ACCOUNTING

201 Principles of Financial Accounting (3) Introduction to financial accounting theory and practice with emphasis on preparation and reporting of financial information. Prerequisite to all other courses in accounting. Prereq: Mathematics 110 or 121 or equivalent. E

202 Principles of Managerial Accounting (3) Introduction to managerial and cost accounting concepts with emphasis on uses of accounting data by managers in planning operations, controlling activities, and decision making. Prereq: 201. E

311-312 Intermediate Financial Accounting (3,3) Theory, principles, and procedures related to valuation of assets, liabilities and equities; measurement of periodic income; and preparation of financial statements. Prereq: 202 for 311; and 311 with a grade of C or better and Management 303 for 312. E

321 Cost and Managerial Accounting (3) Analysis of costing for products, projects, and management control. Topics include cost behavior, cost prediction, budgeting, and responsibility accounting. Prereq: 202. Prereq or Coreq: Management 303. E


360 Professional Issues in Accounting (3) Major writing requirements include advanced media strategy, advanced creative techniques for advertising planning. Instruction in media planning, buying, and evaluation. Prereq: 340 with a grade of C or better.

380 Advertising Professional Seminar (1) Exploration of career choices in mass communications. Resume and letter writing, interviewing, and portfolio preparation. Prereq: Progression as seniors in the College of Business Administration with consent of Head of Department of Advertising.

400 Special Topics (3) Critical consideration of selected current topics. May be selected from managerial, cost, financial, systems or auditing. May include written reports and cases. Prereq: 312, 321, and 341 and consent of instructor.

411 Auditing (3) Role of auditing in society, operational auditing, professional auditing standards, auditor's legal responsibilities, audit evidence and reporting, role of internal control and statistical sampling in auditing, applications to specific transaction cycles. Prereq: 312, 341, F, Sp


431 Federal Income Taxation (3) Fundamentals of gross income, deductions, credits, and tax determination. Introduction to taxation of corporations and partnerships. Prereq: 311 or consent of instructor. E

ADVERTISING

250 Advertising Principles (3) Survey of the role of advertising in American business and society. Relationship between advertising and marketing; functional components of the advertising process: research, media, creative, and management.

340 Advertising Research Methods (3) Secondary data and primary research techniques for advertising decisions. Prereq: 250 with a grade of C or better and Statistics 201.

350 Advertising Creative Strategy (3) Basic concepts of creative strategy with intensive practice in developing creative platforms, writing and designing advertisements, and judging creative work. Prereq: 250 with a grade of C or better.

360 Advertising Media Strategy (3) Assessment of markets, vehicle audiences and mathematical techniques for advertising planning. Instruction in media planning, buying, and evaluation. Prereq: 340 with a grade of C or better.

380 Advertising Professional Seminar (1) Exploration of career choices in mass communications. Resume and letter writing, interviewing, and portfolio preparation. Prereq: Progression as seniors in the College of Business Administration with consent of Head of Department of Advertising.

450 Advertising Management (3) Case-study approach to advertising decisions. Data analysis and interpretation, generating alternative strategies, oral and written presentation of recommendations. Prereq: 350 and 360 with grades of C or better. Open to marketing seniors in the College of Business Administration with consent of Head of Department of Advertising.

470 Advertising Campaigns (3) Group-based development, execution and evaluation of an advertising campaign for a regional or national client. Prereq: 450 with a grade of C or better.

490 Special Topics (3) Detailed study of a specialized area of advertising. Topics vary by semester and include advanced media strategy, advanced creative strategy, direct marketing, and advertising and social issues.

AFRO-AMERICAN STUDIES

201 Introduction to Afro-American Studies (3) Multidisciplinary approach to the Afro-American experience through the Civil War period which examines such issues as traditional African societies, the institution of slavery, the development of Afro-American culture, and the Civil War and Reconstruction.

202 Introduction to Afro-American Studies (3) Multidisciplinary approach to the Afro-American experience from the Civil War through the Civil Rights era which focuses on such topics as Afro-American rural and urban societies, the Afro-American church and education, and the evolution of Afro-American intellectual and protest movements.

310 Introduction to Afro-American Music (3) (Same as Music History 310.)

314 Peoples and Cultures of Africa (3) (Same as Anthropology 314.)

315 Afro-American Anthropology (3) (Same as Anthropology 315.)

322 Minority Group Politics in the United States (3) (Same as Political Science 322.)

343 Race and Ethnicity (3) (Same as Sociology 343.)

350 History of Jazz (3) (Same as Music History 350.)

352 Afro-American Religion in United States (3) (Same as Religious Studies 352.)

353 Topics in Afro-American Religion (3) (Same as Religious Studies 353.)

364 Contemporary Issues in Afro-American Education (3) 1954 to the present. Issues relevant to the current dilemma of providing quality education for the Afro-American student including professional school quotas, intelligence testing, homogeneous grouping, Afro-American college survival, busing, Black English/Standard English controversy.

371-372 African History (3,3) (Same as History 371-372.)

373 African Religions (3) (Same as Religious Studies 373 and Anthropology 373.)

379 Geography of Africa (3) (Same as Geography 379.)

420 Families: Race, Class and Culture (3) (Same as Child and Family Studies 420.)
implement a research project of their choice in the Research Seminar in Afro-American Studies.

Social obstacles confronting Blacks.

Other and the concept of Pan-Africanism.

Tative views Afro-Americans and Africans have of each religion, and social stratification. Includes the respect

Afro-American societies in such areas as education, political, economic, and social factors utilized by Blacks in developing coping strategies and mechanisms.

Black Male in American Society (3) Historical images, myths and stereotypes which have developed concerning Black males in American society. Important historical factors as Black feminism, violence, concepts of masculinity, the family, white males, white females, homosexuality, nationalism, and athletics on Black males in America.

Black Communities in Urban America (3) Benevolent and historical influence of three major institutions: the church, the family, and the school upon the African-American struggle to survive. Includes political, economic, and social factors utilized by Blacks in developing coping strategies and mechanisms.

Afro-American Women in American Society (3) Historical and contemporary socio-economic-political factors in American society as they relate to the Black woman. (Same as Woman's Studies 483.)

Foreign Study (1-15) Prereq: 201-202 and consent of instructor. See page 96.

Off-Campus Study (1-15) Prereq: 201-202 and consent of instructor. See page 96.

Biology of Human Variability (3) (Same as Anthropology 496.)

AGRICULTURAL AND EXTENSION EDUCATION

Field Experience in Agricultural Education (1) Field experience in public school programs in agricultural and education. Prereq: Consent of instructor. May be repeated. F, Sp.

Agriculture Experience, Leadership and Adult Programs (3) Developing supervised agricultural experience programs, conducting leadership development activities anderves Afro-Amer Farms and Farmers of America, Role and methods for adult education in agriculture.

Methods and techniques for teaching agriculture, preparing teaching plans and courses of study, developing programs of activities for agriculture.

Fundamentals of Agricultural Extension (3) History, philosophy, organizational structure; clientele served; major areas of program emphasis-teaching methods of research, participating in other extension agencies.

Methods of Teaching Agricultural Mechanics (2) Methods for teaching agriculture students. Special competencies for planning, conducting and evaluating agricultural mechanics program. Prereq: Agricultural and Natural Resource Technology 201 on consent of instructor.


Agricultural and Extension Education Internship (2) An approved work experience in approved county Extension offices, agricultural businesses, or agriculture related agencies. (Requires living off-campus for a specified time.) Prereq: 411 and consent of instructor. Sp, Su.

Special Problems in Agricultural and Extension Education (1-3) Individualized study of a special project or problem in Agricultural and Extension Education. Must be selected in consultation with the instructor. Prereq: Consent of instructor. May be repeated for credit. Maximum 6 hours. E

AGRICULTURAL ECONOMICS

Introduction to Agricultural Economics (3) Application of economic principles of demand, supply, price determination, and market structure to agriculture, natural resource economics, community development, and international trade and development. Economic aspects of current issues and problems associated with production, marketing, and marketing policies, use of government intervention in the agricultural, rural, and international sectors. Prereq: Economics 201. F, Sp.

Farm and Agribusiness Law (3) Survey of law applicable to the farmer, agribusiness manager, and agribusiness industry. Principles of torts, damage and water rights, landlord-tenant relationships, taxation and insurance, forms of business organization, estate planning, corporate and personal income tax planning, regulatory laws, and other selected topics. Prereq: Junior standing or consent of instructor. F.

Farm Business Management (3) Principles and procedures for determining most profitable farming organization and system of operation: nature of managerial processes; farm records and their uses; budgeting; economic aspects of acquisition and management of capital, labor, and machinery resources. Prereq: Economics 201 and Junior standing. F.

Marketing of Agricultural Products (3) Survey of U.S. food and fiber marketing systems: product functions; market channels, marketing options of farmers; basic analysis of marketing problems. Prereq: 210 or consent of instructor. Sp.

Commodity Futures Markets (2) Futures market contracts: financial futures, physical futures, price formation, investments, hedging, options, and their use in risk management. Prereq: Junior standing. 1 hour and 1 lab. Sp.

Agricultural Production Economics (3) Application of economic principles to the production and marketing of farm products; price determination, spatial equilibrium; temporal price patterns; pricing institutions. Prereq: 350 and Economics 311. F.

Agricultural Crop Management (3) Operational decisions on growing crops, including crop and soil management, crop protection, and resource use efficiency. Prereq: 210 or consent of instructor. F.

Natural Resource Economics (3) Nature of natural resource economics; economic efficiency as a basis for natural resource use; externalities in natural resource use; factors influencing environmental quality; alternative public policy tools for influencing natural resource use or achieving environmental quality. Prereq: 210 or consent of instructor. Sp.

Independent Study (1-3) Directed individual or team research and report writing. Off-campus intern experience and expanding. Special courses in specific topics. Student must arrange with instructor before registering. May be repeated. Maximum 6 hours. Prereq: Junior standing. E.

AGRICULTURAL ENGINEERING

Specialty Areas of Agricultural Engineering (1) Activities and opportunities in five areas of specialization: required training for each area; projected career activities. 1 hour. F.

Environmental Relationships (2) Applications of thermodynamics principles to agriculture. Psychrometrics, thermodynamics cycles, biopharmodynamics, the plant-animal-environment interaction. 2 hours. Sp.

Power Units and Machinery (2) Components and operating characteristics of internal combustion engines and tractor power transmission systems; functional analysis, reliability, maintenance, troubleshooting, and proper training for implement system performance. Prereq: Mechanical Engineering 331. 1 hour and 1 lab. Sp.

Structures and Environment (2) Environmental control systems; ventilation, heat and moisture balance, load, storage, load, building material evaluation. Prereq: 210. 1 hour and 1 lab. Sp.

Processing (2) Application of basic engineering sciences to processing and handling of agricultural products, physical properties, thermal processing, curing, drying and material handling. Prereq: 300, Engineering Science and Mechanics 341, Nuclear Engineering 342. 1 hour and 1 lab. Sp.

Soil and Water Conservation Engineering (2) Hydrology, agronomic and engineering principles applied to agricultural water management problems including flood control erosion control; irrigation design and management; water quality, Prereq: Plant and Soil Science 210, Engineering Science and Mechanics 341, 2 hour and 1 lab (on alternate weeks). Sp.

Properties of Biological Materials (2) Mechanical, thermal, and electrical properties of biological systems and their effect on engineering design and utilization. Prereq: Engineering Science and Mechanics 301. 1 hour and 1 lab. F.

Professional Development (1) Engineering ethics; professional registration; opportunities for professional development and continuing education. 1 hour. F.
211 Surveying and Engineering Technology in Agricultural lubricants; drafting and plan reading; fabrication technology.

480 Selected Topics in Agricultural Engineering (1-4) Special problems in agricultural engineering; design of compression and tension members; beam and column design; properties of materials; design of structures; introduction to structural analysis; selection of materials; application of computer aided design and drafting (CAD) software for design and analysis of design project. Prereq: Engineering 302 or senior standing; 2 hours including project laboratory.

422 Food and Process Engineering Technology (3) Emphasis on processes for agri-cultural and food products. Fluid handling, drying, evaporation, thermal processing, heating and cooling, deodorization, and utilization of wastewater. Prereq: Physics 121, Mathematics 121. 2 hours and 1 lab. F

432 Agricultural Machinery and Tractors (3) Agricultural machinery and power units; adaptation to agricultural practices; management considerations; field efficiency, capital cost, adjustment and servicing. Prereq: Mathematics 121. 2 hours and 1 lab. Sp

442 Agricultural Waste Management and Pollution Control (3) Waste renovation fundamentals; characteristics of animal manures, techniques for collecting, transporting, storing, and utilizing livestock waste. Prereq: Mathematics 121, 2 hours and 1 lab. F

440 Irrigation and Drainage Design (3) Irrigation and drainage systems including crop response, climate, water quantity and quality, and system characteristics. Prereq: Mechanical Engineering 465 or equivalent. 1 hour and 1 lab. Sp, AE

445 Processing and Materials Handling Design (3) Systems and components for processing and utilization of crops including product characteristics, energy and mass balance, storage, handling and economic merit. Prereq: 330. 1 hour and 1 lab. Sp, AO

450 Electrical Distribution and Utility Design (3) Design of on-farm electrical systems; control, motors, stray voltage; special electrical loads; safety. Prereq: Electrical Engineering 301. 1 hour and 1 lab. Sp, AE


460 Design of Agricultural Structures (3) Design fundamentals for wood, steel, and concrete components; compression and tension members; beam and column design; specification of reinforcing steel and joint design. Prereq: 320. 1 hour and 1 lab. Sp, AO

470 Special Problems in Agricultural Engineering (1-3) Selection, analysis solution and report of problem. May be repeated. E

480 Selected Topics in Agricultural Engineering (1-3) Current trends and problems in agricultural engineering. May be repeated. E

AGRICULTURAL ENGINEERING TECHNOLOGY

201 Materials and Fabrication (3) Properties of materials including wood, metals, concrete, plastics and lubricants; drafting and prototyping; fabrication techniques and processes involving hand tools, power equipment, and arc and gas welding. 1 hour and 2 labs. Sp

211 Surveying and Engineering Technology in Agriculture (3) Agricultural surveying including measurement of distances, angles, and areas; differential and profile layout; chain surveying, mapping and surveying; engineering fundamentals applied to problems in soil and water conservation, agricultural machinery, and structures. Surveying and engineering fundamentals solving. 2 hours and 1 lab. F

201-202 Air Force Aerospace Studies (2,2) Emphasis on Air Force Commands, environment in which the Air Force operates, and how the Air Force works within the political and social context. Prereq: Physics 121, Mathematics 121. 2 hours and 1 lab. F

205 Field Training (Academic Program) (1-4) Rule of United States military forces in contemporary world, with particular attention to United States Air Force. Its organizational and mission, various coding font concepts of U.S. military power; organization of America's defense structure, policies of major powers, and elements and processes in making of defense policy. Conducted at Field Training bases throughout the country. Open only to two-year program applicants.

301-302 Air Force Aerospace Studies (3,3) Air Force leadership at junior officer level, including theoretical, professional, and personal development in communication skills. Military management functions, principles, and techniques. Prereq: Air Force ROTC approval.

401-402 Air Force Aerospace Studies (3,3) Role and functions of American professional military and civilian leadership and decision-making; development, funding, and operations of U.S. military and national defense programs. Design and implementation of Department of Defense; political, economic, and social constraints affecting formulation of national military and national peace keeping and international operations. May be repeated. E

AMERICAN STUDIES

310 Introduction to American Culture: The New World (3) Explores the development of American culture through the lens of various themes and topics. Prereq: English 100.

323 Film and American Culture (3) Explores the role of film in shaping American culture and society. Prereq: English 100.

410 Topics in American Culture (3) Content varies. May be repeated once.

ANIMAL SCIENCE

101 Orientation to Animal Science (1) For Animal Science majors and Prevet students in their first year. Discussion of student services, activities, and careers; student participation in projects, the college experience. Satisfactory/No Credit. F

241 Breeds of Farm Animals (2) Evolution and formation of breeds of cattle, goats, horses, poultry, sheep and swine. Breeding structure, history, development, characteristics, and improvement programs of various breeds and strains. Perspectives for poultry industry and impact of crossbreeding programs. 1 hour and 1 lab. Sp AE.

