

desertification; overcutting and fuelwood shortages. 3 seminars. Prerequisite: Graduate standing or consent of instructor.

FNR 504 Agroforestry Systems (2)

Principles and practical applications of tree crop systems which are managed to provide fuel, fiber, fodder, and food. Tree crop identification and tree product uses. Plantation design, establishment, and cultural practices. Soil management. Integration of forest, and range management practices and values. Special applications to tropical forest ecosystems. 2 lectures. Prerequisite: Graduate standing or consent of instructor.

FNR 521 Natural Resources Management for Educators (3)

Philosophy (theoretical and applied) of natural resource management strategies functioning in today's environment. Ecological principles applicable to specific resource components as they relate to the present perception of today's resource base, use demands and projected utilization. 3 seminars. Prerequisite: Graduate standing.

FNR 530 Social Systems in Forest Resources Management (3)

Theories and methods for incorporating community in the management of forest resources. Approaches to conflict resolution between resource owners and community stakeholders using tools such as GIS. 2 lectures, 1 laboratory. Prerequisite: Graduate standing and consent of instructor.

FNR 532 Forestry Applications in Biometrics and Econometrics (4)

Quantitative methods in modeling biological and economic processes associated with managing forested ecosystems. Biometric modeling of stand growth and inventory. Econometric modeling of market and non-market natural resource values. 3 lectures, 1 laboratory. Prerequisite: Graduate standing, and consent of instructor.

FNR 534 Forest Ecosystem Management and Modeling (3)

Methods and modeling approaches used in quantifying ecological processes and conditions associated with forested ecosystems, such as fire behavior, hydrologic processes, terrestrial and aquatic habitat condition using GIS and other models. 2 lectures, 1 laboratory. Prerequisite: Graduate standing, and consent of instructor.

FNR 570 Selected Topics in Forest Resources (1-3)

Directed group study of selected topics for advanced students. *Class Schedule* will list topic selected. Total credit limited to 9 units. 1-3 seminars. Prerequisite: Graduate standing or consent of instructor.

FNR 571 Selected Topics in Forest Resources Laboratory (1-3)

Directed group laboratory of selected topics for advanced students. *Class Schedule* will list topic selected. Total credit limited to 9 units. 1-3 laboratories. Prerequisite: Graduate standing and consent of instructor.

FNR 581 Graduate Seminar in Forest Resources (3)

Group study of selected developments, trends and problems in the field of forest and natural resources. 3 seminars. Prerequisite: Graduate standing.

FNR 599 Thesis (1-9)

Individual research in forest or natural resources management under the general supervision of faculty, leading to a graduate thesis. Prerequisite: Graduate standing and consent of instructor.

FORL-FOREIGN LANGUAGE

FORL 101, 102, 103 Foreign Language (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 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 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 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.

FR-FRENCH

FR 101, 102, 103 Elementary French (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 104 Intensive Elementary French (12)

Class practice in pronunciation, syntax, reading, writing and conversation including appropriate cultural information. Offered in summer only. Laboratory drill required. 9 lectures, 3 activities.

FR 121, 122 Intermediate French (4) (4)

Review of French grammar and practice in writing and oral expression within a cultural context. 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 show the French literary tradition from the Middle Ages to the present in both France and other French-speaking countries. 4 lectures. Prerequisite: Consent of instructor.

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 C3

Critical analysis and oral discussion of poetry, essays, novels, plays. Each course will have a subtitle descriptive of the content. May be repeated to 12 units. 4 lectures. Prerequisite: Consent of instructor.

FR 405 French Literature in English Translation (4) GE C3

Selected works to be read by students in the original or in English translation. Critical analysis, interpretation, and comparison of individual works by outstanding French writers. Lecture in English. *Class Schedule* will list topics selected. Total credit limited to 8 units. 4 lectures. Prerequisite: One literature course or consent of instructor.

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. Honey processing and marketing. Hive inspection and disease detection. 2 lectures, 1 laboratory.

FRSC 131 Pomology (4)

History and outlook for California fruit growing and its relation to world fruit production. General principles of fruit production. Field laboratories in orchard management practices, tree and fruit identification, harvesting, grading and packing. Field trip required. Miscellaneous course fee may be required—see *Class Schedule*. Not open to students with credit in FRSC 230. 3 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: FRSC 131.

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 honeybees, under faculty supervision. 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: CRSC 201, 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 230 California Fruit Growing (4) GE F2

Interrelationship of climate and cultural techniques on orchard productivity. California's place in the international production-marketing scheme. Field trip required. Miscellaneous course fee may be required—see *Class Schedule*. Not open to students with credit in FRSC 131. 3 lectures, 1 laboratory.

FRSC 231 Viticulture (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 331 Advanced Viticulture (4)

New research findings related to vine physiology and vineyard productivity. Use of emerging technologies in grape production. 3 lectures, 1 laboratory. Prerequisite: FRSC 231.

FRSC 332 Fruit Plant Propagation (4)

Physiology of fruit crop reproduction. Use of sexual and asexual propagation techniques for fruit crops. Integration of new research into tissue culture, rootstock selection, and commercial fruit and nursery practices. Field trip required. Miscellaneous course fee may be required—see *Class Schedule*. 3 lectures, 1 laboratory. Prerequisite: FRSC 100-or 200-level course or consent of instructor.

FRSC 339 Internship in Fruit Science (1–12) (CR/NC)

Selected Fruit 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.

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. Miscellaneous course fee may be required—see *Class Schedule*. 3 lectures, 1 laboratory. Prerequisite: FRSC 131 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 414 Integrated Pest Management in Coastal Wine Grapes (4)

Comprehensive survey of major pests in Central Coast wine grapes to include birds, other vertebrates, diseases and insects. Pest biology, descriptions, symptoms and monitoring. Integrated pest management techniques to include cultural, biological, and chemical controls. Total credit limited to 8 units. 3 lectures, 1 activity. Prerequisite: CRSC 311, BOT 323, FRSC 231.

FRSC 421 Postharvest Technology of Horticultural Crops (4)
(Also listed as VGSC 421)

Respiration, respiratory constituents, ripening, and chilling injury; harvesting methods and procedures; current handling and packaging techniques; precooling and refrigeration; modified and controlled atmosphere storage; relative humidity; and transportation of horticultural crops. Field trip to major California production areas required plus local grower visits. 3 lectures, 1 laboratory. Prerequisite: One production class in either fruits, vegetables or ornamentals, 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. Miscellaneous course fee may be required—see *Class Schedule*. 3 lectures, 1 laboratory. Prerequisite: CRSC, FRSC or VGSC 100/200-level course, or consent of instructor.

FRSC 436 Advanced Production Problems (4)

Production problem analysis. Effects of labor and new technology introductions on existing field practices. 3 lectures, 1 laboratory. Prerequisite: FRSC 421.

FRSC 500 Individual Study in Fruit Science (1–6)

Advanced independent study planned and completed under the direction of a member of the Fruit Science faculty. Total credit limited to 6 units. Prerequisite: Consent of department head, graduate adviser and supervising faculty member.

FRSC 539 Graduate Internship in Fruit Science (1–9)

Application of theory to the solution of problems of agricultural production or related business in the field of Fruit Science. Analyze specific management problems and perform general management assignments detailed in a contract between the student, the firm or organization, and the faculty adviser before the internship commences. Degree credit limited to 6 units. Prerequisite: Consent of internship instructor.

FRSC 570 Selected Topics in Fruit Science (1–3)

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 9 units. 1 to 3 seminars. Prerequisite: Graduate standing or consent of instructor.

FRSC 571 Selected Advanced Laboratory in Fruit Science (1–3)

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 6 units. 1–3 laboratories. Prerequisite: 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. Miscellaneous course fee required—see *Class Schedule*. 3 lectures, 1 laboratory. Prerequisite: CHEM 111.

FSN 125 Introduction to Food Science (5)

Basic principles of food science. Chemical, physical, and microbiological properties of foods. Ingredient properties, preservation, and unit processing operations. Overview of the commercial food processing industry at state and national levels. Miscellaneous course fee required—see *Class Schedule*. 4 lectures, 1 laboratory.

FSN 154 Basic Calculations in Food Processing (4)

Introduction to basic calculations needed for food plant operations. Calculations dealing with units, material balance, heat balance, steam heating, psychrometry, vacuum and pressure. 3 lectures, 1 laboratory.

FSN 200 Special Problems for Undergraduates (2–3) (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, FSN 209, FSN 211 or FSN 230 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 154.

FSN 209 Animal Food Products (3)

Composition of muscle-based foods in relation to cost, yield, quality, meal preparation and nutritional value. Buying, storing, handling and preservation. Uniform retail and food service identity standards for fresh cuts. Classification and methods of making processed meat products. Credit not allowed for students having completed FSN 211. Miscellaneous course fee required—see *Class Schedule*. 2 lectures, 1 laboratory.

FSN 210 Nutrition (4)

Introductory nutrition. Sources of nutrients and their functions in the body. Relationship of nutrition to overall health. Selection of

GE E2

healthful diets. Current issues in the field. Emphasis on the young adult. 4 lectures.

FSN 211 Meats (3)

Muscle food processing methods and operations. Meat inspection, grading, composition, curing, preservation and related topics. Carcass beef, pork, and lamb will be processed into consumer ready products. Credit not allowed for students having completed FSN 209. Miscellaneous course fee required--see *Class Schedule*. 2 lectures, 1 laboratory.

FSN 212 Meat Grading and Evaluation (2)

Factors related to carcass quality and yield. USDA meat grading principles and practices. Judging of carcass and wholesale cuts. Field trip to meat packing plants required. 1 lecture, 1 laboratory. Prerequisite: FSN 211.

FSN 230 Elements of Food Processing (4)

Principles of unit operations in food processing covering canning, freezing, dehydration, fermentation and raw material handling. Food quality and spoilage. Miscellaneous course fee required--see *Class Schedule*. For non-Food Science majors only. 3 lectures, 1 laboratory.

FSN 244 Cereal and Bakery Science (4)

Applied science of cereal-based products, bakery, sheeted, and extruded food products. Principles of cereal chemistry and physical-chemical and functional properties of cereal ingredients. Optimization and management of manufacturing line operations. Comparative nutritional evaluation of flours, grains, and finished products. Product development concepts. 3 lectures, 1 laboratory. Prerequisite: FSN 125.

FSN 250 Food and Nutrition: Customs and Culture (4) GE E2 USCP

Historical perspective of traditional and contemporary food customs and culture as shaped by environment, society, politics, religion, health beliefs, and gender. Major emphasis on U.S. cultures including American Indian, Hispanic American, African American, and Asian American. 4 lectures.

FSN 274 Food Plant Sanitation and Safety (4)

Development, organization, management and operation of a food plant sanitation program. FDA inspection and legal issues affecting food plant operations. Chemistry and applications of soaps, detergents, surfactants, insecticides, rodenticides; legal requirements. 4 lectures. Prerequisite: FSN 125; FSN 230 for non-Food Science majors.

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 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; junior standing.

FSN 321 Issues and Trends in Meal Planning (4)

Factors and principles involved in the choice, purchase, and preparation of foods for a meal. Application of 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. Miscellaneous course fee required--see *Class Schedule*. 3 lectures, 1 laboratory. Prerequisite: FSN 121, FSN 210, or consent of instructor.

FSN 325 Food Quality Control (5)

Fundamentals of quality control programs for the food industry. TQM, SQC, HACCP, GMP. Organization and management of quality control programs. Miscellaneous course fee may be required--see *Class Schedule*. 4 lectures, 1 laboratory. Prerequisite: FSN 204, STAT 218, and CHEM 212; FSN 230 for non-Food Science 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, BIO 115.

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 metabolites in body fluids. 3 lectures, 1 laboratory. Prerequisite: FSN 328.

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 341 Wines and Fermented Foods (3)

Processing, manufacturing and bio-technical applications of fermentation technology for the production of food products. Wine, beer, pickles, olives and other fermented food products important to the post-harvest economy of California. Field trip may be required. 3 lectures. Prerequisite: Junior standing.

