

- FOR 304 Forest Resource Economics 3(3,0)** Economic problems and principles involved in the utilization of forest resources and distribution of forest products. Includes analysis of integrated forest operations. *Preq:* ECON 200 or consent of instructor.
- FOR 305 Woodland Management 3(2,2)** Compendium of forestry subjects providing a broad view of the forest environment as it relates to ecology, management, and utilization of forests, especially those of South Carolina. Field and laboratory exercises in the fundamentals of forest-land management. Not open to Forest Resource Management majors. *Preq:* BIOL 103/105 or consent of instructor.
- FOR 308 Remote Sensing and GIS in Forestry 2(1,3)** Introduction to remote sensing, aerial photo interpretation, computer mapping, aerial photo timber estimating, and geographical information systems. *Preq:* Forestry summer camp or consent of instructor.
- FOR 314 Harvesting and Forest Products 4(3,3)** Harvesting of forest products, structure and properties of economically important timbers, and production and properties of primary forest products. *Preq:* Forestry summer camp or consent of instructor.
- FOR 315 Woodland Ecology 3(3,0)** Overview of the forest emphasizing the living and nonliving components of the woodland habitat. Understanding man's use of the forest and interpreting the signs of plants, wildlife, and landscapes.
- FOR 341 Wood Procurement Practices in the Forest Industry 3(3,0)** Study of wood raw material procurement practices currently employed by the forest products industry, including pulp, paper, and related areas. *Preq:* Consent of instructor.
- FOR 400, 600 Public Relations in Natural Resources 3(3,0)** Identifying relevant policies, their characteristics and acceptance to natural resource management, and techniques of maintaining appropriate public relations. *Preq:* Senior standing.
- FOR 406 Forested Watershed Management 2(1,3)** Lectures and discussions on measurements and processes affecting water quality and quantity within watersheds. Introduction to hydrologic principles, geomorphology, and water quality assessment. Discusses best management practices for silviculture and development of a watershed management plan. *Preq:* FOR 315 or consent of instructor.
- FOR 413, 613 Integrated Forest Pest Management 4(3,3)** Nature and control of pests of forest trees and products. Focuses on the relation of pests to silviculture, management, and natural forest ecosystems. *Preq:* Junior standing in Forest Resource Management.
- FOR 415, 615 Forest Wildlife Management 3(2,3)** Principles, practices, and problems of wildlife management emphasizing upland forest game species. Habitat manipulation through use of appropriate silvicultural practices in association with other techniques is evaluated. *Preq:* FOR 460 or consent of instructor.
- FOR (E N R) 416, 616 Forest Policy and Administration 2(2,0)** Introduction to the development, principles, and legal provisions of forest policy in the United States and an examination of administrative and executive management in forestry.
- FOR 417, 617 Forest Resource Management and Regulation 3(3,0)** Fundamental principles and analytical techniques in planning, management, and optimization of forest operations. *Preq:* FOR 302, 308, 418, 460.
- FOR 418, 618 Forest Resource Valuation 3(3,0)** Analysis of capital investment tools and their application to decision making among forestry investment alternatives; valuation of land, timber, and other resources associated with forestry, including the impact of inflation and taxes. *Preq:* FOR 304 or consent of instructor.
- FOR 419 Senior Problems 1-3(1-3,0)** Problems chosen with faculty approval in selected areas of forestry. With department chair's approval, may be repeated once for credit. *Preq:* Senior standing.
- FOR 423, 623 Current Issues in Natural Resources 2(2,0)** Lectures in various fields of forestry delivered by selected representatives from forest industries, consultants, agencies, associations, and other forestry operations. Will not be taught when enrollment is less than 15. To be taken Pass/Fail only. *Preq:* Junior standing or consent of instructor.
- FOR 425 Forest Resource Management Plans 2(1,3)** Development of multiple resource forest management plans. Economic and environmental impacts of implementing management plans. *Preq:* FOR 417 or consent of instructor.
- FOR 426, H426 Forest Resource Management Plans Seminar 1(1,0)** In-depth exploration of topics and problems presented in FOR 425. To earn honors credit, students must be enrolled in corequisite FOR 425 and earn a B or better in both courses. *Preq:* Senior standing, approval of Department of Forest Resources. *Coreq:* FOR 425.
- FOR (HORT) 427, 627 Urban Tree Care 3(3,0)** Principles, practices, and problems of protecting and maintaining trees in urban and recreational areas. Examines environmental and biological factors affecting trees in high-use areas, their management and cultural requirements, and the practices necessary for their protection and care as valuable assets in the landscape. *Preq:* Junior standing or consent of instructor.
- FOR 431, 631 Recreation Resource Planning in Forest Management 2(1,3)** Analysis of forest recreation as a component of multiple-use forest management; techniques of planning; physical and biological effects on forest environments; and forest site, user, and facility management.
- FOR 433, 633 GPS Applications 3(2,3)** Develops competence in global positioning system (GPS) technology including theory, methods, and application to natural resources mapping. Topics include basic concepts of GPS; projection systems; types of data; mission planning; and data capture, correction, and export to geographical information systems (GIS). *Preq:* Senior standing or consent of instructor.
- FOR (E N R) 434, 634 Geographic Information Systems for Landscape Planning 3(2,3)** Develops competence in geographic information systems (GIS) technology and its application to various spatial analysis problems in landscape planning. Topics include data development and management, spatial analysis techniques, critical review of GIS applications, needs analysis and institutional context. GIS hardware and software, hands-on application. Credit may be received for only one of C R P 434, FOR (E N R) 434.
- FOR 441, 641 Properties of Wood Products 3(3,0)** Basic properties of wood, including the hygroscopic, thermal, electrical, mechanical, and chemical properties; standard testing procedures for wood. *Preq:* Junior standing or consent of instructor.
- FOR 442, 642 Manufacture of Wood Products 3(3,0)** Study of the manufacture of lumber, plywood, poles, piles; drying, preservation, grading, and uses of wood products. Considers the manufacture of particleboard, flakeboard, oriented-strand board, fiberboard, and paper products. Includes physical, mechanical, and chemical properties and their applications. *Preq:* Consent of instructor.
- FOR 444, 644 Forest Products Marketing and International Trade 3(3,0)** Study of marketing and international trade practices currently employed by the forest products industry and the application of basic marketing principles and global trade concepts in the industry's current and future environment. *Preq:* FOR 442 or consent of instructor.
- FOR 447 Special Problems in Forest Products 1-3(0,3-9)** Laboratory, library, or field study of problems in selected areas of forest products. Emphasizes the planning and execution of research and the reporting of results. Research must be conducted under the guidance of a Forest Products faculty member. May be repeated for a maximum of three credits, but only if different topics are covered. *Preq:* Senior standing and consent of instructor supervising the study.
- FOR 450, 650 Woody Plant Stress Physiology 3(3,0)** Structure, function, and physiology of tree shoot and crown growth, wood formation, diameter growth, root growth, and reproduction especially as related to stress factors. *Preq:* BIOSC 401 or FOR 460 or consent of instructor.
- FOR (B E, EE&S) 451, H451, 651 Newman Seminar and Lecture Series in Natural Resources Engineering 1(0,2)** See B E 451.
- FOR H461 Silviculture Honors Seminar I 1(1,0)** In-depth exploration of topics and problems presented in FOR 465. To earn honors credit, students must be enrolled in FOR 465 and earn a B or better in both courses. *Preq:* Junior standing and approval of Department of Forest Resources. *Coreq:* FOR 465.
- FOR H463 Silviculture Honors Seminar II 1(1,0)** In-depth exploration of topics and problems presented in FOR 465. To earn honors credit, students must be enrolled in FOR 465 and earn a B or better in both courses. *Preq:* Junior standing and approval of Department of Forest Resources. *Coreq:* FOR 465.

FOR 465, 665 Silviculture 4(3,3) Discussion of the theory and practice of manipulating forests to meet the needs and values of landowners and society in accordances with biological, ecological, and economic principles. *Preq:* FOR 206 and Forestry Summer Camp or consent of instructor.

FOR 480 Selected Topics in Urban Forestry 1-3(1-3,0) Study of selected and varied topics, problems, and issues in urban forestry and arboriculture through readings, class discussion, and individual and group projects. *Preq:* FOR (HORT) 427.

FOR 493 Selected Topics in Forest Resources 1-15(1-15,2-30) Specialized topics not covered in other courses which explore current areas of research and management in forest resources in a format of lecture, lab, or both. May be repeated for a maximum of 15 credits, but only if different topics are covered. *Preq:* Junior standing or consent of instructor.

FOR 498 Senior Portfolio 1(1,0) Collection of Web-based materials representing the creative and scientific papers, presentations, and résumés written by students to satisfy curriculum requirements. Students are informed in F N R 102 and regularly thereafter regarding the format and content of their portfolios. *Preq:* Senior standing in Forest Resource Management. *Coreq:* FOR 425.

FORESTRY AND NATURAL RESOURCES

F N R 102 Forestry and Natural Resources Freshman Portfolio 1(1,0) Informative sketch of forestry, wildlife biology, and natural resources; education and career opportunities for natural resource professionals. Students initiate their Web-based student portfolios which showcase their skills and experiences (e.g., résumés, accomplishments, and work samples) during their undergraduate degree. To be taken Pass/Fail only. Restricted to Environmental and Natural Resources, Forest Resource Management, Forestry and Natural Resources—Undeclared, and Wildlife and Fisheries Biology majors only.

F N R 466, 666 Stream Ecology 3(2,3) Covers the ecology of flowing water systems. Topics include geomorphology, physical and chemical factors of streams, biology of stream-dwelling organisms, trophic relationships, competition, colonization, drift, community structure, disturbance, and human impacts. *Preq:* Junior standing or consent of department chair.

F N R 470 Creative Inquiry 1-3(1-3,0) Multi-semester commitment to participate in forestry and natural resources research with a group of peers, mentored by a faculty member or advanced graduate student. Students learn to collect, analyze, evaluate, and present information. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

F N R H491 Senior Honors Thesis I 3(3,0) Individual research for students in the Forestry and Natural Resources Honors Program. Focuses on developing a plan of research under the direction of a faculty advisory committee. *Preq:* Senior standing, membership in Calhoun Honors College, and approval of Department of Forestry and Natural Resources.

F N R H492 Senior Honors Thesis II 3(3,0) Individual natural resources research for students in the Forestry and Natural Resources Honors Program. Focuses on data collection, analysis, report writing, and oral presentation. *Preq:* F N R H491.

F N R 499 Natural Resources Seminar 1(1,0) Exploration of current literature and research in natural resources. Students participate in the analysis of research findings, utilizing skills acquired in their undergraduate programs. May be repeated for maximum of two credits.

FRENCH

Professors: C. K. Nakuma, Chair; K. M. Szmurlo; *Assistant Professors:* N. C. Guss, J. A. Huntington, J. H. Mai; *Lecturers:* C. S. Edwards, H. G. Newton, K. D. Peebles, E. D. Russell, A. Sawyer

FR 101 Elementary French 4(3,1) Multimedia course for beginners that combines video, audio, and print to teach the fundamentals of the French language and culture. Emphasizes communicative proficiency (listening comprehension, speaking, reading, and writing).

FR 102 Elementary French 4(3,1) Continuation of FR 101; three hours a week of classroom instruction and one hour a week in the language laboratory.

FR 104 Basic French 4(3,1) Intensive one-semester program combining FR 101 and 102 for students who have previously studied French. Includes fundamentals of grammar and vocabulary as a foundation for building written and oral proficiency.

FR 151 French for Graduate Students 3(3,0) Intensive program only for graduate students preparing for the reading examination in French. A minimum grade of B on a final examination will satisfy graduate school foreign language requirement. May be repeated once for credit. To be taken Pass/Fail only. *Preq:* Graduate standing.

FR 201, H201 Intermediate French 3(3,1) Brief review of FR 101 and 102, with conversation, composition, and dictation, and the beginning of more serious reading of French prose. Includes literary and cultural perspectives. *Preq:* FR 102.

FR 202, H202 Intermediate French 3(3,1) Emphasizes reading nontechnical French prose more rapidly. Writing, speaking, and listening skills continue to be developed. Includes literary and cultural perspectives. *Preq:* FR 201.

FR 297 Creative Inquiry—French 1-4(1-4,0) In consultation with and under the direction of a faculty member, students pursue scholarly activities individually or in teams. Arrangements with faculty members must be established prior to registration.

FR 299 Foreign Language Drama Laboratory 1(0,3) Participation in foreign drama productions. No formal class meetings, but an average of three hours per week in a foreign language drama workshop for production. May be repeated for a maximum of three credits. *Preq:* Consent of instructor directing the play.

FR 300 Survey of French Literature 3(3,0) Study of selected masterpieces of French literature in their artistic, cultural, and historical context. May include theme and genre studies. *Preq:* FR 202 or consent of department chair.

FR 304 French Short Story 3(3,0) Introduction to the study of French narrative literature and the elements of critical analysis through the examination of short stories spanning the medieval era to the present from both France and Francophone countries. *Preq:* FR 305 or consent of instructor.

FR 305 Intermediate French Conversation and Composition I 3(3,0) Practice in the spoken language stressing vocabulary building, pronunciation, intonation, and comprehension. Requires written work to increase accuracy and assignments in the language laboratory. *Preq:* FR 202 or consent of department chair.

FR 307 French Civilization 3(3,0) Study of significant aspects of French culture from its origins to the present. *Preq:* FR 305 or consent of instructor.

FR 308 French Linguistics I: Phonetics, Phonology, and Morphology 3(3,0) Study of the fundamental sound patterns, melodic structure, and work-formation processes of modern standard French. *Preq:* FR 304 or 305 or consent of instructor.

FR 309 French Linguistics II: Syntax and Semantics 3(3,0) Study of the fundamental structures of French syntax and semantics. *Preq:* FR 304 or 305 or consent of instructor.

FR 310 CLIP Summer Immersion Program 6(6,0) Conducted entirely in French for eight hours daily, this summer immersion program consists of activities that combine interrelating cultural topics with language skill practice. Frequent opportunities to converse with native speakers during meals and on excursions. Students receive six credits, three of which may be taken in lieu of FR 202. *Preq:* FR 201.

FR 312 Writing in French I 3(3,0) Study of the vocabulary, syntax, and stylistics in short compositions and creative papers in French, on both fiction and non-fiction topics. *Preq:* FR 202 or consent of department chair.

FR 316 French for International Trade I 3(3,0) Spoken and written French common to the French-speaking world of business and industry, emphasizing business practices and writing and translating business letters and professional reports. Cross-cultural references provide opportunity for comparative and contrastive analyses of American and French cultural patterns in a business setting. *Preq:* FR 202, 305 (or concurrent enrollment); or consent of department chair.

FR 317 Contemporary French Civilization 3(3,0) Study of significant aspects of France today; the country, its economy, government, and society. Taught in French. *Preq:* FR 305 or consent of instructor.

