plague (400-1150 CE), with topics including the Barbarian Kingdoms, the early Church, Charlemagne, medieval art and Gothic architecture, Church fathers and Scholasticism, medieval philosophy, agricultural and commercial revolutions, and the Great Plague. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 328 Renaissance and Reformation Europe (4)
Europe from 1348 to 1620 CE, with topics including the urban milieu, Renaissance philosophy and artistic expression, the new prince, the educational revolution, the Renaissance Church, Martin Luther, Jean Calvin, and the monumental economic, social, and political changes of the sixteenth century. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 329 History of African-Americans from the Civil War to the present (4)
The political, economic, social developments in the eighteenth century. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 330 History of Central America (4)
Survey of Latin American history in the colonial period from 1492 to the early nineteenth century. Special attention to the indigenous cultures, the Iberian civilization, and the evolving relationship between them. 3 lectures and research project. Prerequisite: Junior standing.

HIST 331 History of Modern Latin America (4)
Social and political history of South America, Mexico, and Cuba during the nineteenth and twentieth centuries. Historical development of economic structure and socio-political and cultural institutions in the region. 3 lectures and research project. Prerequisite: Junior standing.

HIST 332 History of Modern Latin America (4)
Social and political history of South America, Mexico, and Cuba during the nineteenth and twentieth centuries. Historical development of economic structure and socio-political and cultural institutions in the region. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 333 African-American History from 1865 (4)  USCP
History of African-Americans from the colonial period to the Civil War, roughly 1619-1865. The slave trade, slavery in the colonies, plantation slavery, the Black West, and free Black culture and institutions. 3 lectures and research project. Prerequisite: HIST 206 or HIST 207; junior standing or consent of instructor.

HIST 334 History of African-Americans from 1865 (4)  USCP
History of African-Americans from the Civil War to the present. Reconstruction, racial segregation, the Harlem Renaissance, the Great Migration, the Civil Rights Movement, Black Feminism and Black Power. 3 lectures and research project. Prerequisite: HIST 206 or HIST 207; junior standing or consent of instructor.

HIST 335 Britain at War: The British, the Americans and the Struggle for Freedom, 1939-1945 (4)  GE D5
Historical examination of Great Britain’s challenge to its sovereignty and freedom by the regime of Nazi Germany from 1939-1945. An account of how Britain formed an alliance with the United States, and how that partnership forged a successful campaign that culminated in the survival of Britain and destruction of the Nazi regime. 3 lectures, 1 activity. Prerequisite: Limited to London Study students; completion of GE Area A; completion of two courses in lower-division Area D courses; junior standing or permission of the instructor.

HIST 336 History of Colonial Latin America (4)
Survey of Latin American history in the colonial period from 1492 to the early nineteenth century. Special attention to the indigenous cultures, the Iberian civilization, and the evolving relationship between them. 3 lectures and research project. Prerequisite: Junior standing.

HIST 337 History of Colonial Latin America (4)
Survey of Latin American history in the colonial period from 1492 to the early nineteenth century. Special attention to the indigenous cultures, the Iberian civilization, and the evolving relationship between them. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 338 History of Modern Latin America (4)
Social and political history of South America, Mexico, and Cuba during the nineteenth and twentieth centuries. Historical development of economic structure and socio-political and cultural institutions in the region. 3 lectures and research project. Prerequisite: Junior standing.

HIST 339 History of Modern Latin America (4)
Social and political history of South America, Mexico, and Cuba during the nineteenth and twentieth centuries. Historical development of economic structure and socio-political and cultural institutions in the region. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 340 History of Modern Latin America (4)
Social and political history of South America, Mexico, and Cuba during the nineteenth and twentieth centuries. Historical development of economic structure and socio-political and cultural institutions in the region. 3 lectures and research project. Prerequisite: Junior standing.

HIST 341 History of Modern Central America (4)
Political, social, and economic development of Central American countries in the context of regional history and international politics during the
HIST 381 Precolonial African History (4)
Survey of African history from earliest times. Ancient African civilizations, Moslem penetration, the rise of indigenous kingdoms and the continuous impact of Atlantic slave trade. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 382 Modern African History (4)
Survey of African in the 19th and 20th centuries including European colonialism, African resistance, the rise of African nationalism and problems since independence. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 383 History of American Thought (4)
Thought and culture in America since the Puritans. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 385 Topics in California History (4)
In-depth analysis of selected political, economic, and social issues involved in the development of California from the earliest times to the present. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 387 History of United States Foreign Relations (4)
History of American foreign policy from 1900 to the present. Emergence of the United States as a world power early in the century, the retreat following the Great War, Franklin Roosevelt's diplomacy leading to and through the Second World War, atomic diplomacy and the Cold War, four decades of Containment and the search for a new post-Cold War strategy. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 389 American Presidency (4)
Examination of the American presidency with emphasis on its role in American society since the beginning of the twentieth century. From the era of congressional government through the Imperial Presidency of the post-World War II period, and beyond, using presidential biography as a historical source. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 400 Special Problems for Advanced Undergraduates (1–2)
Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Consent of department chair.

HIST 401 Early America (4)
Age of exploration. European powers in eastern North America. English settlements, development of the English colonies, with emphasis on Virginia and Massachusetts. Proprietary interests, growth of internal control, and colonial conflicts. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 402 American Revolution and the New Nation (4)
Background to the imperial dispute, events leading to the Revolution, Articles of Confederation, Constitution, impact on the national economy, women, African-Americans, Loyalists, Native Americans. Class Schedule will list topic selected. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 404 The Era of Civil War and Reconstruction (4)
Exploration of the different patterns of life in the United States, in order to comprehend the emergence of sectionalism, the violent struggle of the Civil War, and the readjustments of the Reconstruction years. Emphasis on the experiences of ordinary Americans. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 408 The Age of Roosevelt: Depression and World War, 1929-50 (4)
Principle forces affecting the nation’s political, social and economic life during the Age of Franklin Roosevelt. Included are the politics of the New Deal, government regulation of the economy and response to the Depression, the rise of the modern presidency, racial and ethnic conflict, the politics of class and gender, the home front at war and post-war tension. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 409 Vietnam War at Home and Abroad (4)
Interaction of revolutionary Vietnamese nationalism with U.S. foreign policy. Analysis of the conduct of the war. Assessment of the impact of the war on U.S. society. 3 lectures and research project. Prerequisite: Junior standing.

HIST 410 Recent America Since 1950: Shattering of the American Consensus (4)
Political, social and economic forces that have shaped American life since 1950. Subjects included are the Red Scare, suburbanization, the civil rights movement, the Great Society, the politics and culture of protest, recasting the welfare state, and de-industrialization. Emphasis on racial, ethnic and gender issues in the collapse of the American Consensus. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 411 The Fall of Imperial China (4)
History of China’s last dynasty, the Qing (1644-1912). Origins of Manchus, High Qing era of expansion and prosperity, creation of uniquely Manchu dynasty, new contact with Western imperialism, internal rebellions, modern reform policies, and revolution. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 412 Modern Japan (4)
Japan's development as a modern state (1800-2000 CE). Themes include Japan’s engagement with modernity and nationalism, the emperor system, Japanese imperialist expansion, and postwar reconstruction of Japanese society. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 414 The Soviet State (4)
Marxism-Leninism; Civil War; the “experimental” 20s; forced collectivization and industrialization; the Purges; “engineering” a new Soviet Woman and Man for a new communist world; War: Second and Cold. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 415 Modern China (4)
Chinese history in the twentieth century: the fall of the Qing Dynasty and founding of Republic of China in 1912, problems of imperialism and modernity, Chinese Communist Party and People's Republic of China since 1949. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 416 Modern China (4)
Chinese history in the twentieth century: the fall of the Qing Dynasty and founding of Republic of China in 1912, problems of imperialism and modernity, Chinese Communist Party and People's Republic of China since 1949. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 417 Modern China (4)
Examination of 20th century Chinese history through the use of Chinese feature films. Films (with English subtitles) serve as main texts for understanding the tremendous changes in modern Chinese history, and the evolving relationships between film and Chinese society. 4 lectures. Prerequisite: Junior standing or consent of instructor.

HIST 418 Chinese Film and History (4)
Examination of 20th century Chinese history through the use of Chinese feature films. Films (with English subtitles) serve as main texts for understanding the tremendous changes in modern Chinese history, and the evolving relationships between film and Chinese society. 4 lectures. Prerequisite: Junior standing or consent of instructor.

HIST 424 Organizing and Teaching History (4)
Organization, selection, presentation, application, and interpretation of subject matter in history in secondary schools. 4 seminars. Prerequisite: Admission to teacher education program or valid teaching credential.

HIST 426 Imperial Russia (4)
Political, social, intellectual and economic roots of Russian Absolutism. Emergence of Russia as an imperial power, reform, reaction and revolution - 1689-1914. 3 lectures and research project. Prerequisite: Junior standing.

HIST 427 Soviet Russia (4)
Transformation of Russian absolutism from tsarist to Bolshevik under the impact of World War I and the Revolution of 1917. The formative force of Marxism-Leninism; Civil War; the “experimental” 20s; forced collectivization and industrialization; the Purges; “engineering” a new Soviet Woman and Man for a new communist world; War: Second and Cold. 3 lectures and research project. Prerequisite: Junior standing.

HIST 431 South Africa to 1900 (4)
History of South Africa prior to white rule including the African societies populating the area, their history prior to European contact, the nature of early white settlement, and the impact of mineral discoveries in the 19th century. 3 lectures and research project. Prerequisite: One of the following: HIST 315, HIST 381, HIST 382, or consent of instructor.
HIST 432 Twentieth Century South Africa (4)
History of South Africa in the 20th century focusing on the rise and fall of the apartheid state and including Afrikaner nationalism, apartheid legislation, industrial development, and the growth of effective African resistance leading to full democracy. 3 lectures and research project. Prerequisite: One of the following: HIST 315, HIST 381, HIST 382, HIST 431 or consent of instructor.

HIST 434 American Women's History to 1870 (4)
(Also listed as WS 434)
Female ideology and experience from the colonial period through the American Civil War. Use of a variety of sources, including women’s own writing, in order to understand the history of women as it both reflects and shapes American culture and society. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 435 American Women’s History from 1870 (4)
(Also listed as WS 435)
The female past in the modern period of U.S. history. Considers how transformations in gender roles are reflective of other significant changes in American culture and society. Emphasis on class, race, and ethnic variations in women's experience. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 437 Nazi Germany (4)
Background of German Romantic Nationalism; national unification and defeat in World War I; the failure of Weimar Democracy and political radicalization; the Nazi political, economic, and social revolution 1933-1939. 3 lectures and 1 activity. Prerequisite: Junior standing.

HIST 440 Topics and Issues in the History of the United States (4)
Selected topics and issues in United States history. Descriptive subtitles will be assigned to each course. Class Schedule will list topic selected. May be repeated to 8 units. 3 lectures and a research project. Prerequisite: Junior standing or consent of instructor.

HIST 441 Topics and Issues in European History (4)
Selected topics and issues in European history. Descriptive subtitles will be assigned to each course. Class Schedule will list topic selected. May be repeated to 8 units. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 442 Topics and Issues in Latin American History (4)
Selected topics and issues in Latin American history. Descriptive subtitles will be assigned to each course. Class Schedule will list topic selected. May be repeated to 8 units. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 443 Topics and Issues in Asian History (4)
Selected topics and issues in Asian history. Descriptive subtitles will be assigned to each course. Class Schedule will list topic selected. May be repeated to 8 units. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 444 Topics and Issues in African History (4)
Selected topics and issues in African history. Descriptive subtitles will be assigned to each course. Class Schedule will list topic selected. May be repeated to 8 units. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 445 Topics and Issues in Comparative History (4)
Selected topics and issues in comparative history. Descriptive subtitles will be assigned to each course. Class Schedule will list topic selected. May be repeated to 8 units. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 450 History Internship (6–12) (CR/NC)
Supervised work experience using skills of the discipline of history in a public agency ranging from 18 to 36 hours per week. Interns work directly under the supervision of an employee of the agency and are subject to the professional responsibilities typical of the state. Credit/No Credit grading only. Prerequisite: Junior standing. Completion of HIST 303 with grade of B or better and consent of internship coordinator.

HIST 460 Senior Project I (2)
Completion of paper or creative project under faculty supervision. Must be historical in nature, investigate a question of significance, include an historiographical analysis, and make an argument based on primary and secondary sources. Take HIST 461 during a subsequent quarter. Prerequisite: HIST 303; HIST 304; senior standing or consent of instructor; and History major.

HIST 461 Senior Project II (2)
Completion of paper or creative project begun in HIST 460 under faculty supervision. Prerequisite: HIST 303, HIST 304; HIST 460; senior standing or consent of instructor; and History major.

HIST 468 Internship in State and National Park History (3) (3)
Work experience program in interpreting state and national park history. Weekly three-hour seminar and regularly scheduled work experience training at Hearst–San Simeon State Historical Monument. 90 hours of work experience per 3 units of credit. Recommended preparation: Western Civilization Survey, U.S. and California History, History of Art.

HIST 470 Selected Advanced Topics (1–4)
Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class Schedule will list topic selected. Total credit limited to 8 units. 1 to 4 lectures. Prerequisite: Junior standing or consent of instructor.

HIST 485 Cooperative Education Experience (6) (CR/NC)
Part-time work experience in business, industry, government, and other areas of student career interest. Positions are paid and usually require relocation and registration in course for two consecutive quarters. Formal report and evaluation by work supervisor required. Total credit limited to 16 units. Credit/No Credit grading only. Prerequisite: Sophomore standing and consent of instructor.

HIST 495 Cooperative Education Experience (12) (CR/NC)
Full-time work experience in business, industry, government, and other areas of student career interest. Positions are paid and usually require relocation and registration in course for two consecutive quarters. Formal report and evaluation by work supervisor required. Total credit limited to 16 units. Credit/No Credit grading only. Prerequisite: Sophomore standing and consent of instructor.

HIST 504 Graduate Study in History (4)
Weekly reading and discussion course on practical methods and theoretical approaches to the study and writing of history. 4 seminars. Prerequisite: Graduate standing in History and consent of instructor.

HIST 505 Seminar in United States History (4)
Intensive study of selected topics in United States history. Class Schedule will list topic selected. Total credit limited to 12 units. 4 seminars. Prerequisite: HIST 504 or consent of instructor. Graduate standing in History and consent of instructor. Change effective Winter 2007.

HIST 506 Seminar in Modern European History (4)
Intensive study of selected topics in modern European history. Class Schedule will list topic selected. Total credit limited to 12 units. 4 seminars. Prerequisite: Graduate standing in History or consent of instructor.

HIST 507 Seminar in East Asian History (4)
Intensive study of selected topics in East Asian history. Class Schedule will list topic selected. Total credit limited to 12 units. 4 seminars. Prerequisite: Graduate standing in History and consent of instructor.

HIST 508 Seminar in Latin American History (4)
Intensive study of selected topics in Latin American history. Class Schedule will list topic selected. Total credit limited to 12 units. 4 seminars. Prerequisite: HIST 505 or consent of instructor.
HIST 509 Seminar in African History (4)
Intensive study of selected topics in African history. Class Schedule will list topic selected. Total credit limited to 12 units. 4 seminars. Prerequisite: Graduate standing in History or consent of instructor.

HIST 512 Supervised Reading for Comprehensive Exams (2)
Directed supervision of reading for MA comprehensive exams. Regular consultation between advisor and student. Total credit limited to 4 units. 2 seminars. Prerequisite: HIST 504 and 12 units of graduate study.

HIST 599 Thesis (3)
Directed supervision of MA thesis. Regular consultation between advisor and student. Course to be taken three times over three separate quarters; total credit limited to 9 units.

HNRC--HONORS CONTRACT

HNRC 199 Honors Contract (CR/NC)
Students in the Honors Program are required to take at least eight courses for honors credit before graduation. Taking an Honors course may not be possible due to scheduling conflicts or unavailability of courses. In these cases, and with the permission of the Director of the Honors Program, the student may enter into a “Contract” to engage in honors-level work in a class on an individual basis. Credit/No Credit grading only. Students can register for a maximum of 2 Honors Contracts; repeatable in same term.

HNRC 200 Honors Leadership Experience (CR/NC)
The Honors Program encourages its students to develop leadership skills through serving on the Honors Board, chairing Honors Committees, participating as International Student mentors and/or Preface discussion leaders. To receive Honors credit for these activities, students must also participate in a number of formal leadership-training seminars/workshops, and contribute their insights to the Honors and greater Cal Poly communities. Credit/No Credit grading only. Total credit limited to 2 courses. Prerequisite: Student must be in good standing in the Honors Program, and have permission of the Director.

HNRC 399 Honors Contract (CR/NC)
Students in the Honors Program are required to take at least eight courses for honors credit before graduation. Taking an Honors course may not be possible due to scheduling conflicts or unavailability of courses. In these cases, and with the permission of the Director of the Honors Program, the student may enter into a “Contract” to engage in honors-level work in a class on an individual basis. Credit/No Credit grading only. Students can register for a maximum of 2 Honors Contracts; repeatable in same term.

HNRC 400 Honors Professional, Social and Global Experience (CR/NC)
The Honors Program encourages its students to enhance their academic coursework by broadening their professional, social and global perspectives through professional internships/co-ops, participation in community projects and study abroad experience. To receive Honors credit, students must also reflect on these experiences and contribute their insights through presentations (oral and/or written) to the Honors and greater Cal Poly communities. Credit/No Credit grading only. Total credit limited to 2 courses, repeatable in the same term.

HNRS--HONORS see New Courses

HNRS 100 Orientation to the University Honors Program (2) (CR/NC)
Introduction to the Honors Program and overview of the University. Topics include the role of higher education, development of academic skills, career advising, and guest speakers from the Cal Poly community. For University Honors Program students only. Credit/No Credit grading only. 1 lecture, 1 activity.