261 Fundamentals of Food Animal Evaluation (2) Structure and production principles of food animal industries. Criteria for food animal evaluation, market classes and grades of cattle, poultry and pork products, lamb and wool, and swine; subjective and objective techniques for evaluation of beef cattle, dairy cattle, poultry, sheep and swine. Introduction to and utilization of species specific performance programs. 1 hour and 1 lab. Sp AE.


321 Anatomy and Physiology of Farm Animals (3) General and specific diseases of the musculoskeletal, skeletal, endocrine, cardiovascular, respiratory and digestive systems; demonstration of disease and chemical phenomena. Prereq: Biology 120. 2 hours and 1 lab. F

322 The Physiology of Reproduction and Lactation (3) Physiology of sex and sexual differentiation, functional aspects of male and female sexual development, reproduction and lactation, gametogenesis, neuroendocrine and endocrino-physiology of reproduction and lactation, sex cycles. Follow-up; embryo, implantation, pregnancy, parturition, lactation of farm animals. 2 hours and 1 lab. Sp (Same as Zoology 322.)
32 Ration Formulation and Linear Programming Applications
(3) Nutrient requirements and ration formulation for poultry, sheep, swine, and laboratory animals. Mathematical and computer solutions for formulating complex rations with constraints on ration formulation. Prereq: Completion of an introductory computer science course or consent of instructor. 1 hour and 2 labs. Sp

341 Principles of Animal Breeding (3) Genetic and environmental influences of animal variation. Selection and mating systems as mechanisms of genetic change. Prereq: Consent of instructor. 2 hours and 2 labs. Sp


362 Dairy Cattle Judging and Selection (2) Comparative judging, oral reasons, breed classification programs, economic value of conformation traits. Prereq: 261. 2 labs. Sp

363 Judging, Poultry and Poultry Products (2) Grading, quality standards; factors influencing quality. Prereq: 261 or consent of instructor. 2 labs. F

364 Horse Selection and Judging (2) Selection of horses for soundness and functional efficiency and the relationship of form to function in various breeds of horses. 2 labs. F

421 Applied Reproduction in Farm Animals (3) Collection, evaluation and preservation of ova, spermatozoa and embryos, application of methods of natural breeding and techniques of artificial insemination and embryo transfer; herd sire and dam evaluation; pregnancy determination; gestation and parturition; infertility; recent advance in theriogenology. Prereq: 322 and consent of instructor. 1 hour and 2 labs. F

461 Applied Beef Cattle, Dairy Cattle, Horse, Poultry, Sheep and Swine Judging (1) Specialization in judging; evaluation, selection and presentation of oral reasons for classes of beef cattle, dairy cattle horses, poultry, sheep, and swine. Prereq: Consent of instructor. 2 labs. Satisfactory/No credit. F, Sp

461 Beef Cattle Production and Management (3) Integration of principles of nutrition, physiology, and breeding into complete beef cattle management programs. Structure of industry, enterprise establishment, systems of production, production practices, and herd improvement programs. Alternatives evaluated in terms of production response and economic returns. Prereq: Completion of Animal Science sophomore and junior core courses or consent of instructor. 2 hours and 1 lab. Sp

462 Dairy Cattle Production and Management (3) Integration of principles of nutrition, physiology, and breeding into complete dairy cattle management program. Structure of industry, enterprise establishment, systems of production, production practices, and herd improvement programs. Alternatives evaluated in terms of production response and economic returns. Prereq: Completion of Animal Science sophomore and junior core courses or consent of instructor. 2 hours and 1 lab. Sp

463 Pork Production and Management (3) Integration of principles of nutrition, breeding, physiology, and marketing into complete pork production and management program. Structure of industry, enterprise establishment, systems of production, production practices, and herd improvement program. Alternatives evaluated in terms of production responses and economic returns. Prereq: Completion of Animal Science sophomore and junior core courses or consent of instructor. 2 hours and 1 lab. Sp

484 Poultry Production and Management (3) Structure of industry, enterprise establishment, systems of production, feeding, processing and marketing. Prereq: Senior standing and permission of instructor. Completion of Animal Science sophomore and junior core courses recommended prereq. 2 hours and 1 lab. F

485 Horse Production and Management (3) Integration of principles of selection, nutrition, breeding, physiology and ethology into a comprehensive horse production and management program. Economic importance of industry, kinds of horse enterprises, management of feed and pasture resources, health management and first aid. Prereq: 261 or consent of instructor. 1 hour and 1 lab. F

486 Lamb and Wool Production and Management (3) Integration of principles of selection, nutrition, breeding, physiology, and marketing into complete lamb and wool production and management programs. Structure of industry, enterprise establishment, systems of production, production responses and economic returns. Prereq: Completion of Animal Science sophomore and junior core courses or consent of instructor. 2 hours and 1 lab. Sp

489 Companion, Zoo and Lab Animal Management (3) Principles of nutrition, physiology, breeding, handling, and history of breeds of common household pets, zoo animals and animals used in scientific research. Specific species requirements and peculiarities. Laws and agencies governing use of laboratory animals. Laboratory analysis of blood metabolites commonly used to monitor health and nutritional status. Prereq: Completion of Animal Science sophomore and junior core courses or consent of instructor. 2 lectures and 1 lab. F - AE

493 Special Problems in Animal Science (1-3) Special problems in specialized areas of animal science. Prereq: Approval of instructor. May be repeated. Maximum 6 credits. Prereq: Senior standing and consent of instructor and department head. E

495 Seminar (1) Review of literature and oral and written presentation on special topics and current research. Prereq: Senior standing. One 2 hour lab. F, Sp

ANTHROPOLOGY

110 Human Origins (3) Survey of humanity's back-ground, fossil primates, fossil man, and living races of humanity.

120 Prehistoric Archaeology (3) Introduction to methods and techniques used to identify and date archaeological cultures, reconstruct past lifeways and describe and evaluate the cultural traditions of prehistoric Africa, western Europe, southwest Asia, and the Americas from earliest dated human cultures to rise of complex civilizations.

130 Cultural Anthropology (3) Major concepts and methods in the study of culture; survey of cross-cultural similarities and differences in subsistence, social organization, economic, political and religious institutions; language, ideology and arts. Contributions of anthropology to resolving contemporary human problems.


220 Prehistory of Tennessee (3) History of archaeological research in Tennessee and survey of prehistoric Indian cultures from initial occupation of the state to European contact.

230 American Cultures (3) Anthropology in the study of our own society, including such topics as ethnic communities, social classes, power structures, etc. Prereq: 130.

301 Religion of Primitive Peoples (3) (Same as Religious Studies 302.)

306 Genetics and Society (3) (Same as Botany 306.)

311 Southeastern Indians (3) Survey of Southeastern American Indian cultures at the time of European contact. Emphasis on Cherokee culture and on the social, economic, and religious organization of aboriginal groups. Prereq: 130 or consent of instructor.

312 Appalachian Culture (3) Traditional Southern Appalachian cultural heritage with emphasis on religion, organization, beliefs and values, folklore and customs; socio-cultural impacts of industrialization and modernization. Prereq: Consent of instructor. (Same as Latin American Studies 313.)

315 Afro-American Anthropology (3) Anthropological perspectives on lifestyle and social status of persons of African descent in North America, South America, and the Caribbean. Prereq: 130 or consent of instructor. (Same as Afro-American Studies 315.)

360 North American Prehistory (3) Prehistoric cultures of the Americas from initial occupation of the continent to European contact.

361 Historical Archaeology (3) Historical archaeology of Euro-American, Afro-American, and Asian American cultures in the United States from 15th to 20th centuries.

362 Principles of Archaeology (3) Research strategies used in developing methods and theory, considering cultural histories, identifying site function and settlement-subsistence patterns, and evaluating explanations of cultural change. Prereq: 130 or consent of instructor.

373 African Religions (3) (Same as Religious Studies 373 and Afro-American Studies 373.)

400 Readings in Anthropology (1-6) Problem-oriented directed readings in anthropology. Prereq: Anthropology majors with senior standing or consent of instructor. May be repeated. Maximum 6 hours.

410 Principles of Cultural Anthropology (3) Exploration and illustration of major concepts, theories, and methods in cultural anthropology, with applications to analysis of specific ethnographies. Prereq: 130.

411 Linguistic Anthropology (3) Basic linguistic concepts applied to research in cultural anthropology, particularly investigation of relationships between language and culture. Prereq: 130 or Linguistics 200. (Same as Linguistics 411.)

412 Folklore in Anthropology (3) Introduction to anthropological study of folklore, using folklore and folklore materials from various tribal, peasant, and complex societies. Prereq: 130 or consent of instructor.

413 Dynamics of Culture (3) Definition and in-depth study of major forms of culture change, ranging from evolution and diffusion to religious revitalization and political revolt. Continuity and change in diverse cultural settings examined through use of archaeological, ethno-historic, and contemporary cases. Prereq: 130.

430 Fieldwork in Anthropology (3-9) Practicum work in anthropological data recovery and analytical techniques. Prereq: Consent of instructor. May be repeated. Maximum 9 hours.

440 Cultural Ecology (3) Concepts and methods in studying dynamic interaction between prehistoric and present day cultures and their environments. Topics include ecological theory, methods of analysis, and review of selected case studies. Prereq: 120, 130, 410, or consent of instructor.

450 Current Trends in Anthropology (3) Analytical, integrative review of recent directions of research and theory in anthropology.

460 Selected Topics in Anthropology (3) Regional or theoretical issues in anthropology for undergraduate
students. Topics may include practical experience in laboratory study of archaeological materials. May be repeated. Maximum 6 hours. Prereq: 123 or consent of instructor.

461 African Prehistory (3) African cultural history from the earliest evidence of human activity to the time of European contact. Emphasis on the stone age of Africa south of the Sahara. Prereq: 120 or consent of instructor. (Same as Afro-American Studies 461.)

462 Early European Prehistory (3) Origins and evolution of human culture in Europe through the beginnings of settled life and the rise of States. Focus on Paleolithic, Mesolithic, and Neolithic chronology and lifeways. Prereq: 120 or consent of instructor.

463 Rise of Complex Civilizations (3) Development of complex societies in Old World from origins of agricultural economics to rise of States. Focus on Mesolithic, Neolithic, and Metal Age lifeways in Africa, Europe, and Asia. Prereq: 120 or consent of instructor.

464 Principles of Zoonarchaeology (3) Basic osteological studies of major vertebrate groups, with emphasis on the aboriginal's use of animals in subsistence and culture. Identification and interpretation of archaeologically derived molluscan and vertebrate remains, with introduction to laboratory use of comparative collections. Prereq: 120 or consent of instructor.

480 Human Osteology (4) Intensive examination of the human skeleton. Prereq: 110 or consent of instructor. 3 hours and 1 hour lab.

481 Museology I: Museums, Purpose and Function (3) (Same as Art 481.)

482 Museology II: Exhibition Planning and Installation (3) (Same as Art 482.)

484 Museology III: Field Projects (1-12) (Same as Art 484.)

490 Primate Evolution (3) Living and fossil primate taxonomy, ecology, and comparative anatomy. Survey of primate fossil record with emphasis on the origin or major primate lineages. Prereq: 110.

491 Foreign Study (1-15)

492 Off-Campus Study (1-15)

493 Independent Study (1-15)

494 Primate Behavior (3) Social organization and behavior of selected primates including group composition, size, and structure; patterns of mating; other social interactions and cultural behavior. Application of primates to human ethology. Prereq: 110 or consent of instructor.

495 Human Paleontology (4) Introduction to human fossil record from the earliest human remains to the earliest representative of modern human form. Prereq: 110.

496 Biology of Human Variability (3) Introduction to human populations; human adaptation, biological features of major human races, relationships of major groups to one another. Prereq: 110. (Same as Afro-American Studies 496.)

ARCHITECTURE

101 Introduction to Architecture (3) Scope and definition of architecture in relation to contemporary society, building industry, and allied design professions. Architectural design as a creative process. Orientation to courses and programs of the School. F

102 Visual Design (2) Principles of visual design and techniques of representation. Coreq: 172. Sp

171 Design Fundamentals I (3) Definition, ideas, and processes of design. Sketch design studies and freehand drawing. Introduction to drafting techniques; graphic and visual skill development. Coreq: 101. Sp


203 Second Degree Program: Seminar II (2) Theory and practice of architectural design. Selected readings in history, theory, and design methodology with emphasis on contextual issues and architectural ordering principles. Coreq: 281. F

204 Second Degree Program: Seminar II (2) Selected readings in theory and design methodology with emphasis on analysis of architectural exemplars. Prereq: 203. Coreq: 282. Sp

211 History of Architecture I (3) Architectural thought and ideas of building and community form. Ancient times to the Renaissance. Prereq: History 151, 152. F

212 History of Architecture II (3) Architectural thought and ideas of building and community form. Renaissance to mid-twentieth century. Prereq: 211. Sp

213 History and Theory of Contemporary Architecture (3) Architectural thought in design practice in late twentieth century. Examples of contemporary works and review of theoretical issues. Prereq: 212. F

231 Computer Applications in Architecture (3) Survey of the role of the computer in architecture, its potential and limitations. Recent developments in computer graphics with specific applications and demonstrations. F

232 Introduction to Architectural Technology (3) Place of building technology in architectural design. Introduces concepts and theory of structures; building materials and construction; and environmental controls. Sp


281 Second Degree Program: Design I (6) Principles of architectural design emphasizing approaches to site planning and design of buildings in relation to function and context. Circulation patterns, structural order, and space allocation. Coreq: 203. F


312 Materials and Methods of Construction (3) Properties of interior and exterior building materials and their relation to construction methods and details. Theory of material selection and application and the role materials and methods play in the design process. Prereq: 232. Sp

323 Advanced Computer Applications (3) Computer applications in architecture, with special emphasis on structural calculations. Prereq: 231.


332 Architectural Structures II (4) Continuation of analysis and design of simple structures of steel, wood and concrete based upon specific loading requirements. Use of construction and building codes, handbooks and design tables - selection of structural members. Prereq: 331. Sp

333 Advanced Structural Design (3) Analysis and design of basic building structures. Structural and constructional aspects of building, including structures in steel, concrete, masonry, and timber to satisfy loading and building code requirements. Prereq: 332 or equivalent.

334 Advanced Architectural Structures (3) Philosophy of structural design in relation to materials and form. Advanced mathematical and experimental analysis of structures, including use of computer programs. Prereq: 333 or equivalent.


336 Advanced Design of Concrete Buildings (3) Precast and on-site concrete construction and maintenance, foundations, floor and wall systems. Domes and shell roofs. Prereq: 323 or equivalent.

341 Environmental Control Systems I (4) Heating, ventilation, and air conditioning, including passive and active solar energy systems. Plumbing and fire protection systems. Prereq: 231 and 232. F


371 Architectural Design II (6) Design synthesis. Integration of design determinants and development of building concepts. Prereq: 272. F


400 Service Practicum (6) Experience in architectural or equivalent offices for a minimum of 3 months to be completed prior to fifth year entry. E

403 Introduction to Preservation (3) History, theory, and legal aspects of architectural preservation and restoration.

404 Preservation Technology (3) Techniques of preservation: methods of analysis, history of materials and technology used in old buildings.

405 Descriptive Analysis of Historic Buildings (3) Identification and analysis of characteristic elements of buildings from various architectural periods, with emphasis on American architecture. Survey techniques.

406 Ideas in Architecture (3) Historical and critical review of the major ideas of architecture through the ages. Open to all students.

409 Cultural Comparison of Housing Patterns (3) Patterns of spatial organization and discrete elements of design for specific cultures with emphasis on housing, cultural, social, economic, climatic, and technical forces as sources of form.

410 History and Theory of Urban Form (3) Patterns of community development. Selected historical and contemporary examples. Basic urban design issues and exemplary design approaches examined through lectures, readings, essays, and sketch studies including historical change in urban form and design.