- FR 320 Studies in French Theatre 3(3,0)** Explores a variety of genres (medieval farce, classical comedy and tragedy, romantic melodrama, and the Nouveau Théâtre) with emphasis on staging. Class materials consist of scripts, videotaped performances, and theoretical readings on issues pertaining to spectacle in social, political, and artistic terms. May be repeated for a maximum of six credits. *Preq:* FR 202 or consent of department chair.
- FR (PO SC) 383 French-Language News 1(1,0)** See PO SC 383.
- FR H391 Survey of French Literature 1(1,0)** One-hour independent study to allow honors students to pursue supervised research on a topic relating to the literary, cultural, and artistic movement in France. *Coreq:* FR 300, membership in Calhoun Honors College.
- FR 397 Creative Inquiry—French 1-4(1-4,0)** Students focus on a special research area under the guidance of a faculty member. After acquiring the requisite background, students formulate hypotheses for a group project, develop a critical framework, and initiate research on a specific topic.
- FR 398 Directed Reading 1-3(1-3,0)** Directed study of selected topics in French literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.
- FR 400 Modern French Literature 3(3,0)** Study of selected works of 20th-century French literature in their artistic, cultural, and historical context. *Preq:* FR 202 or consent of department chair.
- FR 409 Writing in French II 3(3,0)** Intensive study of syntax and stylistics through composition and translations. *Preq:* Senior standing or consent of department chair.
- FR 410 Francophone Literature 3(3,0)** Study of selected works of francophone literature emphasizing Africa and the Caribbean in their artistic, cultural, historical, and political contexts. *Preq:* FR 300 or consent of department chair.
- FR 411 Advanced French Conversation and Composition 3(3,0)** Continuation of FR 305 emphasizing greater fluency and sophistication in oral and written expression. *Preq:* FR 305 or consent of instructor.
- FR 412 French and Francophone Cinema 3(2,3)** Examination of cinematic practice as a discourse and the role it plays in the representation of social relations, particularly race, ethnicity, class, power, sex, and gender in the French-speaking world. May include a study of major directors, genres, and movements. Taught in French. Films with English subtitles. *Preq:* FR 305 or consent of instructor.
- FR 415 Translation Seminar 3(3,0)** Methods and theory of translation and a comparison of French and English structures. Practical exercises in translating from French to English and vice versa in a variety of texts. *Preq:* FR 305 or consent of instructor.
- FR 416 French for International Trade II 3(3,0)** Study of language and cultural environment of the French-speaking markets of the world, including the linguistic and cultural idioms which support global marketing in general and the international marketing of textiles, agricultural products, and tourism in particular. *Preq:* FR 316.
- FR 420 French Enlightenment, Revolution and Romanticism 3(3,0)** Cultural and literary studies of the century and a half (1715–1851) in which France occupied the center stage of world history and its modern institutions came into being. Emphasizes the free intellectual inquiry championed by philosophers and the romantic melancholy in the aftermath of the Revolution. *Preq:* FR 305 or consent of instructor.
- FR H438 French Honors Research 3(3,0)** Individual honors research conducted under the direction of Language Department faculty. May not be used to satisfy requirements for the major in Modern Languages–French or Language and International Trade or the minor in Modern Languages. *Preq:* Junior standing and membership in Calhoun Honors College.
- FR H439 French Honors Thesis 3(3,0)** Individual honors research conducted and thesis completed under the direction of Language Department faculty member. May not be used to satisfy requirements for the major in Modern Languages–French or Language and International Trade or the minor in Modern Languages. *Preq:* Junior standing, FR H438, membership in Calhoun Honors College.
- FR 475 Advanced French Seminar 3(3,0)** Concentrated research and discussion on an advanced topic in French literature, film, drama, music, or philosophy. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* FR 304 or 305, Senior standing; or consent of instructor.
- FR 476 Advanced Seminar on French Thought 3(3,0)** Research and discussion of an advanced topic, text, or group of texts with a particular focus on French theory and philosophy but including works of French literature. Conducted in English. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Senior standing or consent of instructor.
- FR 477 Advanced Seminar on the French and Francophone Novel 3(3,0)** Examination of the French novel and/or narrative prose focusing on a theme, genre, or period. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* FR 304 or 305, Senior standing; or consent of instructor.
- FR H491 Modern French Literature 1(1,0)** Independent study to allow honors students to pursue in depth an author, work, movement, or genre related to contemporary French culture, art, or literature. *Coreq:* FR 400, membership in Calhoun Honors College.
- FR H492 The French Corporation 1(1,0)** Independent study to allow honors students to pursue an in-depth study of the organization, structure, functions, and economic role of a French business enterprise. *Coreq:* FR 417, membership in Calhoun Honors College.
- FR 497 Creative Inquiry—French 1-4(1-4,0)** Continuation of research initiated in FR 397. Students complete their projects and disseminate their research results. *Preq:* FR 397 or consent of instructor.
- FR 498 Independent Study 1-3(1-3,0)** Directed study of a selected topic in French literature, language, or culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.
- FR 499, 699 Selected Topics in French Literature 3(3,0)** Selected topics that have characterized French literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

GENETICS

Professors: A. G. Abbott, R. H. Hilderman, Chair; G. L. Powell, W. M. Surver; *Associate Professor:* W. R. Marcotte, Jr.; *Assistant Professors:* W. Cao, F. C. Chen, J. K. Frugoli, D. S. Main, B. D. Moore, J. C. Morris, K. S. Smith, S. A. Sparace, J. P. Tomkins

- GEN 103 Careers in Biochemistry and Genetics 1(1,0)** Introduction to biochemistry and genetics career paths, professional organizations, ethical issues, and requirements for advanced study. Also gives students training in design of a professional portfolio. Students may not receive credit for both BIOCH 103 and GEN 103. *Preq:* Freshman or sophomore standing in Biochemistry or Genetics or consent of instructor.
- GEN 300 Fundamental Genetics 3(3,0)** Introductory course covering fundamental principles of genetics in prokaryotes and eukaryotes. Emphasizes Mendelian genetics, physical and chemical basis of heredity, and population genetics. *Preq:* BIOL 104/106 or consent of instructor.
- GEN 301 Fundamental Genetics Laboratory 1(0,3)** Experimental and observational approach addressing the concepts presented in GEN 300. Inheritance patterns in a wide variety of eukaryotic and prokaryotic organisms are covered. *Preq:* GEN 300 (or concurrent enrollment).
- GEN 302, H302 Molecular and General Genetics 3(3,0)** Rapidly-paced course covering Mendelian and molecular genetics, with introductory coverage of quantitative and population genetics. Emphasizes the molecular basis of heredity and gene expression in prokaryotes and eukaryotes and modern genetic technology. *Preq:* BIOL 111 or consent of the instructor.
- GEN 303 Molecular and General Genetics Laboratory 1(0,3)** Laboratory exercises introducing fundamental principles of inheritance in prokaryotes and eukaryotes. *Preq:* GEN 302 or concurrent enrollment.
- GEN (BIOSC) 405, H405, 605 Molecular Genetics of Eukaryotes 3(3,0)** Molecular genetic analyses of eukaryotes in relation to mutations and repair, complex phenotypes, biochemical pathways, short- and long-term regulation of gene expression, and evolution. *Preq:* GEN 302 or equivalent and one semester of biochemistry, or consent of instructor.
- GEN 410, H410, 610 Fundamentals of Genetics I 3(3,0)** First in a two-semester sequence in genetics covering Mendelian genetics, topics in cytogenetics, extranuclear inheritance, quantitative, evolutionary, conservation, and population genetics. *Preq:* CP SC 120 (or equivalent), EX ST 301, GEN 302, or consent of instructor.

- GEN 411 Fundamentals of Genetics I Laboratory 1(0,3)** Crosses are carried out using eukaryotic organisms (*C. elegans*, *Drosophila*, yeast) with appropriate markers to follow inheritance. Population and evolutionary genetics concepts are also examined. *Preq:* GEN 410 or concurrent enrollment.
- GEN (BIOSC) 416, 616 Recombinant DNA 3(3,0)** Familiarizes students with the most current facts and concepts of molecular genetics. Lectures focus on gene organization, structure, and expression in prokaryotes and eukaryotes, highlighting current technologies and research in these areas. *Preq:* GEN 302 or equivalent and one semester of biochemistry or consent of instructor. A developmental biology course is also strongly recommended.
- GEN (BIOSC, MICRO) 418, 618 Biotechnology I: Nucleic Acids Techniques 4(2,4)** Basic training in the manipulation of genetic information using recombinant DNA technology. Includes techniques in molecular cloning, Southern and Northern analyses, clone library construction. *Preq:* BIOCH 301 or 305, MICRO 305 or consent of instructor.
- GEN 420, H420, 620 Fundamentals of Genetics II 3(3,0)** Second in a two-semester sequence in genetics covering molecular genetics, gene expression, recombinant DNA technology, genomics, bioinformatics, proteomics, developmental, human, cancer, and behavioral genetics. *Preq:* GEN 410 or consent of instructor.
- GEN 421 Fundamentals of Genetics II Laboratory 1(0,3)** Molecular genetics is emphasized using prokaryotic organisms (λ and T4 phage, *E. coli*, *B. subtilis*) and yeast. Slime molds are used to model developmental processes. Bioinformatic methods are integrated into laboratory exercises by employing simulations illustrating genetic principles underlying human behavior and cancer biology. *Preq:* GEN 420 or concurrent enrollment.
- GEN 440, H440, 640 Bioinformatics 3(3,0)** Theory and application of computational technology to analysis of the genome, transcriptome, and proteome. *Preq:* CP SC 120 (or equivalent), GEN 302, 410, or consent of instructor.
- GEN 450, H450, 650 Comparative Genetics 3(3,0)** Outlines the genome structure, function, and evolution based on available complete genome sequences. Topics include the evolution of multigene families, origin of eukaryotic organelles, molecular phylogeny, gene duplication, domain shuffling, transposition, and horizontal gene transfer. *Preq:* GEN 420, 440 or consent of instructor.
- GEN (BIOSC, HORT) 465, 665 Plant Molecular Biology 3(3,0)** See HORT 465.
- GEN 470, 670 Human Genetics 3(3,0)** Basic principles of inheritance; population, molecular and biochemical genetics; cytogenetics; immunogenetics; complex traits; cancer genetics; treatment of genetic disorders; genetic screening and counseling; and the Human Genome Project. *Preq:* GEN 302 or consent of instructor.
- GEN 490 Selected Topics in Genetics 1-4(0-4,0-9)** Comprehensive study of selected topics not covered in other courses. May be repeated for a maximum of eight credits, but only if different topics are covered. *Preq:* Junior standing or consent of instructor.
- GEN 491, H491 Special Problems in Genetics 1-8(0,3-24)** Orientation in genetic research (i.e. experimental planning, execution, and reporting). May be repeated for a maximum of eight credits. *Preq:* GEN 410, 411, 420, 421 or consent of instructor.
- GEN 493, H493 Senior Seminar 2(2,0)** Analysis and discussion of papers from the primary literature in the life sciences particularly in genetics. Students find pertinent articles in the primary literature and present and analyze the selected reading.
- GEN (ENT) 495, 695 Insect Biotechnology 3(3,0)** See ENT 495.

GEOGRAPHY

Associate Professor: J. A. Miller; *Assistant Professor:* C. A. Smith; *Lecturer:* L. F. Howard

- GEOG 101 Introduction to Geography 3(3,0)** Survey of the nature of geography emphasizing the discipline's organizing themes of earth science, relations between people and their environments, interrelations between places, locational analysis, and area studies.
- GEOG 103 World Regional Geography 3(3,0)** Systematic and descriptive survey of the major regions of the world, including their physical and cultural features. Provides a global context for courses in the social sciences and humanities.
- GEOG 106 Geography of the Physical Environment 4(3,3)** Examines the condition of the physical environment, especially the earth's surface and the processes that act on it. Topics range from earth-sun relations to the evolution of landscapes; human habitats and human alteration of the environment.
- GEOG 299 Creative Inquiry—Geography 1-4(1-4,0)** In consultation with and under the direction of a faculty member, students pursue scholarly activities individually or in teams. These creative inquiry projects may be interdisciplinary. Arrangements with mentors must be established prior to registration. May be repeated for a maximum of nine credits. *Preq:* GEOG 101, 103, or consent of instructor.
- GEOG 301 Political Geography 3(3,0)** Geographic basis of states: sovereignty, territory, power within states, relations between states. The geography of international affairs. *Preq:* GEOG 101 or 103 or consent of instructor.
- GEOG 302 Economic Geography 3(3,0)** Spatial analysis of economic activity emphasizing regional economics and development. Topics include world population; technology and economic development; principles of spatial interaction; and geography of agriculture, energy manufacturing, and tertiary activities. *Preq:* GEOG 101 or 103 or consent of instructor.
- GEOG 303 Urban Geography 3(3,0)** Historical and contemporary survey of the urban world, with particular attention paid to the relationship between people and urban places. Topics include the rise of cities, urban hierarchies, urban land use, and the social geography of cities. *Preq:* GEOG 101 or 103 or consent of instructor.
- GEOG 305 Cultural Geography 3(3,0)** Broad examination of the basic cultural variables in the human occupation of the earth using ecological, spatial, regional, and historical approaches. Topics vary but may include cultural areas and distributions, cultural change, cultural landscape, and cultural ecology. *Preq:* GEOG 101 or 103 or consent of instructor.
- GEOG 306 Historical Geography 3(3,0)** Exploration of geographical change and the varied patterns of past human activities and people's relationships with the physical environment. Case studies from around the world are used to emphasize key themes in historical geography. *Preq:* GEOG 101 or 103 or consent of instructor.
- GEOG 330 Geography of the Middle East and North Africa 3(3,0)** Thematic survey of a world region extending from Morocco to Afghanistan. Emphasizes climate, environment, social geography, historical development of the regional culture of Islam, and common problems facing the area today. *Preq:* GEOG 101 or 103, or consent of instructor.
- GEOG 340 Geography of Latin America 3(3,0)** Introduction to the physical, economic, political, and human/cultural geography of Latin America. Special focus is on regional unity and diversity and the historical interaction of man and environment.
- GEOG 360 Geography of Africa 3(3,0)** Study of how tropical, or sub-Saharan, Africa functions in the modern world. Africa's physical environments, peoples and cultures, colonial and post-colonial history, and ideologies of economic development. Five basic themes are covered: population, natural resources, environmental quality, political organization, economic development. *Preq:* GEOG 101 or 103 or consent of instructor.
- GEOG 401, 601 Studies in Geography 3(3,0)** Intensive study of the geography of a selected world region, such as North America, Europe, or the Middle East, or the geography of a topic, such as the geography of oil or the geography of underdevelopment. May be repeated once for credit with departmental consent. *Preq:* GEOG 101 or 103 or consent of instructor.
- GEOG 410, 610 Geography of the American South 3(3,0)** Study of the geography of the American South in its changing complexities across almost 400 years of development. *Preq:* GEOG 101 or 103 or consent of instructor.
- GEOG 420, 620 Historical Geography of the United States 3(3,0)** Survey that places the spatial concepts of geography into a time sequence with special emphasis upon the United States. *Preq:* GEOG 101 or 103 or consent of instructor.
- GEOG (PRTM) 430, 630 World Geography of Parks and Equivalent Reserves 3(3,0)** See PRTM 430.
- GEOG 440, 640 Geography of Historic Preservation 3(3,0)** Aspects of historic preservation emphasizing sites and structures in their geographical, historical, and socioeconomic contexts. Examples are drawn from American architectural styles and settlement forms. *Preq:* GEOG 101 or 103 or consent of instructor.