HNRS 101 Public Speaking (4) (Also listed as SCOM 101)
GE A2
Introduction to the principles of public speaking. Practical experience in the development, presentation, and critical analysis of speeches to inform, to persuade, and to actuate. Not open to students with credit in SCOM 102. 4 lectures.

HNRS 112 Race, Culture and Politics in the United States (4) (Also listed as ES 112) GE D1 USCP
Introductory and interdisciplinary study of the ways that race and ethnicity are created by both historical processes and American institutional formation – specifically social, political, economic, legal and cultural institutions. Special attention paid to the interlocking systems of race, class, gender and sexuality. 4 lectures.

HNRS 131 General Physics (4) (Also listed as PHYS 131) GE B3 & B4
Fundamental principles of mechanics. Vectors, particle kinematics. Equilibrium of a rigid body. Work and energy, linear momentum, rotational kinematics and dynamics. Primarily for engineering and architecture students, and for students majoring in the physical sciences. 3 lectures, 1 laboratory. Prerequisite: MATH 141 with grade C- or better, MATH 142 or MATH 182 (or concurrent enrollment), and consent of Honors Program. Recommended: high school physics.

HNRS 132 General Physics (4) (Also listed as PHYS 132) GE B3 & B4
Oscillations, waves in elastic media, sound waves. Temperature, heat and the first law of thermodynamics. Kinetic theory of matter, second law of thermodynamics. Geometrical and physical optics. 3 lectures, 1 laboratory. Prerequisite: PHYS 131 or HNRS 131.

HNRS 134 General Physics IA (4) (Also listed as PHYS 141) GE B3
Fundamental principles of mechanics. Vectors, particle kinematics. Equilibrium of a rigid body. Work and energy, linear momentum, rotational kinematics and dynamics. Primarily for engineering and science students. Not open to students with credit in HNRS/PHYS 131. 4 lectures. Prerequisite: MATH 141 with grade C- or better and MATH 142 or MATH 182 (or concurrent enrollment). Recommended: High school physics.

HNRS 141, 142, 143 Calculus I, II, III (4) (4) (4) GE B1 (Also listed as MATH 141, 142, 143)
Limits, continuity, differentiation, integration. Techniques of integration, applications to physics, transcendental functions. Infinite sequences and series, vector algebra, curves. 4 lectures. 141 prerequisite: ELM requirement and passing score on Mathematics Placement Examination, or MATH 118 and MATH 119 or equivalent; and con-sent of Honors Program. 142 prerequisite: HNRS/MATH 141 with a grade of C- or better or consent of instructor; and consent of Honors Program.

HNRS 145 Reasoning, Argumentation, and Writing (4) (Also listed as ENGL/SCOM 145) GE A3 (formerly HNRS 215)
The principles of reasoning in argumentation. Examination of rhetorical principles and responsible rhetorical behavior. Application of these principles to written and oral communications. Effective use of research methods and sources. 4 lectures. Prerequisite: Completion of GE Areas A1 and A2, and consent of Honors Program.

HNRS 148 Reasoning, Argumentation and Professional Writing (4) (Also listed as ENGL 148) GE A3
The principles of reasoning in technical writing. Discussion and application of rhetorical principles, both oral and written, in technical environments. Study of methods, resources and common formats used in corporate or research writing. 4 lectures. Prerequisite: Completion of GE Areas A1 and A2, and consent of Honors Program.

HNRS 149 Technical Writing for Engineers (4) (Also listed as ENGL 149) GE A3
The principles of technical writing. Discussion and application of rhetorical principles in technical environments. Study of methods, resources and common formats used in corporate or research writing. 4 lectures. Prerequisite: Completion of GE Areas A1 and A2, and consent of Honors Program. For Engineering students only.
HNRS 200  Special Problems for Undergraduates (1–2) (CR/NC)
Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Credit/No Credit grading only. Prerequisite: Consent of instructor and Honors Program. Change effective Spring 2006.

HNRS 201  Survey of Economics (4)  GE D2
(Also listed as ECON 201)
Basic principles of microeconomics and macroeconomics. Emphasis on applications to current national and global economic issues. For majors requiring one quarter of economics. Not open to students having previous credit in ECON 222 or equivalent. 4 lectures.

HNRS 211  Materials Science and Engineering (3)
(Also listed as MATE 211)
MATE 210 for honor students. A more in-depth treatment of the topics presented in MATE 210. 3 lectures. Prerequisite: CHEM 111, CHEM 124, or CHEM 127; MATH 141.

HNRS 212  Global Origins of United States Cultures (4)
(Also listed as ES 212)  GE D3  USC
How the global dispersal of Europeans, Asians, and Africans, the hemispheric dispersal of Latin Americans, and the forced internal migration of Native Americans have contributed to American cultural heritage and the struggles for ethnic, class and gender equality, and justice. 4 lectures.

HNRS 215  Comparative World History (4)
(Also listed as HIST 215)
Interaction of selected traditional and modernizing non-Western cultures with Western industrial imperialism and its attendant economic, political, and cultural forces. Within this context, evaluation of both the nature of industrial imperialism and the way in which it influenced or interfered with the host culture. 4 lectures.

HNRS 231  Philosophical Classics: Social and Political Philosophy (4) (Also listed as PHIL 231)  GE C2
Readings from primary philosophical texts, from the ancient and modern periods, with focus on the identification and evaluation of the central ethical and political themes and arguments presented in them. 4 lectures. Prerequisite: Completion of GE Area A.

HNRS 241  Calculus IV (4) (Also listed as MATH 241)
Partial derivatives, multiple integrals, introduction to vector analysis. 4 lectures. Prerequisite: MATH 143.

HNRS 244  Linear Analysis I (4) (Also listed as MATH 244)
Separable and linear ordinary differential equations with selected applications; numerical and analytical solutions. Linear algebra: vectors in n-space, matrices, linear transformations, eigenvalues, eigenvectors, diagonalization; applications to the study of systems of linear differential equations. 4 lectures. Prerequisite: MATH/HRNS 143 or consent of instructor.

HNRS 251  Great Books I: The Ancient and Classical World—From Myth to Reason (4) (Also listed as ENGL 251)  GE C1

HNRS 299  Honors Group Seminar (1) (CR/NC)
Students in the Honors Program are required to take at least eight courses for honors credit before graduation. Taking an Honors course may not be possible due to scheduling conflicts or unavailability of courses. This course allows students to engage in honors-level work in a standard, non-honors course on a group basis. Credit/No Credit grading only. Total credit limited to 8 units; repeatable in same term. 1 seminar.

HNRS 303  Economics of Poverty, Discrimination and Immigration (4) (Also listed as ECON 303)  GE D5  USC
Economic analysis of the cause, extent and impact of poverty, discrimination and immigration and of the policies designed to address these socioeconomic issues. Emphasis on the experience of African-Americans, Latinos, and women in the United States. 4 lectures. Prerequisite: Completion of GE Areas A, D1, and ECON 201 or 222.

HNRS 304  Values and Technology (4)
(Also listed as HUM 303)
Humanistic investigation into the theoretical and practical applications of technology with specific reference to the social effects of technological change. For all majors. Non-technical. 4 lectures. Prerequisite: Completion of GE Area A and one course from Area C.

HNRS 310  Air and Space (4)
(Also listed as AERO 310)
Technological innovations that have led to modern aircraft and spacecraft as viewed from an historical perspective. Development of aerodynamics, propulsion systems, light-weight structures, and control systems. How aviation has affected, and been affected by, history. Impact of aviation on society, including civil and military aircraft/spacecraft. Federal regulation of aviation, including air traffic control and airlines. Future developments in air and space technology. 4 lectures. Prerequisite: Completion of GE Area B, junior standing and consent of Honors Program.

HNRS 319  Natural Resource Ecology, Theories and Applications (4) (Also listed as FNR 319)  GE B5
Scope and nature of "ecology" in modern society, including resource terminology and classifications systems; dynamics of natural systems (energy exchange and cycles); man's role as a principle agent of change; environmental impacts; historical perspective including people (ethnicity); and the future environment. 3 lectures, 1 laboratory. Prerequisite: Completion of GE Area B2.

HNRS 320  Values, Media, and Culture (4)
(Also listed as HUM 320)
Contemporary popular culture and its relationship to the great art and literature of the past. Discussion of television, films, advertising, best sellers, popular magazines, children's stories, comics, and the great tradition of literature. 4 lectures. Prerequisite: Completion of GE Area A and one course from Area C.

HNRS 375  Technology and the Environment: A Seminar on Contemporary Issues (4) (Also listed as CRP 375)
Interdisciplinary exploration of significant environmental issues (local, regional, national, or global) where technology is a major cause and/or offers a possible solution. 4 seminars. Prerequisite: Completion of GE Area A and two courses from Areas D1, D2, D3. Honors Program membership or nomination by CRP department head.

HNRS 400  Special Problems for Advanced Undergraduates (1–4)
Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units. Prerequisite: Consent of Honors Program Director.

HNRS 411  New Media Arts I (4) (Also listed as ENGL 411)
Advanced-level presentation of new media theory, design and practice. Topics covered include, but are not limited to, interactivity theory, user-centered system design, cognitive psychology, media analysis, and basic web design theory. Total credit limited to 8 units. 4 lectures. Prerequisite: advanced skills in writing and/or graphics, and/or computer programming; upper-division standing, ENGL 148 or ENGL 149 and consent of instructor.

HNRS 412  New Media Arts II (4) (Also listed as ENGL 412)
Advanced level of work with the primary technologies and design/ critique theories currently at use in the professional creation of new media works. Lectures and readings expand upon material presented in HNRS/ENGL 411. 4 lectures. Prerequisite: HNRS/ENGL 411 and consent of instructor.

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HNRS 475 Forest and Environmental Practices (15) (Also listed as FNR 475)

Typical modules: ecosystem sampling and inventory methods, photo interpretation, hydrologic resources, road condition, project impact analysis, best management practices. Topics covered vary from term to term depending on the priority for learning modules. Residence at Swanton Pacific and extended field trips required. 6 lectures, 7 laboratories, 2 activities. Prerequisite: Completion of Area B and consent of instructor.

HNRS 490 President’s Seminar: Science, Society and the University (4) (Also listed as HUM 490)

Development of higher education in the United States; the role of science and research in the University; and the response of higher education to changing economic, political and social demands. 4 seminars. Prerequisite: Senior standing, GPA of at least 3.0, or consent of instructor.

HNRS 499 Honors Group Seminar (1) (CR/NC)

Students in the Honors Program are required to take at least eight courses for honors credit before graduation. Taking an Honors course may not be possible due to scheduling conflicts or unavailability of courses. This course allows students to engage in honors-level work in a standard, non-honors course on a group basis. Credit/No Credit grading only. Total credit limited to 8 units, repeatable in same term. 1 seminar...

HUM—HUMANITIES

HUM 302 Human Values in Agriculture (4)  GE Area F

Technical aspects of controversial agricultural issues. Identification of value conflicts, comparison of potential impacts, and use of relevant ethical principles. Weighing risks and benefits to resolve the issue. Extensive participation and interaction making oral presentations, role playing, and arguing in public forums. 3 lectures, 1 activity. Prerequisite: Completion of GE Area B and junior standing.

HUM 303 Values and Technology (4)  GE C4

(Also listed as HNRS 304)

Humanistic investigation into the theoretical and practical applications of technology with specific reference to the social effects of technological change. For all majors. Non-technical. 4 lectures. Prerequisite: Completion of GE Area A and one course from Area C.

HUM 310 Humanities in World Cultures (4)  GE C4

Interdisciplinary examination of the humanities in a selected culture. Special focus on the arts, literature, philosophy and language in that culture. Class Schedule will list topic selected. Repeatable to 12 units with different course titles. 4 lectures. Prerequisite: Completion of GE Area A and one course from Area C.

HUM 312 Humanities in Chicano/a Culture (4)  GE C4  USCP

Interdisciplinary examination of humanities in Chicano culture. Special focus on the arts, literature, social situations, and the monolingual and bilingual language aspects in Chicano culture. 4 lectures. Prerequisite: Completion of GE Area A and one course from Area C.

HUM 316 London: From Roman Colony to World Capital (4)  GE D5

Selective examination of the historical and cultural legacy of London within the development of Western civilization as well as its influence on the submission and eventual emergence of the non-Western world in the twentieth century. An analytical and interpretive study of how London shaped the social, economic, political and legal institutions of Western society. 4 lectures. Prerequisite: Enrollment in London Study; completion of GE Area A; completion of two courses in GE Area D/E; junior standing or consent of instructor. Co-requisite: Enrollment in HUM 319.

HUM 318 Culture of Spain: Activities (2) (CR/NC)

Examination and experience of Spanish culture via participant observation in Spain. An introductory exploration of the development of Spanish architecture, art, literature, music, theatre and popular culture as experienced in Valladolid, Spain. Credit/No Credit grading only. 2 activities. Prerequisite: Limited to Valladolid, Spain Fall program. Co-requisite: HUM 310.

HUM 319 London Activities (2) (CR/NC)

Analytical and interpretive survey of the principal center of the English speaking world. The development of London from Roman administrative capital to modern cultural, financial and political colossus. Credit/No Credit grading only. 2 activities. Prerequisite: Limited to London Study students.

HUM 320 Values, Media, and Culture (4)  GE C4

(Also listed as HNRS 320)

Contemporary popular culture and its relationship to the great art and literature of the past. Discussion of television, films, advertising, best sellers, popular magazines, children's stories, comics, and the great tradition of literature. 4 lectures. Prerequisite: Completion of GE Area A and one course from Area C.

HUM 330 Cal Poly Land: Nature, Technology and Society (4)  GE Area F

(Also listed as AG 330)  GE Area F

Scientific investigation of the natural features of the Cal Poly landscape and their transformations by land management technology. Analysis of the environmental, economic, social, and political effects of agricultural, resource extraction and construction technology on that landscape. Emphasis on the educational, land-use and long term planning issues of technology presented by this case study. 4 lectures. Prerequisite: Completion of GE Areas A and B, and junior standing.

HUM 350 The Global Environment (4)  GE Area F

(Also listed as AG/BUS/EDES/ENGR/SCM 350)

Interdisciplinary investigation of how human activities impact the Earth’s environment on a global scale. Examination of population, resource use, climate change, and biodiversity from scientific/technical and social/economic/historical/political perspectives. Use of remote sensing maps. Sustainable solutions. 3 lectures, 1 activity. Prerequisite: Completion of GE Areas A and B and junior standing.

HUM 361 Modernism (4)  GE C4

Interdisciplinary survey of the eighteenth, nineteenth and twentieth-century concepts and cultural movements known as modernism throughout Europe, North America and Latin America. Disciplines may include architecture, art, drama, literature, music, philosophy, and photography. 4 lectures. Prerequisite: Completion of GE Area A and one class from Area C.

HUM 400 Independent Study Project (1–2)

Independent study project focusing more than one discipline on a problem in the Humanities. May involve travel and/or independent research. Bibliography and study plan submitted in advance. 1–2 activities. Prerequisite: Junior or senior standing and consent of instructor.

HUM 470 Selected Advanced Topics (2–4)

Focused interdisciplinary study of a problem in the Humanities combining the insight and expertise of more than one discipline, such as history, literature, religious studies, philosophy, fine arts and the sciences. Class Schedule will list topic selected. 2–4 lectures. Prerequisite: Completion of GE Area A and junior standing.

HUM 490 President’s Seminar: Science, Society and the University (4) (Also listed as HNRS 490)

Development of higher education in the United States; the role of science and research in the University; and the response of higher education to changing economic, political and social demands. 4 seminars. Prerequisite: Senior standing, GPA of at least 3.0, or consent of instructor.

IME—INDUSTRIAL and MANUFACTURING ENGINEERING

IME 101 Introduction to Industrial and Manufacturing Engineering (1)

Introduction of major topics in industrial and manufacturing engineering. Time management, study skills and class scheduling necessary for academic
success. University services. Professional ethics. Career opportunities review. 1 laboratory.

IME 130 Technical Foundations (2) (CR/NC)
Introduction to visualization, sketching, and drafting. Basic hand-tools, shop practices, and materials. Clearances and fits, threads and fasteners. Safety. Open to all majors. Credit/No Credit grading only. 1 lecture, 1 laboratory.

IME 140 CAD and Modeling (2)
CAD/CAM on UNIX workstations using parameter-driven, surface-bounded solid modeling with total bi-directional associativity between design, drafting, and manufacturing tools. Introduction to Computer-Aided Engineering (CAE) as driven by the CAD solid model. 1 lecture, 1 laboratory. Prerequisite: IME 130 or high school drafting.

IME 141 Manufacturing Processes: Net Shape (1)
Metal casting as a net shape process in manufacturing. Properties of molding materials and methods of casting. Introduction to rapid prototyping. Pattern and casting design principles. 1 laboratory.

IME 142 Manufacturing Processes: Materials Joining (2)
Theory and application of metal cutting and welding processes. Includes shielded metal arc, flux cored arc, submerged arc, gas metal arc, gas tungsten arc, brazing, resistance, and oxy-acetylene processes. Bonding theory, joint design, codes and testing. Introduction to adhesive bonding. Open to all majors. 1 lecture, 1 laboratory.

IME 143 Manufacturing Processes: Material Removal (2)
Uses, capabilities, and theoretical and operational characteristics of lathe and milling machine tools, including conventional, automatic and numerical control. Cutting tool characteristics, machining parameters, quality control, and production methods. Design considerations for manufacturing. Introduction to robotics and automation. Open to all majors. 1 lecture, 1 laboratory.

IME 144 Introduction to Design and Manufacturing (4)
CAD/CAM on Unix workstations using parameter-driven, surface-bounded solid modeling with integration between design, drafting, and manufacturing tools. Introduction to conventional machining processes on lathes and mills, computer numerical control, cutting tool design, machining parameters, quality control, production methods, and design for manufacturing. Open to all majors. 2 lectures, 2 laboratories. Prerequisite: IME 130 or high school drafting.

IME 156 Basic Electronics Manufacturing (2)
Practical electronics manufacturing knowledge expanded through concepts such as CAD/CAM design, Design for Manufacture (DFM), documentation requirements, prototyping and production planning. Hands-on techniques learned for project planning, soldering, automation, hand tool usage and production methods. 1 lecture, 1 laboratory.