FSN 343 Institutional Foodservice I (3)

Principles of equipment selection and floor planning with emphasis on institutional food production and sanitation/safety. 2 lectures, 1 laboratory. Prerequisite: FSN 321 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 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, CHEM 313.

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 384 Processed Meat and Poultry Products (4)

Physical, chemical and functional characteristics of meat food raw materials. Science and technology of value-added processing including curing, sausage manufacture, low moisture products, and restructuring. Quality assurance and related current industry topics. Miscellaneous course fee may be required—see *Class Schedule*. 3 lectures, 1 laboratory. Prerequisite: FSN 209 or FSN 211, junior standing.

FSN 400 Special Problems for Advanced Undergraduates (2–4) (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 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. 3 lectures, 1 activity. Prerequisite: Senior standing, one course in Food Processing, 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 329 and senior standing.

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 415 and senior standing.

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.

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 (3)

Principles of successful organization and management with their application to the effective operation of food service. Administrative responsibilities of the food service manager. 3 lectures. Prerequisite: FSN 344, and senior standing.

FSN 429 Clinical Nutrition I (4)

Application of the nutritional care process to organic, functional, and metabolic disorders which may alter nutritional requirements or require dietary modifications. Nutritional care process, GI disorders, and diabetes mellitus. 3 lectures, 1 laboratory. Prerequisite: FSN 329 and senior standing.

FSN 430 Clinical Nutrition II (4)

Application of the nutritional care process to organic, functional, and metabolic disorders which may alter nutritional requirements or require dietary modifications. Atherosclerosis, hyperlipidemias, metabolic stress, liver disease, cancer, renal disease, AIDS, and parenteral and enteral nutrition. 3 lectures, 1 laboratory. Prerequisite: FSN 429.

FSN 434 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 374.

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 154, FSN 204; FSN 230 for non-Food Science majors.

FSN 455 Product Development and Sensory Evaluation (5)

How food products are created and tested by scientists and technologists. Sensory tests, consumer acceptance, experimental design. Fat replacement and the use of ingredients and additives. Miscellaneous course fee may be required—see *Class Schedule*. 3 lectures, 2 activities. Prerequisite: FSN 325 and senior standing; FSN 230 for non-Food Science majors.

FSN 461, 462 Senior Project (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 (Nutrition majors) or 180 hours (Food Science majors) required. Prerequisite: ENGL 215 or ENGL 218 and senior standing.

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 470 Selected Advanced Topics (1–3)

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 6 units. 1–3 lectures. Prerequisite: Senior standing.

FSN 471 Selected Advanced Laboratory (1–3)

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 6 units. 1–3 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 Pascalization. Oral presentation required. Miscellaneous course fee required—see *Class Schedule*. 3 lectures, 1 laboratory. Prerequisite: FSN 154 and FSN 204; FSN 230 for non-Food Science majors.

FSN 485 Cooperative Education Experience in Food Science and Nutrition (6) (CR/NC)

Part-time work experience with an approved Food Science and 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 494 Food Engineering (4)

Engineering concepts and unit operations used in the food industry. Materials balance and heat balance, heat transfer, steam heat, fluid flow, water removal and refrigeration. 3 lectures, 1 laboratory. Prerequisite: PHYS 104, MATH 131, MATH 132.

FSN 495 Cooperative Education Experience in Food Science and Nutrition (12) (CR/NC)

Full time work experience with an approved Food Science and 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 adviser.

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 570 Selected Topics in Food Science and Nutrition (1–3)

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 9 units. 1 to 3 seminars. Prerequisite: Graduate standing or consent of instructor.

FSN 571 Selected Advanced Laboratory in Food Science and Nutrition (1–3)

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 6 units. 1–3 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. 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 D4a**

Introduction to the diversity, interrelationships, and spatial features of global cultures. Survey of the field with emphasis on characteristics and/or patterns of population, race, ethnicity, language, religion, government, and economic activity. 4 lectures.

GEOG 250 Physical Geography (4)

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 305 Political Geography (4)

Spatial influences on man's political behavior. Geopolitics, boundaries, significance of resources on power politics, internal spatial structure of the nation–state, relationships between nation–states. 4 lectures. Prerequisite: Junior standing.

GEOG 308 Global Geography (4)**GE D4b**

Survey of principal elements of global geography; multicultural assessment of interrelationships and/or patterns of human activities and biophysical environments, especially in relation to international linkages and trends. Focus on selected regional examples from the developed and developing worlds. 4 lectures. Prerequisite: Junior standing.

GEOG 310 Urban Geography (4)

Presentation of geographic concepts, principles, and generalizations related to urban functions, forms, distribution, and growth. Location, areal extent, and interaction among the various urban functions. 4 lectures. Prerequisite: Junior standing.

GEOG 315 Geography of Resource Utilization (4)

A multicultural, world view of the interconnections of the following resource systems: food, energy, water and nonfuel minerals. A pervading theme is the sustainability of these systems. 4 lectures. Prerequisite: Junior standing.

GEOG 325 Climate and Humanity (4)

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 333 Human Impact on the Earth (4)

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)

Physical environment of California; patterns of settlement and historic development; current problems. 4 lectures. Prerequisite: Junior standing.

GEOG 350 Geography of the United States (4)

The population (including origin, ethnicity, migrations, and distributions), 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: 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 Mexico and Central America (4)

Detailed study of Mexico and Central America; patterns of settlement and development, economic issues and resource utilization; physical environment. 4 lectures. Prerequisite: Junior standing.

GEOG 401 Area Geography (4)

Directed study of geographic characteristics of a selected world area. *Class Schedule* will list topic descriptive of the particular world area to be studied. Total credit limited to 12 units. 4 lectures. Prerequisite: Junior standing.

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-GEOLOGY**GEOL 201 Physical Geology (3) GE B1a**

Processes responsible for the Earth's rocks, structure and surface features. Volcanism, mountain building, plate tectonics, weathering, erosion and deposition by streams, glaciers, wind and waves. 3 lectures.

GEOL 203 Fossils and the History of Life (3) GE B1a

Fossil record. Mechanisms and patterns of evolution. Adaptation of ancient organisms to their environments. Fossils in the

interpretation of Earth history. Important events in the history of life. Historical development of the major groups of invertebrates, vertebrates, and plants. 3 lectures.

GEOL 204 Geologic History of California (3) GE B1a

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. Prerequisite: GEOL 201 recommended.

GEOL 205 Earthquakes and Earth Hazards (3) GE B1a

Plate tectonics, seismicity and faulting. Quake mechanisms, intensity and magnitude. Measurement and prediction. History. Prevention and planning. Related geological effects. 3 lectures.

GEOL 206 Geologic Excursions (1) (CR/NC) GE B1a

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 201 or GEOL 204.

GEOL 207 Geology of the National Parks (3) GE B1a

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. Prerequisite: GEOL 201 recommended.

GEOL 241 Physical Geology Laboratory (1) GE B1a

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 201.

GER-GERMAN**GER 101, 102, 103 Elementary German (4) (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 (4) (4)

Review of German grammar and practice in writing and oral expression within a cultural context. 3 lectures, 1 activity. Prerequisite: GER 103 or consent of instructor.

GER 233 Critical Reading in German Literature (4) GE C1

Selected readings in German from major German-speaking authors that show the German literary tradition from the Middle Ages to the present in Germany and other German-speaking countries. 4 lectures. Prerequisite: Consent of instructor.

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 C3

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: Consent of instructor.

GER 405 German Literature in English Translation (4) GE C3

Selected works to be read by students in the original or in English translation. Critical analysis, interpretation, and comparison of individual works by outstanding German writers. Lecture in English. *Class Schedule* will list topics selected. Total credit limited to 8 units. 4 lectures. Prerequisite: One literature course or consent of instructor.

GER 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.

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 media. 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. Miscellaneous course fee required—see *Class Schedule*. 2 lectures, 1 laboratory.

GRC 202 Image Capture and Manipulation (3)

Optical and digital methods of image capture and image manipulation for the graphic arts. Photographic materials and equipment for the graphic arts. Densitometry, light sources, pin register, film assembly, exposure and development control. Contact frame, camera, and scanner theory and practice. Miscellaneous course fee required—see *Class Schedule*. 2 lectures, 1 laboratory. Prerequisite: GRC 101 and GRC 201.

GRC 203 Electronic Prepress (4)

Terminology, materials, equipment, facilities and methods used in electronic prepress. File formats, fonts, imposition, trapping, screen angling. Preflight, PostScript output, imagesetters, proofing, and platemaking. Miscellaneous course fee required—see *Class Schedule*. 3 lectures, 1 laboratory. Prerequisite: GRC 202.

GRC 204 Introduction to Printing Management (3)

Printing industry structure and business practices. Small business startup. Functional activities of a printing business. Applied organizational and management theory. 3 lectures. Prerequisite: GRC 101.

GRC 211 Substrates and Ink (4)

Technical aspects of paper, other substrates, and ink used in the printing industry. Manufacture, computerized densitometric and performance testing, and interaction of these materials are examined in relation to particular processes and end use requirements. 3 lectures, 1 laboratory. Prerequisite: GRC 101.

GRC 212 Substrates and Ink: Applications (3)

Technical aspects of paper, other substrates, and ink used in the printing industry. Manufacture, applications, 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 GRC 201 or GRC 277.

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 277 Computer Applications in Desktop Publishing (3) GE F1

Computer applications, their relationship to print media and publishing. How desktop publishing is influencing and is influenced by society. Use and selection of personal computers, desktop publishing software, and output devices. Terminology, typography, creating, editing, transferring, merging text and graphics. Credit not allowed for GRC majors. Miscellaneous course fee required—see *Class Schedule*. 2 lectures, 1 laboratory.

GRC 302 New Technologies in Graphic Communication (3)

New graphic communication technologies that are impacting the methods and procedures of producing and distributing print media. Application of computers and electronics, laser beams, telecommunication, digital imaging, integrated systems, non-impact printing, and related technologies. Technological transitions and how to manage technological change. 3 lectures. Prerequisite: GRC 201.

GRC 307 Color: Theories and Applications (3)

Application of color theories from the sciences and arts to the color producing industries of printing, photography, television, textiles, paints, and plastics. Color technology for communication through images, products, and the environment. 3 lectures. Prerequisite: GRC 201.

GRC 315 Sheetfed Lithographic Technology (5)

Theory, practice and applications of sheetfed lithographic technology to the printing industry segments of commercial, books, advertising, catalogs, packaging, reprographics. Computerized press controls, scanning densitometers. 4 lectures, 1 laboratory. Prerequisite: GRC 202, GRC 211 and CHEM 111.

GRC 316 Web Printing Technology (5)

Analysis of web press technology for lithography, gravure, flexographic and letterpress printing. Applications for newspapers, packaging, business forms, magazines, books, catalogs and commercial products. Applications of computers to the management and technical function of web technology. Miscellaneous course fee may be required—see *Class Schedule*. 4 lectures, 1 laboratory. Prerequisite: GRC 315.

GRC 320 Implementing Quality Management in the Graphic Arts (4)

Theory and practices of quality management and productivity in the graphic arts industry. Quantifying customer needs and expectations, the development of specifications, standard operating procedures, statistical process control tools, capability studies, process improvement techniques, and employee empowerment will be examined. 4 lectures. Prerequisite: GRC 315 and STAT 217.

GRC 322 Advanced Typography (3)

Typographic principles, practice and design of complex text, display and tabular composition for mass print media. Copy markup and layout procedures for electronic composition, with consideration of printing process requirements. Miscellaneous course fee required—see *Class Schedule*. 2 lectures, 1 laboratory. Prerequisite: GRC 218 or consent of instructor.

GRC 324 Binding and Finishing 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. Miscellaneous course fee required—see *Class Schedule*. 2 lectures, 1 laboratory. Prerequisite: GRC 101.

GRC 325 Binding and Finishing Processes: Applications (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. Credit not allowed for GRC majors. 2 lectures. Prerequisite: GRC 101.

GRC 326 Printing Equipment Management (3)

Procedures in designing, maintaining and decision making for printing equipment including pneumatics, hydraulics, mechanical and electrical systems. Pollution, safety and training in the graphic communication industry. 2 lectures, 1 laboratory. Prerequisite: GRC 201.