411 Architecture Since 1945 (3) Recent architectural developments and views of the future.

412 Non-Western and Indigenous Architecture (3) Building responsive to climate, material availability, and economic level, as designed by anonymous builders. Examples from pre-historic times to the present including Chinese, Egyptian, Islamic, Buddhist, and Mughal architecture of India, China, and Japan.

413 Tennessee Architecture (3) History of settlement patterns and building in Tennessee. Selected examples examined through reading assignments, lectures, discussion, and field trips. Historical research using primary material.

414 History of Architectural Technology (3) Building materials and construction techniques from antiquity to the present.

415 Medieval Architecture (3) History of architecture from the decline of Rome to the beginning of the Renaissance. (Same as Medieval Studies 415.)

416 Forms of Utopia (3) Ideas and architectural expres-

142 American Architecture II (3) Stylistic periods from the Gothic Revival through the twentieth century.

421 History of Landscape Architecture (3) Intellectual, societal, and geographical influences which provide the theoretical basis for design throughout history. Selections from the history of landscape architecture analyzed in terms of design.

422 Modern East European Architecture (3) Twentieth century architecture in Russia, Czechoslovakia, Poland, Hungary, East Germany, Rumania, Bulgaria, Yugoslavia.

425 Special Topics in Architecture (1-4) Individual topics under faculty direction. Credit adjusted to project complexity and level of effort. May be repeated. Maximum credit 6 hours.

431 Structural and Mechanical Applications (4) Analysis and selection of structural and mechanical systems for a specific case study to integrate technical information into a unified design solution. Prereq: 332, Coreq. 471, F.

433 Earthquake-Resistant Structures (3) Analysis and design of structures to resist earthquake effects. Earthquake phenomena, vibration of single degree structural systems, response and damping. Introduction to dynamic analysis of structures, instrumentation and structural response, frame and shear wall behavior, ground structure interaction. Prereq: Consent of instructor. (Same as Civil Engineering 433.)

434 Elementary Structural Matrix Methods (3) Introduction to generalized matrix methods of analysis of structures. Review of matrix algebra and vectors, development of member stiffness and flexibility matrices, assembly of structure stiffness and flexibility matrices. Prereq: Consent of instructor. (Same as Civil Engineering 434.)

435 Planning and Design of Tall Buildings (3) Architectural, economic and urban design considerations in design of tall buildings. Environmental and service systems; wind, fire and earthquake resistance; structural and construction considerations; building standards; steel, concrete, and masonry structures; foundations. Prereq: Consent of instructor.

443 Building Energy Analysis (3) Balancing heat flow through external skin of residential and small and large commercial buildings; local climate evaluation; site planning, building size and orientation, window area, wall treatments. Conservation of energy, environmental impact. Energy conservation, energy efficiency. Prereq: Consent of instructor. (Same as Civil Engineering 443.)

444 Advanced Environmental Control Systems (3) In-depth analysis and innovative concepts in design of heating, ventilating, and air conditioning. Prereq: 341.

445 Advanced Lighting (3) In-depth analysis and innovative concepts in design of lighting. Prereq: 342.

462 Professional Practice (4) Management and organizational theories and practices for delivering professional design services. Included are assessment of the building industry and its influence on practice; analysis of the basic management functions within professional firms; and legal and ethical concerns facing practitioners today. Special obligations and privileges of the design professional. Sp.

463 Architectural Development (3) Principles and practice of the architect as a developer. Impact of economic, technological, and urban policy on the design and development of real estate. Open to all students.

464 Project and Construction Management (3) Principles, methods, and application of project and construction management in the building process. Project manager's and construction manager's function; responsibilities, abilities, and experience investigated through case studies. Methods and theories of estimating project cost and building cost in current practice. (Does not apply to art, architecture, interior design, and art education majors.)


466 Marketing Services (3) Theories of marketing for architectural practice. Case studies. Public relations procedures.

469 Codes, Zoning, and Fire Protection (3) Theory, review, and research of city, county, state, regional, and national codes and zoning. History and development of fire safety and building codes; history and development of zoning emphasizing architect's responsibility for specific project application. Characteristics of fires in buildings. Fire codes, building evacuation, sprinklers and other fire protection systems. Emergency power and lighting. Fire resistant materials and construction.


472 Architecture Design VI (6) Organ and form in complex designs developed to address programmatic, structural, energy and environmental issues. Prereq: 471.

473 Architectural Photography (3) Photography as a design, research, and presentation medium. Application of photographic techniques, printing and processing. Color, black and white.


481 Advanced Architectural Design Topics (6) Special areas which affect architectural design, such as alternative approaches to design, energy, urban design, urban development, structural studies, historic preservation, and special building types. Work from this program may relate to the student's Comprehensive Design Project. Prereq: 472. Certain architectural electives may be stipulated as prerequisite for specified sections.

482 Comprehensive Design Project II (6) Students select project under faculty direction. Exploration of design hypothesis which forms the character of a substantial building design. (See Architecture 480). Completed project will address all issues of environment, structure, enclosure, use, and ethical consideration of design appropriateness. Design is expected to stand up to rigorous scrutiny regarding strength of idea, economy of means, durability, validity for stipulated use, quality of cultural expression, and character of setting. Prereq: 480 and satisfactory completion of all design courses.

491 Foreign Study (1-15) Research and design projects conducted under direction of architect or expert in an allied profession, in service to public service organizations or agencies of government, and public groups. Not a Design Course elective.

493 Independent Study (6) Faculty initiated studies and projects which are approved by the dean and conducted in a studio. May be repeated once. Prereq: Consent of instructor.

ART


102 Studio Fundamentals: Two Dimensional Design (2) Surface composition and color. Primarily for art, architecture, interior design, and art education majors.

103 Studio Fundamentals: Three Dimensional Design (2) Projects dealing with real space and three dimensional materials. Primarily for art, architecture, art education, and interior design and housing majors.

104 Fabric: Experimental Media on Cloth (3) Experimental media and methods in design of two-dimensional fabric works. Includes discharge dyes, use of copy machine transfers, airbrush, machine free stitching, pencils, and related media.

105 Fiber: Three Dimensional Non-Woven Structures (3) Contemporary approaches to fiber art including exploration and experimentation with various fiber media and techniques in development of sculptural fiber forms.

106 Introduction to Metalsmithing and Jewelry (3) Basic metalworking and jewelry fabrication techniques including repoussé, annealing, forging, chasing, embossing, dapping, drawing, rolling, sinking, soldering, fusing, polishing, and patination with individual setup projects to develop a personal style of expression.

151 History of Graphic Design/ILLUSION (2) Major movements and pivotal artists/designers/art directors. 1650 to the present, and their impact on current graphic design trends. (Does not apply to art history requirement.)

161 Basic Printmaking (3) An introductory survey of printmaking with studio experience in xerography, monotype, linocut, relief and collograph.


172 Western Art I (3) Major monuments in Western Art with emphasis on Europe from prehistory through the Middle Ages.

173 Western Art II (3) Major monuments in Western Art with emphasis on Europe and America from 1400 to the early 20th century.

176 Experiencing Art (3) Form and meaning in the visual arts. Lecture-discussion. Especially for non-majors.

183 Asian Art (3) Art of Central and Southeast Asia, India, China, Korea, and Japan from prehistory through common Buddhist forms and into modern media.

191 Introduction to Studio Art: Various Media (3) Individual sections for various artistic disciplines. For non-majors only. Course may be repeated, medium may not be repeated. Maximum 12 hours.

192 Intermediate Design and Color (3) Further exploration of basic techniques of two-dimensional design, with emphasis on color theory and technique. Prereq: 101, 102, 103.

201 Fabric: Painting and Dyeing (3) Painting and dyeing processes in the development of surface design on fabric, including batik, direct drawing, and/or other related approaches.


204 Fiber: Woven Wall Works (3) Fabrication of woven wall forms on the vertical loom, with emphasis on development of original design. By permission of fiber media, in development of architecturally scaled wall works.
Art/Courses of Instruction

205 Jewelry (3) Metalworking and jewelry techniques emphasizing integration of casting and fabrication methods with individual studio problems to develop a personal style of expression. Prereq: 106. May be repeated. Maximum 6 hours.

206 Enameling (3) Graphical, painterly, and dimensionality capacities of vitreous enamel techniques (including basse-taille, cloisonné, plaque-a-jour, images, sgraffito, grisaille, and champlevé) with individual studio problems to develop an individual style of expression. May be repeated. Maximum 6 hours.

209 Special Topics in Fiber and Fabric (3) Student or instructor-initiated course to be offered at convenience of department. Prereq: Determined by department for individual topic. May be repeated. Maximum 12 hours.


212 Drawing II: Life Drawing (3) Development of drawing and observational skills with special emphasis on structure and dynamics of the human figure and of the figure in environment. Prereq: 211. May be repeated. Maximum 6 hours.

213 Painting I: Introduction (3) Capacities of oil and acrylic painting on canvas. Prereq: 101, 102, 103 for art majors; none for non-art majors.

214 Painting II (3) Techniques of expression in oil and/or acrylic. Prereq: 213 for art majors; 181-Painting for non-art majors. May be repeated. Maximum 6 hours.


216 Watercolor II (3) Capacities of transparent watercolor, with attention to individual exploration of surface, space, and concept. Prereq: 215 for art majors; Art 191-Watercolor for non-art majors. May be repeated. Maximum 6 hours.

219 Special Topics in Drawing/Painting (3) Student or instructor-initiated course offered at discretion of department to enhance and expand the painting, drawing, and watercolor curricula. Prereq: Determined by department for individual topic. May be repeated. Maximum 12 hours.

221 Ceramics I: Handbuilding (3) All ceramic handbuilding techniques including forming methods, glazing, clay preparation, firing, small and large scale pieces. Ceramic history through slide lectures.

222 Ceramic II: Throwing (3) Thrown ceramic forms including functional utilitarian pottery techniques, glazing and firing methods. Prereq: 221 for art majors; 191-Ceramics for non-art majors. May be repeated. Maximum 6 hours.

229 Special Topics in Ceramics (3) Student or instructor-initiated course to be offered at discretion of department to enhance and expand the painting, drawing, and watercolor curricula. Prereq: Determined by department for individual topic. May be repeated. Maximum 12 hours.

231 Photography I (3) Art of black and white photography. Fields and studio shooting, history of photography, basic developing, and enlarging techniques.

232 History of Photography (3) Photography as a fine art. Emphasis on work of Stieglitz, Strand, Weston, and White. (Does not apply to art history requirements). Prereq: 231.

233 Special Topics in Photography (3) Student or instructor-initiated course offered at discretion of department. Prereq: Determined by department for individual topic. May be repeated. Maximum 12 hours.

241 Sculpture I (3) Problems which explore basic materials and techniques including clay modeling, plaster construction, moldmaking. Limited work in plastics, wood, or metal.

242 Life Sculpture I (3) Modeling techniques in clay and plaster. Emphasis on possibilities of expression with human figure as subject. Modeling process as both observational and material handling techniques. Prereq: 101, 102, 103, or consent of instructor. May be repeated. Maximum 6 hours.

243 Metal Cast Sculpture I (3) Metal casting methods in bronze, aluminum. May include lost wax, styrofoam sand, ceramic shell casting methods. May be repeated. Maximum 6 hours.

244 Wood Sculpture I (3) Wood as sculptural medium. May include use of hand and power tools, carving, and construction.

245 Steel Sculpture I (3) Problems to introduce steel as a material for the course of sculpture. Development of welding techniques.

246 Mixed Media Sculpture I (3) Use of two or more materials, and a variety of sculptural techniques, joined to create dimensional form. May include carving, modeling, plaster, egg tempera, wood, and other found objects. Prereq: Consent of department. May be repeated. Maximum 12 hours.

251 Beginning Graphic Design (3) Survey of graphic design: tools, materials, techniques, lettering, and use of type; layout and design. Prereq: 101, 102, 103.

252 Production (3) Design and layout; practice of mechanical preparation of art for various printing processes; skills and craftsmanship emphasized. Prereq: 251.

253 Advertising Design (3) Fundamentals of lettering and layout for newspaper, magazine, television, outdoor advertising. Non-art majors only.

256 Individual Projects in Graphic Design/Illustration (3) Prereq: Consent of instructor. May be repeated. Maximum 8 hours.

259 Special Topics: Graphic Design/Illustration (3) Student or instructor-initiated course offered at discretion of department for individual topic. May be repeated. Maximum 12 hours.

262 Intaglio (3) Metal plate intaglio printing in traditional and contemporary techniques of etching, softground, drypoint, mezzotint, aquatint, and photo etching. May be repeated. Maximum 6 hours.

263 Lithography (3) Stone and aluminum plate lithography applying traditional and contemporary techniques of crayon, tusche, transfer methods, and state proofs. May be repeated. Maximum 6 hours.

264 Screen Printing I (3) Screen printing as a fine art medium including development and application of various basic stencils in compositional printing. May be repeated. Maximum 6 hours.

269 Special Topics in Printmaking (3) Student or instructor-initiated course offered at discretion of department. Prereq: Determined by department for individual topic. May be repeated. Maximum 6 hours.

279 Special Topics in Art History (3) Student or instructor-initiated course offered at discretion of department. Prereq: Determined by department for individual topic. May be repeated. Maximum 12 hours.

291 Papermaking Workshop (3) Papermaking as a medium for two and three-dimensional art, includes sheet forming, embedding, laminating, embossing, pulp dyeing, inlaying, casting, and other related techniques. Emphasis on development of a personal form.

292 Film Design (3) Introductory level and practice of film making. Emphasis on graphic elements through use of motion picture camera.

299 Special Topics (3) Student or instructor-initiated course offered at discretion of department. Prereq: Determined by department for individual topic. May be repeated. Maximum 12 hours.

300 Inter-area Portfolio Review (0) Review of prior studio work. Successful completion required prior to registration for junior and senior courses. Prereq: Consent of department. Satisfactory/No credit only.

301 Fabric: Individual Class Projects (3-6) Prereq: 104, 201, 203 or consent of instructor. May be repeated. Maximum 8 hours.

302 Fiber: Individual Class Projects (3-6) Prereq: 102, 202, 204 or consent of instructor. May be repeated. Maximum 6 hours.

306 Silversmithing (4) Intensive silversmithing techniques including forging, raising, shell forming, lathe, mokume, and lamination with individual studio problems to develop a personal style of expression. Prereq: 106, 205 or consent of instructor. May be repeated. Maximum 8 hours.

311 Drawing III (4) Development of personal drawing techniques and concepts through class problems. Prereq: 212 and 312 or consent of instructor. May be repeated. Maximum 8 hours.

312 Drawing Portfolio Review (0) Review of prior work in painting. Successful completion required prior to registration for junior and senior courses. Prereq: Consent of department. Satisfactory/No credit only.

313 Painting III (4) Individual expression with varied media on canvas. Prereq: 214 and 314 or consent of instructor. May be repeated. Maximum 8 hours.

314 Painting Portfolio Review (0) Review of prior work in painting. Successful completion required prior to registration for junior and senior courses. Prereq: Consent of department. Satisfactory/No credit only.

315 Watercolor III (4) Individual expression with water-based media on paper. Prereq: 216 and 315 or consent of instructor. May be repeated. Maximum 8 hours.

316 Watercolor Portfolio Review (0) Review of prior work in watercolor. Successful completion required prior to registration for junior and senior courses. Prereq: Consent of department. Satisfactory/No credit only.

320 Ceramics Portfolio Review (0) Review of prior work in ceramics. Successful completion required prior to registration for junior and senior courses. Prereq: Consent of department. Satisfactory/No credit only.


331 Photography II (4) Individual expression in photographic medium. Prereq: 231. May be repeated. Maximum 8 hours.


334 Photographic Techniques Workshop (4) Theories and practices of film exposure and development. Introduction to zone system. Prereq: 331.

340 Sculpture Portfolio Review (0) Review of prior works in sculpture. Successful completion required prior to registration for junior and senior courses. Prereq: Consent of department. Satisfactory/No credit only.