IME 157 Electronics Manufacturing (4)
Design, documentation and fabrication of electronic units with emphasis on CAD/CAM. Prototyping techniques, project planning, and production methods. Student completes working prototype from start to finish in 60 hours of project-oriented laboratory. Open to all majors. 2 lectures, 2 laboratories.

IME 200 Special Problems for Undergraduates (1–2)
Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Consent of department chair.

IME 223 Work Design and Measurement (4)
Principles of work simplification and motion analysis. Recording of work flow and methods. Work measurement and standards, time study, synthetic data, predetermined time systems and work sampling. Allowances and performance rating, productivity measures. Work design improvement. Military standards. 3 lectures, 1 laboratory. Prerequisite: MATH 141. Recommended: IME 101.

IME 239 Industrial Costs and Controls (3)
Estimation of manufacturing costs for production planning, cost analysis, and cost control. Planning, budgeting and control processes. Costs, accounting data and analysis of variances for managerial control, inventory valuation and decision making. Techniques of forecasting, pricing, cost estimating and cost reduction. 3 lectures. Prerequisite: IME 223.

IME 240 Additional Engineering Laboratory (1–2)
Total credit limited to 4 units, with a maximum of 2 units per quarter. 1 or 2 laboratories.

IME 241 Manufacturing Process Design I (4)
Economic and engineering analysis of manufacturing processes. Cost estimation for production planning, analysis, and control. Analysis of machining process inputs and mechanisms as an example process. Test report writing, documentation, and inspection methods. Field trips to manufacturing centers. 3 lectures, 1 laboratory. Prerequisite: IME 143 or IME 144, PHYS 131.

IME 251 Introduction to Manufacturing Engineering Analysis (4)
State of the art methods and processes in mechanical and electronic manufacturing. Selection of materials for manufacturing. Product design and manufacturability. Specifications and metrology in manufacturing. Continuous improvement strategies, such as automation, group technology, value analysis, and flexible system design. 2 lectures, 2 laboratories. Prerequisite: IME 143 or IME 144, PHYS 131, CHEM 124.

IME 301 Operations Research I (4)
Introduction to operations research, matrix theory, linear programming formulation and solution. Simplex method, sensitivity analysis, transportation and assignment algorithms. Introduction to linear networks and goal programming. Existing computer programs utilized. 4 lectures. Prerequisite: MATH 244.

IME 303 Project Organization and Management (4)
Design, analysis and implementation of a major industrial/business systems problem. Emphasis on situations requiring resolutions and management decisions by groups representing various elements of an enterprise. Resource leveling and management under constraints. 3 lectures, 1 laboratory. Prerequisite: Junior standing, IME 314 or equivalent.

IME 312 Data Management and System Design (4)
Design and management of industrial databases and reporting systems. Relationships of financial accounting databases and production systems. Efficient data entry and reports, queries, macro function, and Internet based database applications. 3 lectures, 1 laboratory. Prerequisite: CSC 232.

IME 313 Introduction to Information Systems Engineering (4)
Practical approach to use of new and existing data communications technologies related to industrial and manufacturing engineering. Use of hardware, operating systems, networks and application software, covered in both theory and practice. 3 lectures, 1 laboratory. Prerequisite: IME 312.

IME 314 Engineering Economics (3)

IME 319 Human Factors Engineering (3)
Analysis of factors influencing the efficiency of human work. Data on the physical and mental capacities of persons, the physical environment, work organization, and the problem of aging. Human reactions and capabilities related to specific tasks and systems. Design of machines, operations, human computer interface and work environment to match human capacities and limitations, including the handicapped. 3 lectures. Prerequisite: PSY 201 or PSY 202 or consent of instructor, and junior standing.

IME 320 Human Factors and Technology (4)  GE Area F
Analysis of cognitive, sensory and physical limitations and capabilities of operators and users of technology, both hardware and software, in working
and living environments. Analysis of pertinent databases for a proactive approach to designing user-centered industrial products/systems, consumer products, and work environment. 4 lectures. Prerequisite: Junior standing and completion of GE Area B requirements.

IME 326 Engineering Test Design and Analysis (4)
Data gathering and statistical testing applied to industrial engineering and manufacturing fields. Experimental methods for evaluation and comparisons; interpretation of interference, fatigue, and field data. Engineering experimental design, linear and nonlinear regression, ANOVA, and multifactor ANOVA. Utilization of existing computer software. 4 lectures. Prerequisite: STAT 312 or STAT 321.

IME 334 CAD/CAM (3)
Identification and study of the individual techniques of CAD/CAM as being practiced in modern industry. 2 lectures, 1 laboratory. Prerequisite: IME 144, IME 251.

IME 335 Computer-Aided Manufacturing I (4)
Wire-frame, surface, and solid model generation. Benefits, limitations, and selection of CAD and CAM systems. CAD as an input to CAM. Manual, language-based, and graphics-based NC programming. Configuration of CAD/CAM software; post-processor generation. 3 lectures, 1 laboratory. Prerequisite: IME 144, CSC 232, or consent of instructor.

IME 336 Computer-Aided Manufacturing II (4)
Automated production of parts: computerized part programming, post-processor generation and use, and CNC machining center operation. Introduction to flexible manufacturing systems and robotics. 3 lectures, 1 laboratory. Prerequisite: IME 335 or consent of instructor.

IME 341 Tool Engineering (4)
Design and engineering of jigs, fixtures, molds, and dies; material selection. Field trips to manufacturing centers. 3 lectures, 1 laboratory. Prerequisite: IME 241, CE 204, MATH 244, PHYS 133, MATE 210.

IME 342 Manufacturing Systems Integration (3)
Survey of facilities layout, human factors, simulation, and production control to provide manufacturing engineering majors with background and aid in selection of technical electives. 3 lectures. Prerequisite: IME 223, MATH 241. Recommended: STAT 312 or STAT 321.

IME 351 Advanced Material Removal Process Design (4)
Advanced turning and milling processes; grinding and non-traditional processes. Thread and gear manufacturing, producibility, machinability, part and tool materials, cutting fluids, and tool life testing. Finishes and measurement of surface roughness. Process design projects. 2 lectures, 2 laboratories. Prerequisite: IME 241, MATE 210 and MATE 215, and CE 204.

IME 352 Manufacturing Process Design II (4)
Advanced engineering analysis of material shaping processes, surface processing and assembly operations with emphasis on optimizing process parameters, equipment, and operational sequence. Process design projects. 2 lectures, 2 laboratories. Prerequisite: IME 141, IME 142, IME 241, MATE 210/215, CE 204.

IME 356 Manufacturing Automation (4)
Computers in the factory automation environment. Basic control theory including feedback and process synchronization. Programming and use of intelligent controllers, robotic arms, and industrial control systems. Interfacing of electro-mechanical systems; encoders and servo systems; programmable controllers. Computer process control. 3 lectures, 1 laboratory. Prerequisite: EE 321.

IME 400 Special Problems for Advanced Undergraduates (1–2)
Individual investigation, research, studies, or surveys of selected problems. Total credit limit to 4 units, with a maximum of 2 units per quarter. Prerequisite: Consent of instructor.

IME 401 Sales Engineering (2)
Concepts and principles of engineering in sales. Role of the professional engineer in the analysis, design, development, production, and final application of a product or system required by the buyer. 2 seminars. Prerequisite: Senior standing in engineering, or consent of instructor.

IME 404 Engineering Economic Decision Management (3)
Quantitative approaches to engineering and management problems. Time value concepts, breakeven and replacement analysis, optimization techniques for scheduling. Project cost estimation, resource management and risk analysis. Use of computer software packages. For non-majors only. 3 lectures. Prerequisite: Junior standing.

IME 405 Operations Research II (4)
Queuing models, dynamic programming and inventory models, Markovian processes, simulation modeling, computer programming in solution of problems. 3 lectures, 1 activity. Prerequisite: IME 301, STAT 312 or STAT 321 or consent of instructor.

IME 407 Operations Research III (4)
Advanced linear programming as applied to problems in industrial systems. Integer and goal programming. Application of nonlinear, quadratic, dynamic programming concepts. Case studies of current topics in industrial engineering. 3 lectures, 1 activity. Prerequisite: IME 301 or consent of instructor.

IME 408 Systems Engineering (3)

IME 409 Economic Decision Systems (3)
Economic evaluation of information for complex decisions. Analysis of risks and uncertainties. Bayes theory and models. Decision theory, sequential decisions, and value of information applied to financial evaluation and control. Major project justification procedures. 3 lectures. Prerequisite: IME 239, IME 314, and IME 405, or consent of instructor.

IME 410 Inventory Control Systems (4)
Inventory planning and control systems. Implementation of manufacturing resource planning (MRP II) including demand forecasting, production planning, master scheduling, bill-of-material, and inventory master file. Capacity requirements planning and shop floor control. JIT approach to inventory control through pull production system. 3 lectures, 1 laboratory. Prerequisite: IME 405 or IME 342, IME 312.

IME 411 Production Systems Analysis (3)
Systems analysis for production control. Design of computer integrated planning and control systems for scheduling manufacturing orders, monitoring operating costs and control system performance evaluation. Development of computer-aided decision making framework. Interactive decision making using simulation modeling. 2 lectures, 1 laboratory. Prerequisite: IME 410, or equivalent.

IME 413 Flexible Manufacturing Systems (3)

IME 416 Automation of Industrial Systems (3)
Automation in manufacturing and warehousing. Economic selection of automation systems. Projects in automation. 2 lectures, 1 laboratory. Prerequisite: IME 356 or equivalent.

IME 417 Supply Chain and Logistics Management (4)
Overview of key logistics and supply chain management concepts. Models and solution methods for the design, control, operation, and management of supply chains. Techniques that are used to analyze supply chains. Team 2005-2007 Cal Poly Catalog
projects in partnership with industry sponsors. 4 lectures. Prerequisite: IME 410 or consent of instructor.

IME 418 Product-Process Design (4)
Strategic engineering management of product design and manufacturing competitiveness; concurrent engineering. Study of manufacturability constraints in terms of prototyping, designing, testing, pre-production support, processing, quality, delivery, and customer satisfaction. Industrial design projects. Field trip to manufacturing centers. 3 lectures, 1 laboratory. Prerequisite: IME 314, IME 341, IME 356. Recommended: IME 342 or equivalent.

IME 420 Simulation and Expert Systems (4)
Design and analysis of manufacturing and service systems by simulation. Functions of random variables. Random number and function generators, programming, and characteristics of simulation languages. Introduction to rule-based expert systems. 3 lectures, 1 laboratory. Prerequisite: IME 326, IME 405.

IME 421 Manufacturing Organizations (3)
Theory and principles for manufacturing organizations. Competitive advantage. Strategic planning and operations management for organizations and teams in a rapidly changing environment. Engineering management concepts and practices. Team-based projects and cases. 3 seminars. Prerequisite: IME 314, PSY 201/PSY 202, or consent of instructor.

IME 422 Manufacturability Engineering (4)
Manufacturability constraints in terms of issues related to prototyping, designing, testing, preproduction support, processing, quality, delivery, and customer satisfaction. Hands-on projects to discuss the experimental results in dealing with the process of casting, machining, plastic modeling, and electronic board manufacturing. 3 lectures, 1 laboratory. Prerequisite: IME 341, IME 326. Recommended: IME 342.

IME 427 Process Optimization through Designed Experiments (4)
Experiments for optimization of industrial processes: process variables, response, measurements, analysis and interpretation. Statistical principles in design. Design approaches: conventional methods, response surface methodology, and Taguchi methods. Type of experiments: factorial, fractional factorial, mixture, and orthogonal arrays. Design projects using real world problems. 3 lectures, 1 laboratory. Prerequisite: IME 326 and IME 241 or IME 251 or consent of instructor.

IME 428 Engineering Metrology (4)
Measurement of attributes and variables; standards, accuracy and precision; mechanical, electronic and optical/laser measurement systems. Contact and non-contact measurement; straightness, flatness and squareness; GDT (Geometric Dimensioning and Tolerancing); CMM (Coordinate Measurement Machines); surface roughness; metrology for electronic products. 3 lectures, 1 laboratory. Prerequisite: IME 335 or consent of instructor.

IME 429 Ergonomics Laboratory (1)
Investigation of various physiological, sensory, and cognitive capabilities and limitations of people in work and living environments through laboratory data collection, design of experiments and statistical analysis. 1 laboratory. Prerequisite: IME 319, IME 326.

IME 430 Quality Engineering (4)
Quality control, reliability, maintainability, and integrated logistic support. Statistical theory of process control and sampling inspection. Risks associated with decisions based on operating characteristics of control charts and sampling plans. Reliability and life testing methods. Economics of statistical QC. Specifications and standards. 4 lectures. Prerequisite: IME 326 or equivalent.

IME 431 Supplier Quality Engineering (4)

IME 433 Advanced Work Measurement (3)
Predetermined time systems. Time formulas. Standard data systems. Use of statistical methods. Standard data systems applied to clerical, manufacturing, and micro assembly. Developing and maintaining computerized systems. Course will be administered with project orientation. 2 lectures, 1 laboratory. Prerequisite: IME 223, IME 326 or equivalent.

IME 435 Reliability Engineering I (3)
Reliability concepts and mathematical models, mechanical device reliability, electrical device reliability, systems reliability and maintainability, reliability data, assurance program elements. 3 lectures. Prerequisite: IME 326.

IME 437 Advanced Human Factors Engineering (3)
Team-based approach to human factors assessment of consumer and industrial products, systems, and information technology. Team building principles and techniques; performance measurements and monitoring. Usability analysis and ergonomics auditing through experimental methods. 2 lectures, 1 laboratory. Prerequisite: IME 319, IME 326 or equivalent.

IME 440 Quality Process Management (4)
Quantitative approaches to engineering and management of quality. Statistical process control, quality assurance concepts. Variability loss and off-line QC. Tolerance design and experimental design. Human factors and managerial dimensions influencing quality. For non-majors only. 4 lectures. Prerequisite: Junior standing or consent of instructor.

IME 441, 442 Engineering Supervision I, II (1,1)
Theory and principles of supervision. Application of fundamental concepts and techniques of supervision provided by assignment in engineering laboratories. 1 laboratory each. Prerequisite: IME 141, IME 251, IME 334 or IME 335, and senior standing. Recommended: concurrent enrollment in IME 421.

IME 443 Facilities Planning and Design (4)
Design concepts and input requirements in planning and design of new or renovation of existing manufacturing systems. Product, process, and flow and activity analysis techniques. Flow lines and buffering techniques. Computer-aided layout design and evaluation. Design of handling systems. Math models of location problems. 3 lectures, 1 laboratory. Prerequisite: IME 144, IME 223, IME 405 or IME 342, IME 314, or equivalent. Recommended: IME 319, IME 420.

IME 445 Manufacturing Design and Implementation I (3)
A mix of industry and in-house structured group projects, using process, tool, computer control, quality knowledge, and societal considerations. Projects will progress through a complete manufacturing cycle from design through implementation. Field trips to manufacturing centers. 3 laboratories. Prerequisite: IME 418. Recommended co-requisite: IME 430.

IME 447 Advanced Electronic Manufacturing (4)
Design and fabrication of commercial electronic products; PCB layout design, bill of material analysis and component purchasing, production planning and scheduling, programming automated surface-mount assembly line, marketing of products. Multidisciplinary project teams exposed to real-world challenges of electronics manufacturers. 2 lectures, 2 laboratories. Prerequisite: IME 156 or IME 157 or IME 251.

IME 458 Microelectronics and Electronics Packaging (4)
Materials, processes, and reliability of microelectronics and electronics packaging, surface mount assembly and printed circuit board fabrication. Overview of semiconductor manufacturing and optoelectronics packaging. 3 lectures, 1 laboratory. Prerequisite: MATE 210 and PHYS 133.

IME 461, 462 Senior Project I, II (2) (3)
Faculty supervised projects typical of problems which graduates encounter in their professions and which involve costs, planning, scheduling and research. Formal written report, suitable for reference library, discussing methods, results and conclusions. Minimum 150 hours total time. 461: 2
IME 470 Selected Advanced Topics (1–4)
Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. *Class Schedule* will list topic selected. Total credit limited to 8 units. 1–4 lectures. Prerequisite: Consent of instructor.

IME 471 Selected Advanced Laboratory (1–4)
Directed group laboratory study of selected topics for advanced students. Open to undergraduate and graduate students. *Class Schedule* will list topic selected. Total credit limited to 8 units. 1 to 4 laboratories. Prerequisite: Consent of instructor.

IME 481 Senior Project Design Laboratory I (2)
Selection and completion of a project by individuals or team which is typical of problems which IE or MfgE graduates must solve in their fields of employment, which is representative of those encountered in professional practice. Project typically involves system design, modeling, analysis and testing. Project method includes costs, planning, scheduling, and appropriate research methodology. Formulation of project outline, literature review, project activity scheduling and regular progress reviews by instructor are required. 2 laboratories. Prerequisite: Senior standing in major and consent of instructor. Note: Although IME 481 substitutes for IME 461, students may not use as repeat credit.

IME 482 Senior Project Design Laboratory II (3)
Continuation of IME 481. Involves research methodology: problem statement, method, results, analysis, synthesis, project design, construction (when feasible), and evaluation/conclusions. Project results are presented in formal written reports suitable for reference library and formal oral reports. 3 laboratories. Prerequisite: IME 481. Note: Although IME 482 substitutes for IME 462, students may not use as repeat credit.

IME 493 Cooperative Education Experience (2) (CR/NC)
Part-time work experience in business, industry, government, and other areas of student career interest. Positions are paid and usually require relocation and registration in course for two consecutive quarters. Formal report and evaluation by work supervisor required. Credit/No Credit grading only. Total credit limited to 6 units. Prerequisite: Sophomore standing and consent of instructor.