GRC 328 Film Assembly and Platemaking (3)

Planning for lithographic plates. Conventional film assembly techniques including the preparation of supports for black and white and flat color stripping using manual methods. Step and repeat techniques. Film contacting and duplicating methods. Manual and computerized techniques for bookwork imposition. Lithographic platemaking theory and practice. Miscellaneous course fee required—see *Class Schedule*. 2 lectures, 1 laboratory. Prerequisite: GRC 101 and GRC 201.

GRC 329 Prepress Methods and Procedures (3)

Introduction to graphic arts photography including photographic materials and equipment. Line, halftone and color separation theory and practice. Planning and preparation of film materials for lithographic stripping. Black and white color proofing. Preparation and use of various lithographic plates. Miscellaneous course fee required—see *Class Schedule*. Credit not allowed for GRC majors. 2 lectures, 1 laboratory. Prerequisite: GRC 101.

GRC 330 Print Reproduction Processes (3)

The functions of press departments in printing segments of commercial, books, advertising, catalogs, newspapers, business forms, magazines, packaging, quick printing. Standard contract language, press checks, quality assurance. Credit not allowed for GRC majors. 2 lectures, 1 activity. Prerequisite: GRC 101.

GRC 331 Color Quality Control (4)

Color sciences and quality control techniques as they relate to the printing and allied industries. Application of color theory to color reproduction, color control, print inspection, process control, and quality measurement. Use of instruments to quantify color properties. 3 lectures, 1 laboratory. Prerequisite: GRC 320 and PSC 101.

GRC 335 Line and Halftone Media (4)

Preparation and evaluation of original art copy for commercial use. Laboratory problems in drawing and layout for single and multiple color runs. Various approaches to registration through computer generated images and conversions. Use of color and texture in art copy. Miscellaneous course fee required—see *Class Schedule*. 2 lectures, 2 laboratories. Prerequisite: GRC 338.

GRC 337 Consumer Packaging (3)

Problem-solving strategies for package printing which integrate concepts from management, design and technology. Package manufacturing, function, quality, visual appeal, and economics are addressed. Consumer packaging industry. Miscellaneous course fee required—see *Class Schedule*. 2 lectures, 1 laboratory. Prerequisite: Junior standing or consent of instructor.

GRC 338 Digital Content Management for Publishing (4)

Advanced application of type arrangement, digital illustration, image manipulation and page composition. Digital content management strategies: database principles, archiving, document formats, variable data, workflow analysis and repurposing. Technical and creative problem-solving for content production, printing, online publishing and dissemination. 3 lectures, 1 laboratory. Prerequisite: GRC 203. Prerequisite or corequisite: GRC 218.

GRC 357 Screen Printing Technology (2)

Methods and procedures of screen printing technology; frame, ink, fabric and stencil technology as they relate to printing characteristics. Mechanical art-registration tolerances; commercial production practices; screen printing presses and their applications. Safety and environmental consideration. Miscellaneous course fee required—see *Class Schedule*. 1 lecture, 1 laboratory. Prerequisite: GRC 101.

GRC 361 Printing Marketing and Sales (4)

Printing marketing and sales management. Graphic communication market determination, market strategy, and implementation. Strategic sales management, personal selling, forecasting and planning for printed products. 3 lectures, 1 laboratory. Prerequisite: GRC 101.

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 403 Printing Estimating (4)

Estimating the cost of various kinds of printed products. Development of budgeted hour costs and production standards. Cost estimating methods for prepress, sheetfed press and finishing operations. Paper estimating for flat sheet and bookwork production. Analysis of material, labor and other cost factors. Overview of computer estimating methods. 3 lectures, 1 laboratory. Prerequisite: GRC 315.

GRC 408 Newspaper and Publications Management (3)

Analysis of newspaper and publications production systems. Organization of the production function. Personnel and industrial problems peculiar to the industry. 3 lectures. Prerequisite: GRC 316.

GRC 411 Pricing, Costing and Web Estimating (4)

Coordination of customer service, sales and estimating functions to printing industry market trends. Marketing and pricing strategies for printers. Cost estimating for web processes. Evaluating printing company profitability using ratio analysis. Cost-effective techniques for printers including data collection systems, management information systems, and innovative management practices. 3 lectures, 1 activity. Prerequisite: GRC 316 and GRC 403.

GRC 417 Advanced Web Printing Technology (2)

Advanced theory and applications of web printing technology to include copy and design reproduction and management decisions as they pertain to the graphic communication field. 2 lectures. Prerequisite: GRC 316.

GRC 421 Printing Production Management (4)

Production planning, scheduling, and control for printed products. Equipment and inventory planning, resource optimization, and the application of quality management principles to the printing industry. 3 lectures, 1 activity. Prerequisite: GRC 403, and MATH 117, MATH 118, or MATH 120.

GRC 422 Printing Supervision and Personnel Issues (4)

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 or corequisite: GRC 460 or consent of instructor.

GRC 429 Digital Media (3)

Current digital media and electronic publishing systems, including CD ROM and Internet publishing. Industry standards, including SGML, HTML, and PostScript. Multimedia authoring. Current issues in high-resolution imagesetting and digital proofing. Miscellaneous course fee required—see *Class Schedule*. 2 lectures, 1 laboratory. Prerequisite: GRC 338.

GRC 431 Printing Plant Layout Analysis (3)

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.

GRC 432 Imaging Systems Management (4)

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.

GRC 439 Electronic Origination: Books and Publications (4)

Complex and experimental copy electronically generated and art preparation for use in line and halftone reproduction by gravure and offset lithography for book/quality paperback and journal reproduction. Mechanical requirements; production procedures, implemented through computer-controlled production equipment. Miscellaneous course fee required—see *Class Schedule*. 2 lectures, 2 laboratories. Prerequisite: GRC 316, GRC 338.

GRC 440 Electronic Origination: Newspapers and Magazines (4)

Complex copy preparation in line, tone and color for reproduction by offset, gravure, flexography and letterpress (relief) printing. Print production requirements for high-speed computer controlled reproduction presses for magazine and newspaper production. Miscellaneous course fee required—see *Class Schedule*. 2 lectures, 2 laboratories. Prerequisite: GRC 439.

GRC 460 Research Methods in Graphic Communication (1)

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. Prerequisite: Senior standing and STAT 217.

GRC 461 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 formal report. Minimum 90 hours total time. Prerequisite: GRC 460.

GRC 470 Selected Advanced Topics (1–3)

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 6 units. 1–3 lectures. Prerequisite: Consent of instructor.

GRC 471 Applied Graphic Communication Management Practices (2)

Management theories and practices in the graphic communication industry. Application of theories and practices to the University Graphic Systems as they apply to commercial printing, publication printing, and newspaper industries. Total credit limited to 6 units. 2 seminars. Prerequisite: Consent of instructor.

GRC 474 Applied Graphic Communication Practices (2) (CR/NC)

Application of theories and practices to the University Graphic Systems as they apply to commercial printing, publication printing, and newspaper industries. Total credit limited to 18 units, with a maximum of 2 units per quarter. Credit/No Credit grading only. 2 activities. Prerequisite: Consent of instructor.

GRC 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.

GRC 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.

**GSB—GRADUATE STUDIES—
BUSINESS****GSB 500 Independent Study (1–4)**

Advanced study planned and completed under the direction of the Director of Graduate Management Programs. Open only to graduate students who have demonstrated ability to do independent work. Prerequisite: Formal petition with approval.

GSB 502 Foundations for Quantitative Analysis (4)

Basic quantitative concepts used in the MBA program. Matrices, linear systems of equations, introduction to calculus. Probability, basic statistical concepts and regression. Use of computer software to solve problems. This course may not be used for credit toward graduation. 4 seminars.

GSB 511 Financial Accounting (4)

Financial accounting model and accounting systems concepts. Principles and concepts used in preparing published financial statements. Interrelationships among those statements. Analysis and interpretation of their content. 4 seminars.

GSB 512 Quantitative Analysis (4)

Introduction to matrices and the concepts of statistical analysis. Probability distributions, point and interval estimation of population means, proportions, and variances. Analysis of variance, regression, correlation, multiple regression, time series, and forecasting. Use of computers to solve problems. 3 seminars, 1 laboratory. Prerequisite: GSB 502 or equivalent.

GSB 513 Organizational Behavior (4)

Examination of major organizational behavior (individual, interpersonal, group, and organizational) concepts, theories and constructs. Presented from an applied perspective with the purpose of increasing one's effectiveness and skill in understanding, analyzing, and managing organizational processes. 4 seminars.

GSB 514 Business, Government and Society (4)

Analysis from social, economic, political, legal and ethical perspectives of the changing domestic and international environment within which the American business enterprise operates. 4 seminars.

GSB 521 Managerial Accounting (4)

Managerial accounting with emphasis on communication and information to assist management in planning and control. Development of an operational understanding of cost systems, budgeting concepts, performance evaluation and other quantitative accounting techniques to assist management in planning and control. Accounting data in computer modeling applications. 3 seminars, 1 activity. Prerequisite: GSB 511.

GSB 522 Management Science (4)

Concepts and techniques of management science. Mathematical programming, decision theory, queuing models, network models, Markov analysis. Game theory. Dynamic programming. Use of computers to solve problems. 3 seminars, 1 laboratory. Prerequisite: GSB 512.

GSB 523 Managerial Economics (4)

Microeconomic analysis and its application to business decisions. Topics include the use of calculus and other quantitative techniques in economic analysis, market structures, pricing strategies, cost analysis and input selection. Examination of the economic impact of various governmental policies on the business firm. 4 seminars. Prerequisite: GSB 512.

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 seminars.

GSB 531 Managerial Finance (4)

Theories, practices and tools of financial decision making. Topics include financial statement analysis, financial forecasting, valuation, capital budgeting, capital structure, dividends, and an overview of financial markets and institutions. 4 seminars. Prerequisite: GSB 511 and GSB 512.

GSB 532 Information Systems (4)

Overviews of management information systems and decision support systems. Structure of organizational information systems. Process of information systems development. File processing and integrated data base concept. Data communication and on line distributed systems. Management decision making using computer software packages. Report generation using word processing system. Interactive financial planning systems and the decision support systems. 3 seminars, 1 laboratory. Prerequisite: GSB 511.

GSB 533 Aggregate Economics (4)

Theoretical framework and empirical dimensions of the aggregate economic environment in which business enterprise must operate. Understanding of national income accounting, monetary and fiscal policies, inflation, unemployment and balance of payments issues in static and dynamic contexts. Develops an ability to understand macroeconomic events in an evolving and interconnected world economy. 3 seminars, 1 activity. Prerequisite: GSB 523.

GSB 534 Production and Operations Management (4)

Production function and its interaction with other functional areas in an organization. Application of quantitative and statistical methods to planning, control and decision making in operations management. Topics include economics of plant location, logistics, material management, and quality control. 4 seminars. Prerequisite: GSB 522.

GSB 562 Seminar in General Management and Strategy (4)

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: Must be taken within last 24 units prior to graduation and after completion of all MBA first-year required GSB courses or equivalent.

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. Prerequisite: GSB 524.

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 career paths in consumer business/services sectors. 4 seminars. Prerequisite: GSB 524.

GSB 570 Entrepreneurship and Small Business Management (4)

Exploration in entrepreneurship with emphasis on the formation and management of new business ventures. Analysis of typical operating problems of these firms and application of appropriate techniques for their solution. 4 seminars. Prerequisite: GSB 513.

GSB 571 Organizations and Management (4)

Examination of major theories and conceptual constructs relating to the operating requirements of complex organizations, including manufacturing, service, and nonprofit organizations; historical development of theory and practice; managerial behavior functions and processes. Current issues and actual cases. 4 seminars. Prerequisite: GSB 513.

GSB 572 Seminar in Organization Design and Management (4)

Organization design approaches, configurations, principles, and processes. Diagnosis and redesign of a wide variety of complex organizations in the public, private, and international sectors. Organization design as an organization development technology. 4 seminars. Prerequisite: GSB 513.