GEOL 499 Independent Study in Geography 3(3,0) Study of selected topics in geography under the direction of a faculty member chosen by the student. Student and faculty member develop a course of study designed for the individual student and approved by the department chair prior to registration.

GEOLGY

Professors: A. W. Elzerman, *Director*; R. W. Falta, Jr., C. M. Lee, J. R. Wagner, R. D. Warner; *Associate Professors:* E. R. Carraway, J. W. Castle, L. C. Murdoch, M. A. Schlautman; *Assistant Professors:* T. A. Kendall, S. M. Moyses; *Lecturers:* W. G. Dean, L. B. Krause

GEOL 100 Current Topics in Geology 1(1,0) Lectures and demonstrations covering topics of current interest in the different fields of geology. Recent research developments and career opportunities in the geosciences are emphasized.

GEOL 101, H101 Physical Geology 3(3,0) Study of minerals and rocks which compose earth's crust, their origins and transformations. Emphasizes geological processes, both internal and external, by which changes are produced on or in the earth.

GEOL 102, H102 Earth History 4(3,3) Survey of the earth's geologic history emphasizing how the continents and ocean basins have evolved through geologic time. Evolution of life from the beginning of the fossil record through the present; identification of fossil plants and animals and interpretation of earth's past through study of geologic maps. Field trips illustrate principles. *Preq:* GEOL 101, 103.

GEOL 103, H103 Physical Geology Laboratory 1(0,2) Laboratory to accompany GEOL 101. Provides instruction in the identification of minerals and rocks and in the interpretation of geologic processes through study of topographic maps. Field trips provide direct observation of processes and results. *Coreq:* GEOL 101.

GEOL 112 Earth Resources 3(3,0) Survey of earth's mineral, energy, water, and land resources and environmental and societal impacts associated with the use of these resources. *Preq:* GEOL 101.

GEOL 114 Earth Resources Laboratory 1(0,2) Laboratory to accompany GEOL 112. Provides instruction in the identification of ore and gem minerals and of other earth materials of economic importance. Land and water resources are explored through the use of topographic maps, aerial photographs, remotely sensed images, and field trips. *Preq:* GEOL 103. *Coreq:* GEOL 112.

GEOL 206 Mineralogy and Introductory Petrology 4(3,3) Crystal symmetry and introduction to x-ray crystallography, composition and stability of minerals, survey of common rock-forming minerals, petrological classification of rocks and introduction to rock associations. Laboratory focuses on identification of rock-forming minerals and important ore minerals based on their physical properties, and hand specimen petrology. *Preq:* GEOL 101, 103, or consent of instructor.

GEOL 210 Geology of the National Parks 3(3,0) Survey of selected national parks and monuments emphasizing the dynamic geological processes which have shaped the landscapes of these areas. Special attention is focused on parks exhibiting recent geological activity related to volcanoes, earthquakes, and glaciers. Slides and films are used to highlight specific geological features.

GEOL 211 Geoanalysis I 4(3,3) Students develop a working knowledge of statistical methods used to formulate and solve problems in the earth sciences. Emphasis is on sampling methods and experimental design for geologic settings and on formulating and evaluating hypotheses using statistical inference of data sets. *Preq:* MTHSC 108.

GEOL 212 Geoanalysis II 4(3,3) Students develop a working knowledge of deterministic methods used to formulate and solve problems in the earth sciences. Emphasis is on developing conceptual models from geologic field observations, formulating idealized problems, and analyzing and interpreting solutions. Special focus is on using computer software to support analyses. *Preq:* GEOL 211, MTHSC 108.

GEOL 216 Petrography 2(1,3) Techniques of mineral identification using polarizing microscope. Emphasizes study of minerals in thin section. Microscopic recognition of minerals in igneous, sedimentary, and metamorphic rocks. Lecture explores mineral optics theory, optical properties of minerals, and their appearance in various rock types. *Preq:* GEOL 206.

GEOL (ASTR) 220 Planetary Science 3(3,0) Survey of the formation and evolution of planetary bodies. Emphasizes the origin of planetary material and comparative study of the primary processes operative on planetary surfaces. Describes major features of the planets and moons in our solar system, as revealed by recent space missions.

GEOL 270 Experiences in Sustainable Development: Water 3(3,0) Integrates cross-disciplinary perspectives on sustainability through active student participation in real-world development projects. Focuses on identifying and overcoming environmental, technical, social/organizational, and economic barriers to the sustainability of water resources. Emphasizes small-scale international water resources development.

GEOL 291 Introduction to Research I 1(1,0) Required group learning and research experience for Geology majors (open to others with consent of instructor). Introduction to problem solving through case studies and interdisciplinary team approaches. Focus is on, but not limited to, research approaches in geology. Social and ethical contexts, communication skills, and professional development are incorporated.

GEOL 292 Introduction to Research II 1(1,0) Required group learning and research experience for Geology majors (open to others with consent of instructor). Introduction to problem solving through case studies and interdisciplinary team approaches. Focus is on, but not limited to, research approaches in geology. Social and ethical contexts, communication skills, and professional development are incorporated. *Preq:* GEOL 291 or consent of instructor.

GEOL 300, H300 Environmental Geology 3(3,0) Discussion-oriented introduction to relationships of man to his physical surroundings and problems resulting from upsetting the established equilibria of geologic systems; man's role as a geologic agent, environmental conservation and management. *Preq:* GEOL 101 or consent of instructor.

GEOL 302, H302 Structural Geology 4(3,3) Diverse geological structures of the earth, their description, origin, and field recognition. Practical problems in interpreting geologic structures are utilized, in addition to theoretical considerations of the mechanics and causes of tectonism. *Preq:* GEOL 102 or consent of instructor.

GEOL 313 Sedimentology and Stratigraphy 4(3,3) Topics include origin, composition, and texture of sediments and sedimentary rocks; sedimentation processes, depositional environments, facies relationships, and diagenesis; introduction to stratigraphic methods and geochronology. Laboratory involves description and classification of hand specimens and thin sections and analytical methods. *Preq:* GEOL 206 or consent of instructor.

GEOL 314, H314 Sedimentary Petrology 3(2,3) Origin, composition, and texture of sediments and sedimentary rocks, including both siliciclastic and chemical varieties. Interpretation of tectonic settings, depositional systems, facies relationships, and diagenesis. Laboratory involves description and classification of hand specimens and thin sections and analytical methods. *Preq:* GEOL 206 or consent of instructor.

GEOL 316, H316 Igneous and Metamorphic Petrology 3(2,3) Classification, occurrence, and origin of igneous and metamorphic rocks. Discussion of the chemical and physical processes involved in magmatic crystallization and metamorphism. Laboratory study of igneous and metamorphic rocks in hand specimen and thin section. *Preq:* GEOL 206, 216 or consent of instructor.

GEOL 318 Introduction to Geochemistry 3(3,0) Introduction to distribution of elements in the core, mantle, and crust of the earth. Control of rock type on trace element content in soils and sediments. Weathering; soil and regolith formation; water-sediment interrelations; solubility, mobility and bioavailability in relation to redox, pH and complexation; biogeochemical cycles of selected elements. *Preq:* GEOL 101 and CH 102 or consent of instructor.

GEOL 375, H375 Bahamian Field Study 3(1,4) Relationships among marine sediment types, physical processes, and biological activity are observed. The world's third largest barrier reef is examined. Students stay one week at a field station on Andros Island in the Bahamas and travel by van and boat to various sites. Additional fees are required. *Preq:* GEOL 101 or consent of instructor.

GEOL 391 Research Methods I 1(1,0) Required group learning and research experience for Geology majors (open to others with consent of instructor). Introduction to problem solving through case studies and interdisciplinary team approaches. Focus is on, but not limited to, research methods in geology. Social and ethical contexts, communication skills, and professional development are incorporated. *Preq:* GEOL 292 or consent of instructor.

- GEOL 392 Research Methods II 1(1,0)** Required group learning and research experience for Geology majors (open to others with consent of instructor). Introduction to problem solving through case studies and interdisciplinary team approaches. Focus is on, but not limited to, research methods in geology. Social and ethical contexts, communication skills, and professional development are incorporated. *Preq:* GEOL 391 or consent of instructor.
- GEOL 403, 603 Invertebrate Paleontology 3(2,3)** Study of life of past geologic ages as shown by fossilized remains of ancient animals, with emphasis on the invertebrates. *Preq:* GEOL 101 or consent of instructor.
- GEOL 405, 605 Surficial Geology 4(3,3)** Study of surface features of the earth and the processes that produce them. Analysis of landforms including their form, nature, origin, development, and rates and patterns of change. Laboratory studies emphasize terrain analysis and the mechanics of surficial geological processes. *Preq:* GEOL 102, 300, or consent of instructor.
- GEOL H408, 608 Geohydrology 3(3,0)** Study of the hydrologic cycle, aquifer characteristics, theory of groundwater movement, mechanics of well flow, experimental methods, and subsurface mapping. *Preq:* GEOL 101,102.
- GEOL 409 Subsurface Methods 4(3,3)** Students develop an understanding of the principles and methods used to acquire, analyze, and interpret subsurface geological data. Emphasizes borehole measurements; seismic gravimetric, magnetic, and electrical methods; and their applications to hydrogeology, remediation, and oil and gas exploration. *Preq:* GEOL 313.
- GEOL 411, H411 Research Problems 1-3(0,3-9)** Field, laboratory, or library study of an approved topic in geology. Topic would be one not normally covered in formal courses, but may be an extension of a course. Taught either semester. May be repeated for a maximum of six credits. *Preq:* Senior standing or consent of instructor.
- GEOL 413, 613 Stratigraphy 3(2,2)** Analysis of stratified rocks as the repository of earth history and the conceptual framework used to synthesize the world geologic record as a coherent whole. Emphasizes not only traditional lithostratigraphy but also modern seismic stratigraphy, biostratigraphy, magnetostratigraphy, and current stratigraphic issues. *Preq:* GEOL 314 or consent of instructor.
- GEOL 415 Analysis of Geological Processes 3(3,0)** Introduction to methods for analyzing geological processes. Mathematical methods are introduced to solve problems related to stream flow, reaction kinetics, radioactive decay, heat flow, diffusion, fluid flow through geologic media and related processes. *Preq or Coreq:* MTHSC 206 or consent of instructor.
- GEOL 421, 621 GIS Applications in Geology 3(1,4)** Introduction to geographic information systems with applications to current geological and hydrological problems. Topics include the use of global positioning systems, spatial analysis, and image analysis. Hands-on training with geographic information systems software and techniques is covered in lab. *Preq:* Senior standing, strong computer skills.
- GEOL 451, 651 Selected Topics in Hydrogeology 1-4(1-3,0-3)** Selected topics in hydrogeology emphasizing new developments in the field. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* GEOL 300 or 408, or consent of instructor.
- GEOL 475 Summer Geology Field Camp 6(4,6)** Introduction to field techniques emphasizing methods applied to hydrogeology. Includes description and mapping of hydrogeologic units and structures using outcrop data and lithologic and geophysical well logs. Also covers construction of potentiometric maps from water level data, performance of pumping tests on mapped aquifers, and analysis of data to determine aquifer characteristics. *Preq:* GEOL 302 and 206, or consent of instructor.
- GEOL 491 Research Synthesis I 4(3,3)** Required capstone group learning and research experience for Geology majors (open to others with consent of instructor). Involves synthesis of applied geology and other approaches for problem solving through collaborative teams. Course is the culmination of a sequence of case studies incorporating social and ethical contexts, communication skills, and professional development. *Preq:* GEOL 392 or consent of instructor.
- GEOL 492 Research Synthesis II 4(3,3)** Required capstone group learning and research experience for Geology majors (open to others with consent of instructor). Involves synthesis of applied geology and other approaches for problem solving through collaborative teams. Course is the culmination of a sequence of case studies incorporating social and ethical contexts, communication skills, and professional development. *Preq:* GEOL 491 or consent of instructor.

GERMAN

Professor: H. M. Riley; *Associate Professors:* G. J. Love, J. Schmidt; *Lecturers:* L. J. Ferrell, J. T. Littlejohn; *Adjunct Professor:* M. M. Sinka

GER 101 Elementary German 4(3,1) Course for beginners in which, through conversation, composition, and dictation, the fundamentals of the language are taught and a foundation is provided for further study and the eventual ability to read and speak the language. Three hours a week of classroom instruction and one hour a week in the language laboratory.

GER 102 Elementary German 4(3,1) Continuation of GER 101; three hours a week of classroom instruction and one hour a week in the language laboratory.

GER 104 Basic German 4(3,1) Intensive one-semester program combining GER 101 and 102 for students who have previously studied German. Includes fundamentals of grammar and vocabulary as a foundation for written and oral proficiency.

GER 151 German for Graduate Students 3(3,0) Intensive program only for graduate students preparing for the reading examination in German. A minimum grade of B on a final examination will satisfy graduate school foreign language requirement. May be repeated once for credit. To be taken Pass/Fail only. *Preq:* Graduate standing.

GER 201, H201 Intermediate German 3(3,1) Brief review of GER 101 and 102, with conversation, composition, and dictation, and the reading of more serious German prose in short stories and plays. Includes literary and cultural perspectives. *Preq:* GER 102.

GER 202, H202 Intermediate German 3(3,1) Emphasizes reading nontechnical German prose more rapidly. Writing, speaking, and listening skills continue to be developed. Includes literary and cultural perspectives. *Preq:* GER 201 or consent of instructor.

GER 297 Creative Inquiry—German 1-4(1-4,0) In consultation with and under the direction of a faculty member, students pursue scholarly activities individually or in teams. Arrangements with faculty members must be established prior to registration.

GER 299 Foreign Language Drama Laboratory 1(0,3) Participation in foreign language drama productions. No formal class meetings, but an average of three hours per week in a foreign language drama workshop for production. May be repeated for a maximum of three credits. *Preq:* Consent of instructor directing the play.

GER 305 German Conversation and Composition 3(3,0) Training in spoken and written German emphasizing vocabulary acquisition, oral and written communication strategies, appropriate linguistic formulations for specific cultural contexts, and stylistics. *Preq:* GER 202 or consent of instructor.