IME 494 Cooperative Education Experience (6) (CR/NC)
Full-time work experience in business, industry, government, and other areas of student career interest. Positions are paid and usually require relocation and registration in course for two consecutive quarters. Formal report and evaluation by work supervisor required. Credit/No Credit grading only. Total credit limited to 18 units. Prerequisite: Sophomore standing and consent of instructor.

IME 495 Cooperative Education Experience (12) (CR/NC)
Full-time work experience in business, industry, government, and other areas of student career interest. Positions are paid and usually require relocation and registration in course for two consecutive quarters. A more fully developed formal report and evaluation by work supervisor required. Credit/No Credit grading only. Total credit limited to 24 units. Prerequisite: Sophomore standing and consent of instructor.

IME 500 Individual Study (1–4)
Advanced study planned and completed under the direction of a member of the department faculty. Open only to students who have demonstrated ability to do independent work. Prerequisite: Consent of department chair and supervising faculty member.

IME 501 Graduate Survey I (4)
Survey of traditional industrial engineering applications in industrial systems, work methods, measurements and analysis. Facilities design, automation and logistics of industrial operations. Human factors and cost estimation of industrial applications. 3 seminars, 1 activity. Prerequisite: Graduate standing.

IME 502 Graduate Survey II (4)
Survey of current issues in data analysis and mathematical modeling of industrial systems, Queuing theory, Markov Chains quality control and supply chain issues. 4 lectures. Prerequisite: Graduate standing and consent of instructor.

IME 503 Applied Statistical Methods in Engineering (4)
Application of hypothesis testing, regression models, and ANOVA models to forecasting, process optimization, cost estimation, work measurement, inventory control, scheduling, and ergonomics. Probability distributions of process outputs in industries and service systems such as Normal, exponential, Uniform, Hypergeometric, Binomial, and Poisson. Applications in queuing, reliability, Markov chains. Expectations of random variables. Measures of central tendency and variation. Population and a random sample. Central limit theorem and its application in simulation of processes. 3 lectures, 1 laboratory. Prerequisite: Graduate standing or consent of instructor.

IME 507 Graduate Seminar (2)
Selected topics of interest to industrial engineering, integrated technology management, and engineering management graduate students. *Class Schedule* will list topic selected. Total credit limited to 4 units, with a maximum of 2 units per quarter. 1 seminar, 1 laboratory. Prerequisite: Graduate standing or consent of instructor.

IME 516 Mechatronics Systems Analysis (4)
Overview of smart products and intelligent manufacturing systems. Tools and technologies utilized in the design, manufacturing, and operations of such products and systems. Artificial Intelligence Technologies and Fuzzy Logic. Design of smart products and intelligent systems. Case studies. Team projects and formal presentations. 3 seminars, 1 laboratory. Prerequisite: IME 416 or ME 405 or equivalent.

IME 520 Advanced Information Systems for Operations (4)
Advanced information systems (IS) applications in manufacturing and service operations. Introduction of common IS applications, such as manufacturing execution systems; reporting systems; capacity planning systems; scheduling systems; and customer inquiry systems. Industry-specific analysis of IS requirements and availability. 4 seminars. Prerequisite: IME 410 or consent of instructor.

IME 521 Advanced Topics in Manufacturing System Design (4)
Modeling and analysis of manufacturing systems. Advanced topics in manufacturing system design to support development of complex systems: Virtual Reality, discrete event simulation, system architectures, systems integration, scheduling and control of manufacturing systems. Total credit limited to 12 units. 3 seminars, 1 laboratory. Prerequisite: IME 410 or equivalent.

IME 541 Advanced Operations Research (4)
Operations Research approach to model building. Linear programming and sensitivity analysis. Network flow models. Integer programming, large scale linear programming. Goal programming and multi-attribute decision making. Dynamic programming. Nonlinear programming and search methods. Applications in model building and computer solutions in planning, resource allocation, scheduling, and other industrial and service operations. 3 lectures, 1 laboratory. Prerequisite: Graduate standing and consent of instructor.

IME 542 Reliability Engineering II (4)
Reliability engineering terminology and definitions. Reliability mathematics; probability plotting; load-strength interference and safety margin. Failure distributions and failure rate models. Weibull analysis; bath tub curve; reliability of parts. Reliability of systems; redundancy; reliability allocation. Maintainability and availability. Failure modes and effects analysis. Fault tree analysis. Failure data analysis; reliability testing; reliability growth testing. Electronic system, mechanical and software reliability. Safety and human reliability; reliability management. 3 lectures, 1 laboratory. Prerequisite: IME 503.
IME 543 Advanced Human Factors (4)
Theory and application of man-machine relations and system design. Concepts of mathematical models, human information input channels, decision making based on capability of human operator. 3 seminars, 1 laboratory. Prerequisite: IME 319 or equivalent, IME 326 or equivalent and graduate standing.

IME 544 Advanced Topics in Engineering Economy (4)

IME 545 Advanced Topics in Simulation (4)
Validation of simulation models. Statistical techniques for variance reduction. Experimental design and optimization. Comparison of attributes of simulation languages. Review of current manufacturing and service industry applications. Case studies. 3 lectures, 1 laboratory. Prerequisite: IME 420 and graduate standing.

IME 548 Engineering Decision Making (4)
Principles, concepts, models, and case studies of decision making, both quantitative and nonquantitative. Emphasizes commonly used techniques when quantitative models do not exist, do not cover all key factors, or when sufficient data are not available. 3 lectures, 1 laboratory. Prerequisite: IME 301, IME 314, STAT 321 or equivalent and graduate standing.

IME 555 Computer-Integrated Manufacturing (4)
CIM and concurrent engineering concepts. Systems analysis methodologies and functional specifications. Technological and managerial strategies for system integration. Analysis of contemporary CIM frameworks. Information networks and protocols for integrated manufacturing systems. Implementation strategies for CIM and concurrent engineering. 3 seminars, 1 laboratory. Prerequisite: IME 335, IME 411 or equivalent, graduate standing.

IME 556 Technological Project Management (4)
Projects in industrial organizations and enterprises. Emerging technologies and project management. Relationship to strategic plans and managing change in organizations. Formulating, selecting, structuring, and planning projects. Project organization and control. Overcoming barriers. Application of project management software. 3 seminars, 1 laboratory. Prerequisite: Graduate standing or consent of instructor.

IME 557 Technological Assessment and Planning (4)
Assessing likely future technological environments, speed of change in competitive environments, relationship to business, strategic, and technology plans of firms. Past, present and technological evolution and operational changes. Technological and competitive impact assessment and business/technology strategy development. Use of case studies and company experiences. 4 seminars. Prerequisite: IME 503 or equivalent, and graduate standing.

IME 558 Executive Seminars (4)
Culminating overview of major issues facing organizations as they meet the challenge to sustain a competitive advantage in a business environment characterized by rapid and pervasive change. Topics include project management, virtual organizations, the service sector, manufacturing futures, and information technology. 2 seminars, 2 supervision. Prerequisite: Advanced graduate program status or consent of instructor.

IME 559 Engineering Research and Development (4)
Principles, approaches and practices for effective engineering innovation, design, research and development (R&D) in business and industry. Relationship of R&D with corporate strategy and technology base. R&D objectives through implementation. Integration of creativity, evaluation, design, and ongoing operations. Case studies. 4 seminars. Prerequisite: IME 314 or equivalent and graduate standing.

IME 560 Quality Engineering II (4)

IME 570 Selected Advanced Topics (1–4)
Directed group study of selected topics for advanced students. Open to graduate students and selected seniors. Topic lists will be provided with class schedule outlines. 1–4 seminars. Prerequisite: Graduate standing and/or consent of instructor.

IME 575 Critical Technologies (4)
Scientific, engineering and strategic overview of numerous critical emerging technologies. Topics include: technologies critical for different engineering disciplines, critical to numerous industries, and/or critical to the national interest. Focus on each technology to include: understanding key scientific fundamentals, evaluating commercialization potential to industry, and identifying conditions and outlook for future technological breakthroughs. 3 seminars, 1 laboratory. Prerequisite: Engineering graduate student and consent of instructor.

IME 577 Engineering Entrepreneurship (4)
The special requirements of entrepreneurship in a high-tech environment. Guest lectures, focused seminar topics, a business plan project, and case studies provide the tools to evaluate and pursue technology-based business opportunities. 3 lectures, 1 laboratory. Prerequisite: Graduate standing or consent of instructor.

IME 580 Manufacturing Systems (4)
Modern approaches in production and inventory planning and control to support large-scale manufacturing systems, material requirements planning (MRP I), manufacturing resource planning (MRP II), and just-in-time (JIT) manufacturing systems. Enterprise resource planning (ERP) and integration with financials. Information requirements, operational issues, and policy matters. 4 seminars. Prerequisite: Graduate standing or consent of instructor.

IME 591, 592 Integrated Product Development I, II (4) (4)
Team taught course addressing: product opportunity identification, customer needs analysis, concept definition, requirements definition, product-process analysis, product specification, design/process description, prototyping, project management, packaging, product promotion/introduction, and manufacturing ramp-up. Team projects in partnership with industry sponsors, field-trips and formal presentations. 3 seminars, 1 laboratory for each. Prerequisite: Graduate standing.

IME 593 Cooperative Education Experience (2) (CR/NC)
Advanced study analysis and part-time work experience in student’s career field; current innovations, practices, and problems in administration, supervision, and organization of business, industry, and government. Must have demonstrated ability to do independent work and research in career field. Credit/No Credit grading only. Prerequisite: Graduate standing and consent of instructor.

IME 594 Cooperative Education Experience (6) (CR/NC)
Advanced study analysis and full-time work experience in student’s career field; current innovations, practices, and problems in administration, supervision, and organization of business, industry, and government. Must have demonstrated ability to do independent work and research in career field. Credit/No Credit grading only. Prerequisite: Graduate standing and consent of instructor.

IME 595 Cooperative Education Experience (12) (CR/NC)
Advanced study analysis and full-time work experience in student’s career field; current innovations, practices, and problems in administration, supervision, and organization of business, industry, and government. Must have demonstrated ability to do independent work and research in career field. A fully-developed formal report and evaluation by work supervisor required. Credit/No Credit grading only. Prerequisite: Graduate standing and consent of instructor.
IME 596 Team Project/Internship (1-10)
Integrative learning experience through internship and team project with industrial organization. Requires advanced study and focuses on industrial unstructured problem or opportunity requiring integration across disciplines. Team project involves student, faculty, and sponsoring firm representative(s) in a collaborative learning environment, and culminates in comprehensive written report. Total credit limited to 10 units, normally taken over 2 quarters. Prerequisite: Advanced graduate standing, completion of, or concurrent enrollment in, engineering courses in specialization, and consent of participating faculty.

IME 599 Design Project (Thesis) (1-9)
Each individual or group will be assigned a project for solution under faculty supervision as a requirement for the master's degree, culminating in a written report/thesis. Prerequisite: Graduate standing and consent of faculty supervision as a requirement for the master's degree, culminating in a written report/thesis. Prerequisite: Graduate standing and consent of instructor.

IS–INTERDISCIPLINARY STUDIES

IS 101 Orientation to Interdisciplinary Studies and the University (3)
Introduction to collaborative interdisciplinary inquiry. Topics include: Scholarly knowledge production and bibliographic finding tools, University role in knowledge dissemination and creation, and information search and evaluation processes. “Learn-by-doing” disciplinary investigation and interdisciplinary analysis and synthesis. 3 lectures.

IS 301 Critical Issues Seminar (4)
Discussion-oriented seminar focusing on ethics and effective interdisciplinary decision-making in the contemporary world. Examination of ethical and other issues facing society through current public debates, as well as great intellectual traditions that have shaped the past. Class Schedule will list topic selected. Total credit limited to 8 units. 4 seminars. Prerequisite: Admission to the Adult Degree Program (Bachelor of Arts in Interdisciplinary Studies) prior to enrolling in this seminar.

IS 302 Analytical Skills Seminar (4)
Improvement of abilities to collect data, analyze information, frame questions, reach and defend logical conclusions. Emphasis on applying methods of data analysis to a variety of contemporary interdisciplinary issues. Class Schedule will list topic selected. 4 seminars. Prerequisite: Admission to the Adult Degree Program (Bachelor of Arts in Interdisciplinary Studies) prior to enrolling in this class, and IS 101.

IS 450 Advanced Investigation Seminar (5)
In-depth interdisciplinary investigation into a narrowly defined issue of personal and/or professional interest. Identification of topic and examination from a variety of standpoints (e.g., cultural, environmental, religious, political, or economic). Class Schedule will list topic selected. 5 seminars. Prerequisite: Admission to Adult Degree Program (bachelor of Arts in Interdisciplinary Studies), IS 301 and IS 302.

IS 460 Capstone Project (6)
Selection and completion of a summative project or report under the supervision of a faculty member. Topic must be approved by the seminar instructor and the ADP director. Investigation of the topic from an interdisciplinary approach. Prerequisite: Senior standing, IS 301, IS 302, IS 450.

IT–INDUSTRIAL TECHNOLOGY

IT 137 Electronic Systems (4)
Introduction to electronics and electric circuit fundamentals. Essential information for technical managers regarding the universal law, theory, principles, application and troubleshooting of AC, DC, circuits and devices. Familiarity with concepts used extensively in most areas of manufacturing and production as well as the countless electronic products produced. Understanding of inductance, capacitance, resistance, integrated circuit components and the relationship they have with each other. Extensive strategic decision and problem solving skills developed using electronics as the environment. 3 lectures, 1 laboratory.

IT 150 Mechanical Systems (4)
Introduction to the systems that supply energy, convert energy to power and transmit energy and power, including fossil, atomic and solar resources. Conversion by current power technology systems including reactors, internal and external combustion and direct conversion. Power transmission systems including electrical, refrigeration, pneumatic and hydraulic systems. 4 lectures.

IT 233 Decision Making and Problem Solving Using CAD (4)
Fundamental theory and practice of technical design communication and management of information systems. The basic application of computer-aided design (CAD) and fundamental skills in communication of product design and information systems and their impact on the industrial organization. 2 lectures, 2 laboratories.

IT 260 Manufacturing Processes (4)
Manufacturing processes; emphasis on shaping metallic products. Precision measuring, technical drawings, safety and equipment use as they apply to metal machining, welding, casting and sheet metal fabrication. 2 lectures, 2 activities.

IT 276 Principles of Purchasing (3)
Purchasing function applied to manufacturing, retailing, and food-service institutions. Its interdependence with other functional areas of the organization. 3 lectures.

IT 300 Symposium Organization (2) (CR/NC)
Managing the development of a technical information symposium from concept through symposium presentation. Organization of facilities, speakers, dinner meeting, professional meetings, industrial displays, food services, personnel, finances, and advertising. Credit/No Credit grading only. Total credit limited to 6 units. 2 seminars. Prerequisite: Completion of Area A or equivalent.

IT 301 Manufacturing Technologies and Society (4)
Survey of manufacturing technology and its impact on the quality of life in the United States and the world. History, risks, benefits, health, safety, environments, equipment, materials, processes, industrial strategies and their implications. 2 lectures, 2 activities. Prerequisite: Completion of GE Area B and junior standing.

IT 302 Technical Presentations (4)
Methods, techniques and evaluation of presenting technical information to groups. Individual and group presentations using self-produced aids including computer presentation and visual aid generation, video tape, transparencies, slides, charts, and other media. Computer and other media development techniques and video tape editing. 2 lectures, 2 activities. Prerequisite: Junior standing, COM 101 or 102.

IT 303 Industrial Quality Assurance (4)
Principles and techniques of quality assurance as applied to organizations. Emphasis on competitive implications with the integration of fundamental quality assurance techniques and new quality techniques. Technologies focused on continuous organizational improvement. 4 lectures. Prerequisite: STAT 217 or STAT 218.

IT 326 Product and Project Evaluation (4)
Foundation and practical application of value engineering and project management. Systematic application of recognized techniques which identify the function of a product or service, establish the monetary value for that function, and provide the necessary function reliably at the lowest overall cost. Introduction of project management principles and techniques 3 lectures, 1 activity. Prerequisite: IT 150 and junior standing.

IT 327 Plastics Technology (4)
Materials, processes and applications of industrial polymers. Basic operations in processing, fabricating and finishing of thermal plastic and thermal setting resins, product and materials testing. Plastics and the environment. Recycling, reuse, source reduction. Hazardous waste. Laws and regulation pertaining to plastics. 3 lectures, 1 laboratory. Prerequisite: CHEM 110 or CHEM 111 or equivalent.
IT 329 Industrial Materials (4)
Structure, properties, applications and limitations of select industrial materials to include ferrous and nonferrous metals, ceramics, glasses, composites, and organic materials. Materials testing and material selection. 3 lectures, 1 activity. Prerequisite: CHEM 110 or CHEM 111 or equivalent.

IT 330 Fundamentals of Packaging (4)
Overview of packaging. Historical development, functions, and materials. Processes and technology employed to protect goods during manufacture, handling, shipment and storage. Container types, package design, development, research and testing. Economic and international importance and perspective as an industrial activity. Packaging and the environment, recycling, reuse and source reduction, and laws affecting packaging. 3 lectures, 1 activity. Prerequisite: Consent of instructor.

IT 332 Electrical Power Systems (4)
Industrial operational facility management of electrical power systems providing a broad overview of production, distribution, control, pneumatics and hydraulics, conversion and measurement of electrical power. Specific strategies including advantages and disadvantages of economics, safety, conservation, design and maintenance. Familiarity with electronic devices and industrial motor controls. Electrical power system technology including generators, transformers, motors, inductive loads, conductors, distribution systems and power generation. Use of design and analysis software packages for strategic management decisions. 3 lectures, 1 laboratory. Prerequisite: IT 137, MATH 141 or MATH 221, PHYS 122.

IT 336 Textile Technology (4) GE Area F
Physical and chemical characteristics of natural and manufactured fibers. Production of synthetic polymers. Technology of fabric production and finishes. Industrial and consumer applications. Textiles as a global industry. Legislation. Laboratory identification of fibers and evaluation of performance properties of fabrics. 3 lectures, 1 laboratory. Prerequisite: Junior standing, completion of Area A and one laboratory science course, or consent of instructor.