GSB 573 Market Research and Planning (4)

Makes the student a knowledgeable user of marketing research information to develop and implement marketing plans. Emphasis on development of ability for using research information to formulate marketing objectives and strategies and to analyze marketing problems in depth. 4 seminars. Prerequisite: GSB 524.

GSB 574 Seminar in Labor-Management Relations (4)

Exploration of models of labor-management relationships from adversarial to cooperative, in both non-union and union, private and public sectors. Emphasis on labor-management relationships maximizing commitment and performance. Analysis of employee influence. Work organization, reward systems, conflict resolution. 4 seminars. Prerequisite: GSB 513.

GSB 575 Legal Aspects of Business (4)

Managerial approach to important legal issues affecting business and the market system. Focus on those aspects of law which affect managers directly including contracts, products liability and corporations in perspective; principles of partnership authority, liability, and control; managerial duty and liability to the corporation; public control of managerial activity. 4 seminars.

GSB 576 Seminar in Quality and Performance Management (4)

Principles and techniques of quality and performance management as applied to organizations in the private and public sector. Emphasis on competitive implications. Integration of fundamental management techniques, existing improvement efforts, technical tools, and new management technologies focused on continuous organizational improvement. 4 seminars. Prerequisite: GSB 513.

GSB 577 Advanced Quantitative Business Analysis (4)

Case studies using the concepts of GSB 512 Quantitative Business Analysis and GSB 522 Management Science, applied to selected problems in business and industry. These involve concepts of linear programming, quadratic programming, goal programming and advanced forecasting concepts. Solutions of these models obtained using computers. 3 seminars, 1 laboratory. Prerequisite: GSB 522.

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. Case studies and simulations. 4 seminars. Prerequisite: Second-year standing or consent of instructor.

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. The experience curve, vertical integration, managing change, CIM, robotics, and managing international production. 4 seminars. Prerequisite: GSB 534.

GSB 580 Industrial Marketing (4)

Marketing of business goods and services to other businesses, governmental agencies and social institutions by the manufacturer. Market analysis, sales forecasting, product strategy, effective use of sales force and industrial advertising media. 4 seminars. Prerequisite: GSB 524.

GSB 581 Marketing Management Seminar (4)

Practice in the application of analytical tools and techniques to current and potential marketing problems. 4 seminars. Prerequisite: GSB 524.

GSB 582 High-Technology Marketing (4)

Emphasis on marketing of high-technology products, processes, systems and services. Strategic high-tech product planning and high-tech new product development in the context of marketing management. Market forecast for a non-existing new high-tech product. 4 seminars. Prerequisite: GSB 524.

GSB 583 Management of Human Resources (4)

Major functional areas of human resource management, including human resource planning, job analysis, recruitment, selection, performance measurement, employee training and career development, compensation, legal compliance and employee rights. Emphasis on analysis of human resource problems as they arise in real-world settings. 4 seminars. Prerequisite: GSB 513.

GSB 584 Seminar in Financial Policy (4)

Application of financial theory and models to a variety of financial problems. Analysis and formulation of financial plans developed primarily through the use of cases and other real world examples. Working capital management, investment decisions under conditions of risk, and financing and capital structure decisions. 3 seminars, 1 activity. Prerequisite: GSB 531.

GSB 585 Seminar in Investments (4)

Stock, bond and options market. Emphasis on operations of markets, the efficient markets hypothesis and portfolio theory. Setting investment objectives and managing portfolios given efficient capital markets. 4 seminars. Prerequisite: GSB 531.

GSB 586 Financial Institutions and Markets (4)

Structure of money and capital markets and the financial institutions that operate in these markets. Evaluation of contemporary thought on the evolving market and institutional arrangements. Emphasis on the management policies of the institution. 4 seminars. Prerequisite: GSB 531.

GSB 587 International Financial Management (4)

Analysis of the problems facing the financial manager of an international company. Topics include the international monetary system, mechanics of the foreign exchange market, determinants of exchange rates, financing and investment in foreign currencies, trade financing, international capital budgeting, and international working capital management. 4 seminars. Prerequisite: GSB 531.

GSB 588 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. A maximum of 8 units can be used toward graduation. Credit/No Credit grading only. Prerequisite: Graduate standing and consent of instructor and adviser.

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 521.

GSB 590 Designing and Managing Sociotechnical Systems (4)

Designing organizations as sociotechnical systems. Manager's role and functions in managing technology. Organizations as sociotechnical systems. Sociotechnical system theory. Sociotechnical system analysis and design. Managing sociotechnical systems. Design experiments that foster the innovative process. 4 seminars. Prerequisite: GSB 513.

GSB 591 Industry Analysis (4)

In-depth study of major industry using analytical tools developed in first-year courses. Intensive investigation of the dynamic

environment, markets, technology, financial and economic structures, history and other key factors. Further prospects for the industry explored through preparation of a comprehensive forecast. 4 seminars. Prerequisite: Second-year standing.

GSB 592 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 maximum of 8 units can be used toward graduation. Credit/No Credit grading only. Prerequisite: Graduate standing and consent of instructor and adviser.

GSB 593 Management and Control of Information Systems (4)

Overviews 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 seminars, 1 laboratory. Prerequisite: GSB 532.

GSB 594 Future of Business (4)

Examination of the techniques and conclusions of representative future studies by research institutions such as the Rand Corporation, Hudson Institute and The Club of Rome. Analysis of the implications of those conclusions for the operations and role of business in society. 4 seminars. Prerequisite: GSB 514.

GSB 595 Managing Change (4)

Managing planned change within complex organizations. Managing change and development models and interventions, including action research, team development, intergroup conflict, structural, and comprehensive approaches. Design and use of action programs to improve organizational effectiveness. 4 seminars. Prerequisite: Second-year standing.

GSB 596 Economic Forecasting (4)

Applications to business planning of selected economic forecasting techniques. Classical time series analysis, Box-Jenkins (ARIMA) models, adaptive (Kalman) filtering models, leading indicators and input-output analysis. Use of computers in solving problems. 3 seminars, 1 laboratory. Prerequisite: GSB 533.

GSB 597 Seminar in Selected Economic Problems (4)

Selected 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.

GSB 598 Graduate Internship in Business (2-8) (CR/NC)

To permit students to correlate experience and academic knowledge. Placement in a supervised work program in a business or public organization. Minimum forty hours of work experience per two units of credit. A maximum of 8 units can be used toward graduation. Credit/No Credit grading only. Prerequisite: Graduate standing and consent of instructor and adviser.

GSB 599 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 they cannot follow effectively in regularly offered elective courses. Prerequisite: Second-year standing.

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 1500 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 1500 CE to 1900 CE. Comparison of liberal modernization of the West with the retarded, conservative modernization in Central, East and Southeast Europe. 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, with goal of preparing a foundation for HIST 315. 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 201 United States History (3) GE D1

Origins and development of the United States from the 15th century to the New Nation. HIST 201 satisfies the general education requirement of HIST 204 for History majors. 3 lectures.

HIST 202 American Cultures: Consensus and Conflict (4) GE D1 USCP

Multicultural and gender perspectives combined with traditional historical themes. Conflict and consensus viewed as defining the American experience. 4 lectures.

HIST 204 History of American Ideals and Institutions (3) GE D1

Comprehensive thematic study of the historical development of industry, corporations, racial relations, foreign policy and political and constitutional issues since the foundation of the Republic. Such an historical analysis will enable students to better understand contemporary America. Not open to students with credit in HIST 201. 3 lectures.

HIST 303 Research and Writing Seminar in History (5)

Designed to develop students' 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: Junior standing or permission of instructor, ENGL 114, and ENGL 125 or PHIL 125 or SPC 125.

HIST 304 Historiography (4)

Theories of history: past and present. 3 seminar meetings and research project. Prerequisite: HIST 303/301.

HIST 305 History of American Agriculture (3)

Agricultural development with emphasis upon economic, political and social implications. 3 lectures. Prerequisite: Junior standing or consent of instructor.

HIST 311 Early Britain (3)

History of the British Isles from the reconstruction of Celtic history to the end of the Medieval epoch. 3 lectures. Prerequisite: Junior standing or consent of instructor.

HIST 312 Early Modern Britain (3)

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. Prerequisite: Junior standing or consent of instructor.

HIST 313 Modern Britain: Industry, Empire and War (3)

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. 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 315 Modern World History (4) GE D2

Analysis of the interaction of selected traditional and modernizing non-Western cultures with Western industrial imperialism and its attendant 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, and the emergence of nationalism. 4 lectures. Prerequisite: HIST 202 or HIST 204; POLS 110.

HIST 325 Comparative History of American Minorities (3) USCP

Analyzes the political, economic and social status of various racial and ethnic groups in the United States, focusing on the history of Asians, African-Americans, Chicanos and Native Americans, emphasizing both the general and particular forces that influenced their experience in America and the varying degrees to which each was able to maintain its cultural identity. Contemporary issues of race, class and gender will be the central thematic focus. 3 lectures. Prerequisite: Junior standing or consent of instructor.

HIST 328 American Indian History (3) USCP

Historical examination of Native American cultures; topics of cultural conflict, changing roles of women, and contributions emphasized. Contemporary race, class and gender issues will be examined. 3 lectures. Prerequisite: Junior standing or consent of instructor.

HIST 329 American Indian Thought (3) USCP

Cultural, spiritual, and intellectual contributions of several Native American societies; the philosophical and religious influences of Indians upon U.S. society; their intellectual and cultural adaptation to White domination. Contemporary issues of race, class, gender and cultural separatism. 3 lectures. Prerequisite: Junior standing.

HIST 332 African-American History to 1865 (4)

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 202 or HIST 204; junior standing or consent of instructor.

HIST 333 African-American History from 1865 (4) USCP

History of African-Americans from the Civil War to the present. Reconstruction, racial segregation, the Harlem Resistance, the Great Migration, the Civil Rights Movement, Black Feminism and Black Power. 3 lectures and research project. Prerequisite: HIST 202 or HIST 204; junior standing or consent of instructor.

HIST 339 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 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)

An analysis of political, social, and economic development of Central American countries in the context of regional history and international politics during the nineteenth and twentieth Centuries. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 343 Ancient Greece and Rome (4)

Foundations of western civilization through study of the origins of the sociopolitical institutions, philosophy, art, science, and technology that shaped the modern world; from the perspective of the two ancient cultures of the Mediterranean. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 346 Medieval Europe (4)

Medieval Europe from the fall of Rome to the plague, 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 347 Renaissance and Reformation Europe (4)

Europe from 1348 to 1620, 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 348 Religious Wars and Absolutism (4)

Europe from 1559 to 1715 CE, focusing on the Catholic-Protestant conflict, the rise of the Absolutist state (especially Louis XIV), the "Crisis of the Seventeenth Century," the Thirty Years War, the English Civil War and Cromwell, and the Newtonian Paradigm. 3 lectures and research project. Prerequisite: Junior standing or consent of instructor.

HIST 349 The Age of Revolution and Napoleon (3)

Europe from the death of Louis XIV (1715) to the settlement at Vienna of 1815. International rivalries, continental and global

warfare, the philosophy of the Enlightenment. Enlightened Despotism, the French Revolution, and Napoleon. Political, intellectual, economic, and social developments and upheavals during the Eighteenth Century. 3 lectures. Prerequisite: Junior standing or consent of instructor.

HIST 351 Europe in the Age of Reaction and Revolution, 1815-1871 (3)

Reaction to the French Revolution. Industrialization. Liberal socialist and nationalist revolts against the conservative order of 1815. 3 lectures. Prerequisite: Junior standing or consent of instructor.

HIST 352 Europe in the Age of Imperialism and War, 1871-1919 (3)

Maturation of industrialization, socialism and nationalism. Imperialist competition of nation states for world hegemony. Explosion of the First World War. 3 lectures. Prerequisite: Junior standing or consent of instructor.

HIST 353 Europe in the Age of Fascism (3)

Democracy in crisis and the fascist alternatives. Second World War and the recovery of Europe in a bipolar world. 3 lectures. Prerequisite: Junior standing or consent of instructor.