GER 306 The German Short Story 3(3,0) Examines the Austrian, German, and Swiss short story as a distinct literary genre that flourished particularly after 1945. Provides ample conversation and composition practice, as well as an introduction to principles of literary prose analysis. *Preq:* GER 202 or consent of instructor.

GER 310 Summer Immersion Program 6(6,0) Conducted entirely in German for eight hours daily. Program consists of activities that combine interrelating cultural topics with language skill practice. Frequent opportunities to converse with native speakers during meals and on excursions. Students receive six credits, three of which may be taken in lieu of GER 202. *Preq:* GER 201.

GER 316 German for International Trade I 3(3,0) Spoken and written German common to the German-speaking world of business and industry emphasizing business practices and writing and translating business letters and professional reports. Cross-cultural references provide opportunity for comparative and contrastive analysis of American and German cultural patterns in a business setting. *Preq:* GER 202 and 305 (or concurrent enrollment); or consent of department chair.

GER 340 German Culture 3(3,0) Examines the cultures of German-speaking nations from their origins to the present. Emphasizes the Federal Republic of Germany both before and after the German unification of 1990. *Preq:* GER 202 or consent of instructor.

GER 360 German Literature to 1832 3(3,0)
Examines selected topics in German literature from the Middle Ages to 1832. Readings may include works by Lessing, Goethe, Schiller, and the Romantics. *Preq:* GER 305 or 306 (or concurrent enrollment) or consent of instructor.

GER 361 German Literature from 1832 to Modernism 3(3,0) Examines drama, poetry, and prose from the Biedermeier period through naturalism and realism to the advent of Modernism. *Preq:* GER 305 or 306 or consent of instructor.

GER 369 Special Topics in German Literature 3(3,0) Study of a significant aspect of German literature. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* GER 305 or 306 or consent of instructor.

GER 397 Creative Inquiry—German 1-4(1-4,0)
Students focus on a special research area under the guidance of a faculty member. After acquiring the requisite background, students formulate hypotheses for a group project, develop a critical framework, and initiate research on a specific topic.

GER 398 Directed Reading 1-3(1-3,0) Directed study of selected topics in German literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

GER 405 Advanced Contemporary German Language 3(3,0) Advanced study of spoken and written contemporary German based on modern autobiographical texts, eyewitness accounts of recent historical events, and media coverage of current events. Employs Internet, print and audio texts, TV programs, and photo series. *Preq:* One 300-level German course or consent of instructor.

GER 416 German for International Trade II 3(3,0)
Study of language and cultural environment of the German-speaking markets of the world, including linguistic and cultural idioms which support global marketing in general and the international marketing of textiles, agricultural products, and tourism in particular. *Preq:* GER 316.

GER 417 Topics in German for International Trade 3(3,0) Examination and analysis of selected topics related to the business culture and economy of Germany, Austria, Switzerland, the European Union, or the European Free Trade Association. Topics may include the reconstruction of eastern Germany's economy, the expansion of the European Union, or current events of economic importance. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* One 300-level German course or consent of department chair.

GER 450 Advanced Studies in German Drama 3(3,0) Extensive study of a major theme or aspect of German drama. May include recorded live performances, stage design, theatre architecture, and the music and art of the theatre. *Preq:* GER 305 or 306 or consent of instructor.

GER 455 German Film 3(2,3) Overview of German cinema including the expressionist classics of the Weimar Republic, entertainment and documentary movies of the Nazi era, classics of the postwar New German Wave (West Germany), distinctive East German films, and vanguard contemporary films. *Preq:* GER 305 or 306 or consent of instructor.

GER 460 Modernism in German Literature 3(3,0) Study of major works of German literature and culture in the modernist era (1888–1933). May include drama, music, philosophy, and the plastic arts. *Preq:* GER 305 or 306 or consent of instructor.

GER 461 German Literature Since 1933 3(3,0)
Study of selected authors, texts, or genres in contemporary German literature. *Preq:* GER 305 or 306 or consent of instructor.

GER 475 Advanced German Seminar 3(3,0)
Concentrated research and discussion on advanced topics, works, or texts in German literature, film, art, drama, music, or philosophy. Conducted in German. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* One 400-level German course or consent of instructor.

GER 476 Advanced Seminar in German Thought 3(3,0) Concentrated research and discussion on advanced topics, works or texts in German literature, film, art, drama, music or philosophy. Conducted in English. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Senior standing or consent of instructor.

GER 497 Creative Inquiry—German 1-4(1-4,0)
Continuation of research initiated in GER 397. Students complete their project and disseminate their research results. *Preq:* GER 397 or consent of instructor.

GER 498, 698 Independent Study 1-3(1-3,0)
Supervised study of selected topics in German literature, language, or culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

GRAPHIC COMMUNICATIONS

Professors: S. T. Ingram, Chair; J. M. Leininger; *Associate Professors:* J. B. Simmons, E. M. Weisenmiller; *Assistant Professors:* L. H. O'Hara, N. L. Woolbright; *Senior Lecturers:* N. W. Leininger, P. G. Rose; *Lecturers:* K. T. Cox, C. D. Jones, R. N. Marsoun, J. K. Sperry, M. H. Wayne; *Visiting Professors:* J. P. Crouch, F. T. Simon, W. E. West; *Adjunct Professors:* S. Edlein, L. W. Evans; *Visiting Lecturers:* S. Edlein, K. K. Osborne; *Adjunct Lecturers:* C. Porcher, C. Tonkin

G C 101 Orientation to Graphic Communications 1(1,0) Introduction to the curriculum and the industry including its processes, products, and careers. Emphasizes the attributes which are most desirable for successful entry and advancement up a variety of career ladders.

G C 103 Graphic Communications I for Packaging Science 4(2,6) Emphasizes the interrelationships of packaging and graphics arts. Topics include theory and practice in packaging requirements relative to basic graphic arts concepts, principles, and practices; layout; design; electronic copy preparation; the printing processes of offset lithography; screen printing; gravure; and flexography. Includes digital and specialty printing processes, environmental, health, and safety concerns.

G C 104, H104 Graphic Communications I 4(2,6) Emphasizes basic graphic arts industrial concepts, principles, and practices, with laboratory applications in photography, layout and design, conventional and electronic copy preparation, reproduction photography, offset lithography, screen printing, and finishing operations. Flexography, gravure, letterpress, and specialty printing processes are also covered, along with environmental, health, and safety concerns.

G C 199 Creative Inquiry—Graphic Communications I 1-3(1-3,0) Under the direction of a faculty member, students pursue approved scholarly activities individually or in teams. These creative inquiry projects may be interdisciplinary. Arrangements with mentors must be established prior to registration. May be repeated for a maximum of six credits. *Preq:* Freshman standing.

G C 207, H207 Graphic Communications II 3(1,6) Continuation of G C 104. Intermediate course for graphic communications and graphic arts specialists which broadens skills and technical knowledge in areas of layout, copy preparation, reproduction photography, film assembly, screen printing, lithographic presswork, and finishing. *Preq:* G C 101, 104, typewriter/computer keyboarding skills of 20 net words per minute.

G C 215, H215 Photographic and Digital Imaging Techniques 3(1,6) Emphasizes application of black and white and color imaging by photographic and digital technologies. Laboratory experiences assure confidence in the use of photographic and digital techniques for creating and enhancing original images for graphic reproduction and distribution.

G C 245 Graphic Communications Mechanical Systems 3(2,3) Concepts in mechanical systems and their controls as related to equipment and facilities in graphic communications industrial manufacturing. *Preq:* G C 207 and CTE 180, or consent of instructor.

G C 299 Creative Inquiry—Graphic Communications II 1-3(1-3,0) Under the direction of a faculty member, students pursue approved scholarly activities individually or in teams. These creative inquiry projects may be interdisciplinary. Arrangements with mentors must be established prior to registration. May be repeated for a maximum of six credits. *Preq:* Sophomore standing.

G C 310, H310 Applied Principles of Electronic Workflow 4(2,6) Promotes the refining of skills learned in G C 104 and 207, with an in-depth study and application of computerized prepress systems and methodologies. Serves as a transition course to the advanced graphic classes teaching offset lithography, flexography, screen printing, and gravure. *Preq:* G C 207, 215, or consent of instructor.

G C 350 Graphic Communications Internship I 1(0,3) Full-time supervised employment in an industrial in-plant setting for expansion of experience with materials and processes, production people, and organizations. Restricted to Graphic Communications majors. *Preq:* G C 104 or equivalent, consent of instructor. *Coreq:* CO-OP 101.

- G C 399 Creative Inquiry—Graphic Communications III 1-3(1-3,0)** Under the direction of a faculty member, students pursue approved scholarly activities individually or in teams. These creative inquiry projects may be interdisciplinary. Arrangements with mentors must be established prior to registration. May be repeated for a maximum of six credits. *Preq:* Junior standing.
- G C 405, H405, 605 Package and Specialty Printing 2(2,0)** Problems and processes for printing and converting in package, label, and specialty printing industries. Flexographic preparation, printing, die making, diecutting, transfer printing, screen container printing, pad printing, and bar code production are covered. New developments and trends are discussed. *Preq:* G C 245, 310, 350; concurrent enrollment in G C 406; or consent of instructor.
- G C 406, H406, 606 Package and Specialty Printing Laboratory 2(0,6)** Laboratory in techniques for printing and converting in package, label, and specialty printing industries. Experiences in flexographic prepress; printing; die design, die making and diecutting for label, folding cartons and corrugated; and glass, plastic, and metal container printing. *Preq:* G C 245, 310, 350; concurrent enrollment in G C 405; or consent of instructor.
- G C 407, 607 Advanced Flexographic Methods 4(2,6)** In-depth study of the methods used in flexographic printing and converting of porous and nonporous substrates. Theory and laboratory applications include setting standards for process color, preparation of plate systems, ink mixing and color matching, testing of films and foils, analysis of recent developments, and prediction of future markets. *Preq:* G C 406 or consent of instructor.
- G C 440, H440, 640 Commercial Printing 5(2,9)** Advances skills learned in previous graphic communications courses and applies the knowledge to large format presses. Students work from the design conception stage through all aspects of preparation, production, and finishing. Emphasizes understanding and incorporating emerging technologies into the production workflow. *Preq:* G C 310 and 350 or consent of instructor.
- G C 444, H444, 644 Current Developments and Trends in Graphic Communications 4(2,6)** Advanced course for Graphic Communications majors. Emphasizes the theory and technical developments that affect process and equipment selection. Topics include color theory and application, electronic color scanning, electronic prepress and communications, gravure color quality control and analysis. *Preq:* G C 405, 406, 440.
- G C 445, 645 Advanced Screen Printing Methods 3(2,3)** In-depth study of the systems and materials used with the screen printing process. Emphasizes techniques of control and procedures for establishing screen printing methods and standards. *Preq:* G C 207 or consent of instructor.
- G C 446, 646 Ink and Substrates 3(2,3)** Covers components, manufacturing, process use as well as end use of ink and substrates used in lithography, flexography, gravure, and screen printing. Examines the interrelationship between inks, substrates, and the printing process. Through controlled testing and examination, optimum conditions for improved printability are determined. *Preq:* G C 405; 406 or 440; or consent of instructor.
- G C 448, H448, 648 Planning and Controlling Printing Functions 3(2,3)** Study of systems for setting printing production standards, estimating, scheduling, job planning, and the selection of new hardware and technologies. *Preq:* G C 350, 405, 406, 440, 450 or consent of instructor.
- G C 450 Graphic Communications Internship II 1(0,3)** Continuation of G C 350. *Preq:* G C 350, 405; 406 or 440; consent of instructor. *Coreq:* CO-OP 102.
- G C 451, H451 Special Projects in Graphic Communications 1-6(0,3-18)** Advanced projects covering theory and/or practices going beyond the scope of regular coursework. Written project approval is required before registering. May be repeated with advisor's approval. *Preq:* Junior standing, completion of three graphic communications courses, or consent of instructor.
- G C 455 Advanced Graphic Communications Internship 1(0,3)** Full-time employment in an industry directly or indirectly related to printing. Work site and job must be approved in advance. *Preq:* G C 350.
- G C 480 Senior Seminar in Graphic Communications 2(2,0)** Study of current trends and issues in the graphic communications industry. Class centers around group discussions dealing with relevant topics facing the graphic communications manager today. Students draw upon academic experiences, internship experiences, and library research to facilitate discussion. Must be taken during student's last semester on campus. *Preq:* G C 450.
- G C 490, 690 Graphic Communications Selected Topics 1-3(1-3,0)** Subjects not covered in other graphic communications courses; organized according to industry trends and student needs. May be repeated for a maximum of 18 credits, but only if different topics are covered. *Preq:* Consent of instructor.
- G C 499 Creative Inquiry—Graphic Communications IV 1-3(1-3,0)** Under the direction of a faculty member, students pursue approved scholarly activities individually or in teams. These creative inquiry projects may be interdisciplinary. Arrangements with mentors must be established prior to registration. May be repeated for a maximum of six credits. *Preq:* Senior standing.

GREAT WORKS

- G W (ENGL) 301, H301 Great Books of the Western World 3(3,0)** Introduces Great Works minor. Includes readings about the Great Books concept, as well as various great books from the humanities, arts, and natural and social sciences. *Preq:* Sophomore literature (ENGL 207 or 208 strongly recommended).
- G W 402, H402 Great Works of Science 3(3,0)** Understanding of science in terms of its history and its approach to problem-solving through study of selected great works. Emphasis is on developing students' abilities to reflect on the problems and methodologies encountered in the scientific method.

- G W 403, H403 Special Topics in Continental Literature 3(3,0)** Important primary texts written in modern European languages are taught in English. Content varies according to instructor. *Preq:* Sophomore literature.
- G W 405, H405 The Darwinian Revolution 3(3,0)** Examination of Charles Darwin's *The Origin of Species* and its cultural impact from his time to ours. Topics include the contemporaneous reception of Darwin's work, the Scopes Monkey Trial, and more recent controversies over Creationism and Intelligent Design. *Preq:* Sophomore literature.