IT 341 Plastic Processes and Applications (4) GE Area F
Cultural, social and economic implications of plastics in a worldwide environment. Study of materials, costs, processes, resource management, recycling, safety, laws and regulations. Applied experiences include molding, i.e., injection, blow, rotational and compression; extrusion, casting and plastics fabrication. 3 lectures, 1 laboratory. Prerequisite: Junior standing, completion of GE Area B or consent of instructor.

IT 350 Electrical and Mechanical Controls (4)
A systems approach to the control of electrical and mechanical equipment and industrial process instrumentation. Topics covered include: Open-loop and closed loop systems, block diagrams, transfer functions, classifications, microprocessor-based control, relays, sensors, actuators, PLCs and feedback control principles. 2 lectures, 2 laboratories. Prerequisite: IT 137, IT 150, PHYS 121 and PHYS 122.

IT 371 Production Operations and Project Management (4)
Introduction to operations management and production systems; service operations and project management; production and service models. Planning and control in manufacturing and service industries. Quantitative methods and statistical techniques used in production systems and project management. 3 lectures, 1 activity. Prerequisite: A grade of C- or better in all of the following: MATH 141 or MATH 221, and STAT 211 or STAT 252, and junior standing.

IT 375 Packaging Material and Product Testing (4)
Survey of tests and procedures for packaging materials and packaging products following ASTM, TAPPI, and ISTA standards. The testing procedures will include tests for shock, vibration, drop, impact, tensile, shear, edge-wise crush, mullen, and incline plane as prescribed for shipment by truck, rail, sea, and air. 2 lectures, 2 activities. Prerequisite: IT 330.

IT 381 Industrial Management (4)
Organization and functioning of management in industry, Planning, direction, and control of the business enterprise in terms of policy formation, organizational structure, finance, sales, procurement, plant location, facilities and production processes. 4 lectures. Prerequisite: Junior standing.

IT 400 Special Problems for Advanced Undergraduates (1–4)
Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Consent of instructor.

IT 403 Product Quality Control (4)
Develop a quality program plan for a specific manufacturing or service company incorporating vendor controls, test and inspection requirements, calibration, corrective action, audits and statistical process control techniques which are compatible with the latest standards designed for by that industry. 4 lectures. Prerequisite: IT 303.

IT 406 Industrial Sales (4)
Development and implementation of a base of competencies to succeed in industrial sales. Refinement of technical knowledge and selling skills in an industrial setting. Team-taught by Industrial Technology and Marketing faculty. 3 lectures, 1 activity. Prerequisite: BUS 346 and either BUS 371 or IT 407.

IT 407 Applied Industrial Operations (4)
Implementation of product/project design and operation procedures within an integrated national and international manufacturing environment. Students are required to design/develop, manufacture, assemble and market a product while working in a simulated "real world" environment. The course builds upon and solidifies foundational concepts introduced in the business core program. 2 lectures, 2 laboratories. Prerequisite: A grade of C- or better in both: BUS 346 and IT 301.

IT 408 Corrugated Protective Packaging (4)
Principles of protective packaging development. Packaging of different classes of products. Materials and test methods for cushioning, blocking, barriers, packing. Development of cushion design, problem solving. Analysis of package configurations, closing features, locking devices and labels. Examination of permeability of materials to gases, vapors and liquids, considerations of biological protection of packages and packaging materials. International packaging standards and hazmat requirements. 2 lectures, 2 activities. Prerequisite: IT 330, PHYS 121, CHEM 110 or CHEM 111, or consent of instructor.

IT 409 Machinery For Packaging (4)
Analysis of major types of packaging machinery from a practical, operational and marketing viewpoint. Basic processes utilizing packaging machinery. Specialized operations, contract specifications, selection, operation and maintenance. Material handling and distribution equipment and systems, and storage and retrieval systems. Required field trips to packaging operations. 3 lectures, 1 activity. Prerequisite: IT 330, PHYS 104 or PHYS 121, or consent of instructor.

IT 410 Industrial and Facilities Planning (4)
Production planning and control. Linking production planning systems and manufacturing technologies in a global economy. Relating of mechanical equipment and systems along with utility and production support systems into the overall industrial plan. 3 lectures, 1 activity. Prerequisite: IT 233, or consent of instructor.

IT 411 Industrial Safety and Health (4)
Industrial safety and health: worker safety and health legislation; worker's compensation, hazardous waste management requirements of industry; employer/employee responsibility and liability as related to the worker's safety and health and the environment. Hazards and their control in industrial facilities: mechanical, electrical, pressure, explosions/explosives, heat/temperature, falls/falling objects/impacts, radiation, vibration/noise, toxic substances, fire/fire suppression. 3 lectures, 1 activity. Prerequisite: Completion of Area A or consent of instructor.

IT 419 Cooperative Education/Internship (2-12) (CR/NC)
Work experience in business, industry, government and other areas of student career interest. Periodic written progress reports, final report, and evaluation by work supervisor required. Credit/No Credit grading. Total
developing a textile product line; sourcing, pre-production, and production distribution considerations in developing a package. Organizing the package/product successes and failures. Class project for analysis and package function for best results. Case studies of domestic and international to marketplace. Interplay of marketing, economic, technical, production and selection and completion of a project under faculty supervision. Projects IT 461 Senior Project (3)

Construction and maintenance of physical facilities and equipment as IT 454 Facilities Development (4)

Automated manufacturing systems, including computer numerical control (CNC), flexible manufacturing systems, computer-integrated manufacturing and robotics. Laboratory work in manual/automatic programming and set-up of CNC machines and robots. 2 lectures, 2 laboratories. Prerequisite: IT 233, IT 260, or consent of instructor.

IT 446 Textile Product Design and Development (4)


IT 451 Facility Equipment and Systems (4)

Develop an understanding of how major mechanical equipment and systems are incorporated in the utility and production support systems of a modern industrial facility. Includes field trips to industrial/commercial facilities. 4 lectures. Prerequisite: IT 150 or consent of instructor.

IT 454 Facilities Development (4)

Construction and maintenance of physical facilities and equipment as related to plant layout/design, regulatory and environmental compliance, safety/security, energy conservation, and process improvement. 4 lectures. Prerequisite: IT 451 or consent of instructor.

IT 456 Textile Product Quality Assurance (4)

Quality assurance in the textile/apparel industry. Materials and product testing and evaluation through laboratory experimentation. Developing standards and specifications for textile products, inspection processes, sampling and testing procedures. Integration of products with materials and consumers. 3 lectures, 1 laboratory. Prerequisite: IT 336, completion of Areas A, B, and F, or consent of instructor.

IT 461 Senior Project (3)

Selection and completion of a project under faculty supervision. Projects are typical of problems graduates must solve in their field of employment. Project results are presented in a formal report and must be completed during one quarter. Minimum 90 hours total time. Prerequisite: Consent of instructor.

IT 470 Selected Advanced Topics (1–4)

Directed group study and seminars in selected topics in industrial technology. Open to undergraduate students. Class Schedule will list topic selected. Total credit limited to 12 units. 1 to 4 lectures. Prerequisite: Consent of instructor.

IT 480 Operations Planning and Control (4)

Framework for operations planning and control. Management problems associated with controlling flows of material and inventory levels in manufacturing and distribution systems. 4 lectures. Prerequisite: IT 371.

IT 481 Service Operations Management (4)

Principles and techniques of operations management applied to the management of service operations. Producing organizational success through offering reliable, dependable, readily available, and flexible customer service. 4 lectures. Prerequisite: IT 371.

IT 482 Advanced Operations Management (4)

Advanced principles in operations management as applied to both manufacturing and service organizations. Product-service conversion systems, capacity planning and utilization, aggregate planning, scheduling and control, inventory management, and operations subsystem coordination with the organization's strategy. 4 lectures. Prerequisite: IT 371, and senior standing.

IT 487 Seminar in Quality Management (4)

Principles and techniques of quality and performance management as applied to organizations in the private and public sector. Emphasis on competitive implications. Integrations of fundamental management techniques, existing improvement efforts, technical tools, and new management technologies focused on continuous organizational improvement. 4 seminars. Prerequisite: Senior standing, IT 371.

IT 500 Individual Study (1–6)

Advanced study planned and completed under the direction of a member of the department faculty. Open only to graduate students who have demonstrated ability to do independent work. Maximum of 6 units may be applied to degree requirements. Prerequisite: Graduate standing and formal petition with approval from the Associate Dean of OCOB Graduate Programs.

IT 510 Impact of Science and Technology (4)

Comprehensive study of innovation – ideas implemented successfully in practice. Theories, strategies, and information for directing cutting-edge technological trends in a variety of industries but not limited to: materials, telecommunications, biotechnology, environmental management, packaging, transportation, food technology, and facilities. 4 seminars. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

IT 512 Improving Productivity Through Technology (4)

Study, from a management of technology perspective, of current and emerging automation technologies, from a technology perspective, and how they are used in manufacturing to provide firms with a competitive advantage; problems raised and opportunities made available by modern manufacturing automation technologies; issues concerning technology selection, justification, implementation, technology consistency, and restructuring. 4 lectures. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

IT 514 Commercializing Technological Development (4)

The process utilized in developing technologies for customers. Emphasis on new technology/product development process, including idea generation, concept development, industrial market niche, product research and development, manufacturing, product launch and evaluation. 4 seminars. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

IT 520 Leadership of Technology (4)

The role and importance of technology in corporate production environments. Different approaches to manufacturing leadership, organization and planning, in terms of their impact on decision-making, product development and innovation. 4 lectures. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.
IT 521 Training in Industrial and Technical Systems (4)
Developing and managing technological training in industry. The integration of people, technology, philosophy, corporate visions, missions, goals, objectives, resources, populations, facilities, budgets and evaluation in the development of industrial training curriculum and instruction. 4 lectures. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

IT 522 Facilities Planning (4)
Introduction of prospective managers to the methods and techniques used in the planning of the modern industrial facility, including but not limited to: site selection, layout, materials handling, utilities, color and lighting, sound, air, safety standards, and current trends. 4 lectures. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

IT 523 Industrial Sales (4)
Development and implementation of a base of competencies that support the sale of products whose intended application is in manufacturing. Refinement of technical knowledge and selling in an industrial setting. 4 lectures. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

IT 527 Trends and Issues in Technology Management (4)
Advanced study of key current trends and issues relative to technology management of industrial and technical systems. 4 seminars. Prerequisite: Graduate standing or approval from the Associate Dean of OCOB Graduate Programs.

IT 598 Industrial and Technical Studies Project (5)
Completion of a project involving individual research significant to the field of industrial and technical systems. A formal written proposal must be accepted by the Associate Dean of OCOB Graduate Programs before work begins. Course satisfies culminating experience requirement through the completion of the project. Prerequisite: Graduate standing, consent of instructor and IT 510, IT 512, IT 520 and IT 527 or approval from the Associate Dean of OCOB Graduate Programs. Effective Spring 2007.

IT 599 Industrial and Technical Studies Thesis (5)
Completion of a thesis involving individual research that is significant to the field of industrial and technical systems. A formal written proposal must be accepted by the Associate Dean of OCOB Graduate Programs before work begins. Course satisfies culminating experience requirement through the completion of the comprehensive thesis. Prerequisite: Graduate standing, consent of instructor and IT 510, IT 512, IT 520 and IT 527 or approval from the Associate Dean of OCOB Graduate Programs. Change effective Spring 2007.

ITAL–ITALIAN
ITAL 101, 102, 103 Elementary Italian I, II, III (4) (4) (4)
Italian for beginners. Class practice in pronunciation, sentence structure, reading, writing, and basic conversation. Laboratory drill required. Language taught in its cultural context. To be taken in numerical sequence. 3 lectures, 1 activity.

JOUR–JOURNALISM
JOUR 201 Journalism History (4)
Survey of historical influences in the development of today's journalism. Contributions of women and minorities to American mass media. Rise of technology in the communication industry. 4 lectures.

JOUR 203 Writing for the Media (4)
Introduction to the techniques of reporting and writing news from various media perspectives including print, online, broadcast and public relations. Intensive laboratory and field practices in gathering and evaluating information. Writing basic news stories under close supervision. 3 lectures, 1 laboratory.

JOUR 205 Agricultural Communications (4)
Survey of the media of agricultural communication. Newspaper farm pages and sections, general and specialized agricultural magazines. Radio and TV farm broadcasts. Public and private agencies involved in agricultural communication. Role of California minorities in agriculture. Writing on agriculture-related issues. 3 lectures, 1 activity.

JOUR 219 Mass Media in a Multicultural Society (4)
Challenges and triumphs of the mass media in a multicultural society. Survey of print, electronic and online media and how they serve and reflect the communication needs and aspirations of citizens in a multi-ethnic democracy. 4 lectures. Prerequisite: JOUR 203.

JOUR 233 Copy Editing (4)
Introduction to the techniques of newspaper, magazine, and on-line copy desk work. Rewriting and editing copy and headlines for news, feature stories, and on-line material. Headline, caption, and display copy writing. Ethical issues in copy editing. Selecting, cropping, and writing captions. Art/photography selection, sizing, and cropping. Basic editing functions of Photoshop and Quark. Practical laboratory experience in editing. 3 lectures, 1 laboratory. Prerequisite: JOUR 203 or equivalent.

JOUR 302 Mass Media Law (4)
Legal basis for freedom of expression. Court decisions resolving conflicts between First Amendment and right to fair trial, privacy, reputation. Source confidentiality, freedom of information, contempt, copyright. Federal and state laws and regulations affecting mass media reporters, editors, publishers, news directors. 4 lectures. Prerequisite: JOUR 203.

JOUR 304 Public Affairs Reporting (4)
Experience leading to advanced skills in reporting and writing stories about contemporary issues, government and courts. Field and laboratory assignments in beat reporting, public meeting coverage, writing style, investigative techniques and online journalism research. 3 lectures, 1 laboratory. Prerequisite: JOUR 203 and JOUR 233 or JOUR 342.

JOUR 312 Introduction to Public Relations (3)
Growth and development of public relations as a practice in business and industry, government, volunteer agencies and other public institutions. Communications and activities utilized to gain public interest and support. 3 lectures. Prerequisite: Sophomore standing.

JOUR 320 Telecommunications and Broadcasting (4)
Introduction to telecommunications, broadcast and electronic media. Examination of the structure of media organizations, the technologies involved and programming content. Analysis and understanding of that content in terms of perceived target audiences. 4 lectures. Prerequisite: ENGL 134 and SCOM 101 or SCOM 102.

JOUR 331 Contemporary Advertising (4)

JOUR 333 Broadcast News (4)
Beginning broadcast news writing and reporting for radio and television. Emphasis on developing news judgment and producing radio newscasts. Introduction to television studio equipment and procedures. Lab experience includes writing and reporting live on-air for KCPR. 3 lectures, 1 laboratory. Prerequisite: JOUR 203.

JOUR 342 Advanced Public Relations Writing (4)
Specialized course combining theory and practice in advanced public relations writing. Persuasive copy for diverse internal and external audiences. Emphasis on gathering information, preparing news releases, newsletters, talking points, position papers, speeches, and other communications vehicles. Analysis of various media case studies. 4 lectures. Prerequisite: JOUR 233 and JOUR 312.
JOUR 346 Broadcast Announcing and Production (4)
Develop on-air skills in the performance of voice-overs, stand-ups, hosting and the production of televised public service announcements. Emphasis on the effective use of audio and non-linear video editing techniques as well as broadcast writing. 3 lectures, 1 activity. Prerequisite: JOUR 203 and JOUR 333.

JOUR 348 Electronic News Gathering (4)
Instruction on electronic news gathering (ENG) that includes advanced news writing, field reporting and editing for broadcast. Emphasis on developing research techniques, interviewing skills, responsible and effective non-linear video editing, compelling use of natural sound and professional on-air delivery. 3 lectures, 1 laboratory. Prerequisite: JOUR 203 and JOUR 333.

JOUR 351 Advanced Radio Reporting: KCPR (3)
Broadcast lab for students holding news positions on radio station KCPR, or other similar supervised experience as determined by the department. Total credit limited to 6 units. 2 lectures, 1 laboratory. Prerequisite: JOUR 203 and JOUR 333 and JOUR 346 or JOUR 348. Non-majors: consent of instructor.

JOUR 352 Advanced Newspaper Reporting: Mustang Daily (3)
Reporting lab for students holding editorial positions on Mustang Daily. Total credit limited to 6 units. 2 lectures, 1 laboratory. Prerequisite: JOUR 203, JOUR 233 and JOUR 304.

JOUR 353 Advanced Television News Production: CPTV (3)
Senior-level course synthesizing the diverse skills and experiences developed through the broadcast journalism curriculum to produce a weekly 60-minute newscast; emphasis on producing. Total credit limited to 6 units. 2 lectures, 1 laboratory. Prerequisite: JOUR 203 and JOUR 333 and JOUR 346 or JOUR 348. Non-majors: consent of instructor.

JOUR 385 Mass Media Criticism (4)
Examines mass media (especially broadcasting) from a rhetorical/critical perspective. Aims to expand students' understanding of media issues, media's role as critic, and the role of criticism. 4 lectures. Prerequisite: SCOM 101 or SCOM 102, and junior standing.

JOUR 390 Visual Communication for the Mass Media (4)
Theory and application of visual communication in today's print, broadcast and public relations media. Extensive experience in visual and text manipulation for effective information communication. 3 lectures, 1 laboratory. Prerequisite: JOUR 203 and JOUR 233.

JOUR 400 Special Problems for Advanced Undergraduates (1–2–4)
Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 4 units per quarter. Prerequisite: Consent of instructor. Change effective Fall 2006.

JOUR 401 Global Communication (4)
Global communications facilities and operations; world transmission of information; survey of world wire services and international print and electronic media. Analysis of press operations under varying government ideologies, including third world countries. 4 seminars. Prerequisite: JOUR 203.