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 (3)

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. 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 390 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. Miscellaneous course fee may be required—see *Class Schedule*. Prerequisite: Consent of department chair.

HIST 401 Colonial America (3)

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. 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 (3)

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. Prerequisite: Junior standing or consent of instructor.

HIST 405 Rise of Industrial America (3)

Interaction between rising industrialism and traditional agrarian democracy. Relationship between the industrial system and the values of democratic institutions. 3 lectures. Prerequisite: Junior standing or consent of instructor.

HIST 408 The Age of Roosevelt: Depression and World War, 1929-50 (4)

Examination of 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 of 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 415 East Asian Civilization (3)

Central ideas and institutions which have shaped Chinese, Japanese and Korean civilization since ancient times. Emphasis on cultural themes rather than a political continuum. 3 lectures. Prerequisite: Junior standing or consent of instructor.

HIST 416 Modern Japan (3)

Japan's development as a modern state in the 19th and 20th centuries. Emphasized themes include the conflict of modernity and cultural continuity, the persistence of traditional values and postwar reconstruction of Japanese society. 3 lectures. Prerequisite: Junior standing or consent of instructor.

HIST 417 Modern China (3)

Analysis of Chinese history in the twentieth century, the conflict between modernity and cultural continuity, Chinese Communist Party and People's Republic of China since 1949. 3 lectures. Prerequisite: Junior standing or consent of instructor.

HIST 424 Organizing and Teaching History (3)

Organization, selection, presentation, application, and interpretation of subject matter in history in secondary schools. 3 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 autocracy 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 or consent of instructor.

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) **USCP**

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 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 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 (8–12) (CR/NC)

Supervised work experience using skills of the discipline of history in a public agency ranging from 24 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, 461 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Results presented in a formal report. Minimum of 60 hours time per quarter. Student must enroll in second quarter. Prerequisite: HIST 303, HIST 304.

HIST 463 Undergraduate Seminar (2)

Historical analysis of selected problems and topics for undergraduates. 2 seminars. Prerequisite: HIST 300, HIST 301.

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. Miscellaneous course fee required—see *Class Schedule*. Recommended preparation: Western Civilization Survey, U.S. and California History, History of Art.

HIST 470 Selected Advanced Topics (1–3)

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 6 units. 1 to 3 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 590 Seminar in History (3)

Historical analysis of selected problems and topics. *Class Schedule* will list topic selected. Total credit limited to 6 units. 3 seminars. Prerequisite: Graduate standing.

HNRS--HONORS

HNRS 141, 142, 143 Calculus I, II, III (4) (4) (4) **GE B2**
(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. Miscellaneous course fee may be required in sections with a computer component—see *Class Schedule*. 4 lectures. Prerequisite: Admission to Honors Program and approval of Director.

HNRS 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.

HNRS 215 Writing: Argumentation (4) **GE A4**
(also listed as ENGL 215)

Instruction in the drafting, revising, editing and proofreading of effective argumentative prose; techniques of discovery, evaluation, and the incorporation of secondary sources in effective arguments. Discussion of the elements of argument in written prose. Critical reading of modes of effective argument. Not open for A4 credit to students with credit in ENGL 218. 4 lectures. Prerequisite: Admission to Honors Program and approval of Director.

HUM–HUMANITIES

HUM 250 Computer Applications in the Liberal Arts (4) **GE F1**

The computer as a problem-solving tool in Liberal Arts research, teaching, data management, scholarship, writing, and other forms of electronic communication. An introduction to microcomputers, networked computer systems, appropriate software, and Internet and WWW resources. The ethical and phenomenological implications of the burgeoning use of technology in the humanities. 3 seminars, 1 laboratory. Prerequisite: ENGL 114.

HUM 302 Human Values in Agriculture (4) **GE C3**

Technical aspects of controversial agricultural issues. Identifying value conflicts, comparing potential impacts, and using 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. 4 seminars. Prerequisite: Junior standing and ENGL 215 or ENGL 218.

HUM 310 Humanities in World Cultures (4) **GE C3**

Interdisciplinary examination of the humanities in a selected culture. Special focus on the arts, literature, philosophy and foreign language in that culture. *Class Schedule* will list topic selected; some topics may satisfy USCP requirement. Repeatable to 12 units with different course titles. 4 lectures. Prerequisite: Junior standing and ENGL 215 or ENGL 218.

HUM 311 London: Its Life, Culture and Institutions (3) **GE C3**

Analytical and interpretive survey of the principal and most ancient center of the English-speaking and English influenced world. Development of the city through time frame perspective from Roman administrative capital to financial and political colossus. Impact of the age of total war and London's evolution into a multi-ethnic model of post-industrial urban life. 3 lectures. Prerequisite: Current standing in London Study program; upper division standing and ENGL 114, or consent of instructor.

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 361 Modernism (4) **GE C3**

Interdisciplinary survey of the nineteenth and early twentieth-century concepts and cultural movements known as modernism throughout Europe, North America and Latin America. Disciplines include architecture, art, drama, literature, music, philosophy, and

photography. 4 lectures. Prerequisite: Junior standing and ENGL 215 or ENGL 218.

HUM 362 Postmodernism (4) **GE C3**

Development, major characteristics, and social implications of this significant movement within twentieth-century thought. Works studied to be chosen from disciplines including art, architecture, literature, music, literary criticism and philosophy. 4 lectures. Prerequisite: ENGL 215 or ENGL 218.

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 402 Values and Technology (4) **GE C3**

Humanistic investigation into the theoretical and practical applications of technology for all majors with specific reference to the social effects of technological change. 4 lectures. Prerequisite: Junior standing and ENGL 215 or ENGL 218.

HUM 403 Ethical Issues in Cyberspace (3) **GE C3**

The ethical debates and issues connected to the rise of online communications technology. The impact of the Internet on freedom of speech, privacy, property rights, and other democratic values. Effect of online communications technology on the quality of personal and interpersonal life. Open to all majors. 3 lectures. Prerequisite: Junior standing and ENGL 215 or ENGL 218.

HUM 410 Values, Media, Culture (4) **GE C3**

Ways in which mass media and popular culture challenge the traditional high culture of art and literature. Comparison of great books to popular entertainments. Ways in which both attempt to influence our values and beliefs. 4 lectures. Prerequisite: Junior standing and ENGL 215 or ENGL 218.

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: Junior standing and ENGL 215 or ENGL 218.

HUM 490 President's Seminar: Science, Society and the University (4) **GE C3**

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 status and GPA of at least 3.0, or consent of instructor.

IME–INDUSTRIAL and MANUFACTURING ENGINEERING

IME 101 Introduction to Industrial and Manufacturing Engineering (1)

Development of the industrial economy and the professions of industrial and manufacturing engineering. Survey of engineering techniques and areas of application in manufacturing and service systems. Career opportunities review. 1 laboratory.

IME 121 Industrial Systems Analysis (2)

Systems, subsystems, and relationships (interfaces) of industrial systems. Productivity concepts and measurements. Trends in techniques for data gathering, analysis, including spread sheet analysis, and presentation for management decisions. 1 lecture, 1 laboratory.

IME 122 Manufacturing Survey (1)

Overview of manufacturing processes relating to metals and plastics. Study of materials, including composites. Survey of net shape, materials joining, and material removal processes. Open to all majors. 1 lecture.

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. Miscellaneous course fee required—see *Class Schedule*. 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. Miscellaneous course fee required—see *Class Schedule*. 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. Miscellaneous course fee required—see *Class Schedule*. 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 145 Manufacturing Processes: Machining (1)

Relationship between engineering design and production fabrication. Hole forming by drilling, boring, broaching,

punching, piercing and nontraditional methods. Forming and assembly of gauge metal components. Engineering and economic significance of various production techniques. Miscellaneous course fee required—see *Class Schedule*. Open to all majors. 1 laboratory. Prerequisite: IME 143 or IME 144 or consent of instructor.

IME 155 Industrial Welding (1)

Application of various electric welding processes to joining of steel sheet and plate. Includes short circuiting arc, flux cored electrode, gas metal arc, and shielded metal arc processes. Gas welding of steel pipe and hard surfacing. 1 laboratory. Prerequisite: IME 142.

IME 157 Electronic Manufacturing (3)

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. Miscellaneous course fee required—see *Class Schedule*. Open to all majors. 1 lecture, 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 201 Production Costs Estimating (3)

Estimating costs of manufactured products and services based on detailed estimates of labor, materials, overhead and general and administrative expenses. Break even points, price breaks, industrial learning, network cost analysis, multiple regression derived formulas, labor efficiency and cost indices. 3 lectures. Prerequisite: Sophomore standing. Credit not allowed for Industrial Engineering or Manufacturing Engineering majors.

IME 214 Production Control (2)

Coordination of production facilities to meet objectives of customer service, minimum inventory investment, and maximum manufacturing efficiency. Forecasting, statistical determination of order requirements, group technology concepts, input-scheduling and machine loading control techniques. Production systems computer modeling. 2 lectures. Prerequisite: Sophomore standing. Credit not allowed for Industrial Engineering or Manufacturing Engineering majors.

IME 222 Engineering Analysis (3)

Mathematical and statistical methods of evaluating and control of variability of engineering design parameters, predicting deviations from expected averages, grouping data for computations. Computer applications. Quality control concepts and applications. 2 lectures, 1 activity. Prerequisite: MATH 131. Credit not allowed for Industrial Engineering or Manufacturing Engineering majors.

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, IME 141.

IME 233 Computer Aided Manufacturing (2)

Introduction to CAM. Manual and computer part programming. Basic concepts of part design, process planning, manufacturing

operations. Tool path definition/verification to production phase. Use of commercially available software. 1 lecture, 1 laboratory. Prerequisite: IME 144, CSC 234 or CSC 231 or equivalent.

IME 234 Robotic Assembly (2)

Product design and planning for robotic assembly. Robot characteristics required for product assembly. Off-line programming environment for robots. Selection of sensors, end-of-arm tooling and control arrangements for robotic assembly. Practical applications using a robot programming language for assembly. 1 lecture, 1 laboratory. Prerequisite: Computer literacy course (F1)

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 (1)

Chip formation, tool geometry, feed and speed rates. Introductory metal cutting process design projects with emphasis on test report writing, documentation, and inspection methods. 1 laboratory. Prerequisite: IME 143 or IME 144, MATH 142.

IME 242 Manufacturing Process Design II (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, PHYS 131.

IME 243 Manufacturing Process Design III (4)

Engineering analysis of sheet metal fabrication, coating and finishing, powder metallurgy and ceramics, plastics and composites, deformation, and material joining processes. Advanced process design projects. 2 lectures, 2 laboratories. Prerequisite: IME 242.

IME 251 Introduction to Manufacturing Engineering Analysis (3)

State of the art methods and processes in mechanical and electronic manufacturing. Selection of materials for manufacturing. Process control methods and metrology. Coordinate measuring machines and surface profile analysis. Product design and manufacturability. Value engineering, group technology and parts codification. 2 lectures, 1 laboratory. Prerequisite: IME 143 or IME 144, MATH 142, CHEM 125.

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 242.

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. 4 lectures. Prerequisite: Junior standing, IME 239 or equivalent.

IME 304 Operations Research (3)

Introduction to operations research. Matrix theory, linear programming formulations and solution. Simplex method, sensitivity analysis, transportation and assignment algorithms. Introduction to goal programming. Existing computer programs and algorithms utilized. 3 lectures. Prerequisite: MATH 242.

IME 305 Operations Research II (4)

Queuing models, dynamic programming and inventory models, Markovian processes, simulation modeling, computer programming in solution of problems. 4 lectures. Prerequisite: IME 301 or IME 304, STAT 321.

IME 312 Data Management and System Design (3)

Design and management of industrial data bases and reporting systems. Relationships of financial accounting and production control systems, efficient data entry routines, report formats, data base managers and system benefit cost analysis. 3 lectures. Prerequisite: IME 239, IME 314, CSC 234 or CSC 231.