HEALTH

Professor: D. B. Jackson; *Associate Professors:* G. E. Costello, *Chair;* C. J. Dye, K. A. Kemper, J. K. Kingree, R. M. Mayo, W. W. Sherrill, H. D. Spitler, *Research Associate;* M. Thompson, *Research Associate;* *Assistant Professors:* C. B. Okafor, E. E. Seiber; *Lecturers:* C. S. Chambers, K. M., Meyer, R. S. Welsh; *Adjunct Professor:* V. S. Gallicchio; *Adjunct Lecturer:* D. Charles

- HLTH 202 Introduction to Public Health 3(3,0)** Examination of the forces that have influenced current health delivery systems, health practices, and trends. General systems theory is introduced. Health majors and minors will be given enrollment priority.
- HLTH 203 Overview of Health Care Systems 3(3,0)** Introduction to the health care delivery system including public health and health care components. Examines and discusses individual and public expectations of need and demand for health care and delivery of public health and health care services.
- HLTH 240 Determinants of Health Behavior 3(3,0)** Analysis of health behaviors based on psychological, social, cultural, and environmental factors. Introduces health behavior theories. *Coreq:* Health Science major.
- HLTH 250 Health and Fitness 3(3,0)** Study of interrelationship between health and fitness. Emphasizes the cardiovascular system and benefits of exercise.
- HLTH 298 Human Health and Disease 3(3,0)** Study of good health practices emphasizing lifestyles and measures of health. Health majors and minors will be given enrollment priority.
- HLTH 303 Public Health Communication 3(3,0)** Introduction to the use of health and communication theory and social marketing strategies to create effective, evidence-based, culturally appropriate health communication messages and campaigns. *Preq:* HLTH 240, 298.
- HLTH 305 Body Response to Health Behaviors 3(3,0)** Positive benefits and the negative impact of certain behaviors at cellular, organ, and body-system levels are examined. The pathways of selected injury and disease are explored. Expected physiological changes are applied in identifying strategies for promoting health in the presence (or absence) of disease. Health majors and minors will be given enrollment priority. *Coreq:* BIOSC 223 or consent of instructor.

- HLTH 310 Women's Health Issues 3(3,0)** Exploration of specific health needs of women, with emphasis on understanding and preventing problems of women's health. Health majors and minors will be given enrollment priority. *Preq:* Two-semester sequence in science or consent of instructor.
- HLTH 315 Social Epidemiology 3(3,0)** Exploration of the current problems and issues associated with the health of population groups. The interrelationships of biological, sociocultural, behavioral, environmental, political, and economic risk factors and the health and illness patterns of those in population groups are examined. *Preq:* HLTH 298, 380 or consent of instructor.
- HLTH 320 Health Maintenance for Men 3(3,0)** Exploration of specific health maintenance needs of men, with emphasis on understanding and preventing problems of men's health. Health majors and minors will be given enrollment priority. *Preq:* Two-semester sequence in science or consent of instructor.
- HLTH 340 Health Promotion Program Planning 3(3,0)** Students develop skills to conduct community health needs assessments and to plan and evaluate theoretically grounded health promotion intervention programs for diverse populations. Best practices for specific health behavior change interventions are identified. *Preq:* HLTH 240, 298.
- HLTH 350 Medical Terminology and Communication 3(3,0)** Skills in building, analyzing, defining, pronouncing, and spelling medical terms related to the human body are developed and applied through electronic communication. *Preq:* Junior standing or consent of instructor.
- HLTH (AP EC, C R D) 361 Introduction to Health Care Economics 3(3,0)** See C R D 361.
- HLTH 380 Epidemiology 3(3,0)** Introduction to epidemiological principles and methods used in the study of the origin, distribution, and control of disease. Health majors and minors will be given enrollment priority. *Coreq:* Approved statistics course.
- HLTH H395 Honors Research Seminar 3(3,0)** Students review basic steps in the development of an honors research proposal and develop a draft of the proposal under the supervision of a faculty mentor. Students are also required to attend research presentations of senior departmental honors students. *Preq:* HLTH 380, Junior standing, statistics course, or consent of instructor.
- HLTH 398 Health Appraisal Skills 1(0,3)** Utilizes laboratory experiences to measure health risk, interpret laboratory health data, and design personal health programs. Restricted to Health Science majors. *Preq:* HLTH 298.
- HLTH 400, 600 Selected Topics in Health 1-3(1-3,0)** Topics selected to meet special and individualized interest of students in health. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Junior standing, consent of instructor.
- HLTH 401, 601 Health Consumerism 3(3,0)** Exploration of consumer decisions regarding health products and services emphasizing strategies for decision making. Health majors and minors will be given enrollment priority. *Preq:* Two-semester sequence in science or consent of instructor.
- HLTH 402 Principles of Health Fitness 3(3,0)** Students apply current theories concerning physiological effects of exercise to select new populations; understand the relationship between exercise and various chronic diseases; and design, execute, and evaluate exercise programs in terms of safety and effectiveness. *Preq:* HLTH 398, CPR certification. *Coreq:* BIOSC 223.
- HLTH 410, 610 Maternal and Child Health 3(3,0)** Focuses on key issues concerning the health status and needs of mothers and children. Topics include primary health care, measurement and indicators of health status, health of minorities, role of families, and major programmatic interventions towards the health needs of these two groups.
- HLTH 411 Health Needs of High Risk Children 3(3,0)** Analysis and evaluation of health needs of high-risk families and special needs children from the prenatal period to age six. Emphasizes health maintenance and early intervention strategies. *Preq:* HLTH 410.
- HLTH 415, 615 Public Health Issues in Obesity and Eating Disorders 3(3,0)** In-depth review of prevalence, risk factors, consequences, and treatments of obesity and other eating disorders. Focuses on the public health importance of cultural norms, prevention, and early intervention related to obesity and eating disorders. *Preq:* Junior standing in Health Science or consent of instructor.
- HLTH 419 Health Science Internship Preparation Seminar 1(1,0)** Preparation for internship experience. Includes topics such as résumé development, interviewing skills, internship agency selection, and responsibilities of student, department, and agency. *Preq:* Junior standing in Health Science.
- HLTH 420, 620 Health Science Internship 1-6(0,3-18)** Under supervision in an approved agency, students have an opportunity for on-the-job experiences. Students are placed in an agency and develop personal/professional goals and objectives appropriate to the setting, population, and health issues. Students create a comprehensive exit portfolio in a digital format. May be repeated for a maximum of six credits. *Preq:* HLTH 419, minimum grade-point ratio of 2.0, Junior standing in Health Science, consent of instructor.
- HLTH 430, 630 Health Promotion of the Aged 3(3,0)** Focuses on analysis and evaluation of health issues and health problems of the aged. Emphasizes concepts of positive health behaviors. Health majors and minors will be given enrollment priority. *Preq:* Developmental psychology, two-semester sequence in science, or consent of instructor.
- HLTH 431 Public and Environmental Health 3(3,0)** Principles of environmental health emphasizing understanding various health concerns created by the interactions of people with their environment. Students evaluate the impact of environmental factors on public health policy decisions. Meets specific area of need in environmental health issues.
- HLTH 440 Managing Health Service Organizations 3(3,0)** Provides the conceptual and theoretical foundation of management and organizational theory of health service organizations. Focuses on the role of health services managers and how they modify and maintain organizations.
- HLTH 450, 650 Applied Health Strategies 3(3,0)** Students plan, implement, and evaluate strategies to promote health through individual behavior changes. Both healthful and unhealthful behaviors are included. Examples include smoking cessation, weight management, and stress management. *Preq:* HLTH 480, Health Science major.
- HLTH 460 Health Information Systems 3(3,0)** Focuses on the application of information systems to patient care and management support systems. Provides a general understanding of how the information needs of health professionals and health service organizations can be met through the proper acquisition, storage, analysis, retrieval, and presentation of data.
- HLTH 470 International Health 3(3,0)** Deepens students' knowledge of global health and how public health work is conducted internationally. Introduction to assessment of international health needs and designing, implementing, managing, and evaluating public health programs in international settings. *Preq:* HLTH 298.
- HLTH 475 Principles of Health Care Operations Management and Research 3(3,0)** Provides a foundation in concepts, structure, and analysis that enables an understanding of the importance of production/operations management within health care organizations and systems. Includes training in operations research methods and objectives. *Preq:* HLTH 490.
- HLTH 478 Health Policy Ethics and Law 3(3,0)** Critical examination of the legal and ethical dimensions of public health policy formation and change and how legal, ethical, and policy considerations influence health services administration and delivery. Health majors and minors will be given enrollment priority. *Preq:* HLTH 202, 240, 298, 380 or consent of instructor.
- HLTH 479 Financial Management and Budgeting for Health Service Organizations 3(3,0)** Overview of basic principles of budgeting and financial management and analysis for health services organizations. Techniques for financial management are provided with an emphasis on health services environments. *Preq:* HLTH 440.
- HLTH 480 Community Health Promotion 3(3,0)** Focuses on the participatory approach in the planning and implementation of community health programs. Emphasizes professional ethics, needs assessment, coalition building, proposal writing, and implementation of special events in the community. *Preq:* HLTH 303, 340, 380, Health Science major.
- HLTH 490 Research and Evaluation Strategies for Public Health 3(3,0)** Discussion of research in health. Focuses on analysis of reported research. Ethical, moral, and legal issues are discussed. *Preq:* EX ST 301, MTHSC 203, or 301.
- HLTH H495 Honors Thesis Seminar 3(3,0)** Senior honors thesis seminar in public health sciences. Independent research is conducted under the supervision and guidance of a faculty mentor for students enrolled in departmental honors program in support of an honors thesis/service learning research project. *Preq:* HLTH H395, Senior standing, or consent of instructor.

HLTH H496 Honors Research Colloquium 1(1,0) Students enrolled in departmental honors present independent research conducted under the supervision of a faculty member in a public research forum to other honors students and public health professionals and/or submit a paper or presentation based on this research for publication. *Preq:* HLTH H495, Senior standing.

HLTH 497 Creative Inquiry—Public Health 1-4(1-4,0) In consultation with and under the direction of a faculty member, students pursue scholarly activities individually or in teams. These creative inquiry projects may be interdisciplinary. Arrangements with mentors must be established prior to registration. May be repeated for a maximum of eight credits.

HLTH 498, 698 Improving Population Health 3(3,0) Critical examination of current and emerging issues in improving public health practice and population health. Covers examples in empirical and applied research, revealing future trends in population health. Health Science majors and minors will be given enrollment priority. *Preq:* HLTH 240, 298, 380, or consent of instructor.

HLTH 499 Independent Study 1-3(1-3,0) Study of selected problems in health under the direction of faculty member chosen by the student. Student and faculty member develop a course of study designed for the individual student and approved by the department chair prior to registration. May be repeated for a maximum of three credits. *Preq:* Junior standing or consent of instructor.

HISTORIC PRESERVATION

Professor: J. Burden

H P 410, 610 History and Theory of Historic Preservation 3(3,0) Survey history of preservation that explores a variety of theoretical issues that impact the discipline. Provides a basis for critical evaluation of historic preservation. *Preq:* Three semesters of Art and Architectural History or equivalent or consent of instructor.

H P 411, 611 Research and Documentation in Historic Preservation 3(3,0) Introduction to documenting and recording historic buildings and landscapes. Charleston and its environs provide case study projects for archival research, field investigation, and preparation of final documentation. *Preq:* Three semesters of Art and Architectural History or equivalent or consent of instructor.

H P 412, 612 Materials and Methods of Historic Construction 3(3,0) Survey of traditional materials and methods of construction in America from the 18th through the early 20th century. Scientific examination of historic construction provides case studies. *Preq:* Three semesters of Art and Architectural History or equivalent or consent of instructor.

HISTORY

Professors: S. L. Barczewski, E. D. Carney, H. R. Grant, T. J. Kuehn, *Chair*; S. G. Marks, D. M. McKale, E. E. Moise, R. L. Saunders, Jr; *Associate Professors:* P. C. Anderson, J. R. Andrew, Jr., J. M. Burns, C. A. Grubb, P. E. Mack, M. N. Taylor-Shockley; *Assistant Professors:* A. Bein, R. A. Chico, J. L. Grisinger, J. D. Hamblin, M. S. Silvestri; *Visiting Assistant Professor:* J. B. Jeffries

HIST 100 Higher Education and Clemson 1(1,0) Introduction to higher education, its background and development in the western world, emphasizing land-grant institutions and Clemson University in particular.

HIST 101, H101 History of the United States 3(3,0) Political, economic, and social development of the American people from the period of discovery to the end of Reconstruction.

HIST 102, H102 History of the United States 3(3,0) Political, economic, and social development of the American people from the end of Reconstruction to the present.

HIST 122, H122 History, Technology, and Society 3(3,0) Topics in the history of technology with emphasis on how technology affects society and how society shapes technology. Emphasis is on 19th and 20th century America, but some material from other periods of Western Civilization and other world regions may be discussed.

HIST 124, H124 Environmental History Survey 3(3,0) Introduction to environmental history, in the United States and globally, with emphasis on changing attitudes toward the environment and the interaction between science and public policy.

HIST 172, H172 Western Civilization 3(3,0) Political, economic, and social movements of Western civilization from ancient times to the 17th century.

HIST 173, H173 Western Civilization 3(3,0) Political, economic, and social movements of Western civilization from the 17th century to the present.

HIST 193 Modern World History 3(3,0) Political, economic, social, and cultural history of the modern world from the 19th century to the present.

HIST 198 Current History 1(1,0) Examination of major events and problem areas in the news emphasizing their historical context and possible long-range significance. May be repeated for a maximum of three credits. Does not count toward the requirements of the major or minor in History.

HIST 200 Fort Hill Internship 1-3 Provides practical experience in public history museum work and/or historical preservation in the setting of Fort Hill. May be repeated for a maximum of three credits. To be taken Pass/Fail only. *Preq:* Consent of internship committee.

HIST 201 Prelaw Internship 1-3 Faculty-supervised internship in a law firm or other legal setting. Introduces students to the workings of the legal system. To be taken Pass/Fail only. *Preq:* History major and sophomore standing.

HIST 202 Internship 1-3(0,3-9) Exposes History majors to hands-on experience in research, analysis, and public presentation of historical scholarship. May include working with faculty on research projects or museums, historical organizations, or sites. May be repeated for a maximum of three credits. To be taken Pass/Fail only. *Preq:* Sophomore standing.

HIST 289 Creative Inquiry—History 1-4(1-4,0) In consultation with and under the direction of a faculty member, students pursue scholarly activities individually or in teams. These creative inquiry projects may be interdisciplinary. Arrangements with mentors must be established prior to registration. May be repeated for a maximum of nine credits.

HIST 299 Seminar: The Historian's Craft 4(3,2) Writing and speaking intensive course to introduce History majors to study of what history is and what a historian does, including historiography, research techniques, ethics of the historical profession, and forms of presentation. *Preq:* History major.

HIST 300 History of Colonial America 3(3,0) Development of American institutions and customs in the period before 1776. Considerable emphasis is placed on the imperial relations between Great Britain and her colonies and upon the movement towards and the philosophy of the American Revolution.

HIST 301 American Revolution and the New Nation 3(3,0) Study of the various historical explanations leading to an understanding of the American Revolution, the establishment of the Nation under the Constitution, and the first decade of the new nation. Special emphasis is on developing an understanding of individual motivation and ideological development present during the last four decades of the 18th century.

HIST 302 Age of Jefferson, Jackson, and Calhoun 3(3,0) Formation and growing pains of the new nation through the Federal and Middle periods of its history emphasizing economic and political development, the westward movement, and the conflicting forces of nationalism and sectionalism.