JOUR 402 Journalism Ethics (4)
Current issues revolving around the social responsibility of the mass media. Role of the public, government, and media in considerations of media accountability. Professional behavior in media organizations. 4 seminars. Prerequisite: Junior standing, JOUR 203.

JOUR 407 Feature Writing (4)
Practice in researching, interviewing, writing and marketing nonfiction articles for print media, and analysis of similar work in current distribution. 4 lectures. Prerequisite: JOUR 203 or consent of instructor.

JOUR 410 Applied Multimedia Reporting (4)
Exploration of the uses of computers for newsgathering and reporting. Focus on information gathering from mass media, governmental and corporate data bases and contextual manipulation using personal computers and mainframe computers. Commercial online and Internet tools (such as the World Wide Web) and database tools used for day-to-day and project oriented reporting. 3 lectures, 1 laboratory. Prerequisite: JOUR 203.

JOUR 413 Public Relations Campaigns (3)
Methods employed in dissemination by organizations, institutions and governments. Interaction of media and PR practitioners, strategies for integrating appropriate media to facilitate effective dissemination, case histories, formation and measurement of public opinion. Public opinion survey projects. 3 lectures. Prerequisite: JOUR 203 and JOUR 312 and JOUR 342 or consent of instructor.

JOUR 415 Advanced Public Relations Practice (4)
Application of public relations tools and techniques required to create, manage, and implement a comprehensive, professional public relations campaign. Includes research, planning, writing goals and objectives; establishing themes, strategies, and plan evaluations. Public relations crisis management. 4 lectures. Prerequisite: JOUR 203, JOUR 312, JOUR 342 and JOUR 413.

JOUR 444 Media Internship (3)
Application of techniques on daily basis with media under supervision of department faculty. Prerequisite: Junior standing in Journalism and consent of instructor.

JOUR 460 Senior Project (3)
Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 90 hours total time.

JOUR 470 Selected Advanced Topics (2–4)
Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class Schedule will list topic selected. Total credit limited to 8 units. 2–4 lectures. Prerequisite: Consent of instructor.

JPNS–JAPANESE

JPNS 101, 102, 103 Elementary Japanese I, II, III (4) (4) (4)
Beginning Japanese class practice in pronunciation, sentence structure, reading, writing, basic conversation, and introduction to Japanese culture. Activity drill required. To be taken in numerical sequence. 3 lectures, 1 activity.

KINE–KINESIOLOGY

(See also PE–Physical Education)

PROFESSIONAL ACTIVITIES

Priority for enrollment given to those students pursuing a major in Kinesiology. Kinesiology majors may apply a maximum of 24 units of credit earned in PE 101-199 or KINE 206-239 toward the bachelor's degree. When applicable, course selection should be determined by students after consultation with their advisor. All courses are one or two units and meet for two or four hours per week. The primary purpose of all professional activities is for students to attain intermediate skills in performance and analysis and knowledge of rules and strategy. Secondary purposes may include leadership and teaching experiences. In some classes a beginning level activity class (see Physical Education) will be recommended for individuals who have little or no previous experience.

KINE 206 Gymnastics (2)
KINE 208 Golf (1)
KINE 210 Tennis (1)
KINE 211 Softball-Baseball (1)
KINE 212 Handball/Racquetball (1)
KINE 213 Basketball (1)
KINE 214 Volleyball (1)
KINE 216 Wrestling (1)
KINE 217 Flag Football/Football (1)
KINE 218 Aquatics (2)
KINE 219 Progressive Strength Training (1)
KINE 220 Group Fitness Activities (2)
KINE 221 Combatives/Self Defense (1)
KINE 222 Archery (1)
KINE 223 Cross Country and Track Events (1)
KINE 224 Field Events (1)
KINE 225 Team Handball (1)
KINE 226 Soccer (1)
KINE 227 Aerobic Dance Exercise (2)
KINE 228 Cooperative Games and Activities (1)
KINE 229 Badminton (1)

ACADEMIC COURSES

Professional courses designed primarily for the student majoring in kinesiology.

KINE 241 Understanding Fitness and Training (1)
Introduction to physiological principles and factors which provide the basis for the development and maintenance of optimal physical fitness. 1 lecture. Prerequisite: Concurrent enrollment in one course in the PE 101-199 series, or consent of instructor.

KINE 243 Lifeguard Training (3) (CR/NC)
Lifeguarding skills and knowledge needed to prevent and respond to aquatic emergencies. Successful completion of this course will result in American Red Cross certifications in Lifeguard Training, First Aid, and CPR for the Professional Rescuer. AED, and O2 Administration. Credit/No Credit grading only. 2 lectures, 1 activity.

KINE 250 Healthy Living (4)  GE D4
Personal health with emphasis on healthful behavioral practices including physical fitness, nutrition, psychosocial well-being, alcohol and other drugs, intentional and unintentional injury, reproductive health, infectious and non-infectious diseases. 4 lectures. Not open to students with credit in KINE 255. Change effective Fall 2006.

KINE 252 Introduction to Athletic Training (2)
Modern principles and practices in the prevention, treatment, rehabilitation and follow-up care of athletic injuries. Functions and limitations of the athletic trainer as an athletic paramedic. Theory and practice of adhesive strapping as related to supporting major body joints for athletic participation. 2 activities. Prerequisite: GE B1b.

KINE 255 Personal Health: A Multicultural Approach (4)  GE D4  USCP
Personal health with special emphasis on multicultural practices. Not open to students with credit in KINE 250. 4 lectures. Change effective Fall 2006.

KINE 270 Orientation to Kinesiology (2)
Designed to acquaint the student with the concept of kinesiology as a profession and to orient the student to the Cal Poly program. 2 lectures.

KINE 275 Sports Officiating (2)
Designed to provide knowledge, understanding, appreciation of officiating in general, and the development of skills in officiating. 1 lecture, 1 activity.

KINE 276 Athletic Coaching Theory (3)
Basic concepts, methods, practices, strategies and philosophies as they apply to competitive athletics. 3 lectures.

KINE 277 Coaching Practicum (2–6) (CR/NC)
Practical experience through the actual coaching of a competitive sports team. 2–6 activities; minimum of 2 hours per week per unit. Total credit limited to 6 units. Credit/No Credit grading only. Learning outcomes must be developmental if more than one practicum is completed. Prerequisite: KINE 276 and consent of advisor.

KINE 280 Responding to Emergencies: First Aid/CPR (3)
An American Red Cross certification course, more comprehensive than a Standard First Aid course. Skills and knowledge necessary in the treatment of life-threatening emergencies and other injuries and sudden illnesses. Red Cross First Aid/CPR certifications issued upon successful completion of certification requirements. 2 lectures, 1 activity.

KINE 300 Planning Techniques in Physical Education (5)
History and philosophy of physical education in educational settings. Practical skills and techniques of teaching physical education in schools. Unit and lesson planning, class management, implementation and evaluation of a lesson in a laboratory setting. 3 lectures, 2 activities. Prerequisite: 2 professional activities or equivalent. Recommended: KINE 317.

KINE 301 Functional Muscle Anatomy (1)
Functional organization of the human muscular system. All major muscle groups, with emphasis on segmental motion. 1 laboratory. Prerequisite: ZOO 331 or concurrent enrollment.

KINE 302 Biomechanics (4)
Fundamental biomechanical concepts and their application to human movement activities, and analyses of exercise mechanics and skill performance. 3 lectures, 1 laboratory. Prerequisite: ZOO 331 and KINE 301.

KINE 303 Physiology of Exercise (4)
Application of human physiology to exercise situations. 3 lectures, 1 laboratory. Prerequisite: ZOO 331, 332 (or transfer equivalent). Recommended: FSN 210, KINE 317.

KINE 304 Pathophysiology and Exercise (3)
Selected human diseases, their etiology, pathophysiology, symptoms, diagnosis, effects on health and physical performance, and as affected by preventive or therapeutic exercise. 3 lectures. Prerequisite: KINE 303.

KINE 305 Drug Education (2)
Instruction on the nature and effect of the use of tobacco, alcohol, narcotics and restricted dangerous drugs. 2 lectures. Prerequisite: GE Area D4.

KINE 307 Adapted Physical Activity (4)
Major categories of disabling conditions with implications for the development of physical activity programs for specific disabilities. 3 lectures, 1 laboratory. Prerequisite: GE Area B2 and B3, sophomore standing. Recommended: ZOO 331, 332.

KINE 308 Motor Development (3)
Motor development of individuals from birth to maturity. Emphasis on interrelationship between motor and cognitive characteristics and affective needs and interests. 3 lectures. Prerequisite: GE D4 or consent of instructor.

KINE 309 Creative and Nontraditional Games (3)
Introduction of preparatory teachers to non-traditional and multicultural games and activities which address the State Framework and the National Standards. Students present the activities in a manner which demonstrates effective models of instruction, including maximum participation. 1 lecture, 2 activities. Prerequisite: KINE 300.

KINE 310 Concepts in Elementary Physical Education (3)
Movement as it relates to physical motor skill development, fitness, wellness, social development, cross-cultural understanding, and self-image. 2 lectures, 1 activity. Prerequisite: GE D4. Recommended: Junior standing.

KINE 315 Field Sports (3)
Introduction and preparation for teaching field sports in accordance with state and national standards for K-12 physical education programs. Students learn to present activities in a manner that reflects effective models of instruction. 1 lecture, 2 activities. Prerequisite: KINE 300.

KINE 317 Computer Applications in Kinesiology (2)
Experiences focusing on applications of computers, data processing and information technology as they relate to understanding and solving specific problems in the field of kinesiology. Total credit limited to 4 units. 2 activities. Prerequisite: Basic computer literacy.

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KINE 319 Measurement and Evaluation in Kinesiology (4)
Principles of test selection and administration, measurement and evaluation of data characteristics, and data analysis related to motor behavior and the performance of physical skills. 3 lectures, 1 activity. Prerequisite: STAT 217 or STAT 218. Recommended: KINE 317.

KINE 320 Sport and Gender (4)  GE D5 USCP
Intersections between sport and gender in American society. Identification and discussion of the historical, sociological and psychological issues that affect the sport experiences of males and females, especially as they relate to class, race/ethnicity, sexuality, and political movements. 4 lectures. Prerequisite: Completion of GE Areas A, D1 and either D3 or D4. Kinesiology majors will not receive GE Area D5 credit.

KINE 324 Sport, Media and American Popular Culture (4)  GE D5 USCP
Issues of class, race/ethnicity, gender, various forms of deviance, and other aspects of social life. Exploration of sociological manifestations and implications of how the aforementioned social issues are embedded in mediated forms of sports. Kinesiology majors will not receive GE Area D5 credit. 3 lectures, 1 activity. Prerequisite: Completion of GE Areas A, D1 and D3.

KINE 354 Health Education Strategies (2)
Introduction to health promotion services, environment, and instruction within public and private settings. Strategies, methods, technology and resources used in the design and delivery of health education about infectious and non-infectious diseases. 2 activities. Prerequisite: BIO 111/BIO 115, KINE 250 or KINE 255. Recommended: KINE 317.

KINE 356 Teaching Gymnastics (2)
Techniques and problems in teaching gymnastics along with practical experience: Emphasis on teaching progressions, class organization, spotting, and safety. 2 activities. Prerequisite: KINE 206 and KINE 300. Recommended: KINE 317.

KINE 384 Water Safety Instructor (4)
Analysis of swimming strokes and techniques with emphasis on teaching methods for beginners through advanced swimmers. Those students who complete the course requirements are eligible for American Red Cross Water Safety Instructor certification. 2 lectures, 2 activities. Prerequisite: Demonstrated proficiency in swimming or instructor permission.

KINE 385 Lifeguard Instructor (3)
Analyzing lifeguarding, CPR and First Aid skills with emphasis on techniques and methods for teaching rescue skills. Upon successful completion of this course, American Red Cross guard certifications issued in: Lifeguard Instructor, CPR for the Professional Rescuer Instructor, community First Aid and Safety, Automated External Defibrillation, and Oxygen Administration Instructor, 2 lectures, 1 activity. Prerequisite: KINE 243 or equivalent certifications.

KINE 396 Outdoor Education (3)
Introduction and preparation for teaching Outdoor Education activities in accordance with state and national standards for K–12 physical education programs. Students learn to present activities in a manner that reflects effective models of instruction. Includes a clinical teaching experience. 1 lecture, 2 activities. Prerequisite: KINE 300 and KINE 384 or equivalent.

KINE 400 Special Problems for Advanced Undergraduates (1–3)
Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 6 units, with a maximum of 3 units per quarter. Prerequisite: Senior standing or consent of instructor.

KINE 401 Managing Kinesiology Programs (3)
Planning, organizing and controlling programs in public, commercial, private and clinical physical activity settings. Emphasis on legal, ethical and budgetary considerations. 3 lectures. Prerequisite: Senior standing or consent of instructor.

KINE 402 Motor Learning and Control (4)
Variables which control sensory-motor integration. Analysis of factors which affect the acquisition of motor skills as related to the learning process and the learning environment. 3 lectures, 1 activity. Prerequisite: STAT 217 or KINE 319 or consent of instructor.

KINE 405 Community Health Promotion (4)
Practices to educate and empower communities toward actions that resolve health issues and problems. Sociological, historical, educational, environmental and biological influences on health status. 3 lectures, 1 activity. Prerequisite: KINE 250 or KINE 255 and GE Areas A and D3, junior standing.

KINE 406 Neuroanatomy (4)
Structure and function of the human nervous system. Afferent and efferent pathways involved in perception and action. Behavioral aspects of motor control and related neurological dysfunction and pathologies. Designed for allied health professions students. 4 lectures. Prerequisite: ZOO 331 and ZOO 332.

KINE 408 Exercise and Health Promotion for Senior Adults (4)
Special fitness, exercise, and health needs of the senior population. Theories of aging and age-related changes. Health promotion, exercise needs and activity programs for senior adults. 3 lectures, 1 activity. Prerequisite: KINE 250 or KINE 255, and one of the following: KINE 220, KINE 227, KINE 228, or KINE 219, senior standing or consent of instructor.

KINE 410 Psychology of Coaching (3)
Psychological considerations of the coach-athlete relationship and mental preparation of teams and individuals for competition and practice. Special emphasis on the male and female adolescent with regard to the psychological implications of sports participation. 3 lectures. Prerequisite: Junior standing. Recommended: PSY 201 or PSY 202.

KINE 411 Psycho/Social Aspects of Physical Activity (3)
Psychological and sociological effects of physical activity on individuals and groups in American society. 3 lectures. Prerequisite: Junior standing. Recommended: Completion of GE Areas A and D3; PSY 201 or PSY 202.

KINE 416 Physical Education/Recreation Facilities (3)
Management, clientele considerations, facilities and outdoor areas planning and operations, personnel, finance and equipment as related to physical education and recreation areas and facilities. Consideration of architectural and environmental barriers. Field visits required. 3 lectures. Prerequisite: Upper division standing and consent of instructor for non-KINE/REC majors.

KINE 419 Physical Education Program Content in the Elementary School (3)
Cognitive and psychomotor competencies required to design a developmental physical education program for elementary aged school children. 2 lectures, 1 activity. Prerequisite: KINE 300 and two activity classes.

KINE 420 Aquatic Facility Management and Operation (4)
Principles of aquatic facility management; swimming pool purification and filtration systems. Aquatic facility safety; instructional programming. Successful completion of this course and attainment of appropriate scores on written tests will result in two national certifications: Certified Aquatic Manager and Pool Operator on Location. 4 lectures. Prerequisite: KINE 384 or consent of instructor.

KINE 421 Strategies for Teaching Physical Education (3)
Systematic analysis and refinement of teaching skills within the discipline of physical education. 2 lectures, 1 activity. Prerequisite: KINE 419.

KINE 422 Teaching Elementary School Physical Education (2)
Implementation of a developmental physical education program for elementary aged children. The program will complement that conducted in the local public schools. 1 lecture, 1 laboratory. Prerequisite: KINE 421.
KINE 423 Teaching Middle School Physical Education (3)
Techniques for teaching physical education in middle school. Emphasis on class organization, lesson plan development and evaluation, class management and control, and understanding the middle school setting. 1 seminar, 2 laboratories. Prerequisite: KINE 206, KINE 422.

KINE 424 Organization and Implementation of a K-12 Physical Education Program (4)
Methods of teaching K-12 physical education, with emphasis on alignment with the California Physical Education Challenge Standards, English language learners, special students, and educational technologies. 4 lectures. Prerequisite: KINE 425 or consent of instructor.

KINE 425 Teaching High School Physical Education (3)
Techniques for teaching physical education in high schools. Emphasis on teaching strategies, organization, lesson plan development, self-evaluation, class management, and behavior management. 1 seminar, 2 laboratories. Prerequisite: KINE 423, and one 300-level activity class.

KINE 426 Senior Seminar (2)
Capstone course which engages students in activities that integrate the sub-disciplines of kinesiology, and facilitates the development of a personal portfolio. 2 seminars. Prerequisite: Senior standing.

KINE 434 Planning Health Promotion Programs: Theory and Practice (4)
Theory and methods to facilitate individual and group behavior change to promote health and prevent disease. Concepts in the behavioral sciences affecting health behavior, motivation, and decision making. Development of planning and evaluation skills. 3 lectures, 1 activity. Prerequisite: KINE 250 or KINE 255, completion of GE Areas A and D3, and junior standing.

KINE 437 Directed Fieldwork (1–3) (CR/NC)
Practical work experience in related activities of kinesiology under qualified supervision. Total credit limited to 9 units. Credit/No Credit grading only. Minimum of 2 laboratory hours per week per unit. Prerequisite: Senior standing or consent of instructor.

KINE 438 Adapted Physical Activity Fieldwork (1–3) (CR/NC)
Practical experience in adapted physical activity programming. Students plan and conduct physical activity programs for people who are disabled. Total credit limited to 6 units. Credit/No Credit grading only. Prerequisite: KINE 307, and consent of instructor.

KINE 440 Physical Education Practicum (1)
Supervised experience involving organizational and instructional responsibilities in activity, lecture and/or laboratory classes as determined by curricular concentration or certificate program. Total credit limited to 3 units. Prerequisite: Consent of instructor.