341 Sculpture II (3) Further exploration and development of sculptural concepts and materials. Prereq: 240 and 340. May be repeated. Maximum 8 hours.

342 Life Sculpture II (3) Advanced modeling techniques in clay and wax working from the figure. Includes casting a minimum of one piece. Prereq: 242 and 340 or consent of instructor. May be repeated. Maximum 6 hours.


344 Wood Sculpture II (3) Extension of skills and techniques begun in 244. Prereq: 244 and 340 or consent of instructor. May be repeated. Maximum 8 hours.
473 19th Century American Painting (3) From West and Copley to emergence of "The Eight".

474 History of Modern Architecture in Europe and America (3) Emphasis on France: Neoclassicism, Romanticism, Frederick, Constable, Turner, Cezanne. 20th-century Chinese leaders, the Bauhaus, Gropius, Van der Rohe, Le Corbusier, and Wright. Aalto to Kahn, Tange and Metabolism, Archigram, Sert, and Venturi.


476 History of 20th-Century Painting in Europe and America (3) Fauvism, Die Brucke, Cubism, Del Blau Reiter, Futurism, Dada and Surrealism, geometric abstraction, social commentary painting, Abstract Expressionism in the USA and surrealism in Europe; Pop, Op, Minimal and Concept Art.

479 Special Topics in Art History (3) Student or instructor-initiated course offered at convenience of department. Prereq: Determined by department for individual topic. May be repeated. Maximum 12 hours.

480 Enameling (2-4) Intermediate to advanced. May be repeated. Maximum 12 hours.

481 Museology I: Museums, Purpose and Function (3) Purposes, functions and development of museums of art, history, natural and applied science. (Same as Anthropology 481.)

482 Museology II: Exhibition Planning and Installation (3) Exhibition concept development and implementation. Exhibition design and installation techniques. Publicity, production, matting and framing, shipping and storage. Prereq: 481 or consent of instructor. (Same as Anthropology 482.)

484 Museology III: Field Projects (1-12) Special field projects including restoration, preservation, registration, and other related research in on or off campus. Prereq: 481 and 482. May be repeated. Maximum 12 hours. (Same as Anthropology 484.)


486 Art of Indian Asia (3) History of Indian art with consideration of the art of Central Asia and Southeast Asia.

489 Studies in Art History (3) Concentration in individually selected area. Prereq: 12 hours of art history and consent of instructor. May be repeated. Maximum 6 hours.

491 Foreign Study (1-15) See page 97.

492 Off-Campus Study (1-15) See page 96.

493 Independent Study (1-15) See page 96.

494 Individual Problems (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hours.

495 Visiting Artist Seminar (2) Study and discussion of contemporary art issues conducted by different visiting artists each semester. (Does not apply toward art history requirement.) May be repeated. Maximum 8 hours.

496 Advanced Airbrush (3) Advanced techniques of airbrush drawing; skills and use in illustrations emphasized. Prereq: 396.

499 Special Topics (3) Student or instructor-initiated course offered at convenience of department. Prereq: Determined by department for individual topic. May be repeated. Maximum 12 hours.

210 Drawing (2-4) Beginning to intermediate. May be repeated.

220 Ceramics (2-4) Beginning to intermediate. May be repeated.

230 Painting/Weathering (2-4) Beginning to intermediate. May be repeated.

240 Metal Art (2-4) Beginning to intermediate. May be repeated.

260 Fibers (2-4) Beginning to intermediate. May be repeated.

270 Fabric (2-4) Beginning to intermediate. May be repeated.

280 Enameling (2-4) Beginning to intermediate. May be repeated.

290 Wood (2-4) Beginning to Intermediate. May be repeated.

400 Special Topics (2-4) Student or instructor-initiated course offered at convenience of department. May be repeated.

410 Drawing (2-4) Intermediate to advanced. May be repeated.

420 Ceramics (2-4) Intermediate to advanced. May be repeated.

430 Photography (2-4) Intermediate to advanced. May be repeated.

440 Painting/Weathering (2-4) Intermediate to advanced. May be repeated.

450 Metal Art (2-4) Intermediate to advanced. May be repeated.

460 Fibers (2-4) Intermediate to advanced. May be repeated.

470 Fabric (2-4) Intermediate to advanced. May be repeated.

480 Enameling (2-4) Intermediate to advanced. May be repeated.

490 Wood (2-4) Intermediate to advanced. May be repeated.

ART EDUCATION

300 Art for the Elementary Classroom Teacher (2) Methods of teaching art in elementary classrooms, including developmental theory, philosophical concerns and selected media experiences. E

301 Foundation of Art Education (3) Basic philosophy and structure including directed learning activities in two and three dimensional design, art appreciation, and teaching methodology. F, Sp

302 Concepts of Drawing and Painting (3) Processes in teaching of drawing and painting including consideration of pertinent literature and research. F, Sp

303 Concepts of Sculpture and Crafts (3) Processes in teaching of sculpture and crafts including pertinent literature and research. Prereq: 301 and admission to Teacher Education Program. F

304 Concepts of Printmaking, Graphic Design and Lettering (3) Processes in teaching printmaking, graphic design and lettering including pertinent literature and research. Prereq: 301 and admission to Teacher Education Program. Sp

350 Field Experience (1) Tasks related to teaching and to teacher roles. May be repeated. Maximum 2 hours. Prereq: Admission to Teacher Education Program. Sp

400 Curriculum Planning and Teaching Strategies (3) Program development, instructional methods, professional literature, contemporary issues, simulation and micro teaching situations. Prereq: 301 and admission to Teacher Education Program. Satisfactory/No Credit only. F, Sp

410 Pre-Internship Seminar (1) Orientation describes the objectives and policies of the internship program. Must be completed the term immediately preceding the internship. Prereq: Admission to Teacher Education Program. Satisfactory/No Credit only. Sp, Su

481 Internship I: Grades K-12 (2-6) Test of materials and theories of teaching. Internship is completed in local public school. Application for internship should be made upon admission to Teacher Education Program. Prereq: 410 and admission to Teacher Education Program. Satisfactory/No Credit only. Sp, Su

482 Internship II: Grades K-12 (3-6) Demonstration of professional competence in planning, instruction and classroom management. Internship is completed in local public school. Prereq: 481 and admission to Teacher Education Program. Satisfactory/No Credit only. Sp

490 Special Topics (3) May be repeated. Maximum 6 hours.

493 Independent Study (3) May be repeated. Maximum 9 hours.

ASIAN STUDIES

101-102 Asian Civilization (3) Comparative study of development of religion, social institutions, and high culture in India, China, Japan, and the Islamic world. 101-102 is a course sequence in the first year. F

128-129 Elementary Modern Standard Arabic I, II (5,5) Elementary Arabic, the language of the press, broadcasting, literature, and formal situations. Meets every day, three days with instructor and two with native informant. Application for internship must be made in advance. Must be taken in sequence.

131-132 Elementary Chinese I, II (5,5) Must be taken in sequence.

141-142 Elementary Modern Hebrew I, II (4,4) Taped language program. Must be taken in sequence.

151-152 Elementary Japanese I, II (5,5) Must be taken in sequence.

161-162 Elementary Persian (4,4) Taped language program. Must be taken in sequence.

221-222 Intermediate Modern Standard Arabic I, II (5,5) Intermediate Arabic, the language of the press, broadcasting, literature, and formal situations. Meets every day, three days with instructor and two with native informant in addition to language lab. Application for internship must be made in advance. Prereq: 121-122 or equivalent or consent of instructor.

231-232 Intermediate Chinese I, II (5,5) Prereq: 131-132 or equivalent or consent of instructor. Must be taken in sequence.

241-242 Intermediate Modern Hebrew I, II (4,4) Taped language program. Prereq: 141-142 or equivalent or consent of instructor. Must be taken in sequence.

251-252 Intermediate Japanese I, II (5,5) Prereq: 151-152 or consent of instructor. Must be taken in sequence.

311-312 Chinese Literature in English Translation (3,3) Classical literature. 312-Vernacular and modern literature.


319 Islamic Literature in English Translation (3) Selections from the Koran, classical Arabic and Persian, and classical Arabic, Persian, and Turkish prose,
115-152 Introductory Astronomy (4,4) Survey of the composition, structure, and dynamics of the universe which introduces the basic vocabulary of astronomy and scientific method. Components of the solar system including results from interplanetary exploration; hypotheses and theories of the origin and evolution of our solar system and celestial motions; evolution to the changing conceptions of the universe; structure of the universe and introducing the basic vocabulary of astronomy. May be repeated for credit with consent of department. Maximum 9 hours.

151 Topics in Astronomy (1-3) Topics of current interest in Astronomy and Astrophysics. May be repeated for credit with consent of department. Maximum 9 hours.

Astronomy

411 Astrophysics (3) Development of analytical physical models of the galactic structure of the universe, stellar and interstellar matter, and planetary systems. Topical and interdisciplinary approach includes consideration of quasars, pulsars, black holes and current developments in the field. Acceptable for major credit in physics. Prereq: Physics 232 and consent of instructor.

490 Special Topics in Astronomy (1-3) Topics of current interest in Astronomy and Astrophysics. May be repeated for credit with consent of department. Maximum 9 hours.

AUDIOLOGY AND SPEECH PATHOLOGY

126 Speech for Foreign Students (3) Sounds and imitation patterns of American English and relation of speech to hearing. Prereq: 221-222 or consent of instructor. May be repeated. Maximum 9 hours.

404 Appraisal of Speech and Language Disorders (3) Diagnostic procedures for children and adults with speech and language problems including observation and practice with diagnostic tests. Prereq: 304, 305, 433 or consent of instructor. (Same as Special Education 404.)

431 Stuttering (3) Nature, appraisal and treatment. Prereq: 304 or consent of instructor.

431 Clinical Practice in Speech-Language Pathology II (1-4) Prereq: 433 and consent of instructor. Enrollment for fewer than 2 semester hours must have prior departmental approval. (Same as Special Education 434.)

440 Voice Disorders (3) Etiology, diagnosis, and treatment of articulatory defects. Prereq: 304, 305, or consent of instructor. (Same as Special Education 331.)

473 Audiology II (3) Basic acoustics. Fundamental aspects of auditory anatomy and physiology. Introduction to disorders of hearing. Basic Psycholinguistics. Prereq: Audiology I (3) or consent of instructor.

445 Clinical Practice in Audiology (1-4) Prereq: 473 and consent of instructor. May be repeated. Maximum 12 hours. Prereq or Coreq: 410, 419.

450 Voice Disorders (3) Etiology, diagnosis, and treatment of organic and functional voice disorders. Prereq: 304, 305, or consent of instructor. (Same as Special Education 440.)

BIOCHEMISTRY

310 Introduction to Biochemistry (3) Biochemical principles underlying physiological events in animal tissues. Metabolism of carbohydrates, lipids, proteins, and nucleic acids. Biochemistry of body fluids. Action of drugs and hormones. Prereq: Chemistry 120-30 or 161-30 and Biology 110-20. Lecture and discussion. Not available for credit if credit has previously been received for 410 or 420. F, Sp

429 Advanced Topics in Biochemistry (3) Selected Topics of current research interest, e.g., allosteric theory and control of protein function, immunology, regulation of gene expression, bioregulatory systems. Emphasis on original literature and the experimental basis of current knowledge. Historical background, societal impact, ethical and moral implications, and future developments in these technological. Written reports required. Prereq: 410. Sp

430-440 Introduction to Physical Biochemistry (3,3) Development of concepts from physical chemistry to applications to biological problems. 430 - Thermodynamics; intermolecular bonding; transport; shape and structure of macromolecules; kinetics of enzyme-catalyzed reactions. 440 - Amino acids, proteins, and nucleic acids; overall protein structure; measuring and utilizing other sensory modalities. Prereq: 473. F, Sp

465 Speech and Language of the Culturally Different Child (3) Speech and language differences of children of various minority groups, of different ethnic groups. Emphasis on original literature and the experimental basis of current knowledge. Historical background, societal impact, ethical and moral implications, and future developments in these technological. Written reports required. Prereq: 410. Sp

466 Introduction to Audiology (1-4) Prereq: 473 and consent of instructor.

455 Problems in Speech Pathology (1-4) Prereq: Consent of instructor.


463 Practical Applications of Language Habilitation Techniques (3) Various methods and procedures used in treating delayed/disordered preschoolers. Alternative/ augmentative systems included. Prereq: 461 or consent of instructor.
and other environmental factors. Lecture and lab. Prereq: 

313 Introductory Plant Pathology (3) (Same as Entomology 313, Morphogenesis, elements of metabolic processes, of an environment in which humans and their cultures 

321 Introductory Plant Physiology (4) Organismal physiology of plants: water relations, mineral nutrition, morphology, elements of metabolic processes, early life, age, light, natural rhythms, temperatures, and other environmental factors. Lecture and lab. Prereq: 

410 Television News (3) Writing, reporting, performing and producing news for television. Lecture and lab course providing students with experience as report- er/producers for a television news program. Includes an overview of electronic news gathering equipment and techniques as well as video editing. Prereq: 310.

420 Radio and Television Sales and Promotion (3) Problems and practices of television, radio, and cable sales and promotion. Case studies in sales, sales management, pricing, rate cards, use of rating and sales presentation. Includes an overview and analysis of effective station promotion techniques. Prereq: 320.


490 Radio and Television Management (3) Business policies and practices of broadcast operations, department functions, cost and income analysis, leadership styles and organizational techniques. Prereq: 420. Capstone course to be taken in student's last semester. Prereq: 319, 320, 330.

492 Practicum (1) On or off-campus work and learning experience at radio, television, cable or non-broad- cast facility. 1 hour must be at WUTF-FM. 150 hours of work required for each hour of credit. Final written report required. May be repeated once. Prerequisite: 275, progression to a Broadcasting major and consent of department head.

493 Independent Study (3) AREA OF STUDY IN BROADCASTING TO BE DETERMINED BY STUDENT IN CONSULTATION WITH FACULTY ADVISOR. ORDINARILY THE AREA OF STUDY IS NOT PART OF THE DEPARTMENTAL CURRICULUM. STUDENTS MUST COMPLETE AN APPLICATION FORM AVAILABLE IN THE DEPARTMENT. Prerequisites: Senior standing and consent of department head.

BUSINESS ADMINISTRATION

311 International Business (3) Survey of strategic implications of conducting business operations in an international context. Analysis of relevant cross-na- tional environments, including cultural, political, economic and legal characteristics. Prereq: Economics 201.

320 Business Career Planning and Placement (1) Career opportunities in business. Making the career decision, preparing for and conducting a job cam- paign. Using the Placement Office. Satisfactory/No Credit only. Prereq: Satisfactory progression to upper-level in Business or Liberal Arts Business Minor.

467 Honors: Corporate Executive in Residence Sem- inar (3) Interaction with top corporate executives from a wide spectrum of business disciplines. Domestic and international strategic planning as it is applied in major U.S. Corporations. Executive presentations and seminars on U.S. and international strategic planning as it is applied in major U.S. Corporations. Executive presentations and small group discussion on goods and services in con- sumer goods and industrial settings. Prereq: Senior standing, Finance 301, Management 301, Marketing 301 and consent of instructor.