IME 314 Engineering Economics (3)

Economic analysis of engineering decisions. Determining rates of return on investments. Effects of inflation, depreciation and income taxes. Sensitivity, uncertainty, and risk analysis. Application of basic principles and tools of analysis using case studies. 3 lectures. Prerequisite: ECON 201 or equivalent, MATH 241.

IME 319 Human Factors Engineering (3)

GE F2

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 and junior standing.

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 233, CSC 231 or a course in a high level computer language.

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 251, CSC 234.

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.

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 242, CE 204, MATH 242, 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, IME 239.

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: IME 233 or IME 335, EE 201, EE 321, ME 211.

IME 357 Advanced Electronic Manufacturing (4)

Electronic manufacturing overview with emphasis on new technologies, planning, producibility, product assurance, packaging and testing. Advanced fabrication techniques and advanced use of electronic CAD/CAM. 2 lectures, 2 laboratories. Prerequisite: ENGL 218, EE 321.

IME 361 Advanced Welding Processes (4)

Modern material joining processes, with emphasis on high energy density. Laser beam, electron beam, and plasma arc welding processes. Welding fixtures positioners, and power sources. Welding automation and control. Robotic arc welding. 2 lectures, 2 laboratories. Prerequisite: IME 142, PHYS 133.

IME 362 Welding Quality Control (4)

Weldability of engineering materials. Thermal effects of welding, including residual stresses and distortion. Weld defects, their examination and correction. Mechanical properties and testing of weldments. 2 lectures, 2 laboratories. Prerequisite: IME 361, MATE 210, MATE 215, ME 313.

IME 363 Design for Welding (4)

Welding design, concepts and practices; connection design, and weld sizing. Welding codes and procedure qualification. Cost analysis of welding. 2 lectures, 2 laboratories. Prerequisite: IME 362.

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 department chair.

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 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. 4 lectures. Prerequisite: IME 301, IME 305.

IME 408 Systems Engineering (3)

Systems, subsystems, static, dynamic, closed and open systems. Systems design requirements. Performance measures. Process control modeling and analysis, transform methods, linear systems analysis, digital, adaptive and steady state optimal control. Optimal search strategies. Manufacturing, maintenance, replacement and engineering applications. 3 lectures. Prerequisite: IME 305, IME 426, CSC 234 or CSC 231.

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 305, IME 314.

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 305 or IME 342, IME 312, or equivalent.

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)

Structure of flexible manufacturing systems. Planning and control for FMS. Tool management and operations control. Application of techniques related to production scheduling decisions. Cellular manufacturing and production flow analysis. Case studies of flexible manufacturing systems. Computer applications. 3 lectures. Prerequisite: IME 335.

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, IME 335 or equivalent.

IME 418 Product-Process Design (4)

Unification of product design, process engineering, tool development, and product manufacturing; 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 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 305, IME 312.

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.

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 251, IME 426 or equivalent.

IME 426 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 321.

IME 427 Process Optimization through Designed Experiments (4)

Experiments for optimization of industrial processes: process variables, response, measurements, analysis and interpretations. 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 426 and 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.

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 426.

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 426 or equivalent.

IME 431 Supplier Quality Engineering (4)

Customer-supplier partnership. Functions of Supplier Quality Engineering. Supplier selection, development, process qualification, concurrent engineering, value engineering. Process characterization, repeatability, consistency, process control. Quality system standards. Supplier survey, audit, rating, measurement of quality, delivery performance and certification. Customer service, corrective action approaches. 3 lectures, 1 laboratory. Prerequisite: IME 251, IME 430 or consent of instructor.

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 312, IME 426 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 305, IME 430.

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 426 or equivalent.

IME 440 Quality Process Management (3)

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. 3 lectures. Prerequisite: Junior standing.

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 335 (or IME 233), and senior standing. Concurrent enrollment in IME 421 recommended.

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 223, IME 251, IME 305 or IME 342, IME 319, IME 335, or equivalent.

IME 455, 456 Manufacturing Design and Implementation I, II (3) (2)

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. 455: 3 laboratories, 456: 2 laboratories. Prerequisite: IME 418. Co-requisite: IME 430.

IME 461, 462 Senior Project (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. Prerequisite: Senior standing (within 3 quarters of graduation), IME 314, IME 443, or IME 418.

IME 463 Undergraduate Seminar (2)

Preparation, oral presentation, and discussion by students of technical papers on recent engineering developments and/or subject matter pertinent to industrial and manufacturing engineering. 2 seminars. Prerequisite: Senior standing (within 3 quarters of graduation).

IME 470 Selected Advanced Topics (1–3)

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 6 units. 1–3 lectures. Prerequisite: Consent of instructor.

IME 471 Selected Advanced Laboratory (1–3)

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 6 units. 1 to 3 laboratories. Prerequisite: Consent of instructor.

IME 485 Cooperative Education Experience (6) (CR/NC)

Part-time work experience in business, industry, government, and/or 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.

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. 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.

IME 500 Individual Study (1–3)

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. Enrollment by petition. Prerequisite: Consent of department chair, graduate adviser and supervising faculty member.

IME 501 Graduate Survey I (3)

Survey of current issues in the design and analysis of the workplace. Methods analysis, work measurement, human factors, automation, cost estimating, and facilities planning issues are covered. Not available for graduate credit in Industrial Engineering. Not for undergraduate students. 3 seminars. Prerequisite: Graduate standing with approval of instructor.

IME 502 Graduate Survey II (3)

Survey of current issues in the mathematical analysis of systems. Industrial statistics, quality control, engineering economy, linear programming, integer programming, inventory theory, Markov processes, queuing theory, and dynamic programming. Not available for graduate credit in Industrial Engineering. Not for undergraduate students. 3 seminars. Prerequisite: Graduate standing or upper division with approval of instructor, MATH 242 or MATH 206, STAT 321 or equivalent.

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 526 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 (3)

Models for mathematical programming and operations research. Topics in linear programming, network analysis, and dynamic programming. Operations research models including queuing, inventory, simulation, and Monte Carlo. Special problems in nonlinear programming and integer programming. 3 seminars. Prerequisite: IME 305, IME 426, or equivalent and graduate standing.

IME 542 Reliability Engineering II (3)

Theory and techniques for determining the reliability of systems and system elements. Influence of failures in series, parallel, and redundant designs. Failure modes and effects. Frequency distributions of failures and failure rates. Methods of estimating, predicting, measuring, and testing for reliability and maintainability. 3 seminars. Prerequisite: IME 430, and graduate standing.

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 426 or equivalent and graduate standing.

IME 544 Advanced Topics in Engineering Economy (3)

Advanced topics in engineering economy. Replacement analysis, capital budgeting and allocation theory, risk and uncertainty, and benefit-cost analysis. Impacts of governmental and industrial policy. 3 seminars. Prerequisite: IME 314, graduate standing.

IME 545 Advanced Topics in Simulation (3)

Validation of simulation models. Statistical techniques for variance reduction. Experimental design and optimization. Comparison of attributes of simulation language. Review of current manufacturing and service industry applications. 2

seminars, 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. Role of computers. 4 seminars. Prerequisite: IME 421 or equivalent, graduate standing and experience using computers.

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. Total credit limited to 8 units. 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)

Integrated total quality system engineering for manufacturing and service firms. Classical and modern quality philosophies and quality assurance and improvement methods. Statistical methods. Designing for quality, continuous quality improvement, and total

quality system integration. Case studies. 4 seminars. Prerequisite: IME 421, IME 430, or equivalent.

IME 570 Selected Advanced Topics (1-3)

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. 1-3 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 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. Information requirements, operational issues, and policy matters. 4 seminars. Prerequisite: IME 410 or equivalent.

IME 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.

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: second year MS/MBA.

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. Total credit limited to 9 units. Credit/No Credit grading only. Prerequisite: Graduate standing and consent of instructor.

IME 596 Team Project/Internship (4) (6)

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. Prerequisite: Advanced

graduate standing, completion of, or concurrent enrollment in, engineering courses in specialization, and consent of participating faculty.

IME 599 Design Project (Thesis) (2) (2) (5)

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 instructor.

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 141 Plastics Processes and Applications (3) GE F2

Global, cultural and social implications and applications of plastics. Uses, capabilities, and operational characteristics of plastics machinery and processes including plastic resource management and toxicity. Injection molding, extrusion, compression molding, rotational molding, forming, casting, and plastic fabrication. Miscellaneous course fee may be required—see *Class Schedule*. 2 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 200 Special Problems (1–4)

Individual investigations, 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 260 Manufacturing Processes (4)

Application of manufacturing processes and testing using metals and ceramics including base material preparation, forming, fastening and finishing processes. Emphasis on current methods of manufacturing, equipment use, safety and material standards. Miscellaneous course fee may be required—see *Class Schedule*. 2 lectures, 2 activities.

IT 300 Symposium Management (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: ENGL/PHIL/SPC 125 or equivalent.

IT 301 Current Technological Issues (3) GE F2

Technological issues, benefits and risks of technological decisions. The dynamics of technology and its impact on energy resources, the environment and quality of life. The effects of technological innovation on productivity, travel, communication, leisure and personal expression. Demonstrations of industrial processes will be conducted. 3 seminars. Prerequisite: ENGL/PHIL/SPC 125.

IT 302 Plastics Design (2)

Properties of plastics as a class of materials. Interpretation of plastic design data. Principles underlying the properties of plastics. Design problems. Laboratory applications of plastics processes and their effects on design. Miscellaneous course fee required—see *Class Schedule*. 1 lecture, 1 laboratory. Prerequisite: CHEM 110 or CHEM 111 or consent of instructor.

IT 303 Industrial Quality Management (4)

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

IT 326 Product Evaluation (4)

Practical application of value engineering. 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. 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. Miscellaneous course fee required—see *Class Schedule*. 3 lectures, 1 laboratory. Prerequisite: CHEM 110.

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, conversion and measurement of electrical power. Specific management and operational 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 131/141/221, PHYS 122.

IT 333 Introduction to CAD and MIS (4)

Computer aided decision making and problem solving in industry utilizing CAD and other computer and communication applications software. Introduction to the essentials of management information systems, grounding in the fundamentals of organizational information systems and their effect on the industrial organization and its employees. 2 lectures, 2 laboratories. Prerequisite: CSC 119 or consent of instructor.

IT 336 Textile Technology (4)

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: ENGL/PHIL/SPC 125 and one laboratory science course, or consent of instructor.

IT 345 Applied Production Management (4)

Applied production management using the framework of a broad international perspective, production in a facility like most small manufacturing industries and the management tools and techniques of today's international production management. Linkages with marketing, purchasing, design, cost analysis, equipment use, quality control, jig and fixture design and use to solve production management problems. Miscellaneous course fee required—see *Class Schedule*. 2 lectures, 2 activities. Prerequisite: IT 260 and BUS 371 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 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 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 402 Technical and Management Presentations (4)

Methods, techniques and evaluation of presenting technical and management 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, SPC 201 or SPC 202.

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 and by that industry. 4 lectures. Prerequisite: IT 303.

IT 408 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, 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 Planning (4)

Production planning and control. Linking production planning systems and manufacturing technologies in a global economy. 3 lectures, 1 activity. Prerequisite: BUS 387, IT 333, or consent of instructor.

IT 411 Industrial Safety and Health Management (4)

Industrial safety and health management: 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: ENGL/PHIL/SPC 125 or consent of instructor.

IT 419 Industrial Internship (2-6) (CR/NC)

Part-time industrial experience or early field experience in an approved school, with or without pay. Conducted under company or school personnel supervision, and University faculty supervision. Guided observations related to technical management or education. Report of experiences required at end of quarter. 30 hours work experience per unit of credit. Credit/No Credit grading only. Prerequisite: Consent of instructor.

IT 428 Industrial Management and Strategy (4)

International and strategic dimensions of managerial concepts as they relate to industrial work forces, resources and industrial management leadership, knowledge, skills and methods. Investigate management systems and practices, ethics, industrial

decision making tools and concepts, and management analysis through the use of case studies and individual and team projects. 4 lectures. Prerequisite: BUS 371, IT 410 or consent of instructor.