KINE 443 Comprehensive School Health Education (4)
Course content includes the health status of children K-12, and the recommendations of the California Health Framework. 4 lectures. Prerequisite: KINE 250 or KINE 255.

KINE 445 Electrocardiography (3)
Basic principles of electrocardiography, including practical skills of the ECG technician. Recognition of normal ECG patterns and abnormal changes related to rhythm disturbances, conduction defects, and myocardial ischemia/infarction. 2 lectures, 1 laboratory. Prerequisite: KINE 303, or consent of instructor.

KINE 446 Echocardiography (4)
Basic principles of echocardiography, including practical skills of the echocardiographer. Recognition of normal echocardiographic patterns and abnormalities, including those caused by pathology and exercise conditioning. 2 lectures, 2 laboratories. Prerequisite: KINE 445 or consent of instructor.

KINE 450 Worksite Health Promotion Programs (3)
Designed to acquaint students with those events, situations and relationships leading to healthy lifestyles in fitness and occupational settings. Design and implementation of workplace health promotion programs. 3 lectures. Prerequisite: KINE 250 or KINE 255, KINE 434, and senior standing. Recommended: KINE 317.

KINE 451 Nutrition for Fitness and Sport (5)
Application of nutritional and metabolic facts to selected aspects of physical training, degenerative disease, obesity and weight control, diet manipulation and modification in sport, nutritional supplementation and special dietary considerations for the young and old, male and female athletes. 5 lectures. Prerequisite: KINE 250 or KINE 255, KINE 303. Recommended: CHEM 313.

KINE 452 Testing and Exercise Prescription for Fitness Specialists (4)
Selected areas of health/fitness screening and evaluation. Application of components relevant to the development and administration of exercise programs for persons regardless of sex, age, functional capacity and presence or absence of CHD or CHD risk factors. 2 lectures, 2 laboratories. Prerequisite: KINE 303, KINE 445 (or concurrent enrollment in KINE 445) or consent of instructor.

KINE 461 Senior Project (1)
Comprehensive report, or a field experience, or a synthesis of professional literature that integrates content from kinesiology courses. Topic must be approved by the instructor. 1 laboratory. Prerequisite: KINE 319 and completion of GE Area A.

KINE 462 Research Honors Senior Project (2–4)
Completion of an advanced research, or creative project. Intended for students taking a significant or leadership role in a professional area. Results may be submitted for poster presentation or other public/professional forum. 2-4 laboratories (minimum 60 hours). Prerequisite: KINE 319, completion of GE Area A, and consent of instructor.

KINE 463 Exercise Science and Health Promotion Fieldwork (3) (CR/NC)
200 hours of concentration specific practical experience over a ten-week period at an approved agency that provides exercise/fitness/hand promotion programs. Students participate in program administration under the direct supervision of an approved on-site coordinator. Credit/No Credit grading only. Prerequisite: Senior standing, minimum GPA of 2.0, successful completion of all concentration coursework requirements and consent of fieldwork coordinator.

KINE 470 Selected Advanced Topics (1–4)
Directed group study of selected topics for advanced students. Class Schedule will list topic selected. Total credit limited to 8 units. 1–4 lectures. Prerequisite: Consent of instructor.

KINE 471 Selected Advanced Laboratory (1–4)
Directed laboratory study of selected topics for advanced students. Class Schedule will list topic selected. Total credit limited to 8 units. 1–4 laboratories. Prerequisite: Consent of instructor.

KINE 485 Cooperative Education Experience (6) (CR/NC)
Part-time work experience in business, industry, government, and other areas of student career interest. Positions are paid and usually require relocation and registration in course for two consecutive quarters. Formal report and evaluation by work supervisor required. Total credit limited to 16 units. Credit/No Credit grading only. Prerequisite: Sophomore standing and consent of instructor.

KINE 495 Cooperative Education Experience (12) (CR/NC)
Full-time work experience in business, industry, government, and other areas of student career interest. Positions are paid and usually require relocation and registration in course for two consecutive quarters. Formal report and evaluation by work supervisor required. Total credit limited to 16 units. Credit/No Credit grading only. Prerequisite: Sophomore standing and consent of instructor.

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KINE 500  Individual Study (1–3)
Advanced study planned and completed under the direction of a member of the department faculty. Open only to graduate students who have demonstrated ability to do independent work. Enrollment by petition. Only 6 units may be applied to degree requirements. Prerequisite: KINE 517 and consent of department head, graduate advisor, and supervising faculty member.

KINE 501  Evaluation of Current Studies (3)
Analysis and evaluation of published studies in kinesiology. 3 seminars. Prerequisite: Graduate standing.

KINE 502  Current Trends and Issues in Physical Education and Sport (3)
Practical problems in physical education and sport and their solution in terms of desired objectives in these fields. 3 seminars. Prerequisite: Graduate standing.

KINE 503  Seminar in Adult Wellness (3)
Advanced seminar investigating topics relating to wellness in adults. Cardiovascular, respiratory, and stress related diseases as well as health issues in the later years. 3 seminars. Prerequisite: KINE 250 or KINE 255 and graduate standing or consent of instructor.

KINE 504  Advanced Pathophysiology and Exercise (3)
Selected human diseases, their etiology, pathophysiology, symptoms, diagnosis, effects on health and physical performance, and as affected by preventive or therapeutic exercise. Not open to students with credit for KINE 304. 3 lectures. Prerequisite: KINE 303 or equivalent, and graduate standing.

KINE 510  Communication and Health Behavior Change (3)
Contemporary theory and research related to promoting healthy behavior. Health problems from biological, ecological, and psycho-social perspectives. Behavioral change strategies integrated into activities and programs for the purpose of acquiring and maintaining behaviors which enhance health status and overall well-being. 3 seminars. Prerequisite: KINE 250 or KINE 255, KINE 411 and graduate standing or consent of instructor.

KINE 511  Management and Administration in Kinesiology (3)
Principles and techniques of administration in health, activity and academic settings including budget, personnel supervision, resource acquisition, leadership techniques, and facility management. 3 seminars. Prerequisite: Graduate standing.

KINE 514  Health Education Planning (3)
Resolution of health problems in the workplace and community requires constant involvement in the systematic process of planning. Included in this course is the investigation of planning forces and processes that move toward specification of actions to address health problems. 3 seminars. Prerequisite: KINE 250 or KINE 255, KINE 434, and KINE 510.

KINE 517  Research Methods in Kinesiology (3)
Experimental, descriptive, historical, philosophical, survey, and action research in kinesiology. Selection of adequate problems for investigation; various sampling techniques and analyses; use of library facilities; manuscript requirements for the thesis. 3 seminars. Prerequisite: KINE 501 or consent of instructor.

KINE 522  Advanced Biomechanics (3)
Advanced biomechanical concepts applied to human movement, examination of research, and biomechanical analyses of movement activities. 2 seminars, 1 laboratory. Prerequisite: KINE 302 or equivalent.

KINE 525  Advanced Motor Learning and Control (3)
Analysis of control theories, research principles and motor learning variables involved in the acquisition of skilled movement with an emphasis on the behavioral level of learning. 3 seminars. Prerequisite: KINE 402 or equivalent.

KINE 526  Sport in American Society (3)
Understanding the role of physical education and sport in American society as viewed from sociological perspectives. 3 seminars. Prerequisite: Graduate standing or consent of instructor.

KINE 530  Advanced Physiology of Exercise (4)
Physiological determinants of physical work capacity and sports performance. 3 seminars, 1 laboratory. Prerequisite: KINE 303 and graduate standing.

KINE 536  Advanced Electrocardiography (4)
Theory and application of electrocardiography and other techniques for cardiovascular assessment and treatment of cardiac disease and other abnormalities. 3 seminars, 1 laboratory. Prerequisite: KINE 445 or equivalent and graduate standing.

KINE 537  Internship (3–12) (CR/NC)
Supervised work experience in an approved wellness/fitness clinical facility, school, or other faculty approved setting. Total credit limited to 12 units. Maximum of 6 units may be applied toward Master of Science in Kinesiology. Credit/No Credit grading only. Prerequisite: Graduate standing and consent of instructor. Student must be advanced to candidacy.

KINE 539  Observation and Analysis of Teaching Physical Education and Coaching Sports (3)
Observation and analysis of teaching physical and sport education with special emphasis in pedagogical systems. 2 seminars, 1 activity. Prerequisite: KINE 421 or equivalent and graduate standing.

KINE 581  Graduate Seminar in Kinesiology (1–3)
Directed group study of selected topics for advanced students. Class Schedule will list topic selected. Total credit limited to 6 units. 1–3 seminars. Prerequisite: Graduate standing or consent of instructor.

KINE 585  Cooperative Education Experience (6) (CR/NC)
Advanced study analysis and part-time work experience in student's career field; current innovations, practices, and problems in administration, supervision, and organization of business, industry, and government. Must have demonstrated ability to do independent work and research in career field. Total credit limited to 9 units. Credit/No Credit grading only. Prerequisite: Graduate standing and consent of instructor.

KINE 599  Thesis or Project (3) (3)
Completion of a thesis or project pertinent to the field of kinesiology. Independent research under the guidance of the faculty. Prerequisite: KINE 517, consent of graduate committee and supervising faculty member.

LA–LANDSCAPE ARCHITECTURE

LA 101  Introduction to Landscape Architecture (4)
Introduction to the profession of landscape architecture and orientation to the department curriculum and learning processes. 3 lectures, 1 recitation.

LA 109  Visual Literacy and Design Communication in Landscape Architecture (4)
A special course recommended for students transferring from the community colleges. The basics of visual literacy and design communication in landscape architecture. Topics also include plans, sections, oblique drawings and perspective views. 4 laboratories.

LA 110  Graphic Communication for Landscape Architects (3)
Communication through descriptive drawing and professional plan graphics, including theories of perspective. 3 laboratories.

LA 111  Three Dimensional Graphics for Landscape Architects (4)
Elements of three dimensional perception/visualization with emphasis on freehand and mechanical perspective drawing methods. Methods will also include presentation and rendering techniques. 4 laboratories. Prerequisite: LA 110 or consent of instructor.

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**LA 114 Landscape Analysis and Planning (4)**
Research and analysis techniques of natural components of a landscape. Contour maps, aerial photographs, soil reports, climate and hydrologic studies, vegetation surveys, visual and sensory assessments, program analysis, suitability/sensitivity analyses, and ethics. Mapping, case study reviews, individual and team field studies, research and project analysis and land use planning. 2 lectures, 2 laboratories. Concurrent: SS 121.

**LA 130 Landscape Interpretation (4)**
Introduction to the relationships between culture and art, architecture and the natural environment through the description and exploration of significant landscapes and related societies and cultures. 4 lectures.

**LA 170 Principles of Design Communication (4)**
Overview of design communications for landscape architects incorporating the principles, techniques, skills and tools used in design generation, exploration, review and implementation. 4 laboratories. Prerequisite: LA 101; concurrent: LA 202.

**LA 201 Survey of Landscape Architecture (2)**
Survey of the profession of landscape architecture from small space design to regional planning. Relationships between landscape architecture and society and professionals in related fields. 2 lectures.

**LA 202 Design Fundamentals I (4)**
Introduction to the principles, methods and elements of two- and three-dimensional design in order to communicate intended concepts and meanings. Exploration of the basic design elements including composition, design process and the creation of spatial settings. 4 laboratories. Prerequisite: LA 101, LA 130; concurrent: LA 170.

**LA 203 Design Fundamentals II (4)**
Continuation of ideas introduced in LA 202 with the introduction of environmental and visual perception, including three-dimensional site design and landscape architectural design principles. Spatial design and sequencing of space with concern for human behavioral, environmental and natural site factors and generation of program, concept and design development. 4 laboratories. Prerequisite: LA 202, LA 170; concurrent: LA 220.

**LA 204 Design Fundamentals III (4)**
Continuation of ideas introduced in LA 202 and LA 203 with the introduction of the principles of design theory, landscape ecology and technical applications. Problems of increasing complexity incorporate critical and creative problem solving, the relationship of aesthetics, response to human needs and design for sustainable environments. 4 laboratories. Prerequisite: LA 203, LA 220; concurrent: LA 241.

**LA 213 Site and Terrain Analysis (4)**
Introduction to various inventory and analysis methodologies, case study reviews, mapping and overlay techniques, environmental ethics and an overall understanding of the function and structure of the natural landscape. Visual assessment, synthesis techniques and relating mapped analytical data with design program analysis for use in site planning. 2 lectures, 2 laboratories. Enrollment limited to CRP and LA majors.

Concepts, theories and techniques related to landscape analysis, ecology, planning and design with an emphasis on landscape assessment, sustainability, land health, environmental protection and restoration, and natural resource management. 4 lectures. Prerequisite: LA 101, LA 202, LA 170, BOT 121; concurrent: LA 203.

**LA 221 California Plants and Plant Communities (4)**
(Also listed as BOT 221)
Introduction to the horticultural characteristics and landscape design potential of California native plants, California plant communities and associated vernacular plants. Includes experiences in field identification, basic planting design, installation techniques and maintenance requirements. Required field trips. 2 lectures, 2 laboratories. Prerequisite: BOT 121 or consent of instructor.

**LA 231 Landscape Architecture Construction (3)**

**LA 240 Additional Landscape Architecture Laboratory (1–3)**
Total credit limited to 6 units, with a maximum of 3 units per quarter. 1–3 laboratories.

**LA 241 Site Engineering Techniques and Applications (4)**
Introduction and application of the techniques, methods, principles and criteria for site engineering and landform design. Includes an introduction to soil science, survey methods, and experiences in the principles, procedures and application of site grading and drainage for landscape architecture. 4 laboratories. Prerequisite: LA 220, MATH 118/119; concurrent: LA 204.

**LA 242 Implementation Strategies (4)**
Introduction and application of the methods, principles and criteria for landscape implementation. Encompasses fundamental design and technical decisions common to landscape architectural design and construction projects including the development of concept, design development and working drawings, and construction management process. 3 lectures, 1 activity. Prerequisite: LA 204, LA 241; concurrent: LA 243.

**LA 243 Materials and Techniques of Landscape Construction (4)**
Introduction to the properties, uses and inherent qualities of the fundamental materials of landscape architectural concerns and associated construction techniques and processes. Materials and techniques explored as a source of design ideas, form and expression in landscape architecture. 3 lectures, 1 activity. Prerequisite: LA 204, LA 241; concurrent: LA 242.

**LA 251 Fundamentals of Design and Planning in Landscape Architecture (4)**
Introduction to the principles of environmental design including basic design elements and composition. Exploration of landscape architectural design and planning projects in various scaled environmental settings including site, neighborhood, urban, regional. Contextual understanding of the relationships of natural and cultural elements in the environment and the landscape architect's role in environmental design. Basic principles of design, composition, design process and the creation of spatial settings for human use. 4 laboratories. Prerequisite: LA 110, LA 111, LA 114, or consent of instructor.

**LA 252 Fundamentals of Site Planning and Design (4)**
Elements of environmental and visual perception including three dimensional site planning and design principles. Spatial design and sequencing of spaces with concern for human behavior and social implications. Behavioral, environmental and natural site factors for program, concept, and design development. Plant characteristics, forms, and ecological conditions as related to landscape architectural design. 4 laboratories. Prerequisite: LA 251.

**LA 253 Applied Design and Planning Fundamentals (5)**
Focus on the application of basic design fundamentals to the design of different environments. Included will be development of the skills necessary for solving of grading and drainage problems related to landform manipulation. 5 laboratories. Prerequisite: LA 252.

**LA 310 Introduction to Computing in Landscape Architecture (2)**
Introduction to computer software and hardware which is important to landscape architecture. Current issues and applications which can be used in the profession. Laboratory utilizes self-paced learning modules. Miscellaneous course fee required—see Class Schedule. 1 lecture, 1 laboratory. Prerequisite: Computer literacy elective or consent of instructor.
LA 317 The World of Spatial Data and Geographic Information Technology (4)  GE Area F
(Also listed as BIO/FNR/GEOG 317)
Basic foundation for understanding the world through geographic information and the tools available to utilize spatial data. Application of Geographic Information Systems (GIS) and related technologies, including their scientific basis of operation. 3 lectures, 1 activity. Prerequisite: A course in computer science, completion of Area B, and junior standing.

LA 318 Applications in GIS (3) (Also listed as FNR/GEOG 318)
ARC/INFO and ArcView Geographic Information System (GIS) computer software to explore environmental, natural resource, social and economic issues using spatial data. Develop and apply data base and software management competencies. 1 lecture, 2 laboratories. Prerequisite: Junior standing, computer literacy or consent of instructor.

LA 320 Design Theory for Landscape Architects (4)
Complements the material and knowledge presented in the history of landscape architecture, architecture and art courses. Design theory and associated concepts as they are related to landscape architecture. Literature research and analysis of completed design projects. The artists/designers, materials and overall expressions of work are related to the social and economic issues of the time as well as their associations with the other arts and sciences. 4 lectures. Prerequisite: LA 341, LA 342, or consent of instructor.

LA 321 Concepts in Environmental Decision Making (3)
Investigation of theoretical and attitudinal bases of environmentally concerned disciplines. Ecology, perception, behavior and design studies as organizational principles and theories in developing understanding of interface between built and natural environments. 3 lectures. Prerequisite: Consent of instructor.

LA 330 Cultural Landscapes: People, Places and Ethical Decisions (4)
Investigation of the complexities and interrelatedness of culture, environment and ethical decisions. Interpretation of personal and cultural values and ethics in terms of decisions made and behaviors and actions expressed in the built landscape. 3 lectures, 1 activity. Prerequisite: LA 341, LA 342; concurrent: LA 320.

LA 341 History of Landscape Architecture (4)
Historical investigation of human activity and how it shaped environments. Consequences are examined for entire continents or as isolated statements in individual gardens. The metaphor of “garden” provides understanding for agrarian regions, urban spaces, and vernacular landscapes of the world. 4 lectures. Prerequisite: Consent of instructor.