491 Foreign Study (1-15) Prereq: Consent of instruc- tor. See page 56.

492 Off-Campus Study (1-15) Prereq: Consent of instructor. See page 57.

493 Independent Study (1-15) Prereq: Consent of instructor. See page 57.

BUSINESS LAW

301 The Legal Environment of Business (3) Intro-
Organizational functions, structures, skills for managing communications, conflict, other interpersonal processes in professional settings. Prereq: Junior standing. F

319 Early Greek Mythology (3) Archaic Greek rel-
igious observance across the life-cycle. Prereq: 220 for CFS majors. F

420 Families: Ethnicity, Race, Class and Culture (3) Cultural, socioeconomic, ethnic variations; emerging needs and programs. Prereq: 220, 320, Junior standing or consent of instructor. (Same as Afro-America Studies 420.) A, F

440 Teaching in Community-Based Programs (3) (Same as Home Economics Education 440) A, Sp

450 Assessment in Early Childhood Programs (3) Physical, cognitive, social, language development in handicapped and nonhandicapped children birth to 5 years; early development, assessment. Includes super-
vised practicum in assessment. Prereq: 351 or consent of instructor. F

451 Early Childhood Education III: Mainstreaming Exceptional Children (3) Individualized curriculum plan-
ning based on knowledge of normative, nonnormative development, assessment, effective teaching strategies for facilitating development. Includes participation. Prereq: 450. F

460 Directed Study in Child and Family Studies (1-3) Individual learning experience arranged for students under supervision of faculty. May be repeated with different topics. Maximum 6 hours. Prereq: 3 hours. Child and Family Studies and consent of instructor. F, Sp

470 Student Teaching (15) Responsibility for plan-
ing and guiding groups of infants, toddlers, or preschoolers under supervision of head teacher. Includes weekly seminar. Prereq: 370. 450. Satisfactory/No Credit only. F, Sp, Su

475 Day Care Administration (3) Theories, methods, and materials for administrators of early childhood education programs; writing funding proposals, staff selection, financial management, recruiting and enroll-
ing children, supervision, evaluation, public relations, communication, conflict resolution. Includes particip-
tion experience. Prereq: 351 or consent of instructor. Sp

480 Practicum in Child and Family Studies (3-15) Supervised experiences working with children or families, designed to meet special interests of the student. Prereq: 15 hours in Child and Family Studies and consent of instructor. May be repeated. Maximum 15 hours. Satisfactory/No Credit only. F, Sp, Su

486 Special Topics in Child and Family Studies (1-9) Personal or professional interest in human develop-
ment or family studies. Prereq: 9 hours in Child and Family Studies, Junior or Senior standing, or consent of instructor. May be repeated. Maximum 9 hours. F, Sp, Su

497 Honors: Child and Family Studies (3-6) Issues or topics affecting children and/or families, designed to meet particular interests of the student. Prereq: 15 hours in Child and Family Studies, overall GPA of 3.25 or greater, Junior standing, or consent of instructor. May be repeated. Maximum 6 hours.

221 Early Greek Mythology (3) Archaic Greek reli-
gion through comprehensive study of Greek myths with emphasis on how they reflect the early Greek vision of the universe and humanity's place in it. Origins and development of Greek myths and the rise of organized religiosity. Age to about 450 B.C. Readings include Hesiod and Aeschylus.

222 Classical Greek and Roman Mythology (3) Use of myth in literature, history, religion and philosophy of Greece and Rome from about 450 B.C. to about 50 B.C. Two-week block courses on Greek and Roman periods. B.C. and the last quarter of the first century B.C. Includes Oriental intrusions into Greece and Rome, including early Christianity. Readings include Sopho-
cles, Euripides, Roman poetry, and modern scholarship.

232 Archaeology and Art of Ancient Greece (3) Survey of Greek archaeology from prehistoric times to the Roman period (ca. 3000-100 B.C.) with emphasis on architecture and artifacts used to recreate the culture of the Mycenaean and Mycenaean cities and that of the following Dark Ages. For Archi. Classical, and Hellenistic periods emphasis on development of architecture, sculpture, and vase painting includes minor arts and the relationship between archaeology and art.

233 Archaeology and Art of Etruria and Rome (3) Survey of the archaeology of the Italian peninsula and the Roman world from prehistoric times to the fall of the Roman Empire (1000 B.C.-500 A.D.) Reconstruction of the Etruscan culture from tombs, paintings, and artifacts, development of Roman architecture, and urban planning in Rome and the provinces. Prereq: 232 or consent of instructor.

253-254 Greek and Roman Literature in English Trans-
lation (3,3) 253-Greek Literature. Major literature of ancient Greece from Homer to Manander, with emphasi-
s on the sixth and fifth centuries B.C. 254-Roman Literature. Major literary works of the Romans from Plautus, Ovid, to Juvenal. Students are encouraged to read the Greeks and then achieved their own artistic iden-
ty by the time of Vergil's Aeneid.

273 Medical and Scientific Terminology (3) Greek and Latin roots from which medical and scientific terms and abbreviations are derived. Practice in use of Latin nomenclature.

331 Archaeology of the Aegean Bronze Age and Early Greece (3) Includes Troy, the Cycladic Islands, the Greek mainland and north-eastern Cyprus ca. 3000-700 B.C. Rise and fall of the Minoan and Mycenaean civili-
zations and their effect on the Aegean World and Cyprus. Evidence for daily life, religion, trade, and foreign contacts. Architecture, wall paintings, and arti-
facts. Prereq: One of the following: 232, 381, ancient history (Ancient Greek, Early Ancient or Greek), or con-
sent of instructor.

334 Cities and Sanctuaries of the Ancient Greek World (3) Archaeological survey of the development of the Greek city and sanctuary from prehistoric times through the Roman period (ca. 2000 B.C. - 200 A.D.). Includes topography and plans of major cities and sanctuaries, functions of buildings, development of city planning, quality of early Minoan and Mycenaean festivals including the Olympic games. Ancient sites include Mycenae, Athens, Priene, Alexandria, Per-
gamon, Carthage. Students are encouraged to have taken one of the following: 221; 232, 233, 231, History 310.

381 Greek Civilization (3) Major aspects of ancient Greek civilization: religion, fine arts, political life, pa-

t-Mediterranean relations, the prominence of Athens; the role of modern archaeology in interpretation; empha-
sis on the sixth and fifth centuries B.C.

382 Roman Civilization (3) Major aspects of ancient Roman civilization: political institutions, art and archi-
tecture, history, culture and daily life, emphasizing the late Republic and early Empire.

383 Women in the Greek and Roman World (3) The condition of women in the apparently male-
dominated world of Classical Greece and Classical Rome. Evidence from literature, vase paintings, and other arts is examined from the age of Homer to the second century A.D. with emphasis on Athens in the fifth century B.C. and Roman Italy in the first and second centuries A.D. (Same as Women's Studies 383.)

422 Seminar in Classical Studies (3) Field of Classi-
cal studies today: recent achievements in the areas of both philology and archaeology, impact of the deci-
ded change in linear B, new understandings of the culture and politics of the "golden age" of Pericles and Augustus; Classical studies and the academic profession on both the high school and college levels. May be repeated. Maximum 6 hours.

441 Special Topics in Classical Civilization (1-3) Topics in art, literature, religion, and society of Greece and Rome. Topics selected to reach up to three times with con-
sent of department.

461 Studies in Classical Archaeology (3) Variable content course offering subject matter not taught in an existing course, or concentration on one aspect of the existing survey. May be repeated. Maximum 9 hours. Prerequisites according to topic.

462 Roman Law (2) Development of Roman law through examination of cases from the writing of the Roman jurists, the world's first legal professionals. Emphasis on understanding legal institutions in relationship to Roman society, and coverage of aspects of Roman prop-
erty and contract law.

491 Foreign Study (1-15) See page 97.

COLLEGE SCHOLARSHIP HONORS

317-318 College Scholars Seminar (1,1) Sequence (in any order) limited to and required of all College Scholars each year. May be repeated. Maximum 8 hours. Satisfactory/No Credit grading only. F, Sp

491 College Honors: Foreign Study (1-15) See page 97 and Director of Special Programs. Primarily for College Scholar students.

492 College Honors: Off-Campus Study (1-15) See page 96 and Director of Special Programs. Primarily for College Scholar students.

493 College Honors: Independent Study (1-15) See page 96 and Director of Special Programs. Primarily for College Scholar students.

498 Honors: College Scholars Studies (2-12) Designed for College Scholars working on their senior thesis, project, or performance. May be repeated. Maximum 16 hours.

COMMUNICATIONS

100 Introduction to Mass Communications (3) Over-
view of systems of mass communications, with emphasis on American media, their ownership, legal and social controls, role and effects. Advertising, broadcasting, journalism and publishing, and public relations are examined in the context of theories of mass commu-
nications. Potential majors in the College of Communications should take the course during their freshman year. E

200 Writing for Mass Communications (3) Informa-
tion gathering and writing under deadline for print and broadcast media, including news and promotional copy. Preparation of news, advertising and persuasive text. Comparison of styles and organization techniques. Grammar, usage, and style workshop. Prerequisites: 100, 161, 128 and college admissions tests (typing, spelling and grammar).

300 Mass Communications Research Methods (3) Social science research methods, especially sample surveys, used by communications media. Applica-
tions to both internal decision-making and to external communication in media. Prereq: 200 or consent of instructor. E

400 Mass Communications Law and Ethics (3) Empha-
sis on legal issues directly affecting the mass media: libel, privacy, free press-fair trial, judicial controls, governmental regulations. Also includes ethical stan-
dards and practices of the mass media in America. Prereq: 200 or consent of instructor. E

COMPARATIVE LITERATURE

201 Introduction to Comparative Literature (3) Basic knowledge, techniques, and sources necessary to compare literatures of various cultures, ages, and nations.

202-203 Cross-Cultural Perspectives in World Liter-
ature (3,3) Literary perspectives and values in different nations.

301 Computer Techniques for Literary Study (3) Com-
puter research in literary study including writing programs
in BASIC which have literary research applications. Projects include indexing and bibliography; concordances, syntactic analysis, context analysis, authorship attribution, textual editing, and stylistic analysis. No previous computer knowledge or background is assumed or required.

401-402 Special Topics in Comparative Literature (3,3) Content varies. May be repeated. Maximum 9 hours.

COMPUTER SCIENCE

100 Introduction to Computing (4) History of computers and programming, hardware and software, computing tools currently available. Organization and characteristics of modern digital computers. Introduction to programming, emphasis on developing good programming habits. Problem solving and algorithm development. Building abstractions with procedures and data. 100 and 102 may not both be taken for credit. 100 for students with little or no background in computing.

101 Introduction to Programming Using FORTRAN (3) Problem solving and algorithm development, introduction to programming using FORTRAN. Organization and characteristics of modern digital computers. Emphasis on developing good programming habits. Problem solving and algorithm development. Building abstractions with procedures and data. Programming in a modern computing language. 100 and 102 may not both be taken for credit with some background in computing. 3 hour lab required.

111 Computer Organization (3) Number systems, internal representation of numbers in computers, hardware components, hardware organization, introduction to assembly language, microprogramming control units. Computing with register machines, introduction to digital circuits. Prereq: 100 or 102. 3 hour lab required.

112 Data Structures (3) Structured programming, data structures and applications, I/O techniques, lists, queues, trees, tables and chips for understanding techniques to design and implement systems, design and classification of parallel systems. 3 hour lab required.

203 COBOL (3) Computer programming in COBOL. File handling, disk data sets. Prereq: 100 or 101 or 102 or consent of instructor.


291 Lower-Division Special Topics (1-3) Topics vary. Programming languages, operating systems and application software packages. May be repeated. Maximum 9 hours.

311 Discrete Structures (3) Propositional and predicate calculus, algorithms, graphs, trees. Prereq: Mathematics 222 and either 100 or 102.

320 Problem Solving (3) General approaches to problem solving, with emphasis on formalizing intuitive heuristics. Structure of problems and goals, generation of solutions, backtracking, coding and verification of partial solutions. Prereq: 111 and 112 and 311. (Required core course for the Machine Intelligence Concentration.) 3 hour lab required.

331 Digital Design (3) Logic design, microprocessors and microcomputer interfacing, interrupt controllers. Prereq: 111 and 112. 3 hour lab required.

340 Advanced Data Structures (3) AVL trees, b-trees, advanced concepts and techniques. Prereq: 111 and 112. (Required core course for the Computer Systems Concentration.) 3 hour lab required.

360 Systems Programming (3) Linkers, loaders, multitasking, I/O facilities, interrupt handling, monitors, editors. Prereq: 111 and 112. (Required core course for the Computer Systems Concentration.) 3 hour lab required.

380 Theory of Computation (3) Recursive functions, Turing machines, computability, halting problems, Gödel theorem. Prereq: 111 and 112 and 311. (Required core course for the Theory of Computing Concentration.)

381 Formal Languages (3) Grammars of the Chomsky hierarchy and their recognizers. Properties of languages and machines. Prereq: 111 and 112 and 311.

401 Applications of Computer Graphics (3) Commercial software, techniques, hardware. Prereq: 100 or 101 or 102. May not be taken for credit by Computer Science majors. 3 hour lab required.

402 Applications for Artificial Intelligence (3) Commercial software, techniques, hardware. Prereq: 100 or 101 or 102. May not be taken for credit by Computer Science majors. 3 hour lab required.

403 Applications of Microcomputers (3) Microcomputers, DOS, commercial software and hardware. Prereq: 100 or 102. May not be taken for credit by Computer Science majors. 3 hour lab required.

404 Applications of Database Systems (3) Commercial software, systems, techniques. Prereq: 100 or 101 or 102. May not be taken for credit by Computer Science majors. 3 hour lab required.


412 Senior Thesis II (3) Continuation of 411.

421 Introduction to Artificial Intelligence (3) Introduction to AI languages. Basic techniques of heuristic search, parsing, and theorem proving. Prereq: 320. 3 hour lab required.

422 Expert Systems (3) Production rule model and its extension into many-valued and fuzzy logics. Deriving explanations, examples of expert system tools and building expert systems. Other methodologies—frames, scripts, decision expression. Prereq: 421. 3 hour lab required.

423 Natural Language Processing (3) Phrase-structured and slot grammars, error-correcting interfaces and semantics. Applications in database and expert systems. Prereq: 381 and 421.

424 Robotics Software (3) Software for robotic control. Prereq: 331 and Mathematics 142. 3 hour lab required.

425 Functional Languages (3) Functional, applicative and object-oriented languages such as LISP and SMALL-TALK used for research applications. Prereq: 111 and 112 and Mathematics 222. 3 hour lab required.

432 Computer Graphics (3) Interactive computer graphics. Transformations, perspectives, shading, vector generation, etc. Details of graphics hardware such as tablets and chips for understanding techniques to design computer systems for graphics capability. Prereq: 351. 3 hour lab required.

433 Computer Systems Architecture (3) Parallel processing, memory, I/O, pipelines, specialized architectures. Prereq: 331 and 360.

434 Networks and Communications (3) ISO open system interconnection model, protocols, study of several existing wide area networks, local area networks. Prereq: 331 and 360.

435 Microcomputer Systems (3) Disk operating systems, peripherals, local area networks and communication protocols to interconnect microcomputers and a larger network. Prereq: 331 and 360. 3 hour lab required.

436 Computer Systems Hardware Design (3) Investigation of computer systems hardware, including bus structures, memory, interrupt support hardware, direct memory access logic, timing budgets, and system considerations in the design of instruction, testing and debugging of either or both of a prototype subsystem; a system based on commercially available microcomputer component devices. Prereq: 435. Includes 3 hour lab.

438 Microprogramming (3) Microprogramming concepts and techniques for control systems of large and small machines. Bit-slice architecture, sequencers, etc. Prereq: 331. 3 hour lab required.

441 Science Information Systems (3) Design of scientific data banks, document repositories, information retrieval and electronic dissemination; systems for the dissemination of scientific information at the national and international level. Prereq: 340.

442 Introduction to Database Management Systems (3) Designing and implementing database software, network and relational models: relational calculus and algebra, data definition and manipulation languages; implementation and security considerations, performance, integrity, and reliability metrics, intelligent database systems. Prereq: 340 and 311.

443 Introduction to Information Storage and Retrieval (3) Information storage and retrieval, statistical, syntactic and logical analysis of information content, evaluation of retrieval effectiveness. Prereq: 340.


451 Pattern Recognition and Analysis (3) Elements of syntactic pattern recognition, learning algorithms, decision theory, classification rules. Prereq: 111 and 112 and 311. 3 hour lab required.

452 Image Processing and Analysis (3) Methods for digitizing, preserving, processing, analyzing, and storing image enhancement, restoration. Prereq: 451. 3 hour lab required.

460 Human Factors in Software (3) Interface between people and machines and the ease of use of software for the equipment for which it is intended. Prereq: 111 and 112.