HIST 303 Civil War and Reconstruction 3(3,0) Study of the political, military, and social aspects of the sectional conflict and of the era of Reconstruction. Some emphasis is placed on the historical controversies which the period has inspired.

HIST 304 Industrialism and the Progressive Era 3(3,0) Study of American society in the period between the 1880s and 1930s. Emphasizes the effects of industrialization and urbanization on the American people.

HIST 305 The United States in the Jazz Age, Depression, and War: 1918–1945 3(3,0) Starting at Armistice Day, 1918, course analyzes the dawn of the ages of mass consumption and mass communication, the Crash of 1929, Franklin Roosevelt and the New Deal, the gathering war clouds in Europe and Asia, and the Great Crusade of World War II. *Preq:* Sophomore standing.

- HIST 306 The United States in the Postwar World: 1945–1975 3(3,0)** Examination of the American experience from the end of World War II through the period of the Korean and Vietnam wars, the Cold War, the Civil Rights movement, the counter-culture of the 1960s, assassinations, and Watergate.
- HIST 308 The United States in the Age of Reagan and Clinton: 1975–Present 3(3,0)** The United States and the world in the recent era of economic and political upheaval, the end of the Cold War, the rise of the global economy and terrorism, social and cultural change, and deepening political and social divisions. *Prq:* Sophomore standing.
- HIST 311 African Americans to 1877 3(3,0)** Study of the African-American experience in the United States from the African past through slavery to 1877.
- HIST 312 African American History from 1877 to the Present 3(3,0)** Study of African American experience in the United States from 1877 to the present.
- HIST 313, H313 History of South Carolina 3(3,0)** Political, economic, and social development of South Carolina from 1670 to the present.
- HIST 314 History of the South to 1865 3(3,0)** Origins and development of political, social, economic, and cultural institutions of the South from the Colonial period to the end of the Civil War and the role of the South in the nation's development.
- HIST 316 American Social History 3(3,0)** Study of American society, including the relationship among classes, ethnic groups, regions, and sexes, from the Colonial period to the present.
- HIST 318 History of American Women 3(3,0)** Survey course of the history of American women emphasizing the changing role of women in American culture and society.
- HIST 319 Women and Law in United States History 3(3,0)** Survey of the legal status of women throughout United States history. Emphasizes the relationship between legal rules and social conditions and the way in which law defined the status of women over time and helped change their status and rights.
- HIST 321 History of Science 3(3,0)** Survey of the development of science in the Western world, emphasizing the period from the Renaissance to the present.
- HIST 322 History of Technology 3(3,0)** History of the major developments in Western technology and their relationships to the societies and cultures in which they flourished.
- HIST 323 History of American Technology 3(3,0)** History of developments in technology and their role in American life with particular emphasis on the American Industrial Revolution and the 20th century.
- HIST 324 History of the South, 1865 to the Present 3(3,0)** Development of political, social, and cultural institutions of the South from the end of the Civil War to the present and the South's relationship to the rest of the nation.
- HIST 325 American Economic Development 3(3,0)** Economic development of the United States from Colonial to recent times, emphasizing the institutional development of agriculture, banking, business and labor, and government regulations and policy.
- HIST 326 History of American Transportation 3(3,0)** Examines the principal forms of transportation in the United States from colonial times to the present, including water, road, canal, railroad, internal combustion, and air. Emphasizes technological developments and economic, geographic, and social impact of specific transport forms.
- HIST 327 American Business History 3(3,0)** Survey of the history of American business using a case-study approach. Focuses on the effects that policies and institutions have on individual businesses.
- HIST 328 United States Legal History to 1890 3(3,0)** Survey of American legal system in its historical perspective from Colonial times to 1890. Emphasizes the relationship between law and society, the way in which the practice of law changed American society, and the way in which social development affected both the theory and practice of the law.
- HIST 329 United States Legal History Since 1890 3(3,0)** Examination of the social, cultural, intellectual, economic, and political forces that have helped shape the law in the U.S. since 1890.
- HIST 330 History of Modern China 3(3,0)** Growth and development of Chinese civilization from ancient times to the present. Emphasis is on 20th century China, particularly since the rise to power of the Communist regime.
- HIST 333 History of Modern Japan 3(3,0)** Origin and development of Japanese civilization with particular emphasis on modern Japan from mid-19th century to the present.
- HIST 334 Premodern East Asia 3(3,0)** Introduction to histories of China and Japan, from antiquity to approximately 1850. Political, religious, artistic, and other aspects of premodern society are examined and compared in order to gain significant insights regarding the premodern antecedents of these two dynamic and important nations.
- HIST 337 History of South Africa 3(3,0)** Examines the important trends in the history of South Africa from earliest times to the present. Topics include nature of precolonial society, European immigration, rise of industrial capitalism, advent of Apartheid, and the liberation struggle.
- HIST 338 African History to 1875 3(3,0)** Study of sub-Saharan Africa from antiquity to European colonial rule, exploring the development of Stone Age cultures; agricultural and pastoral societies; ancient civilizations; political, economic, and social systems; gradual shift of initiative from the interior to the coast; and various slave trades.
- HIST 339 Modern Africa, 1875 to the Present 3(3,0)** Study of sub-Saharan Africa from 1875 to the present, with the focus placed upon the development and decline of European imperialism, dilemmas of African independence, and ethnic struggles in Southern Africa.
- HIST 340 Latin America: From Conquest to Independence 3(3,0)** Examination of the encounters, collaborations, and clashes that characterized the conquest period and beyond in Latin America. Readings are assigned regarding the spiritual, biological, social, and political consequences of the meeting of Indians, Africans, and Europeans. Historical sources include images, artwork, letters, and memoirs.
- HIST 341 Modern Mexico 3(3,0)** Introduction to the geography of the region; origins and progress of the Independence movements; political, economic, and social developments after 1825; and current domestic and international problems.
- HIST 342 South America Since 1800 3(3,0)** Introduction to the geography of the region; origins and progress of the Independence movements; political, economic, and social developments after 1825; and current domestic and international problems.
- HIST 351 Ancient Near East 3(3,0)** History of the peoples and civilizations of the Near East from the Sumerians to the establishment of Roman power in this region. Includes geography, mythology, religious, and economic currents as well as the methods and discoveries of archaeology.
- HIST 352 Egypt in the Days of the Pharaohs 3(3,0)** Egyptian civilization from its beginning until the period of Roman conquest. Includes a survey of political history but also deals with daily life, making much use of archaeological evidence.
- HIST 353 Women in Antiquity 3(3,0)** Focuses on women in the ancient period in Mesopotamia, Israel, Egypt, Greece, Rome, and in the early Christian Church. Formation of gender roles and issues related to ancient sexuality also receive attention.
- HIST 354 The Greek World 3(3,0)** Study of Greek civilization from its beginning until the time of the Roman conquest, concentrating on the social institutions of the Greek city-states.
- HIST 355 The Roman World 3(3,0)** Considers the rise of Rome to world empire and the international civilization it dominated. Concentrates on the nature of the political change from Republic to monarchy with particular emphasis on city life and the causes of its decline.
- HIST 361 History of England to 1688 3(3,0)** Evolution of English political, social, economic, and cultural institutions to the 17th century. (Study Abroad)
- HIST 363 Britain Since 1688 3(3,0)** Study of political, cultural, social, economic, and imperial issues in the history of the British Isles from the late 17th century to the present.
- HIST 365 British Cultural History 3(3,0)** Examination of topics in British cultural history from the 17th century to the present. Emphasizes the 19th and 20th centuries.
- HIST 367 Modern Irish History 3(3,0)** Examines Irish history over the past four centuries, with particular attention to the 19th and 20th centuries. Irish political, social, economic, and cultural history, Anglo-Irish relations, and the Irish diaspora are considered.

- HIST 370 Medieval History 3(3,0)** Survey of the period from the eclipse of Rome to the advent of the Renaissance, emphasizing human migrations, feudalism, rise of towns, and cultural life.
- HIST 372 The Renaissance 3(3,0)** Examination of the transitional period of European civilization (ca. 1300–1500) emphasizing institutional, cultural, and intellectual developments.
- HIST 373 Age of the Protestant Reformation 3(3,0)** Evolution of Modern Europe (ca. 1500–1660), as affected by the Reformation, wars of religion, and growth of nation-states. Study includes intellectual advances and the beginnings of European expansion overseas.
- HIST 374 Europe in the Age of Reason 3(3,0)** Study of the quest for order and the consolidation of the European state system between 1660 and 1789 with emphasis on the idea of absolutism, the question of French hegemony, and the synthesis of the 18th-century Enlightenment.
- HIST 375 Revolutionary Europe 3(3,0)** History of Europe from the outbreak of the French Revolution through the Revolutions of 1848 emphasizing the conflict between the forces of change and those of conservatism, within the states and in Europe in general.
- HIST 377 Europe, 1914–1945 3(3,0)** Focuses on Europe during two major wars and the peacetime adjustments Europeans made, or failed to make, during the twenty-year interim between those wars.
- HIST 378 Europe Since 1945 3(3,0)** Focuses on how World War II completed the destruction of European global hegemony, creating a bipolar continent with the west dominated by the United States and the east by Soviet Russia, and how Europe adjusted to this situation.
- HIST 380 Imperial Germany 3(3,0)** German history from the beginning of the German Empire, 1870–71, through World War I. Emphasizes the influence of militarism, nationalism, anti-Semitism, and xenophobia on the German culture and political process.
- HIST 381 Germany Since 1918 3(3,0)** German history from the time of Germany's defeat in World War I, through the Nazi period and World War II. Culminates with the study of a divided Germany.
- HIST 384 History of Modern France 3(3,0)** French history from mid-19th century to the present with particular emphasis on France since 1900.
- HIST 385 History of Imperial Russia 3(3,0)** Survey of the formative years of the Russian Empire from the time of accession of Peter the Great to the time of the Russian Revolution. Social, political, diplomatic, and intellectual developments are given equal treatment.
- HIST 386 History of the Soviet Union 3(3,0)** Soviet history from the revolution to the present. Surveys the creation and subsequent development of the communist political and social system, with attention given to culture and diplomacy.
- HIST 387 The Russian Revolution 3(3,0)** History of one of the most formative series of events of the 20th century. Follows the crisis of Imperial Russia, its downfall during World War I, and subsequent revolutionary upheaval leading to the formation of the USSR.
- HIST 390 Modern Military History 3(3,0)** Survey of the development of modern warfare and the influence of technological change on warfare. Particular attention is given to the major conflicts of the 20th century.
- HIST 391 Post World War II World 3(3,0)** Examines the world in the age of the Cold War; the breakdown of the colonial empires; and racial, religious, ethnic, national, and social tensions. The United States provides the central core to the class.
- HIST 392 History of the Environment of the United States 3(3,0)** Examination of the historical development of the attitudes, institutions, laws, people, and consequences that have affected the environment of the United States from pre-Columbian days until the present. Emphasizes the interaction of human beings within and with the environment.
- HIST 393 Sports in the Modern World 3(3,0)** Analysis of the global evolution and diffusion of sports in the industrial age emphasizing the linkage of sports structure and performance to the larger social context.
- HIST 394 Non-Western History 3(3,0)** Examines the important trends in world history since 1500—including capitalism, industrialization, nationalism, migration, and imperialism—with a focus on non-Western regions. *Preq:* HIST 173.
- HIST 396 History of the Middle East 3(3,0)** Examines the histories, cultures, and societies of the Middle East from late antiquity to the present day.
- HIST 397 Modern Middle East 3(3,0)** Examines the histories, cultures, and societies of the Middle East from the 18th century to the present day with particular emphasis on contemporary issues.
- HIST 400, 600 Studies in United States History 3(3,0)** Topics and problems in the history of the United States from the Colonial era to the present. May be repeated once for credit with departmental consent.
- HIST 409 Kennedy Assassination and Watergate 3(3,0)** Journey into the underbelly that examines the diverse elements of national security, divisive politics, the Cold War and Cuba, FBI, CIA, the mob, fanaticism, anomie, and threats to the stability of the republic that seem to have come together in Dallas in 1963 and in Watergate. *Preq:* Junior standing.
- HIST 420, 620 History and Film 3(2,3)** Analyzes the role of the cinema in the construction and dissemination of history. May be repeated once for credit with departmental consent.
- HIST 424, 624 Topics in History of Medicine and Health 3(3,0)** Selected topics in the development of medicine and health care including public attitudes towards health and medicine.
- HIST 436, 636 The Vietnam Wars 3(3,0)** Wars in Vietnam are seen in two phases. The First Indochina War, 1946–54, is covered briefly. Main body of the course covers the Second Indochina War, which began as a guerrilla conflict in 1959–60 and ended as a mostly conventional war in the Communist victory of 1975.
- HIST 438, 638 Problems in African Historiography and Methodology 3(3,0)** Concentrates on major issues in the field of African history with an additional focus on methodological concerns. May be repeated once for credit with departmental consent.
- HIST 440, 640 Studies in Latin American History 3(3,0)** Consideration of selected and varied topics in Latin American history through readings, discussions, and individual or group projects. Special attention is given to the use of an inquiry or problem-solving method of historical analysis and to the cultivation of a comparative perspective. May be repeated once for credit with departmental consent.
- HIST 451, 651 Alexander the Great 3(3,0)** Focuses on the career of Alexander the Great and deals with the history and archaeology of ancient Macedonia.
- HIST 460, H460, 660 Studies in British History 3(3,0)** Examination of selected themes, topics, or periods in British history from Anglo-Saxon times to the present. May be repeated once for credit with departmental consent.
- HIST 470, 670 Studies in Early European History 3(3,0)** Study of selected topics or themes in European history from the fall of the Roman Empire to the age of industrialization. May be repeated once for credit with departmental consent.
- HIST 471, H471, 671 Studies in Modern European History 3(3,0)** Study of selected topics or problems in European history from the end of the Old Regime to the present. May be repeated once for credit with departmental consent.
- HIST 490 Senior Seminar 3(3,0)** Seminar in current research themes in history. Students conduct directed research on a particular topic and learn research, writing, and oral presentation techniques. Seminar topics vary from section to section and from semester to semester. *Preq:* History major, Senior standing, and HIST 299 with a C or better.
- HIST 491, H491, 691 Studies in the History of Science and Technology 3(3,0)** Selected topics in the development of science and technology emphasizing their social, political, and economic effects. May be repeated once for credit with departmental consent.
- HIST 492, 692 Studies in Diplomatic History 3(3,0)** Selected topics and problems in international conflict and conflict resolution among nations. Concentration is usually in 20th century history. May be repeated once for credit with departmental consent.
- HIST 493, 693 Studies in Social History 3(3,0)** Studies in the ways people have earned their livings and lived their lives, individually and as communities, in the confines of different societies. May be repeated once for credit with departmental consent.
- HIST 494, 694 Studies in Comparative History 3(3,0)** Selected topics in comparative history, contrasting and comparing similar historic developments in different nations, geographic areas, or civilizations. May be repeated once for credit with departmental consent.