IT 435 Packaging Development Management (4)

Managing the development of industrial and consumer goods packaging from concept to marketplace. Interplay of marketing, economic, technical, production and distribution considerations in developing a package. Organizing the package function for best results. Case studies of domestic and international package/product successes and failures. Class project for analysis and solution. 3 lectures, 1 activity. Prerequisite: IT 330.

IT 445 Computerized Manufacturing Management (4)

The utilization of computer aided design; computer aided machining and materials processing; robotic control in production, planning and control; flexible manufacturing; concurrent design and production quality management. Conceptual foundation providing an integrated production orientation. 2 lectures, 2 activities. Prerequisite: IT 333, IT 345.

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 453 Facility Maintenance and Construction Management (4)

Maintenance, construction, repair and operation of industrial/commercial facilities, including preventive and remedial maintenance, job control systems, CMMS, work estimating, budgeting, and other essential services. Field trips to industrial facilities. 3 lectures, 1 activity. Prerequisite: IT 451 or consent of instructor.

IT 454 Facilities Management (4)

Management 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 and IT 453 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 (1–3)

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 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

IT 471 Selected Advanced Activity (1–3)

Directed group study for advanced undergraduate and graduate students. *Class Schedule* will list topic selected. May be required with IT 470. Total credit limited to 6 units. 1 to 3 activities. Prerequisite: Consent of instructor.

IT 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.

IT 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.

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. Enrollment by petition. Maximum of 6 units may be applied to degree requirements. Prerequisite: Consent of department head or graduate adviser and supervising faculty member.

IT 505 Graduate Seminar (3)

Organize and conduct experimental projects using research techniques. Problem solving initiated through research by the student. Prerequisite: Graduate standing.

IT 515 Historical and Philosophical Perspective of American Industry (3)

Study of significant historical and philosophical changes in American industry. 3 seminars. Prerequisite: Graduate standing.

IT 520 Organization and Administration of Industrial and Technical Environments (3)

Current industrial management principles, methods and tools in the administration and organization of industrial and technical environments. 3 seminars. Prerequisite: Graduate standing.

IT 521 Training in Industrial and Technical Systems (3)

Basic principles and practices in the preparation of course guides, courses of instruction and related materials for industrial instruction. 3 seminars. Prerequisite: Graduate standing.

IT 522 Facility Planning (3)

Analysis of major factors in planning and designing industrial and educational facilities. 3 seminars. Prerequisite: Graduate standing.

IT 527 Technical Trends and Issues (3)

Advanced study of current trends and issues relative to industrial and technical systems. 3 seminars. Prerequisite: Graduate standing.

IT 580 Graduate Research in Industrial and Technical Systems (3)

Study of basic research methodology relative to industrial and technical systems. Development of a thesis/project proposal. 3 seminars. Prerequisite: Graduate standing.

IT 599 Industrial and Technical Studies Thesis or Project (5)

Completion of a thesis or project involving individual research that is significant to the field of industrial and technical systems. Student must enroll each quarter in which advisement is received or facilities are utilized. Prerequisite: Graduate standing, IT 580 and consent of instructor.

ITAL–ITALIAN

ITAL 101, 102, 103 Elementary Italian (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 News Writing and Reporting (4)

Introduction to the techniques of reporting and writing news for the news media. Intensive laboratory and field practice in gathering and evaluating information. Writing basic news stories under close supervision. 3 lectures, 1 laboratory. Prerequisite: ENGL 114 and typing proficiency.

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 218 Mass Media in Society (4)

Traditional mass media and the emerging technologies, their methods, functions and dysfunctions. Responsibilities of journalists. The current status of ethnic media in the U.S. Importance of media in society. 4 lectures.

JOUR 233 Copy Editing (4)

Introduction to the techniques of newspaper and magazine copy desk work. Rewriting, editing, and writing headlines for news and feature copy. Selecting, cropping, and writing cutlines for photographs and line art. Practical laboratory experience in editing. 3 lectures, 1 laboratory. Prerequisite: JOUR 203 or equivalent.

JOUR 290 Multicultural Journalism (4) USCP

Role of American journalism (both print and broadcast media) in the social, political, and economic integration into American society of racial and ethnic minorities and women. Emerging minority groups from developing countries and their media. 4 lectures. Prerequisite: ENGL/SPC/PHIL 125.

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. 4 lectures. Prerequisite: JOUR 203.

JOUR 304 Reporting Contemporary Issues (4)

Experience leading to advanced skills in reporting and writing stories about contemporary issues, government and courts. Field and laboratory assignments focusing on beat reporting, coverage of speeches and meetings, investigative techniques and interpretive

reporting. 3 lectures, 1 laboratory. Prerequisite: JOUR 203 and JOUR 233.

JOUR 312 Introduction to Public Relations (4)

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. 4 lectures. Prerequisite: Sophomore standing.

JOUR 331 Contemporary Advertising (4)

Principles of advertising, copy, layout, and production for print and broadcast media. Economic, political, and social function of advertising in a free market society. Advertising ethics. Social responsibility of advertising in a multicultural environment. Emerging advertising technologies. Advertising on the Internet. 4 lectures.

JOUR 333 Broadcast News (4)

Beginning broadcast news writing, reporting and editing emphasis on radio. Gathering and producing audio and video materials for news and public affairs programming. Newsroom and studio equipment operation and procedures. 3 lectures, 1 laboratory. Prerequisite: JOUR 203 and JOUR 233.

JOUR 335 Television News and Production (4)

Advanced broadcast news writing, reporting, editing and producing television news and public affairs programming. Electronic news gathering techniques. Television studio and control room equipment and procedures. Discussion and evaluation of electronic news organizations and policies. 3 lectures, 1 laboratory. Prerequisite: JOUR 223 and JOUR 333 or consent of instructor.

JOUR 342 Public Relations Media and Methods (4)

Application of public relations techniques with emphasis on writing for media and working with media editors. Preparing news releases, newsletters and other communications. Analysis of the use of broadcast media. Utilization of case studies. 4 lectures. Prerequisite: JOUR 203 and JOUR 312 or consent of instructor.

JOUR 346 Broadcast Announcing and Production (4)

Broadcast skills including writing, announcing, editing, and production. Editing and production of news wraps, promos, public service announcements, commercials and interviews. 3 lectures, 1 activity. Prerequisite: JOUR 333.

JOUR 351 Advanced Radio Reporting: KCPR (2)

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 4 units. 1 lecture, 1 laboratory. Prerequisite: JOUR majors–JOUR 304 and JOUR 333. Non-majors–consent of instructor.

JOUR 352 Advanced Newspaper Reporting: Mustang Daily (2)

Reporting lab for students holding editorial positions on *Mustang Daily*. Total credit limited to 4 units. 1 lecture, 1 laboratory. Prerequisite: JOUR 233 and JOUR 304.

JOUR 353 Advanced Television Reporting: CPTV (2)

Television lab for students involved in news and production on Cal Poly's campus station, CPTV. Total credit limited to 4 units. 1 lecture, 1 laboratory. Prerequisite: JOUR 333 or consent of instructor.

JOUR 385 Mass Media Criticism (4)
(Also listed as SPC 385)

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: SPC 201 or SPC 202.

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 233 and JOUR 304.

JOUR 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.

JOUR 401 International 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: Junior standing.

JOUR 402 Social Responsibility of Mass Media (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 218.

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 413 Public Relations Campaigns (4)

Methods employed in dissemination of public information by organizations, institutions and governments. Interaction of media and PR practitioners, case histories, formation and measurement of public opinion. Public opinion survey projects. 4 lectures. Prerequisite: JOUR 203, JOUR 342 or consent of instructor.

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 (4) (4) (4)

Beginning Japanese class practice in pronunciation, sentence structure, reading, writing, basic conversation, and introduction to Japanese culture. Activity drill required. 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 the student after consultation with his/her adviser. All courses are one or two units and meet for two or four hours per week. All professional activities are designed to attain intermediate skills in performance and analysis and knowledge of rules and strategy. Prerequisites in the PE 101-165 series activities will be required for those students who cannot demonstrate minimum skill levels.

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 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 227 Aerobic Dance Exercise (2)

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 optional physical fitness. 1 lecture. Prerequisite: Concurrent enrollment in PE 110, PE 116, PE 125, PE 131, PE 145, PE 146, PE 147, PE 154 or PE 156.

KINE 243 Lifeguard Training (3) (CR/NC)

Lifeguarding skills and knowledge needed to prevent and respond to aquatic emergencies. Successful completion of this will result in American Red Cross certifications in Community First Aid and Safety, CPR for the Professional Rescuer and Lifeguard Training. Credit/No Credit grading only. 2 lectures, 1 activity.

KINE 250 Health Education (4)

GE E2

Introduction to the study of personal health. Topics include mental health, drugs, nutrition, fitness, communicable and chronic diseases, violence, sexuality, and other health related issues. Not

open for credit to students who have completed KINE 255. 3 lectures, 1 recitation.

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 E2 USCP

Introduction to personal health with special emphasis on multicultural practices and contributions. 3 lectures, 1 recitation. Not open for credit for students who have completed KINE 250.

KINE 270 Orientation to Physical Education (2)

Designed to acquaint the student with the concept of physical education as a profession and to orient the student to the Cal Poly program. 2 lectures. Prerequisite for non-majors: Consent of instructor.

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)

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. Prerequisite: KINE 276 and consent of adviser.

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, teaching aids, implementation and evaluation of a lesson in a laboratory setting. 3 lectures, 2 activities. Prerequisite: 2 professional activities or equivalent.

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 240 and ZOO 340.

KINE 303 Physiology of Exercise (4)

Application of the knowledge of human physiology to exercise situations. 3 lectures, 1 laboratory. Prerequisite: ZOO 240 and ZOO 241. Recommended: FSN 210.

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: KINE 250.

KINE 307 Adapted Physical Activity for Special Populations (4)

Major categories of handicapping conditions with implications for the development of physical activity programs for specific disabilities. 3 lectures, 1 laboratory. Prerequisite: ZOO 240 and ZOO 241.

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)

Historical, physiological, mechanical, psychological, and sociological foundations of physical education. Movement as it relates to physical fitness, wellness, social development, cross-cultural understanding, and self-image. 2 lectures, 1 activity. Prerequisite: GE E1 (See page 79 for GE requirements.)

KINE 315 Field Sports (3)

Basic skill development and instructional strategies related to the following sports: soccer, speedball, ultimate frisbee, speed-a-way, field hockey, and lacrosse. 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: GE Area F or consent of instructor.

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. How the personal computer and various software can be used to enhance the entire process. 3 lectures, 1 activity. Prerequisite: KINE 317, STAT 217 or STAT 218.

KINE 354 School Health Programs (2)

Introduction to school health services, environment, and instruction within the public and private school system. Health instruction and curriculum. Identification and control of children's communicable diseases and special problems within the classroom. 2 lectures. Prerequisite: KINE 250 or KINE 255.

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, or consent of instructor.

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: Demonstrate 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 certifications Lifeguard Instructor, CPR for the Professional Rescuer Instructor, and community First Aid and Safety Instructor will be issued. 2 lectures, 1 activity. Prerequisite: KINE 243 or equivalent certifications.

KINE 396 Outdoor Education (4)

Planning and implementation of outdoor education activities appropriate for K–12th grade physical education programs. Includes but is not limited to Project Adventure, orienteering, backpacking, ropes course, and a water sport. 2 lectures, 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 Physical Education and Health Promotion Programs (3)

Planning, organizing and controlling programs in school, commercial, private and clinical settings. Emphasis on legal, ethical and budgetary considerations. 3 lectures. Prerequisite: KINE 319.

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: GE F1 and KINE 317, or consent of instructor.

KINE 404 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: Two physical education Basic Instructional Program courses (PE 101-165) and senior standing.

KINE 405 Community Health Promotion (4)

Application of methods 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, junior standing; KINE 443 recommended.

KINE 408 Exercise and Health Promotion for Senior Adults (3)

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. Prerequisite: KINE 250, 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: PSY 201 or PSY 202.