462 Software Engineering (3) Software design and application process from initial requirement and specification statements to coding, testing, implementation, and maintenance. Prereq: 111 and 112.

463 Programming Languages (3) Study and comparison of programming languages and their environments. Human interfaces, formalisms, domain of applicability, object manipulation, syntax, etc. Prereq: 111 and 112.


465 Parallel Computation I (3) Examination of non-numerical algorithms for parallel computation, operating systems, design and classification of parallel processors, compilers, concurrent computation. Prereq: 353.


469 Non-Numeric Algorithms (3) Design and analysis of effective and efficient computer algorithms. Trees, sorting, searching, graphs, pattern matching, etc. Prereq: 111, 112 and 311.

471 Numerical Analysis (3) (Same as Mathematics 471).

473 Numerical Algebra (3) (Same as Mathematics 472).

473 Computer Modeling and Simulation of Physical Systems (3) Interactive techniques for the simulation of various kinds of physical systems. Prereq: 111, 112, and 311; and Mathematics 371.

476 Management of Uncertainty of Computer Systems (3) Origins of uncertainty and methods for dealing with the various classes of uncertainty. Topics may include hazards in switching circuits, vagueness in logical expressions, stochastic processes, computer models of physical processes, etc. Prereq: 111, 112 and Mathematics 222.

482 Graph Theory and Applications (3) Planarity,
DANCE

101 Practicum: Dance Production (1) Supervised technical and promotional production aspects of university dance company. May be repeated. Maximum 2 hours.

201 Practicum: Dance Performance (2) Preparation and presentation of university dance company performances. Participation through audition only. May be repeated. Maximum 16 hours.

210 Ballet: Level I (2) Instruction and practice in elementary classical ballet techniques. May be repeated. Maximum 4 hours.

220 Jazz: Level I (2) Instruction and practice in elementary jazz dance styles and techniques. May be repeated. Maximum 4 hours.

230 Modern: Level I (2) Instruction and practice in elementary modern dance techniques. May be repeated. Maximum 4 hours.

240 Tap: Level I (2) Instruction and practice in elementary tap dance techniques.

250 Composition I (3) Choreographic skills emphasizing form, content and music.

310 Ballet: Level II (2) Instruction and practice in intermediate classical ballet techniques. Available to majors and minors or with consent of instructor. May be repeated. Maximum 12 hours.

320 Jazz: Level II (2) Instruction and practice in intermediate jazz dance styles and techniques. Available to dance majors and minors or with consent of instructor. May be repeated. Maximum 12 hours.

330 Modern: Level II (2) Instruction and practice in intermediate modern dance techniques. Available to majors and minors or with consent of instructor. May be repeated. Maximum 12 hours.

340 Tap: Level II (2) Instruction and practice in intermediate tap dance techniques. Prereq: 240 or consent of instructor.

350 Composition II (3) Choreographic skills emphasizing design, use of costumes and props. Prereq: 250.

380 Special Topics (1-3) Selected disciplinary or professional areas of dance. May be repeated.

410 Ballet: Level III (2) Instruction and practice in advanced classical ballet techniques. Available to majors and minors or with consent of instructor. May be repeated. Maximum 16 hours.

415 The Teaching of Creative Dance (2) Theory, methods, materials and practical experience in the presentation and integration or creative dance in grades K-6.

420 Jazz: Level III (2) Instruction and practice in advanced jazz and musical theater dance styles and techniques. Available to dance majors and minors or with consent of instructor. May be repeated. Maximum 16 hours.

430 Modern: Level III (2) Instruction and practice in advanced modern dance techniques. Available to majors and minors or with consent of instructor. May be repeated. Maximum 16 hours.

450 Composition III (3) Application of choreographic and production skills culminating in the presentation of two works. Prereq: 350.

460 Rhythmic Analysis (3) Basic nature and principles of music, rhythm and rhythm notation with emphasis on their relation with dance movement and composition. Prereq: Consent of instructor. Senior standing or graduate status required for graduate credit. Different level of performance is expected of those registered for graduate credit.

465 Dance Notation (3) Fundamentals of movement notation with emphasis on notation and reading of elementary movement studies. Senior standing or graduate status required for graduate credit. Different level of performance is expected of those registered for graduate credit.

480 History of Dance I (3) Survey of the dance of various societies and cultures from pre-history through the nineteenth century. Senior standing or graduate status required for graduate credit. Different level of performance is expected of those registered for graduate credit.

481 History of Dance II (3) Survey of the development of dance in theater, recreation and education during the 20th century. Senior standing or graduate status required for graduate credit. Different level of performance is expected of those registered for graduate credit.

490 Philosophy of Dance and Related Arts (3) Aesthetic principles and current trends in dance emphasizing relationships with other art forms. Senior standing or graduate status required for graduate credit. Different level of performance is expected of those registered for graduate credit.

493 Directed Independent Studies (1-3) Independent study in a specialized area with dance. May be repeated. Maximum 9 hours. Prereq: Consent of instructor.

495 Dance Pedagogy (3) Principles and methods of the teaching of dance with practical application in a mini-teaching experience. Prereq: Upperclass or graduate standing and approval of instructor. Senior standing or graduate status required for graduate credit. Different level of performance is expected of those registered for graduate credit.

ECOLOGY

370 Environment and Conservation (2) Introduction to natural and artificial environments and natural resource conservation. Limited to students in the College of Education.

ECONOMICS

100 Survey of Economic Ideas (3) Ideas of major economists in context of socioeconomic conditions of their times. Emphasis on nontechnical treatment. May not be substituted for Economics 201.

201 Introductory Economics: A Survey course (4) Theory of consumer behavior, theory of firms, supply and demand, costs of production, market models, national income and employment theory, money and banking, taxation, income distribution, money and fiscal policy, debt, and international economic policies.

207 Honors: Introductory Economics (4) Honors course for students of superior ability and interest. Students accepted on the basis of their records.

311 Intermediate Microeconomics (3) Theories of consumer behavior, production and costs, of price and behavior of firms in perfectly competitive, monopolistic and imperfectly competitive markets, input prices, and cost, income distribution, welfare and general equilibrium. Prereq: 201.


321 International Economics (3) Balance of payments, exchange rate determination, monetary and fiscal policies, monetary arrangements, comparative advantage, tariff and non-tariff trade distortions, protection arguments, regional integration. Prereq: 201.

333 Economic Development (Third World) (3) Theories of economic development, policies and strategies used to promote economic improvement in less developed countries. Prereq: 201.


331 Government and Business (3) Antitrust and regulatory economics, problems in regulation and social control of business organization, oligopoly models. Prereq: 201.

341 Survey of Labor Economics (3) Extension of economic principles to labor markets, public policy questions, demand and supply theory, wage differentials, unemployment, unionization, measurement and regulation in individuals, education and training, mobility. Prereq: 201.

343 Labor Relations and Collective Bargaining (3) See Management 311.


361 Regional and Urban Economics (3) Overview of regional differences. Theory of industrial and agricultural location and human migration, economic basis for land use patterns, central places, and urban form, regional and urban structure, growth, and methods of analysis, examination of urban problems. Prereq: 201.

381 Econometrics (3) Methods of specification, estimation, testing and forecasting of economic relationships. Includes specification of models, estimation methods, statistical inference of empirical results, forecasting procedures and common econometric problems, such as multicollinearity, heteroscedasticity, and autocorrelation. Prereq: 201, Statistics 201, Mathematics 121-122 or 141-142.

400 Special Topics (3) Topics vary. Prerequisites determined by department each time course is offered. Numerical grade is given to law students. Prereq: 201.


462 Economics of Resources and Environmental Policy (3) Analysis of environmental policy and
404 Special Topics (1-3) Instructor initiated course offered at the discretion of the department on various topics of current interest. Contact department for listing of topics to be covered. May be repeated. Maximum 15 hours. E

410 Sex Role Development: Implications for Education and Counseling (3) Theories and research concerning the development of sexual role and its relevance in educational and counseling settings. E

421 Personality and Mental Health (3) Perspectives of mental health with applications to education and other social settings. E

432 The Disadvantaged Student: Psychoeducational-Practical Aspects (3) Theory and research in terminology, psychological behavior and appropriate interventions. E

460 Self-Management in the Helping Professions (3) Applications of self-management strategies to career, social, emotional and health domains for helping professionals and their clientele. Prereq: Introductory course in psychology or permission of instructor. E

493 Independent Study (1-15) Independent investigation of problems in educational and counseling psychology. May be repeated. Maximum credit 15 hours. E

EDUCATIONAL CURRICULUM AND INSTRUCTION

141 Efficient Reading and Study Skills (2) Improvement of reading comprehension and rate, intensive vocabulary enrichment, study skills as they relate to content area subjects. Satisfactory/No Credit only. F, Sp

203 Field Study in Education (1-3) Problems of persons in active service in the field. Includes methods of teaching, curriculum materials, school-community relationships and school organizations. May be repeated. Maximum 6 hours. E

302 School and American Society (3) Historical, philosophical and social perspectives on contemporary educational issues. Prereq: Junior level standing. (Same as Education 302.) F, Su

303 Teacher Effectiveness and Curriculum Design (1) Literature and research on effective teaching. Relationship to basic concepts, principles and processes of curriculum design. Prereq: Admission to Teacher Education Program. (Same as Education 303.) F, Sp

304 Microcomputers and Instructional Design (1) Basic operations and application of microcomputer as related to curriculum development and instructional design. Prereq: Admission to Teacher Education Program. (Same as Education 304.) F, Sp

325 Teaching Science and Social Studies in Elementary and Middle Schools (3) Methods and materials for teaching science and social studies in elementary and middle schools. Teaching approaches common to both fields including inquiry, multi-sensory activities and group approaches. Prereq: Admission to Teacher Education Program. F, Sp

326 Teaching Language Arts/Reading in Elementary and Middle Schools (3) Language and language development as applied to teaching of oracy (listening-speaking) and certain aspects of literacy (reading-process/readiness and writing). Includes methods and materials. Prereq: Admission to Teacher Education Program. F, Sp

329 Teaching Developmental Reading in the Elementary and Middle Schools (3) Methods and background on how to teach word recognition skills, comprehension, study skills and how to use materials. Includes units on phonics, evaluation and basal readers. Prereq: Admission to Teacher Education Program. F, Sp

335 Teaching Elementary and Middle School Mathematics (3) Specific procedures for helping children learn mathematics. Unit planning, daily planning, grouping, classroom management are included. Prereq: Admission to Teacher Education Program. F, Sp

351 Laboratory and Field Studies in Elementary Education (1-3) Simulated instructional experiences in which students apply concepts and skills from professional methods courses in a variety of school settings and levels. May be repeated. Maximum 3 hours. Prereq: Admission to Teacher Education Program. Satisfactory/No Credit only. E

352 Field Experiences in Teaching: Secondary I (1) Field experiences in tasks related to teaching and teacher roles. Prereq: Field Experiences in Teaching: Secondary I. Prereq: Admission to Teacher Education Program. Satisfactory/No Credit only. Sp

353 Field Experience in Teaching: Secondary II (1) Field experiences in tasks related to teaching and to teacher roles. Prereq: 352 and admission to Teacher Education Program. Satisfactory/No Credit only. Su

355 Introduction to Secondary Schools (3) Aspects of teaching in grades 7-12, including curricular programs and roles and responsibilities of secondary school teachers and administrators. Prereq: Admission to Teacher Education Program. Sp, Su

402 Social Theory and Educational Practice (1) Concurrent with internship, designed to integrate student's own experience with foundational theory and policy. Prereq: Admission to Teacher Education Program, (Same as Education 402.) F, Sp

404 Problems in Improvement of Instruction (1-3) Special conferences, workshops or inservice programs designed for improvement of instruction. May be repeated. Maximum 6 hours. Satisfactory/No Credit, E

410 Pre-Internship Seminar (1) Objectives and policies of the internship program. Must be completed term immediately preceding the internship. Prereq: Admission to Teacher Education Program. Satisfactory/No Credit only. Sp, Su

419 Teaching Laboratory (3) Learning and practicing research based effective teaching behaviors. Video taping in simulated school settings. Sp, Su

421 Elementary and Middle School Science and Social Studies Instruction (3) Methods and materials for teaching science and social studies. Development of functional relationships and individual entities of the two fields. Not open to students with recent course or background in The Teaching of Elementary School Science and/or Social Studies. Prereq: Admission to Teacher Education Program. F, Sp

424 Studies in Elementary Education (1-3) Variable topics on teaching in Early Elementary (K-3), Middle Elementary (4-8), and Skills (K-8). Prereq: Admission to Teacher Education Program and permission of instructor. May be repeated. Maximum 3 hours. E

429 Language Arts/Reading Instruction in Elementary and Middle Schools (3) Language and language development as applied to teaching of oracy (listening-speaking) and certain aspects of literacy (reading-process/readiness and writing). Not open to students who have had recent course in language arts methods. Prereq: Admission to Teacher Education Program. F, Sp

430 Elementary and Middle School Developmental Reading Instruction (3) Word recognition (including phonics), comprehension, evaluation, and materials. Not open to students who have had recent course in reading methods. Prereq: Admission to Teacher Education Program. F, Sp

434 Topics in Reading Education (1-6) May be repeated. Maximum 6 hours. Prereq: Admission to Teacher Education Program and a course in Reading Education. E

443 Elementary and Middle School Mathematics Instruction (3) Procedures for helping children learn mathematics. Unit planning, daily planning, grouping, general factors related to classroom management. Not open to students with a recent course in teaching of elementary school mathematics in which admission to Teacher Education Program. F, Sp

445 Early Childhood Education: Program Development and Teaching in Kindergarten (3) Curriculum plan-
450 Education in Cultural Perspective (3) Contribution of anthropological concepts to understanding of educational issues, principles, policies, and the use of data in public schools; preparation of teaching plans and materials; strategies for classroom management. Prereq: Admission to Teacher Education Program. E

454 Teaching and Learning (3) Contributions of psychological and sociological theory to understanding of human learning and the learning process. Prereq: Admission to Teacher Education Program. F

457 Teaching and Learning (3) Strategies for classroom management. Prereq: Admission to Teacher Education Program. F

458 Teaching Foreign Language (3) Grammar. Prereq: Admission to Teacher Education Program. F

459 Teaching English in the Secondary School (3) Techniques of teaching composition, language, and literature. Prereq: Admission to Teacher Education Program. F

460 Teaching Reading and Literature in the Secondary School (3) Teaching basic reading skills and literature. Sp

461 Developing Reading Skills in Content Fields (3) Teaching reading and study skills in content areas of the school program. Extensive assessment of textbooks. Emphasis on middle school and high school. F, Sp, Su

471 Internship I: Elementary (3-6) Methods and theories of teaching. Internship is completed in local public schools. Application for internship should be made upon admission to the Teacher Education Program. Prereq: 410 and admission to Teacher Education Program. Satisfactory/No Credit only. F

472 Internship II: Elementary (3-6) Demonstration of professional competence in planning, instruction, and classroom management. Internship is completed in local schools. Prereq: 471 and admission to Teacher Education Program. Satisfactory/No Credit only. Sp

475 Utilization of Instructional Media (3) Same as Library and Information Science 475. F, Sp, Su

476 Instructional Media in Elementary Education (3-6) Basic operation of visual and auditory media, selection and utilization of materials, and basic production skills needed for effective communication in the elementary classroom. Media Lab experience in production of AV software. F, Su

481 Internship I: Grades 7-12 (3-6) Methods and theories of teaching. Internship is completed in local public schools. Application for internship should be made upon admission to the Teacher Education Program. Prereq: 410 and admission to Teacher Education Program. Satisfactory/No Credit only. F

482 Internship II: Grades 7-12 (3-6) Demonstration of professional competence in planning, instruction, and classroom management. Internship is completed in local public schools. Prereq: 481 and admission to Teacher Education Program. Satisfactory/No Credit only. Sp

485 Teaching of Mathematics, Grades 7-12 (3) Preparation of teaching plans, evaluation, materials for teaching mathematics; teaching simulation and directed observation in schools. Prereq: Admission to Teacher Education Program. F