HIST 495, 695 Studies in the History of Ideas 3(3,0) Selected topics and themes in the development of ideas that have had an impact on the behavior of individuals and civilizations. May be repeated once for credit with departmental consent.

HIST 496, 696 Studies in Legal History 3(3,0) Study of selected problems in the development of law and the system of criminal and civil justice. May be repeated once for credit with departmental consent.

HIST H497 Senior Honors Research 3(3,0) Research for the preparation of senior honors thesis. *Preq:* Senior standing, completion of a 400-level history course, approval of the History Department. May be repeated once for credit with departmental consent.

HIST H498 Senior Honors Thesis 3(3,0) Writing of the senior honors thesis. May be repeated once for credit with departmental consent. *Preq:* HIST H497.

HIST 499 Independent Study 1-3(1-3,0) Study of selected problems in history under the direction of a faculty member chosen by the student. Student and faculty member develop a course of study designed for the individual student and approved by the department chair prior to registration. May be repeated once for credit with departmental consent.

HORTICULTURE

Professors: W. V. Baird, D. W. Bradshaw, M. T. Haque, L. B. McCarty, T. Whitwell, *Chair; Associate Professors:* J. W. Adelberg, J. D. Caldwell, J. E. Faust, H. Liu; *Assistant Professors:* D. G. Bielenberg, C. E. Wells

HORT 101 Horticulture 3(3,0) Environmental factors and horticultural practices affecting optimum production of floral, fruit, ornamental, and vegetable crops. Includes a survey of the various areas of horticulture and their importance to society.

HORT 102 Experience Horticulture 1(0,2) Students experience the art, science, business, and diversity of horticulture through visits to greenhouses, nurseries, botanical gardens, athletic fields, golf courses, orchards, farms, and research fields and laboratories. Students learn about horticulture from a cross section of professionals sharing their work experiences. *Preq:* Freshman or sophomore standing in Horticulture or Turfgrass.

HORT 202 Selected Topics 1-3(1-3,0) Introduction to developing trends, concepts or technologies in horticulture and/or turfgrass. May be repeated for a maximum of three credits, but only if different topics are covered. *Preq:* Consent of instructor.

HORT 208 Landscape Appreciation 3(3,0) Deepens students' appreciation of natural and built environments through a study of landscape elements, styles, and professions. Landscapes ranging in scale from residential to regional are critiqued, and design principles and landscape ethics are discussed.

HORT 212 Introduction to Turfgrass Culture 3(3,0) Studies of the introductory principles associated with the art and science of turfgrass culture. Develops an understanding of the history and evolution of turfgrasses and turfgrass culture. Explores career potentials in turfgrass management. Explains the basic scientific principles and techniques associated with the propagation and establishment of fine turfgrasses. *Preq:* BIOSC 205, 206.

HORT 213 Turfgrass Culture Laboratory 1(0,2) Provides hands-on activities and understanding of basic principles and techniques in turfgrass culture. Students learn all phases of turfgrass management including identification, turfgrass culture, common turfgrass pest identification and control. *Coreq:* HORT 212.

HORT 271 Internship 1-6(0,2-12) Preplanned, practical, supervised work experience to give beginning students on-the-job learning opportunities that support classroom experience. Students submit monthly reports and present a departmental internship seminar. Undergraduates may accumulate a maximum of six credits for participation in HORT 271 and/or 471. *Preq:* Consent of instructor.

HORT 303 Landscape Plants 3(2,3) Woody, ornamental plants and their aesthetic and functional uses in landscape developments. Study covers habit of growth, ultimate size, texture effect, period of bloom, color, and cultural requirements.

HORT 304 Annuals and Perennials 3(2,3) Annual and perennial flowers' aesthetic appeal and functional uses and needs. Color, texture, bloom time, form, size, and growth requirements as they relate to designing, planting, and maintaining colorful landscapes. *Preq:* HORT 208, 303, or consent of instructor.

HORT 305 Plant Propagation 3(2,3) All phases of plant propagation from seeds, bulbs, divisions, layers, cuttings, budding, and other types of grafting are comprehensively treated. Timing, manner, and material for making cuttings; temperature and media requirements and propagation structures for rooting cuttings of ornamental and fruit trees, shrubs, and indoor plants are studied.

HORT 306 Plant Propagation Techniques Laboratory 1(0,3) Techniques of plant propagation including sexual methods: germination, scarification, and stratification. Asexual methods including grafting, budding, cuttings, layering, tissue culture divisions, and separations. Local nurseries are visited. *Coreq:* HORT 305.

HORT 308 Landscape Design 4(3,3) Landscape planning of residential and public properties in order to achieve best use and most enjoyment from a given piece of ground. Offered fall semester only. *Preq:* HORT 208, 303, or consent of instructor.

HORT 310 Growing Landscape Plants 3(2,3) Principles, technologies, and techniques of landscape plant production and growth including environmental control and manipulation, water, nutrient and pest management, scheduling, propagation, and plant problem diagnostics. Emphasizes herbaceous ornamentals along with significant woody landscape plants. *Preq:* HORT 101 or equivalent.

HORT 400 Selected Topics 1-6(1-6,0) Advanced study of any aspect of horticulture and/or turfgrass not addressed in other courses. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Junior standing or consent of instructor.

HORT 406, 606 Nursery Technology 3(2,3) Principles and techniques in handling nursery crops. *Preq:* HORT 303, 305.

HORT 408 Horticulture Discovery and Inquiry 1-9(0,3-18) Students learn about horticulture through research, service learning, and/or creative inquiry projects. They explore a topic of interest with faculty, organize a quality proposal, complete the project, and report results to appropriate professional audiences. *Preq:* Junior standing or consent of instructor.

HORT 409 Seminar 1(1,0) Recent research work on various phases of horticulture, methods of conducting investigations, and preparation of report of investigations.

HORT 412, 612 Advanced Turfgrass Management 3(2,3) Advanced principles and practices associated with turfgrass management for golf courses, sports fields, sod production, and commercial lawn care. Topics include turfgrass physiology, plant growth and development, construction, turfgrass nutrition, irrigation, drainage, pesticide use and fate, and development of effective management systems. *Preq:* CSENV 202, HORT 212, or consent of instructor.

HORT 420, 620 Applied Turfgrass Physiology 3(3,0) Advanced course in turfgrass science and management. Provides the current status and development of turfgrass stress physiology and research. Main topics include temperature, drought, traffic, edaphic stresses, new developments in the turf industry and environmental stewardship. *Preq:* HORT 212, 213.

HORT (FOR) 427, 627 Urban Tree Care 3(3,0) See FOR 427.

HORT (CSENV) 433, 633 Landscape and Turf Weed Management 3(2,2) Weed management strategies that include cultural, biological, and chemical methods are studied for landscape and turfgrass areas. Problem-solving skills and herbicide characteristics are emphasized. *Preq:* HORT 212 or consent of instructor.

HORT 455, 655 Just Fruits 3(3,0) Students explore the origins, biology, culture, and production of major temperate zone fruits—apples, berries, and cherries to pawpaws, peaches, and pomegranates, the familiar to the forbidden. They discover principles, practices, and technologies employed to grow, protect, and harvest the fruits that feed us from commercial orchards, organic farms, and backyards. *Preq:* HORT 101 or consent of instructor.

HORT 456, 656 Vegetable Crops 3(3,0) Principles and practices employed in commercial growing and marketing of vegetable crops with emphasis on plant characteristics, cultivars, management practices, harvest, quality factors and grading, storage, economic importance, and areas of production.

HORT 461, H461, 661 Problems in Landscape Design 4(3,3) Landscape planning for larger residential properties, schools, industrial plants, real estate developments; detailed finished plans; further study of materials used; original problems; field study. *Preq:* HORT 308 or consent of instructor.

HORT (BIOSC, GEN) 465, 665 Plant Molecular Biology 3(3,0) Study of fundamental plant processes at both the cellular and molecular levels. Topics include genome structure and organization (both nuclear and organellar); regulation of gene expression and its role in cellular and whole-plant processes; transposable genetic elements; applications for biotechnology. *Preq:* Junior standing or consent of instructor; BIOSC 304 or 305; GEN 302.

HORT 471, 671 Advanced Internship 1-6(0,2-12) Preplanned work experience under competent supervision in approved agency dealing with horticultural endeavors. Gives advanced students on-the-job learning opportunities to apply acquired knowledge and skills. Monthly reports and final departmental seminar required. Undergraduates may accumulate a maximum of six credits for participation in HORT 271 and/or 471. *Preq:* Junior standing and consent of instructor.

HORT 472, 672 Garden Experiences in Youth Development 2(1,3) Exploration of the role of gardening and related outdoor experiences in enhancement of educational development, self-esteem and pro-social behavior in elementary school children. *Preq:* Senior standing and consent of instructor.

HUMANITIES

Professor: S. K. Eisiminger; *Associate Professor:* A. Bennett

HUM 301 Humanities 3(3,0) Introduction to humanistic studies focusing on relationships among disciplines—painting, sculpture, architecture, music, literature, philosophy, and drama—beginning with prehistory and continuing to the Renaissance.

HUM 302 Humanities 3(3,0) Introduction to humanistic studies focusing on relationships among disciplines—painting, sculpture, architecture, music, literature, philosophy, and drama—beginning with the 17th century and continuing to the present.

HUM 306 Creative Genius in Western Culture 3(3,0) Investigation of creativity through study of great innovators in art, literature, music, and ideas. May be repeated once for credit.

HUM 309 Studies in Humanities 3(3,0) Interdisciplinary approach to the humanities. Special subject matter varies according to the instructor and as approved by the chair of the English Department. May be repeated once for credit.

HUM (ENGL) 456, 656 Literature and Arts of the Holocaust 3(3,0) See ENGL 456.

INDUSTRIAL ENGINEERING

Professors: A. K. Gramopadhye, *Chair*; W. G. Ferrell, D. L. Kimbler, S. A. Shappell; *Associate Professors:* B. R. Cho, Jr., J. S. Greenstein, B. J. Melloy; *Assistant Professors:* M. E. Kurz, M. E. Mayorga, K. M. Taaffe

I E 201 System Design I 4(3,3) Introduction to the design of industrial engineering systems. Design methodologies are introduced in the context of a design process that includes identifying user needs; developing a design specification; generating, evaluating, refining, and selecting design concepts; detail design; constructing, testing, and refining prototypes; and delivering the product to the customer. *Preq:* CES 102, ENGL 103.

I E 210 Design and Analysis of Work Systems 4(3,3) Workplace design, ergonomics of workplace design, performance measurement, and methods engineering are discussed.

I E 220 Design of Information Systems in Industrial Engineering 3(3,0) Introduction to Visual Basic and object-oriented programming principles, databases, and software applications of human-centered system design.

I E 268 Creative Inquiry Seminar 1(1,0) Students are introduced to creative inquiry methods, resources, and current activities in a seminar format. To be taken Pass/Fail only.

I E 280 Methods of Operational Research I 3(3,0) Introduction to operations research models, including linear programming, integer linear programming, transportation and assignment problems, and network flows. *Preq:* MTHSC 106.

I E H300 Junior Honors Seminar 1(1,0) Acquaints students enrolled in the Departmental Honors Program with current research issues in the profession. This assists students in preparing a research proposal for the senior thesis. *Preq:* Junior standing, admission to Departmental Honors Program.

I E 360 Industrial Applications of Probability and Statistics 3(3,0) Axioms of probability, discrete and continuous distributions, and sampling distributions applied to industrial engineering applications. Engineering applications of statistical estimation, hypothesis testing, and confidence intervals. *Preq:* MTHSC 206.

I E 361 Industrial Quality Control 3(3,0) Quality engineering techniques focusing on process control using statistical methods including control charts and acceptance sampling. *Preq:* I E 360.

I E 368 Professional Practice in Industrial Engineering 1(1,0) Seminar to orient students to issues of professional development and professional practice of industrial engineering.

I E 381 Methods of Operational Research II 3(3,0) Probabilistic modeling of engineering systems. Topics include calculus-based probability, decision analysis, Markov processes, queueing, and reliability. *Preq:* I E 280, 360.

I E 384 Engineering Economic Analysis 3(3,0) Basic principles and techniques of economic analysis of engineering projects. Consideration of time, value of money, short- and long-term investments, replacement analysis, depreciation methods, cost allocation, and measures of cost effectiveness. *Preq:* MTHSC 108.

I E 386 Production Planning and Control 3(3,0) Fundamentals of forecasting demand, scheduling production, and controlling the movement and storage of material associated with production are studied. State-of-the-art manufacturing techniques are discussed. *Preq:* I E 280; CP SC 161 or I E 220.

I E H400, 600 Honors Thesis 1-6(1-6,0) Individual or joint research project performed with a faculty mentor or committee of faculty. May be repeated for a maximum of six credits. *Preq:* I E H300 or consent of mentor.

I E 402 Creative Inquiry Projects 1-3(1-3,0) Project-oriented experience promoting reasoning, critical thinking, ethical judgment, communication skills, and an understanding of the scientific method and engineering design. Typical experiences include design projects, service-learning activities, and applied/basic research, usually undertaken with a team under the mentorship of a faculty member or advanced graduate student. May be repeated for a maximum of nine credits. *Preq:* I E 268 and consent of mentor.

I E 440, 640 Decision Support Systems in Industrial Engineering 4(3,2) Study of design of decision support systems for production and service systems based on operations research models. Includes use of spreadsheets, databases, and integrated software development environments to implement decision support systems. *Preq:* I E 280; CP SC 161 or I E 220.

I E (MGT) 444 International Perspectives in Industrial Management 1-6(1-6,0) See MGT 444.

I E 452, 652 Reliability Engineering 3(3,0) Probabilistic approach to assessing system reliability. Methods for analyzing serial, parallel, and complex systems. Reliability life testing and its acceleration are covered. Essential elements of maintainability are identified and related to system availability. *Preq:* I E 360.

I E 456, 656 Supply Chain Design and Control 3(3,0) Industrial engineering aspects of supply chains including design and control of material and information systems. *Preq:* I E 386.

I E 457, 657 Transportation and Logistics Engineering 3(3,0) Introduces transportation and logistics systems analysis from both analytical and practical perspectives. Covers methods for identifying level-of-service metrics and measuring system performance. Discusses key aspects of modeling, simulation, and other techniques for economic and quantitative analysis of transportation and logistics planning issues. *Preq:* Senior standing in engineering, science, or management program.

I E 460, 660 Quality Improvement Methods 3(3,0) Study of modern quality improvement techniques presented in an integrated, comprehensive context. *Preq:* Junior standing.

I E 461, 661 Quality Engineering 3(3,0) Design aspects of quality and the engineer's role in problems of quality in production systems. *Preq:* I E 360.