LA 342 History of Twentieth Century Landscape Architecture (4)
Philosophies and ethics of important personalities in the environmental design disciplines of the twentieth century. Design theories supporting these individuals’ projects and the nature of their practice, combined with the great influential events in industry, the arts and sciences, politics, and society of this century. 4 lectures. Prerequisite: At least one course in either architecture, landscape architecture or planning history.

LA 349 Advanced Planting Design (3)
Advanced examination of the theories and applied principles of planting design. Emphasis on connections between art and science in the design of parks, gardens and other landscapes. Case studies and field trips. 2 lectures, 1 activity. Prerequisite: EHS 231, EHS 232 and EHS 381 or LA 221.

LA 351, 352 Design for Landscape Architects I, II (5) (5)
Process oriented site design with emphasis on identification of problems and opportunities, creative problem solving, spatial design site analysis, landform, plantform, builtform, circulation, detail design and graphic communication. 5 laboratories. Prerequisite for LA 351: LA 114, LA 253. For LA 352: LA 351.

LA 353 Design for Landscape Architects (6)
Completion of a comprehensive design project with sufficient complexity to encompass many fundamental design and technical decisions common to landscape architectural design and construction projects. Concept, design development, and working drawings will be prepared as a complete set. An emphasis on planting design, installation and irrigation as related to design and composition. 6 laboratories. Prerequisite: LA 352.

LA 363 Recreation and Open Space Planning and Design (3) (4)
Planning and design methods for meeting leisure requirements. Issues of recreation and society. Relationship of recreation and open spaces, assessment of needs and supply of resources. 3 lectures, 1 activity. Prerequisite: Must have completed minimum of one 200-level course in planning, design or recreation and third-year standing or consent of instructor. Change effective Spring 2007.

LA 370 Professional Practice (4)
Issues related to the practice of landscape architecture incorporating processes, procedures and outcomes of professional practice. Topics include professional ethics, business and legal aspects of the profession, relationships to the client and society, personal goal setting, resume and portfolio preparation. 4 lectures. Prerequisite: LA 204.

LA 371 Internship (3) (CR/NC)
Involvement in a work setting related to landscape architecture. Thirty hours work experience per unit of credit. Credit/No Credit grading only. Prerequisite: Third year standing in Landscape Architecture.

LA 400 Special Problems for Advanced Undergraduates (1–3)
Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 6 units, with a maximum of 3 units per quarter. Prerequisite: Consent of instructor.

LA 401 Research Project (1) (CR/NC)
Research methods in landscape architecture and proposal writing techniques. Students prepare proposal and strategy for fifth year study in area of concentration. Credit/No Credit grading only. 1 seminar. Prerequisite: LA 451 and LA 452.

LA 402 Design Theory and Exploration Focus Studio (4)
Exploration and application of design theory, exploratory design process and form exploration to design and planning projects. Emphasis on incorporation of inquiry techniques based on the synthesis of interdisciplinary frameworks of art and design theory with historical and cultural issues. Total credit limited to 12 units. 4 laboratories. Prerequisite: LA 204, LA 341, LA 342; prerequisite or concurrent: LA 320; concurrent: Integrated Learning Course (ILC) of student’s option.

LA 403 Natural Environments Design Focus Studio (4)
Assessment, exploration and environmental planning to design and planning projects. Emphasis on interpretation and application of environmental and ecological issues at a range of design scales. Total credit limited to 12 units. 4 laboratories. Prerequisite: LA 204, LA 220, LA 341, LA 342; concurrent: Integrated Learning Course (ILC) of student’s option.

LA 404 Cultural Environments Design Focus Studio (4)
Assessment, exploration and interpretation of cultural values, issues and landscapes to design and planning projects. Emphasis on observation and inquiry of diverse cultural settings, differences in cultural values and personal ethics in the design process. Total credit limited to 12 units. 4 laboratories. Prerequisite: LA 204, LA 341, LA 342; concurrent: Integrated Learning Course (ILC) of student’s option.

LA 405 Project Design and Implementation Focus Studio (4)
Development, exploration and integration of project design and implementation strategies to design and planning projects. Emphasis on creative and exploratory problem solving, spatial design, project resolution, and graphic communication. Total credit limited to 12 units. 4 laboratories. Prerequisite: LA 204, LA 243, LA 242, LA 241; concurrent: Integrated Learning Course (ILC) of student’s option.

LA 410 Information Systems in Landscape Architecture (2)
GIS applications using current software on advanced work stations. Basic GIS concepts including topological data structures, relational database concepts, data input techniques and issues and spatial analysis techniques.
LA 441 Regional Landscape History (3)
Developmental history of the landscape in the western region with specific focus on the Basin and Range region and California. One or more field trips required. 3 lectures. Prerequisite: Fourth year standing or consent of instructor.

LA 442 Professional Practice II (2)
Theoretical and practical aspects of professional practice. Addressing professional, human, and business skills. Practice diversity and interpersonal relationships. Professionalism and ethics. Licensure, communication skills, office management and marketing. Construction documentation. 2 lectures. Prerequisite: LA 351.

LA 443 Cultural Environments (ILC) (4)
Integrated Learning Course (ILC) to assist integration and application of geographic information systems (GIS) and spatial information into focus 3D digital graphic communication and presentation skills in coursework, project design principles and implementation strategies in project planning and design studio courses. Total credit limited to 12 units. 4 activities. Prerequisite: LA 220, LA 221; concurrent: Design Focus Studio of student’s option.

LA 444 Selected Advanced Topics (1–4)
Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class Schedule will list topic selected. Total credit limited to 8 units. 1–4 lectures. Prerequisite: Consent of instructor.

LA 445 Selected Advanced Laboratory (1–4)
Directed group laboratory study of selected topics for advanced students. Open to undergraduate and graduate students. Class Schedule will list topic selected. Total credit limited to 8 units. 1–4 laboratories. Prerequisite: Consent of instructor.

LA 446 Visual Resource Management Methods (3)
Investigation and application of the major visual resource management methods relevant to landscape architecture. Theoretical basis for visual resource assessment, the different assessment techniques, and the process of translating assessment results into visual resource management techniques. 2 lectures, 1 laboratory. Prerequisite: Fourth-year standing or graduate standing, or consent of instructor.

LA 447 3D Digital Design Communications (ILC) (4)
Integrated Learning Course (ILC) to assist integration and application of 3D digital graphic communication and presentation skills in coursework, project planning and design studio courses. Focus on skills and integration of three-dimensional digital media explorations. Total credit limited to 12 units. 4 activities. Prerequisite: LA 170, LA 204; concurrent: Design Focus Studio of student’s option.

LA 448 GIS Application to Design Projects (ILC) (4)
Integrated Learning Course (ILC) to assist integration and application of geographic information systems (GIS) and spatial information into focus design studio courses. Total credit limited to 12 units. 4 activities. Prerequisite: LA 220; concurrent: Design Focus Studio of student’s option.

LA 449 Professional Practice I (2)
Advanced design studio. Emphasis on complex design problems and special environmental situations or interdisciplinary work and involvement in current design issues. At least one course in the series must be self-directed. 4 laboratories. Prerequisite: Completion of fourth-year design sequence (LA 451, LA 452, LA 461).

LA 450 Cultural Environments (ILC) (4)
Integrated Learning Course (ILC) to assist integration and application of landscape ecology principles in project planning and design studio courses. Focus on understanding and developing a framework for ecological planning and design to anticipate consequences of planning and design decisions. Total credit limited to 12 units. 4 activities. Prerequisite: LA 220, LA 221; concurrent: Design Focus Studio of student’s option.

LA 451 Regional Landscape Assessment (6)
Emphasis on regional landscape assessment and design techniques utilizing geographic information systems (GIS) techniques. Land planning and design issues in regional scale environments. 6 laboratories. Prerequisite: LA 353 or consent of instructor.

LA 452 Urban Design Collaborative for Landscape Architects (5)
Emphasis in urban and community design issues related to landscape architecture; scales of investigation and application; community involvement techniques. 5 laboratories. Prerequisite: LA 353.

LA 453 Traditional and Digital Media Communications (ILC) (4)
Integrated Learning Course (ILC) to assist integration and application of graphic communication and presentation skills in coursework, project planning and design studio courses. Focus on skills, distinctions and integration of analyzing the cultural landscape, understanding diverse cultural values and assessing personal ethics. Total credit limited to 12 units. 4 activities. Prerequisite: LA 341, LA 320, LA 330; concurrent: Design Focus Studio of student’s option.

LA 454, LA 455, LA 456 Design for Landscape Architects I, II, III (4) (4) (4)
Advanced design studio. Emphasis is on complex design problems and special environmental situations or interdisciplinary work and involvement in current design issues. At least one course in the series must be self-directed. 4 laboratories. Prerequisite: Completion of fourth-year design sequence (LA 451, LA 452, LA 461).

LA 455 3D Digital Design Communications (ILC) (4)
Integrated Learning Course (ILC) to assist integration and application of graphic communication and presentation skills in coursework, project planning and design studio courses. Focus on skills, distinctions and integration of traditional and digital media explorations. Total credit limited to 12 units. 4 activities. Prerequisite: LA 241, LA 242, LA 243; concurrent: Design Focus Studio of student’s option.

LA 456 Senior Design Project Focus Studio (4)
Comprehensive landscape architectural design and research project showing professional level competency in the integration of design theory, landscape architectural principles and project resolution. Emphasis on creative resolutions, organization and communication skills and technical abilities in program generation, design process, design and research. Total credit limited to 8 units. 4 laboratories. Prerequisite: Completion of Design Focus Sequence (20 units from LA 402-LA 405).

LA 457 Senior Seminar (1) (CR/NC)
Identification and exploration of problems and opportunities in the environmental design field. Intensive thinking, research and discussion of issues relating to local, regional or global significance. To be taken each quarter during fifth year. Credit/No Credit grading only. 1 seminar. Prerequisite: Fifth-year standing in Landscape Architecture.

LA 458 GIS Application to Design Projects (ILC) (4)
Integrated Learning Course (ILC) to assist integration and application of geographic information systems (GIS) and spatial information into focus design studio courses. Total credit limited to 12 units. 4 activities. Prerequisite: LA 220; concurrent: Design Focus Studio of student’s option.

LA 459 Professional Practice II (2)
Theoretical and practical aspects of professional practice. Addressing professional, human, and business skills. Practice diversity and interpersonal relationships. Professionalism and ethics. Licensure, communication skills, office management and marketing. Construction documentation. 2 lectures. Prerequisite: LA 351.

LA 460 Professional Practice I (2)
Advanced design studio. Emphasis on complex design problems and special environmental situations or interdisciplinary work and involvement in current design issues. At least one course in the series must be self-directed. 4 laboratories. Prerequisite: Completion of fourth-year design sequence (LA 451, LA 452, LA 461).

LA 461 Senior Seminar (1) (CR/NC)
Identification and exploration of problems and opportunities in the environmental design field. Intensive thinking, research and discussion of issues relating to local, regional or global significance. To be taken each quarter during fifth year. Credit/No Credit grading only. 1 seminar. Prerequisite: Fifth-year standing in Landscape Architecture.

LA 462 Urban Design Collaborative for Landscape Architects (5)
Emphasis in urban and community design issues related to landscape architecture; scales of investigation and application; community involvement techniques. 5 laboratories. Prerequisite: LA 353.

LA 463 Traditional and Digital Media Communications (ILC) (4)
Integrated Learning Course (ILC) to assist integration and application of graphic communication and presentation skills in coursework, project planning and design studio courses. Focus on skills, distinctions and integration of traditional and digital media explorations. Total credit limited to 12 units. 4 activities. Prerequisite: LA 370; concurrent: Design Focus Studio of student’s option.

LA 464 Selected Advanced Topics (1–4)
Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class Schedule will list topic selected. Total credit limited to 8 units. 1–4 lectures. Prerequisite: Consent of instructor.

LA 465 Selected Advanced Laboratory (1–4)
Directed group laboratory study of selected topics for advanced students. Open to undergraduate and graduate students. Class Schedule will list topic selected. Total credit limited to 8 units. 1–4 laboratories. Prerequisite: Consent of instructor.

LA 466 Visual Resource Management Methods (3)
Investigation and application of the major visual resource management methods relevant to landscape architecture. Theoretical basis for visual resource assessment, the different assessment techniques, and the process of translating assessment results into visual resource management techniques. 2 lectures, 1 laboratory. Prerequisite: Fourth-year standing or graduate standing, or consent of instructor.
LA 482 Evaluating Social and Behavioral Factors for Open Space Design (3)
User oriented approach to open space design. Interview and survey techniques, behavioral trace mapping and systematic observation, post occupancy evaluation and similar methods are used to generate user input and feedback in the design process. Understanding the behavioral implications of designed environments. 2 lectures, 1 laboratory.
Prerequisite: Fourth-year or graduate standing or consent of instructor.

LA 483 Special Studies in Landscape Architecture (1–12)
Special issues and problems through research, field trips, seminars and other forms of investigation and involvement. Course requirements are determined prior to each individual project through a contractual agreement between students and department. Departmental Off Campus Study Program guidelines apply. Total credit limited to 36 units. 1–12 activities. Prerequisite: Fourth- or fifth-year standing, or consent of instructor.

LA 485 Cooperative Education Experience (6) (CR/NC)
Part-time work experience in business, industry, government, and other areas of student career interest. Positions are paid and usually require relocation and registration in course for two consecutive quarters. Formal report and evaluation by work supervisor required. Total credit limited to 16 units. Credit/No Credit grading only. Prerequisite: Junior standing and consent of instructor.

LA 495 Cooperative Education Experience (12) (CR/NC)
Full-time work experience in business, industry, government, and other areas of student career interest. Positions are paid and usually require relocation and registration in course for two consecutive quarters. Formal report and evaluation by work supervisor required. Total credit limited to 16 units. Credit/No Credit grading only. Prerequisite: Junior standing and consent of instructor.

LA 551 Regional Landscape Assessment I (4)
Definition, research and filing of data covering the biological, cultural and physical resources of a specific region. Concepts of regionalism, land planning, reclamation and preservation are integral to the course.
Utilization of mainframe and microcomputer facilities and software. 4 laboratories. Prerequisite: Graduate standing or consent of instructor.

LA 552 Regional Landscape Assessment II (4)
Application of data manipulation techniques in order to model both impacts on natural systems and land development potentials. Use of planning strategies to predict outcomes resulting from the land use decision process. Utilization of mainframe and microcomputer facilities and software. 4 laboratories. Prerequisite: LA 551 and graduate standing.

LA 585 Cooperative Education Experience (6) (CR/NC)
Advanced study analysis and part-time work experience in student's career field; current innovations, practices, and problems in administration, supervision, and organization of business, industry, and government. Must have demonstrated ability to do independent work and research in career field. Total credit limited to 9 units. Credit/No Credit grading only.
Prerequisite: Graduate standing and consent of instructor.

LA 595 Cooperative Education Experience (12) (CR/NC)
Advanced study analysis and full-time work experience in student's career field; current innovations, practices, and problems in administration, supervision, and organization of business, industry, and government. Must have demonstrated ability to do independent work and research in career field. Total credit limited to 9 units. Credit/No Credit grading only.
Prerequisite: Graduate standing and consent of instructor.

LA 595 Cooperative Education Experience (12) (CR/NC)
Advanced study analysis and full-time work experience in student's career field; current innovations, practices, and problems in administration, supervision, and organization of business, industry, and government. Must have demonstrated ability to do independent work and research in career field. Total credit limited to 9 units. Credit/No Credit grading only.
Prerequisite: Graduate standing and consent of instructor.

LIB–LIBRARY

LIB 101 Library Instruction (1)
Instruction and practice in the use of the on-line catalog, reference books, periodical indexes, government documents, and other library materials.
Development of student independence and initiative in using the library as a source of information. 1 lecture.

LIB 302 Library Resources and Literature Searches (1–4)
Sources of information and search strategies in major subject fields. Reference materials, bibliographic aids, indexing and abstracting tools, and Internet sources. Evaluation of sources. Class Schedule will list major subject area covered. Total credit limited to 4 units. 1–4 lectures.
Prerequisite: ENGL 134, junior standing or consent of instructor.

LIB 402 Library Resources and Literature Searches (1–4)
Sources of information and search strategies in major subject fields. Reference materials, bibliographic aids, indexing and abstracting tools, and Internet sources. Evaluation of sources. Class Schedule will list major subject area covered. Total credit limited to 12 units. 1–4 lectures.
Prerequisite: ENGL 134, junior standing or consent of instructor.

LIB 502 Library Resources and Literature Searches (1–4)
Courses of information and search strategies in major subject fields. Reference materials, bibliographic aids, indexing and abstracting tools, and Internet sources. Evaluation of sources. Literature review process for a master's thesis. Class Schedule will list major subject area covered. Total credit limited to 12 units. 1–4 lectures. Prerequisite: Graduate standing.

LS–LIBERAL STUDIES

LS 101 Orientation to Liberal Studies (1)
Exploration of the Liberal Studies Program as preparation for the Multiple Subjects Credential and for alternate career objectives. To be taken during the first quarter in attendance at Cal Poly as a Liberal Studies major. 1 lecture.

LS 211 The American Enterprise: The Birth of a Nation to the 1876 Centennial (4)

LS 212 The American Enterprise: The 1876 Centennial to the 21st Century (4)
Manifest Destiny. Evolution of our government institutions–parallels between the past and present. Immigration in the 20th Century. The Nation steps into a larger world–World Wars. Civil Rights–equity for all. 3 lectures, 1 activity. Prerequisite: ENGL 134.

LS 230 Field Experience I (2)
Overview of current practices and issues in elementary education, including teacher compensation, cultural impact on schools, time and classroom management, English learners, and the affective aspect of teaching. 48 hours of fieldwork required. 1 lecture, 1 activity.

LS 250 Field Experience II (2)
Overview of current practices and issues in elementary education, including components of effective teaching, motivating students, diagnostic/prescriptive teaching, curriculum, and accountability. In