486 Introduction to Instructional Computing (3) Classroom uses of computers, applications for teachers, overview of computer operation and software for teachers of all grades. F, Sp

493 Independent Study (1-3) Topics to be assigned. May be repeated. Maximum 12 hours. E

494 Supervised Readings (1-3) Topics to be assigned. May be repeated. Maximum 12 hours. E

495 Special Topics (1-3) Topics to be assigned. May be repeated. Maximum 12 hours. E

498 Teaching Science Grades 7-12 (3) Methods, materials, recent trends in science and environmental education programs for secondary schools. Prereq: Admission to Teacher Education Program. F, Sp

517 Seminar (1-3) Curriculum, instructional technology, elementary education, secondary education, and social foundations as they relate to goals of students' programs. May be repeated. Maximum 6 hours. E

ENGINEERING AEROSPACE

345 Aerospace Engineering Instrumentation and Measurement (3) Fundamentals of measurement systems; standards; dynamic characteristics of instruments; statistical data treatment; transducers; signal conditioning; strain, pressure, temperature and flow measurements. Prereq: Mech. E. 341 or Mech. E. 342 and E&E 301. F, Sp


362 Dynamics/Vibrations (3) Central force dynamics, transfer functions, vibration analysis, design of simple and multiple degree vibration systems. Prereq: ESM 231. F

363 Structural Analysis of Aerospace Vehicles (3) Fundamentals of structural analysis applied to configurations common to aerospace vehicles. Prereq: ESM 321. Sp


401 Thesis (3) Problem investigation and report. Prereq: Senior standing. F, Sp

422 Aerodynamics (3) Theory and design of aerodynamic bodies for desired characteristics. Potential flow theory, viscous effects, compressibility effects. Subsonic, supersonic, and transonic airplane airflow. Prereq: 370. F

423 Viscous Flow (3) Boundary layer theory; laminar and turbulent flow; compressibility effects; numerical solution methods. Prereq: 351 and Mech. E. 391. Sp


425 Propulsion (3) Principles of propulsion devices; turbo-jet, ram jet and rocket engines. Prereq: 351. F


429 Aerospace System Design (4) Synthesis and design of a complete aerospace system including economic and technical aspects. Participation in team design effort including formal presentations and design report. Prereq: 425, 426. Sp

431 Mechanical Engineering/Aerospace Engineering Seminar (1) Topics related to engineering including ethics. Formal oral presentations by students on engineering topics. Prereq: Senior standing. F

449 Aerospace Engineering Laboratory (3) Designing, conducting, and reporting results of experimental exercises. Test standards and specifications. Analysis of data and formation of conclusions. 3 hours lab per week. Prereq: 345, 351. F

494-495 Selected Topics in Aerospace Science (1-4) Current problems and topics in aerospace science; topics in science and engineering for the several areas of aerospace science. Prereq: Consent of instructor. F, Sp

ENGINEERING BASIC

100 Seminar (1) Overview of the College, engineering as a profession, engineering ethics. Consideration of each major and the various engineering disciplines. Satisfactory/No Credit.


111 Fundamentals of Engineering Graphics (3) Technical sketching; geometric construction with emphasis on plane surface analytically; presentation of engineering data; graphical solution of three dimensional space problems; primary and secondary auxiliary views. Two three-hour periods or three two-hour periods, including one hour of lecture per week.

121 Statics (3) Vectors, forces and moments; equivalent force systems; free body diagrams, equilibrium, frames, trusses and friction. Coreq: Math 141.

131 Particle Dynamics (3) Kinematics, simple harmonic motion; kinetics, Newton's laws, work-energy, impulse-momentum; impact. Prereq: 121; Coreq Math 142.

201 Numerical Techniques (2) Use of FORTRAN in the development of algorithms for roots of equations; systems of linear equations; curve fit, interpolation, numerical integration and solution of ordinary differential equations. Prereq: 101, 131 and Math 142.

ENGINEERING CHEMICAL


240 Fluid Flow and Heat Transfer (3) Force, energy and mechanical energy balances, flow in tubes, piping systems, fluid flow, molecular and technical aspects. Participation in team design effort including formal presentations and design report. Prereq: 200. F

310 Chemical Engineering Laboratory (3) Thermodynamics, fluid flow and heat transfer in chemical engineering. Prereq: 240, 330.

330 Chemical Engineering Thermodynamics (3) Basic concepts and chemical engineering applications of thermodynamics; emphasis on flow processes, real gases, estimation of properties, phase equilibria and chemical equilibria. Prereq: 240.

340 Mass Transfer (3) Stagewise operation; application of analytical, graphical and computer methods to design of stagewise separatory operations. Differential operations-application of analytical and computer methods to the design of process equipment and control systems. Prereq: 240, 330.

360 Process Dynamics and Control (4) Introduction to process modeling and industrial control system design. Mathematical tools for characterizing dynamic behavior of processes; theory and practice of operating and controlling such systems. Includes laboratory work. Lab. Prereq: 240.

380 Seminar (1) Presentation and discussion of topics in the practice of chemical engineering. Satisfactory/ No credit.

401 Chemical Engineering Data Analysis (3) Analy-
sis of experimental data; identification of system externalities; statistical properties of samples; empirical modeling of processes; statistical process control; optimization techniques.

403 Introduction to Optimization (3) Principles and applications of optimization techniques to chemical processes; constrained and unconstrained optimization; linear programming; dynamic programming; and geometric programming. Prereq: Math 202.

410 Chemical Engineering Laboratory II (2) Laboratory investigations of mass transfer and chemical reaction phenomena in chemical engineering. Prereq: 440, 450.

415 Computer Applications in Chemical Engineering (3) Introduction to computer solution of chemical engineering problems. Primary focus on the application of personal computer programs. Includes flow sheet simulators, statistics, spreadsheets, graphics and process modeling.


440 Transport Phenomena (3) Overview of momentum, mass, and energy, the analogies, differential and macroscopic balances, applications involving molecular diffusion, including simultaneous mass, momentum, and energy balances. Prereq: 340.

450 Chemical Reactor Fundamentals (3) Homogeneous and heterogeneous reaction kinetics, idealized homogeneous reactor models, both for closed and flow systems, continuous and batch reactors for ideal residence time distributions; identification of scaling parameters; catalyst effectiveness factors and conversion in fixed bed catalytic reactors. Prereq: 340, Chemistry 350.

461 Advanced Process Dynamics and Control (3) Process and control system simulation and advanced industrial system design. Cascade, feedforward, multivariable, deadtime, adaptive, and nonlinear control system design, includes computer and laboratory work. Lab. Prereq: 360 and consent of instructor.

469 Engineering Internship in Process Control (4) Selected students work in small groups on industrial problems in process dynamics and control. Directed by faculty member or from host company. Prereq: 360 and consent of instructor.

475 Fundamentals of Bioreactor Design (3) Reactor modeling, analysis and design for microbial fermentations and cell culture, including batch, fed batch and continuous operation; suspension cultures and immobilized systems; factors affecting productivity and control.

476 Principles of Biochemical Separations (3) Selection and design of separation and purification processes; analysis of separation processes in chromatography, electrophoresis, centrifugation, membrane processes, and conventional and supercritical fluid extraction.


485 Hydrocarbon Processing (3) Chemical and physical properties of petroleum liquids and processes utilized in conversion of raw material into various fuels and feedstocks; refining and petroleum markets. Prereq: 340.

486 Coal Processing to Liquid Fuels (3) Characterization of a variety of coals with respect to current gasification and liquefaction technologies; modeling of conversion processes and estimation of product yields from the associated water, oxygen, and energy requirements; catalytic hydrogenation and reactor design considerations; economic assessments. Prereq: 485.


494 Special Problems in Chemical Engineering (3) Chemical engineering problems related to recent developments in industrial practice or engineering research. Prereq: Consent of instructor. May be repeated. Maximum credit 6 hours.

ENGINEERING CIVIL

210 Engineering Surveys (3) Mensuration through application of surveying techniques; theory of errors and their analysis; concepts of horizontal; vertical and angular measurements and control; construction surveys; and route surveys through vertical and horizontal curves. Prereq: Sophomore standing.

251 Transportation Engineering I (3) Transportation problems and perspectives, rural and urban; use of a systematic planning process; analysis of existing travel patterns, modeling and demand, development of alternatives and the evaluation of civil engineering projects. Civil engineering decision making and applications of economic analysis. Prereq: Sophomore standing.

261 Stresses in Framed Structures (3) Stress and strain in two dimensions; Mohr’s circle; area moments of inertia; reactions, moments, shears, and stresses in beams, columns, and torsional members. Prereq: Basic Engr. 121.

310 Route Surveying (3) Basic principles and practical applications of horizontal and vertical alignment of transportation routes, including compound, reverse and parabolic curves and spiral transitions. Includes earthwork computations by micro-computer. Prereq: 210.


330 Introduction to Soil Behavior (3) Physical and mechanical properties of soils, theory of compaction, seepage, and foundation stress. Consolidation theory, time rate and settlement, and shear strength of sands and clays. Two lectures and 1 lab. Prereq: 261.

335 Foundation Engineering (3) Fundamentals of geotechnics applied to design and analysis of soil-structure systems; subsurface investigation; design of shallow and deep foundations, foundation on rock. Lateral earth pressure and retaining structures. Analysis of homogeneous slopes. Prereq: 330.

340 Construction Methods and Equipment (3) Fundamental concepts in the specification and equipment selection and productivity; concrete and steel construction; and construction contracts and economics. Prereq: 350.

352 Transportation Engineering II (3) Introduction to design, construction and operation of a variety of transportation modes, their guideways and terminals. Two lectures and 1 lab. Prereq: Junior standing and 210.

361 Analysis of Framed Structures I (3) Forces in trusses; influence lines; deflections and beams and trusses; analysis of indeterminate structures; moment distribution. Prereq: 261.

380 Water and Waste Treatment (3) Principles of unit operations employed in physical, chemical, and biological treatment of water and sewage; dissolved and solid wastes. Prereq: Junior standing and 390.

390 Hydraulics (3) Basic laws and properties of incompressible fluids. Units and dimensional analysis; drag forces; continuity, energy, and momentum equations; pipe flow; flow measurement; open channel flow and culverts; pump characteristics. Two lectures and 1 lab. Prereq: E & M 231, Basic Engr. 101.

395 Hydrology (3) Concept of hydrologic cycle; weather patterns; precipitation measurement and distribution; abstraction; and runoff; storm hydrograph and peak flow analyses, including design floods; reservoir and channel routing; rainfall and streamflow frequency analyses; groundwater flow. Prereq: 390.

400 Senior Design Project (3) Final effort in problem formulation, specification, feasibility and equipment selection. Senior project policy may but include problems typical of those designed by Civil Engineering consulting firms. Prereq: Completion of all technical courses through junior year.


405 Seminar (2) Selected topics including historical and modern civil engineering achievements, professional and ethical responsibilities and evaluation of performance. Senior seminar and completion of all junior level non-elective engineering courses.

406 Legal and Ethical Aspects of Engineering (2) Legal principles underlying engineering work; laws of contracts, torts, real property; problems of professional registration and ethics. Prereq: Senior standing.

409 Special Topics (1-3) Recent developments and current practice in civil and environmental engineering through field internship and/or self-study. Prereq: Consent of instructor and department head. May be repeated.

410 Land Surveying (3) Procedures of locating properties; evaluating evidence; procedures to describe property; to create legal documents. May be used to prepare plots of lands of land surveying. Prereq: 210.

421 Portland Cement and Asphaltic Concrete (3) Aggregate properties and tests, tests of portland cement concrete, mix design methods for concrete and asphalt concrete admixtures, tests of asphalt and asphalt mixes, and nondestructive testing. Two lectures and 1 lab. Prereq: 261.

433 Earthquake-Resistant Structures (3) Same as Architecture 433.

434 Elementary Structural Matrix Methods (3) Same as Architecture 434.

440 Civil Engineering Systems Design and Management (3) Methods of data analysis and modeling of civil engineering systems to enhance resource allocation for specific application to problems of transportation, environmental, water resources, structural analysis materials. Emphasis on microcomputer applications. Prereq: Junior standing or consent of instructor.

451 Highway Engineering (3) Design, construction, operation, and maintenance of highway facilities; includes application of various engineering principles and techniques to problems of planning, designing and constructing of highway facilities; covers both geometric and pavement design. Prereq: 210, 251, 352.

452 Traffic Engineering (3) Characteristics of driver, vehicle, and roadway and their interrelationship; traffic studies; basic considerations of traffic circulation and control, lighting, capacity analysis, roadway safety analysis and design. Prereq: 210, 251, 352.

453 Airport/Railroad Planning and Design (3) Airport master planning and railroad engineering. Runway configuration, airfield capacity, geometrics and terminal layout and design. Railroad capacity, geometrics and system layout and design. Prereq: 210, 251, 352.

461 Analysis of Framed Structures II (3) Maximum stresses due to moving loads; influence of lines; lateral forces due to earthquake and wind; analysis of steel building frames; applications of momentum and energy methods; use of computer in structural analysis. Prereq: 361.

471 Introduction to Structural Design (3) Selection of rolled structural steel beams, design of structural steel members for axial loads, bending and combined loads; reinforced concrete beams; use of standard specifications. Prereq: 361.

472 Steel Design (3) Design of plate girders and composite beams; determination of internal forces subject to combined stresses; design of a typical framed building including connections. Prereq: 451.

474 Reinforced Concrete Design (3) Reinforced con-
480 Water and Waste Transport (3) Theory and design of water distribution systems, wastewater collection systems and solid waste collection systems. Prereq: 590.

490 Water Resources Project Design (3) Development and analysis of reservoirs and dam project including data acquisition; spillway and outlet works design; earth and gravity dam stability analyses; drainage systems analysis and operation principles; and dam safety concepts, including dam break analyses. Prereq: 390, 395.

494 Urban Drainage Engineering (3) Design and management of stormwater conveyance and control structures. Application of hydrologic and hydraulic principles to design of drainage systems for urban, strip mining, and highway development; design of inlet structures, ditches, culverts, and detention/retention basins; application of commonly used computer runoff models; evaluation of land use changes for streamflow quantity and quality. Prereq: 390, 395.

495 Water Resources Development and Management (3) Institutional framework including: water law, evaluation procedures for comparing and selecting among water resources development alternatives, objective planning, principles of engineering economics, benefit-cost analysis, and cost allocation methods; engineering property rights procedures; decisions using risk-based methods; case studies. Prereq: Senior standing.

ENGINEERING ELECTRICAL AND COMPUTER

201 Circuits I (3) Fundamental laws of circuit analysis. Ohm's Law, Kirchhoff's current and voltage laws, the law of conservation of energy, circuits containing capacitors and inductors, superposition, nodal analysis, and natural response. Prereq: Physics 232 and Mathematics 241.

202 Circuits II (3) Average complex, imaginary and real number representations of alternating current; use of phasors. Prereq: 201.


204 Circuits IV (3) Multistage transistor amplifier amplifier; bipolar junction transistors; power supplies; operational amplifiers; operational amplifier feedback circuits; analog computer fundamentals; digital circuits, applications, simple power supplies, and amplifiers. Prereq: 203.

205 Circuits V (3) Multistage transistor amplifier design; bipolar junction transistors; power supplies; operational amplifiers; operational amplifier feedback circuits; analog computer fundamentals; digital circuits, applications, simple power supplies, and amplifiers. Prereq: 204.

207 Circuits VI (3) Multistage transistor amplifier design; bipolar junction transistors; power supplies; operational amplifiers; operational amplifier feedback circuits; analog computer fundamentals; digital circuits, applications, simple power supplies, and amplifiers. Prereq: 205.

299 Circuits VII (3) Digital systems; system simulation techniques; pulse, wave, noise, and jitter. Prereq: 207.

301 Circuits and Electro Mechanical Components (3) DC and AC Circuits, Transistors, Transformers, Motors, Generators. For non-majors only. Prereq: Mathematics 231, Physics 231.