I E 462, 662 Six Sigma Quality 3(3,0) Study of DMAIC (Define, Measure, Analyze, Improve, and Control) elements of Six Sigma, project management, process analysis, quality function deployment, hypothesis testing, gage R&R, data analysis, multivari-analysis, design of experiments, statistical process control, and process capability analysis. *Preq:* EX ST 301, 411, I E 360, MTHSC 301, 302, or 309.

I E 465, 665 Facilities Planning and Design 3(3,0) Study of the principles and techniques of facility planning and design. Discusses economic selection of materials handling equipment and integration of this equipment into the layout plan to provide effective product flow in production, distribution, and service contexts. Includes quantitative techniques for evaluation of facility design. *Preq:* I E 280.

I E 467 Systems Design II 3(2,3) Provides students with the challenge of integrating and synthesizing general engineering knowledge into creatively solving real-world, open-ended problems. This includes developing the problem statement, objectives, and criteria; data collection; technical analysis; developing and integrating recommendations; and presenting results. *Preq:* All required industrial engineering courses in the Industrial Engineering curriculum.

I E 477, 677 Systems Safety 3(2,3) Introduces the issue of safety and response to significant events. Provides exposure to and experience in hazard and accident causes and mitigation. Emphasizes current theories applied to large, complex systems. *Preq:* Senior standing.

I E 482, 682 Systems Modeling 4(4,0) Modeling of discrete industrial systems using a digital computer. The purpose, theory, and techniques of system modeling are presented. *Preq:* I E 381.

I E 485, 685 Industrial Systems Engineering 3(3,0) Modeling and analysis of multistage decision processes, recursive optimization, process and system design, and control problems. *Preq:* I E 280, 381.

I E 487, 687 Industrial Safety 3(3,0) Recognition and prevention of hazards; recognition and control of hazardous materials; developing and managing a safety program; designing inherently safe equipment and workplaces. *Preq:* Junior standing.

I E 488 Human Factors Engineering 3(3,0) Introduction to designing systems for human use. Information about human performance, abilities, and limitations are surveyed and applied to the design of tools, machines, facilities, tasks, and environment for effective, efficient, safe, and comfortable use. *Preq:* Junior standing.

I E 489, 689 Industrial Ergonomics and Automation 3(2,3) Physical ergonomics and ergonomics in industrial settings, including work physiology, the physical environment, automated systems, and hybrid work systems. *Preq:* I E 210 or Senior standing.

I E 491, H491, 691 Selected Topics in Industrial Engineering 1-3(0-3,0-9) Comprehensive study of any timely or special topic in industrial engineering not included in other courses. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

INTEGRATED PEST MANAGEMENT

Professor: B. G. Bellinger

I P M 401, 601 Principles of Integrated Pest Management 3(3,0) Origins, theory, and practice of integrated pest management. Relationships among crop production and protection practices are explored. Economics of various control strategies are considered. Integrated pest management field projects are studied. Conventional and integrated pest management approaches are compared. Multidisciplinary plant problem analysis is introduced. *Preq:* CSENV 407, ENT 301, PL PA 310, or consent of instructor.

INTERNATIONAL STUDIES

I S 210 Selected Topics in International Studies 3(3,0) Topics in cross-cultural awareness and intercultural communications are studied in situ as part of a study abroad program. Addresses the impact of culture on behavior in intercultural contact in professional and personal contexts. May be repeated for a maximum of six credits, but only if different topics are covered.

ITALIAN

Professor: B. M. Zaczek; *Lecturer:* L. Barattoni

ITAL 101 Elementary Italian 4(3,1) Introductory course stressing grammar, pronunciation, oral practice, and reading skills. Attention is given to practical everyday living as well as cultural considerations.

ITAL 102 Elementary Italian 4(3,1) Continuation of ITAL 101. *Preq:* ITAL 101 or consent of instructor.

ITAL 201, H201 Intermediate Italian 3(3,1) Intermediate course to build on the foundation of previous language courses, with practice in listening, speaking, reading, and writing. Introduction to cultural perspectives through readings of literary prose selections. *Preq:* ITAL 102.

ITAL 202, H202 Intermediate Italian 3(3,1) Increasingly difficult readings in Italian literature, supplemented with classroom discussions and compositions. *Preq:* ITAL 201.

ITAL 297 Creative Inquiry—Italian 1-4(1-4,0) In consultation with and under the direction of a faculty member, students pursue scholarly activities individually or in teams. Arrangements with faculty members must be established prior to registration.

ITAL 301 Introduction to Italian Literature 3(3,0) Study of selected texts of Italian literature in their artistic, cultural, and social context. May include theme and genre studies. *Preq:* ITAL 202 or consent of department chair.

ITAL 302 Modern Italian Literature 3(3,0) Study of selected works from major 19th- and 20th-century Italian authors, including Manzoni, Verga, Svevo, Moravia, Ginzburg. *Preq:* ITAL 202 or consent of department chair.

ITAL 305 Intermediate Italian Conversation and Composition 3(3,0) Practice in the written and spoken language with emphasis on vocabulary, pronunciation, and comprehension. *Preq:* ITAL 202 or consent of department chair.

ITAL 307 Italian Civilization and Culture 3(3,0) Study of the significant aspects of Italian civilization and culture through analysis of literary texts, paintings, films, and magazine articles. *Preq:* ITAL 202 or consent of department chair.

ITAL 397 Creative Inquiry—Italian 1-4(1-4,0) Students focus on a special research area under the guidance of a faculty member. After acquiring the requisite background, students formulate hypotheses for a group project, develop a critical framework, and initiate research on a specific topic.

ITAL 398 Directed Reading 1-3(1-3,0) Directed study of selected topics in Italian literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

ITAL 400 Image of an Italian City 3(3,0) Study of historical, social, and architectural images of Italian cities through analysis of literary texts and films. *Preq:* ITAL 202 or consent of instructor.

ITAL 497 Creative Inquiry—Italian 1-4(1-4,0) Continuation of research initiated in ITAL 397. Students complete their project and disseminate their research results. *Preq:* ITAL 397 or consent of instructor.

ITAL 498 Selected Topics 3(3,0) Study of selected topics in Italian literature, language, and culture. Taught in Italian. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of department chair.

JAPANESE

Associate Professors: T. Kishimoto, E. L. Williams; *Lecturers:* M. Shimura, I. Tokunaga

JAPN 101 Elementary Japanese 4(3,1) Course for beginners in which fundamentals are taught and a foundation is provided for further study and the eventual ability to read and speak the language. The Japanese writing system is introduced. Students learn how to recognize and write the two alphabets Hiragana and Katakana. Three hours a week of classroom instruction and one hour a week in the language laboratory.

JAPN 102 Elementary Japanese 4(3,1) Continuation of JAPN 101. Students study Kanji characters. *Preq:* JAPN 101.

JAPN 201 Intermediate Japanese 3(3,1) Brief review of JAPN 101 and 102, with conversation, composition, and beginning of more serious reading of Japanese in short stories. Students study Kanji characters. *Preq:* JAPN 102.

JAPN 202 Intermediate Japanese 3(3,1) Brief review of JAPN 201, with conversation, composition, and dictation based on more difficult Japanese reading selections. Includes a continuation of Kanji characters. *Preq:* JAPN 201.

JAPN 297 Creative Inquiry—Japanese 1-4(1-4,0) In consultation with and under the direction of a faculty member, students pursue scholarly activities individually or in teams. Arrangements with faculty members must be established prior to registration.

- JAPN 303 Intensive Conversation and Composition in Japan 3(3,0)** Study of Japanese with native instructors at a university in Japan. All coursework conducted in Japanese. May be repeated for a maximum of six credits. *Preq:* JAPN 202 or consent of instructor.
- JAPN 305 Japanese Conversation and Composition 3(3,0)** Practice in the spoken language with emphasis on vocabulary, Kanji, pronunciation, and comprehension; learning practical language skills and intercultural communication through various topics. *Preq:* JAPN 202 or consent of department chair.
- JAPN 306 Japanese Conversation and Composition 3(3,0)** Continuation of JAPN 305. More practice in the spoken language emphasizing vocabulary, Kanji, pronunciation, and comprehension. Learning practical language skills and intercultural communication through various topics. *Preq:* JAPN 305 or consent of department chair.
- JAPN 307 Japanese Civilization I 3(3,0)** Study of the significant aspects of the culture of Japan. *Preq:* JAPN 202 or consent of department chair.
- JAPN 308 Japanese Civilization II 3(3,0)** Study of significant aspects of the culture of Japan. *Preq:* JAPN 202 or consent of department chair.
- JAPN 316 Japanese for International Trade I 3(3,0)** Spoken and written Japanese common to the Japanese-speaking world of business and industry emphasizing business practices and writing and translating business letters and professional reports. Cross-cultural references provide opportunity for comparative and contrastive analysis of American and Japanese cultural patterns in a business setting. *Preq:* JAPN 306 or consent of department chair.
- JAPN 397 Creative Inquiry—Japanese 1-4(1-4,0)** Students focus on a special research area under the guidance of a faculty member. After acquiring the requisite background, students formulate hypotheses for a group project, develop a critical framework, and initiate research on a specific topic.
- JAPN 398 Directed Reading 1-3(1-3,0)** Directed study of selected topics in Japanese literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.
- JAPN 401 Japanese Literature in Translation 3(3,0)** Introduction to Japanese literature from 712 AD to the present. Cultivates an appreciation for Japanese literature and culture. All readings and discussions are in English. May not be used to satisfy general foreign language requirements.
- JAPN 403 Internship in Japan 3(3,0)** Minimum of one month of full-time work experience in Japan. All work activities with host companies are conducted in Japanese. May be repeated for a maximum of six credits. *Preq:* JAPN 202 or consent of instructor.
- JAPN 404 Cultural Studies in Japan 3(3,0)** Study of Japanese cultural topics on site in Japan through lectures, field trips, small student group reconnaissance excursions, and reporting sessions. All activities are conducted in Japanese. May be repeated for a maximum of six credits. *Preq:* JAPN 202 or consent of instructor.
- JAPN 406 Introduction to Japanese Literature 3(3,0)** Students read contemporary Japanese narrative fiction, poetry, and drama in their historical and social context. *Preq:* 300-level Japanese course or consent of department chair.
- JAPN 411 Studies in the Japanese Language I 3(3,0)** Advanced training in the spoken and written language with emphasis on formal expressions. *Preq:* JAPN 306 or consent of department chair.
- JAPN 412 Studies in the Japanese Language II 3(3,0)** In-depth study of Kanji characters. *Preq:* JAPN 411 or consent of department chair.
- JAPN 416 Japanese for International Trade II 3(3,0)** Study of language and cultural environment of the Japanese-speaking market, including the linguistic and cultural idioms which support global marketing in general and the international marketing of textiles, agricultural products, and tourism in particular. *Preq:* JAPN 316 or consent of department chair.
- JAPN (ANTH) 417 Japanese Culture and Society 3(3,0)** Focuses on basic themes in Japanese culture found in social interaction and ritual behavior. Japanese social organization, including marriage and family patterns, neighborhood and community organization, and gender roles receive extensive attention. All readings and discussions are in English. May not be used to satisfy general foreign language requirements.
- JAPN 490 Classical Japanese 3(3,0)** Examination and analysis of premodern Japanese texts. Special emphasis is on the grammar and syntax of the classical language, its divergence from and influence upon the modern idiom. All coursework is conducted in Japanese. *Preq:* JAPN 306 or consent of instructor.
- JAPN 491 Senior Seminar in Japanese Literature 3(3,0)** Close readings of various works of premodern and modern Japanese literature. Includes study of important authors and their representative works in prose and poetry. Familiarizes students with the cultural and linguistic nuances of literature in the original language. All readings and activities are in Japanese. *Preq:* JAPN 306.
- JAPN 497 Creative Inquiry—Japanese 1-4(1-4,0)** Continuation of research initiated in JAPN 397. Students complete their project and disseminate their research results. *Preq:* JAPN 397 or consent of instructor.
- JAPN 499 Selected Topics in Japanese Culture 3(3,0)** Topic-generated examination of fundamental cultural themes in premodern and modern Japan, including, but not limited to, such topics as Japanese drama, poetry, prose, religious traditions, cinema, and folklore/mythology. May be repeated for a maximum of six credits, but only if different topics are covered. Readings and discussions are in English. May not be used to satisfy general foreign language requirements.
- LANDSCAPE ARCHITECTURE**
- Professors:* F. F. Chamberlain, D. L. Collins, D. J. Nadenicek, *Chair;* Associate Professor: S. Burmil, U. Yilmaz; *Assistant Professor:* C. L. Goetcheus; *Visiting Assistant Professor:* R. R. Hewitt; *Lecturers:* R. W. Bainbridge, C. L. K. Martin
- LARCH 103 Landscape Architecture Portfolio I 1(1,0)** First of two one-credit portfolio courses. Students learn basics of a digital portfolio as a record of academic achievement and the specific use of a portfolio in landscape architecture. *Preq:* Landscape Architecture major or consent of instructor.
- LARCH 116 History of Landscape Architecture 3(3,0)** History of design on the land from prehistory to the present. Overview of the interface of aesthetics, science, technology, and natural features that influence cultures in shaping places.
- LARCH 128 Technical Graphics 3(2,2)** Introduction to rendering techniques, plan graphics, 3-D projection drawings, drafting skills, perspective drawing, and overview of computer graphics. *Preq:* Landscape Architecture major.
- LARCH 151 Basic Design I 3(0,6)** Studio introduction to design fundamentals through 2-D and 3-D application of basic systems and development of attitudes essential to the creative design process. *Preq:* Landscape Architecture major. *Coreq:* LARCH 153.
- LARCH 152 Basic Design II 3(0,6)** Further investigations into design fundamentals through 2-D and 3-D application of basic systems and development of attitudes essential to the creative design process. *Preq:* LARCH 151. *Coreq:* LARCH 154.
- LARCH 153 Landscape Architecture Design Theory I 1(1,0)** Lecture course on the underlying theories of design and visual perception that constitute the language of design. Topics include conceptual thinking and problem solving, visual communication, and interaction between design elements and principles. *Preq:* Landscape Architecture major. *Coreq:* LARCH 151.
- LARCH 154 Landscape Architecture Design Theory II 1(1,0)** Second in a series of lecture courses on the underlying theories of design and visual perception that constitute the language of design and landscape architecture. Topics include light and value perception, color theories, basic perspective systems. *Preq:* LARCH 151, 153. *Coreq:* LARCH 152.
- LARCH 199 Creative Inquiry—Landscape Architecture I 1-4(1-4,0)** In consultation with and under the direction of a faculty member, students pursue scholarly activities individually or in teams. These creative inquiry projects may be interdisciplinary. Arrangements with mentors must be established prior to registration.
- LARCH 251 Landscape Architecture Design Fundamentals 6(1,10)** Development of compositional skills introduced in LARCH 151 and 152 applied to design in the landscape. Through design projects, readings, and discussion, students derive and apply design principles to place, study the processes and styles of design, and develop an understanding of design types. *Preq:* LARCH 152 or consent of instructor.