KINE 411 Psycho/Social Aspects of Physical Activity (3)

Principles of sport psychology and sport sociology. The effect of sport on individuals and groups in American society. 3 lectures. Prerequisite: GE D4a and 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. Miscellaneous course fee required—see *Class Schedule*. 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. Recommended: PSY 210/202, KINE 206.

KINE 420 Administration of Aquatic Programs (3)

Health and sanitation in swimming facilities; state swimming codes; pool chemistry; filtration systems; safety; liability; instructional programming; facility design; and equipment. 3 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 300, KINE 419, and 2 activity classes.

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 activity. Prerequisite: KINE 300, KINE 419, and 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. 3 activities. Prerequisite: KINE 206, KINE 300 and KINE 421.

KINE 424 Organization and Implementation of a K-12 Physical Education Program (3)

Organization, selection, presentation, strategy, application, and interpretation of K-12 subject matter in physical education. 3 seminars. Prerequisite: KINE 300, KINE 419, KINE 422 and KINE 423.

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. 2 activities, 1 seminar. Prerequisite: KINE 300, KINE 421, KINE 422, KINE 423, and one 300-level activity class.

KINE 426 Senior Seminar for Teaching Concentration (2)

Capstone course which engages students in activities that integrate the sub-disciplines of kinesiology, facilitates the development of a personal portfolio, and prepares the student to apply to a credential program. 2 seminars. Prerequisite: KINE 300, KINE 421, KINE 422, KINE 423, and KINE 425. One of these classes may be taken concurrently.

KINE 432 Athletic Training and Rehabilitation (2)

Modern principles and practices in conditioning and care of athletes. Theory and practice in the scientific manipulation of the muscles as related to therapeutic exercise. 2 activities.

Prerequisite: KINE 241 and KINE 252 for non-KINE majors; KINE 252 and senior standing for KINE majors.

KINE 434 Contemporary Approaches to Health Promotion Programming (4)

Theory and contemporary practices for planning, implementing, and evaluating health promotion programs in various settings.

Leading physical activity and educational sessions for adult learners. 3 lectures, 1 activity. Prerequisite: KINE 250 or KINE 255, junior standing, 2 professional activities recommended.

KINE 437 Directed Fieldwork (1–3) (CR/NC)

Practical work experience in related phases of physical education 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 adviser.

KINE 438 Adaptive Physical Education Fieldwork (1–3) (CR/NC)

Practical experience in physical education for special populations. Students plan and conduct physical activity programs for subjects who have special needs. Total credit limited to 6 units. Credit/No Credit grading only. Prerequisite: KINE 307, 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: KINE 423 or consent of instructor.

KINE 443 Comprehensive School Health Education (4)

Satisfies the California Commission for Teacher Credentialing requirement for health education. Must be seeking a California Teaching Credential. Course content includes the health status of children K-12, and the recommendations of the California Health Framework. 4 lectures. Prerequisite: Senior standing or consent of instructor.

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.

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. Emphasis on stress and time management, exercise, nutrition and relaxation techniques. Design and implementation of workplace health promotion programs. 3 lectures. Prerequisite: Senior standing. Non-majors: Consent of instructor.

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: FSN 210, 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: FSN 210, KINE 303, KINE 445 or consent of instructor.

KINE 461 Senior Project (2)

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. Prerequisite: KINE 302, KINE 303, KINE 319, KINE 402 and junior level writing course.

KINE 462 Senior Project (1)

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 30 hours total time. Prerequisite: KINE 461 and consent of adviser.

KINE 463 Clinical and Worksite Health Promotion Field Work (3)

Practical experience at approved site which provides fitness and wellness programs. Students participate in program administration under direct supervision of on-site coordinator. Prerequisite: Senior standing and successful completion of all undergraduate requirements except KINE 463.

KINE 470 Selected Advanced Topics (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 lectures. Prerequisite: Consent of instructor.

KINE 471 Selected Advanced Laboratory (1–3)

Directed group laboratory study of selected topics for advanced students. *Class Schedule* will list topic selected. Total credit limited to 6 units. 1–3 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.

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 adviser, and supervising faculty member.

KINE 502 Current Trends and Issues in Physical Education (3)

Practical problems in physical education and their solution in terms of desired objectives in this field. 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: Graduate standing or consent of instructor.

KINE 504 Cardiopulmonary Physiology, Pathology, and Exercise (3)

Selected cardiovascular and pulmonary disease problems, their etiology, symptoms, diagnosis, physical limitations, and physiology as affected by exercise in therapy and rehabilitation. 3 seminars. Prerequisite: ZOO 241, KINE 303.

KINE 511 Administration of Physical Education and Athletics (3)

Principles and techniques of administration of physical education and athletics on the elementary and secondary school levels. 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 and KINE 401 or consent of instructor.

KINE 515 Communication and Behavior Within a Health and Physical Education Setting (3)

Communication and behavioral theories integrated into activities or programs for the purpose of changing, encouraging, and maintaining healthful behavior. 3 seminars. Prerequisite: KINE 250, KINE 401 or consent of instructor.

KINE 516 Management of Health Promotion in the Workplace (3)

Application and development of principles, procedures and concepts for managing and facilitating promotion in various

health and fitness settings. 3 seminars. Prerequisite: KINE 401 and KINE 450.

KINE 517 Research Methods in Kinesiology (3)

Experimental, descriptive, historical, philosophical, and action research in physical education. Selection of adequate problems for investigation; various sampling techniques and analyses; use of library facilities; manuscript requirements for the thesis. 3 seminars. Prerequisite: KINE 319 or consent of instructor.

KINE 519 Evaluation of Current Studies (3)

Analysis and evaluation of published studies in physical education, health education and recreation. 3 seminars. Prerequisite: KINE 517.

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 Human Performance and Learning (3)

Analysis of research principles and concepts and variables related to human motor performance and learning with emphasis on the information processing approach for evaluating performance. 3 seminars. Prerequisite: Graduate standing.

KINE 526 Sport in American Society (3)

Understanding the role of sport in American society as viewed from sociological and psychological perspectives. Effect of success and failure in competitive sport situations. 3 seminars. Prerequisite: Graduate standing.

KINE 530 Advanced Physiology of Exercise (4)

Physiological determinants of physical work capacity and sports performance. 3 seminars, 1 laboratory. Prerequisite: KINE 303.

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.

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 Development, Observation and Analysis of Teaching Physical Education (3)

Development of effective teaching strategies and observation and analysis of teaching with special emphasis in sport pedagogy systems. 2 seminars, 1 activity. Prerequisite: Undergraduate methods and/or instructional process class.

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 519, consent of graduate committee and supervising faculty member.

LA—LANDSCAPE ARCHITECTURE**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.

LA 114 Landscape Analysis and Planning (4)

Research and analysis techniques of primary 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. Miscellaneous course fee required—see *Class Schedule*. 4 laboratories. Concurrent: SS 121.

LA 150 Graphics Fundamentals (6)

Elements of three dimensional perception/visualization with emphasis on freehand and mechanical perspective drawing methods. Exploration of two and three dimensional graphic techniques including presentation and rendering methods. 6 activities. Prerequisite: Transfer student status or consent of instructor.

LA 151 Design Fundamentals (7)

Exploration of design and planning projects on different scales and in different environmental settings including site, neighborhood, community, city, region. Introduction to principles of environmental design including basic elements and composition. Contextual understanding of landscape architecture and other environmental design disciplines; 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. 7 activities. Prerequisite: Transfer student status or consent of instructor.

LA 201 Survey of Landscape Architecture (2) GE F2

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 212 Site Analysis (3)

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, 1 laboratory.

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.

LA 231 Landscape Architecture Construction (3)

Introduction and application of formulas, principles, and criteria for grading and drainage. Horizontal and vertical road alignment. Cut and fill calculations. Runoff calculations. Miscellaneous course fee required—see *Class Schedule*. 3 laboratories. Concurrent: LA 252. Prerequisite: LA 114, BRAE 237, MATH 118/119.

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 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. Miscellaneous course fee required—see *Class Schedule*. 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. Miscellaneous course fee required—see *Class Schedule*. 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 300 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 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: GE F1 computer literacy elective or consent of instructor.

LA 311 History of Landscape Architecture (4) GE F2

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 313 Architectural Design for Landscape Architects (3)

Exposure to architectural design concepts and theories with attention given to historical and contemporary case studies. Discussions and field trips emphasize architectural implications of materials and methods of construction. 2 seminars, 1 activity. Prerequisite: Third-year standing.

LA 314 Site Planning (3)

Identifies the elements of a site and influences methods and examples of site planning for environmental design projects. Emphasis on interdisciplinary nature of site planning. Regulatory and technical requirements. Creation and evaluation of prototypical site planning projects. Miscellaneous course fee required—see *Class Schedule*. 2 lectures, 1 laboratory. Prerequisite: Upper division standing in ARCH, LA, CRP or related discipline.

**LA 318 Applications of GIS in Natural Resources (3)
(Also listed as FNR 318)**

ARC/INFO and ArcView Geographic Information System (GIS) computer software to explore natural resources, social and business issues, using spatial data. Develop data base, use software and apply with relevant natural systems. Miscellaneous course fee required—see *Class Schedule*. 1 lecture, 2 laboratories. Prerequisite: Junior standing, AG 250 or CSC 110 or consent of instructor.

LA 320 Design Theory for Landscape Architects (3)

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. 3 lectures. Prerequisite: LA 311, LA 323, or consent of instructor.

LA 321 Concepts in Environmental Decision Making (3)**GE F2**

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 323 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 351, 352 Design for Landscape Architects (5) (5)

Process oriented site design with emphasis on identification of problems and opportunities, creative problem solving, spatial design site analysis, landform, platform, builtform, circulation, detail design and graphic communication. Miscellaneous course fee required—see *Class Schedule*. 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. Miscellaneous course fee required—see *Class Schedule*. 6 laboratories. Prerequisite: LA 352.

LA 363 Recreation and Open Space Planning and Design (3)

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. Prerequisite: Must have completed minimum of one 200-level course in planning, design or recreation and third-year standing or consent of instructor.

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 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. Miscellaneous course fee required—see *Class Schedule*. 1 lecture, 1 laboratory. Prerequisite: LA 451, LA/FNR 318 or consent of instructor.

LA 411 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 441 Professional Practice I (2)

Theoretical and practical aspects of professional practice. Addressing professional, human, and business skills. Practice diversity and inter-professional relationships. Professionalism and ethics. Licensure, communication skills, office management and marketing. Construction documentation. 2 lectures. Prerequisite: LA 351.

LA 442 Professional Practice II (2)

Practical aspects of professional practice. Addressing methods of contracting professional services. Project management procedures, office practice and conditions. Goal setting, resume and portfolio preparation. Job procurement and licensure requirements. 2 lectures. Prerequisite: Fourth year standing, LA 441.

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. Miscellaneous course fee required—see *Class Schedule*. 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. Miscellaneous course fee required—see *Class Schedule*. 5 laboratories. Prerequisite: LA 353.

LA 454, LA 455, LA 456 Design for Landscape Architects (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 461 Senior Design Project (5)

Student selection and completion of approved design or research project sufficient in scale and complexity to encompass issues common to landscape architecture. Time management, documentation, and communication skills emphasized. Miscellaneous course fee required—see *Class Schedule*. 5 laboratories. Prerequisite: LA 442, LA 451, LA 452.

LA 464 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 470 Selected Advanced Topics (1–3)

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 6 units. 1–3 lectures. Prerequisite: Consent of instructor.

LA 471 Selected Advanced Laboratory (1–3)

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 6 units. 1–3 laboratories. Prerequisite: Consent of instructor.

LA 474 Collaborative Studio: Rendering, Animation and Modeling (4) (Also listed as ARCH 475/ART 474)

A collaborative visualization and design studio focusing on rendering, animation and modeling. Modeling and animation software for design conceptualization and expression. Collaboration in teams with students from the College of Architecture and Environmental Design and the Art and Design Department. Total credit limited to 8 units. 2 lectures, 2 activities. Prerequisite: ARCH 460 or consent of instructor.

LA 481 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 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. Miscellaneous course fee required—see *Class Schedule*. 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: Sophomore 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: Sophomore 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.