303 Electronic Devices (3) Fundamentals of energy bands, theory of p-n junctions, diodes, field effect transistors, and bipolar transistors; integrated circuit fundamentals; device applications, simple power supplies, and amplifiers; project laboratory. Prereq: 202.

305 Electronic Circuits (3) Multimedia computer architecture and organization. Prereq: 205.


319 Systems Lab (1) Experiments and projects demonstrating systems discussed in 312.

321 Energy System Components (3) Iron core magnetic circuits, transformer, level and phase detection, leads, collectors, and detectors; energy storage elements; energy systems and control; energy system examples; power electronics; frequency conversion. Prereq: 205.


329 Electrical Energy Lab (1) Experiments and projects demonstrating electrical energy discussed in 321 and 322.

331 Electronic Devices (3) Fundamentals of energy bands, theory of p-n junctions, diodes, field effect transistors, and bipolar transistors; integrated circuit fundamentals; device applications, simple power supplies, and amplifiers; project laboratory. Prereq: 202.

332 Electronic Circuits (3) Multistage transistor amplifier design; bipolar junction transistors; power supplies; operational amplifiers; operational amplifier feedback circuits; analog computer fundamentals; digital circuits, applications, simple power supplies, and amplifiers. Prereq: 203.

333 Electronic Devices (3) Fundamentals of energy bands, theory of p-n junctions, diodes, field effect transistors, and bipolar transistors; integrated circuit fundamentals; device applications, simple power supplies, and amplifiers; project laboratory. Prereq: 202.

334 Field Theory (3) Coulomb's law, Gauss's law, and Ampere's law. Maxwell's equations for electrostatic and magnetostatic cases; Maxwell's equations for dynamic cases, dynamic potentials, uniform plane wave propagation. Prereq: 202.

342 Communication Theory (3) Propagation of waves on guiding systems, analysis and design of transmission line systems for communication; elements of amplitude and frequency modulation system for analog signals, fundamentals of broadcast AM, broadcast FM, FM stereo, and television systems. Random processes. Prereq: 341. Coreq: 349.

349 Communications Lab (1) Experiments and projects demonstrating communications discussed in 341.

351 Introduction to Logic Design of Digital Systems (3) Boolean algebra and logic design of combinational and sequential logic systems, introduction to digital computer components and architecture. Prereq: 202.

352 Small Computer Systems (3) Structured assembly language programming; control of peripherals through device service routines; data collection under the control of the small computer using A/D converters, D/A converters output to crt displays; on-line, real time data analysis; fast Fourier Transform, digital filters; automated testing; spread sheet applications; word processing; information management; communications between computers. Prereq: 351. Coreq: 359.

369 Computers Lab (1) Experiments and projects demonstrating computers discussed in 362.

371 Introduction to Plasma Engineering (3) Particle motion in electric and magnetic fields; collective motions of charged particles; plasma diagnostics and the Langmuir probe; plasma light sources and lasers; radio waves and plasmas; the ionosphere; MHD generators and fusion energy, and plasma etching for microelectronics. Prereq: 202 for ECE majors; or Physics 232 or 238 for all others. Coreq: 365.


413 Passive and Active Network Synthesis (3) Network analysis techniques, passive network driving point synthesis, transfer function synthesis, approximation theory, topics in active network synthesis. Prereq: 312.

421 Power Systems (3) Bulk power system planning and control, reliability, system stability. Prereq: 322.

422 Machines (3) Dynamic behavior of rotating machines; transfer functions for the common modes of operation of d.c. machines; response to different waveforms in supply; describing equations for a.c. machines and their numerical solutions. Prereq: 322. Coreq: 426.

423 Power Electronics (3) Industrial motor controls, phase control, variable frequency, motor characteristics; power HVDC, rectification, inverter, electromagnetic compatibility; VAr control; interoperability of power systems; surge arresters. Prereq: 352. Coreq: 429.

425 Direct Electrical Energy Conversion (3) Principles and practices of energy conversion devices and interfacing them to loads. Includes photovolatds, MHD, and fuel cells. Prereq: 321.

426 Machines Lab (1) Experiments and projects demonstrating machines described in Machine Design. Prereq: 322.

429 Power Electronics Lab (1) Experiments and projects demonstrating power electronics discussed in 423.

431 Digital and Analog Integrated Electronics (3) Basic processing and fabrication of active and passive components for monolithic integrated circuits; characteristics of bipolar, MOS and JFET transistors in analog and digital integrated circuit designs; standard digital logic circuits including TTL, ECL, Schottky, NMOS, CMOS, and GaAs gates and arrays; design concepts for op-amps, comparators, references, regulators, and other linear functions. Acceptable as a designated design course. Prereq: 332. Coreq: 435.

432 Analog Signal Processing Electronics (3) Transducer signal and interfacing characteristics; analog integrated circuits including operational, instrumentation, and isolated amplifiers; frequency response, feedback systems, and operational amplifiers. Prereq: 369. Coreq: 435.

433 Electronic Amplifiers (3) Feedback amplifier principles; bandwidth limitations; design; radio frequency and audio power amplifier design; linear regulated power supply design; oscillator principles. Acceptable as a designated design course. Prereq: 332. Coreq: 439.

435 Digital and Analog Integrated Electronics Lab (1) Experiments and projects demonstrating electronics discussed in 431.

436 Analog Signal Processing Electronics Lab (1) Experiments and projects demonstrating electronics discussed in 432.

439 Electronic Amplifiers Lab (1) Experiments and projects demonstrating electronic amplifiers discussed in 433.

442 Antennas and Propagation (3) Linear antennas, and phase simple antennas. Antenna gain, impedance, communication link parameters. Wave propagation in earth bound free space, earth's troposphere and ionosphere. Reflections from earth, effects on link reliability. Prereq: 349.

443 Microwave Circuits and Electronics (3) Scattered wave description of circuits to include isolators and amplifiers, couplers and power dividers, circulators, and phase shifters. Loading and interconnection of systems. Power generation and amplification by vacuum and solidstate (bulk and junction) devices. Micro- wave techniques, filtering and multiplexing devices. Transmission line and waveguide components. Prereq: 342. Coreq: 449.


445 Microwave Circuits and Electronics Laboratory (1) Experiments and projects demonstrating microwave circuit and electronics discussed in 443.

451 Microprocessors in Computer Engineering (3) Project oriented using a microcomputer kit having a monitor program and development system with crossassembler, interpreter, debug and simulation capability. Interfacing and hardward/software trade-offs in interrupt driven applications. Grade is dependent upon number of projects completed, computer solutions, and engineering notebook. Acceptable as a designated design course. Prereq: 352. Coreq: 455.


453 Data Acquisition Systems (3) Digital-Analog conversion techniques; Quad and R-2R ladder networks; error analysis of D/A converters; Sample-Hold circuits; analog-to-digital conversion techniques; open loop systems; direct and matrix converters; closed loop systems; dual slope and successive approximation; error analysis of A/D converters; accuracy, linearity, drift, dynamic range, frequency response, gain, grounds and shielding; automated testing of A/D and D/A converters; device service routines; signature analysis. Prereq: 352. Coreq: 459.

455 Microprocessor Laboratory (1) Experiments and projects demonstrating microprocessors discussed in 451.

456 Digital System Design Laboratory (1) Experiments and projects demonstrating digital systems discussed in 452.

459 Data Acquisition Systems Laboratory (1) Experiments and projects demonstrating digital communications discussed in 453.

461 Plasma Magnetohydrodynamic Engineering (3) The MHD approximation; MHD waves and instabilities; MHD in static and dynamic systems; MHD in pulsed and steady-state power generation. Applications to fusion energy, industry, and astrophysics. Prereq: 361.

462 Plasma Kinetic Theory Engineering (3) Introduction to kinetic theory: beam-plasma system; driven waves in a plasma. Collisions with multiple beams to a continuum; Vlasov and Landau theory; microwave generation in plasmas and traveling wave tubes; free electron laser; determination of the cyclotron and orbitron. Design of plasma devices. Acceptable as a designated design course. Prereq: 361; 461 or consent of instructor. (Same as Nuclear Engineering 463.)

464 Introduction to Fusion Energy II (3) Continuation of 463. Advanced fusion issues. Theory and design of tokamak reactors, advanced magnetic confinement concepts, advanced fusion fuels, fuel technology, plasma engineering and other high energy physics studies. Includes design project which integrates material in 463 and 464. Acceptable as a designated design course. Prereq: 463 or consent of instructor. (Same as Nuclear Engineering 464.)

468 Plasma Laboratory (1) Experiments and design projects illustrating material covered in 461, 462 and ECE/Nuclear Engr. 463 and 464.


489 Electro-Optics I Lab (1) Experiments and projects demonstrating electro-optics discussed in 481.

490 Special Problems in Electrical Engineering (1-3) Problems in Electrical Engineering involving library and experimental research. May be repeated. Maximum nine hours. Prereq: Consent of instructor.

495 Senior Seminar (1) Topics vary. May be repeated once. Prereq: Senior standing or consent of instructor.

498 Electro-Optics II Lab (1) Experiments and projects demonstrating electro-optics discussed in 482.

ENGINEERING INDUSTRIAL

200 Fundamental Computer Applications in Industrial Engineering (3) Application of modern computer hardware and software to enhance professional productivity. Spreadsheets, word processing, graphics and compiled IE programs applied to Industrial Engineering. Includes FORTRAN programming and numerical analysis. Prereq: Basic Engr. 101.


301 Operations Research (3) Introduction to mathematical programming includes classical optimization theory, linear programming (simplex method, transportation and assignment problems) and dynamic programming. Prereq: Mathematics 231 and 200.

302 Work Methods and Measurement (4) Job analysis, job evaluation, design of wage structures, design of work measurement systems, layout, flow charts, activity charts and methods improvement. Work measurement tools such as time study, predetermined time systems, work sampling, data analysis, development of standard time data, learning curves and wage incentive systems. Prereq: Statistics 251.

303 Project Planning and Control (2) Project planning, scheduling and control based on networking and precedence diagramming methods. Includes resources allocation and time-cost trade off algorithms, multi-project control. Computer applications, and PERT methods of handling uncertainty in activity times. Prereq: Statistics 251.

304 Production Facilities Design and Material Handling (3) Design of production facilities including plant layout, material handling, automation, packaging and storage of materials. This includes office layout and service areas. Principles applicable to facilities design for such diverse groups as hospitals, banks, and industry. Prereq: 302, 401.

305 Motion and Time Study (3) Design of work methods; time measurement; design of work and determining standards. For non-industrial engineering students. Prereq: Junior standing.


403 Production Facilities Design and Material Handling (3) Design of production facilities including plant layout, material handling systems, automation, packaging and storage of materials. This includes office layout and service areas. Principles applicable to facilities design for such diverse groups as hospitals, banks, and industry. Prereq: 302, 401.

404 Senior Seminar (1) Discussions, lectures and trips to unify students educational experience. Prereq: Senior standing in Industrial Engineering.

405 Engineering Economy (2) Methods and problems in selection or replacement of equipment. Decisions among engineering alternatives involving capital recovery, economic life of equipment, and rate of return on investment.


412 Quantitative Methods in Project Management (2) Project planning, scheduling, and control based on networking and precedence diagramming methods. Includes resource allocation and time-cost trade off algorithms, multi-project control. Computer applications, and PERT methods of handling uncertainty in activity times. Prereq: Statistics 251.

413 Research Methods in Industrial Engineering (3) Methods to collect and analyze data as related to industrial engineering. Topics such as process control, statistical modeling, experimental design, statistical sampling, single subject experimental designs, classical experimental design methods, and time series modeling experiments. Validity and reliability concepts as related to measurement and collection of data. Strategies to control rival hypotheses such as statistical control, matched subjects, and blocking experiments. Factors to fit the experimental design to the appropriate experimental requirements. Prereq: 300 and senior standing, Statistics 251.
414 Laboratory and Methodology in Human Factors Engineering (3) Project and laboratory-oriented investigations of human factors problems. Instrumentation and measurement of human capabilities and limitations, environmental factors that affect work such as temperature, humidity, lighting, and noise. Measurement of task loading effects and effects of interface design on human performance. Student-selected group project. Prereq: 304 and senior standing.

421 Informational Systems I (3) Systems engineering, design, implementation, and evaluation of systems. Emphasis on informational aspects of IS. Study of data structures and database management systems. Prereq: 200 and senior standing.

422 Senior Industrial Engineering Problems Analysis (3) Application of Industrial Engineering to field assignments in local organizations, including problem definition, analysis and presentation. Prereq: 402 and 405.


ENGINEERING MATERIALS SCIENCE

201 Introduction to Materials Science and Engineering (3) Correlation of atomic structure, crystal structure and microstructure of solids with mechanical, physical and chemical properties of engineering significance. Prereq: Chemistry 130. E

202 Fundamentals of Materials Engineering (3) First law of thermodynamics, mass and energy balances, thermodynamics, introductory kinetics, introduction to materials processing. Prereq: 201. Sp

203 Experimental Methods in Materials Science (2) Laboratory including data acquisition and processing, error analysis, photomicroscopy, measurement techniques, use of computers in data acquisition and analysis, 1 hour and 3 hour lab. Prereq: 201. Sp


315 Biomaterials (3) Metals, polymers and ceramics utilized in orthopedic, cardiovascular, and dental surgical implant devices; corrosion and degradation problems; material properties of primary importance; tissue response to synthetic materials. Prereq: 201. Recommended for engineering science and mechanincs majors.

331 Introduction to X-ray Diffraction (3) Generation of x-rays, x-ray instrumentation, x-ray spectra, determination of lattice constants; phase identification, measurement of orientation; chemical analysis by x-ray techniques. Includes laboratory. Sp

444 Corrosion Science and Engineering (3) Mechanisms and control of corrosion and degradation processes; thermodynamics and electrode kinetics of corrosion reactions; electrochemical measurements and techniques; applications to design. Prereq: 201. Recommended for chemical engineering, mechanical engineering, civil engineering and mining engineering science and mechanics majors. Sp

ENGINEERING MECHANICAL

331 Thermodynamics I (3) Energy and laws governing energy transformations; thermodynamic properties; thermodynamic cycles; applications to engineering problems. Prereq: Chemistry 130, and Mathematics 231. F, Sp, Su

332 Thermodynamics II (3) Properties of gases and mixtures; chemical reactions; equilibrium; compressible flow; applications to engineering problems. Prereq: 331. F, Sp, Su

341 Fluid Flow (3) Development of mass, momentum, and energy principles for fluid systems; dimensional analysis, internal and external viscous flows. Prereq: ES&M 231, Mathematics 231. F, Sp, Su

344 Heat Transfer (3) Heat transfer by conduction, therm radiation, free and forced convection. Prereq: 331, 341, 391. F, Sp, Su


401 Thesis (3) Problem investigation and report. Prereq: Senior standing. F, Sp, Su

415 Energy Conversion Systems (3) Fossil fuel energy conversion systems with emphasis on coal technology. Coreq: 475.

416 Turbo-Machinery (3) Basic principles of turbomachinery; systematic methods of analysis, design, performance evaluation. Prereq: Aerospace Eng. 351.

422 Environmental Noise (3) Acoustics - measurements and control of noise in industrial and community environments. Prereq: Senior standing in engineering or consent of instructor.

431 Seminar (1) Topics related to engineering including ethics. Formal oral presentation by students on engineering topics. Prereq: Senior standing. F

445 Lubrication (3) Hydrodynamic theory of lubrication of sliding bearings; application of Navier-Stokes equations to infinite and finite bearing geometries, analytical and numerical solutions; applications to design. Prereq: 344, Aerospace Eng. 351.

449 Mechanical Engineering Laboratory (3) Design, execution, analysis and reporting of results of experimental exercises. Test standards and specifications. Analysis of data and formation of conclusions. 3 hours per week. Prereq: 332, 344, 345, Coreq: 475. Sp, Su

451 Systems and Controls (3) Analytical models of physical systems; comprised of combinations of mechanical, fluid, electrical, and thermal components; feedback control systems; transient and frequency response, stability analysis; non-linear control of linear systems; sampled data systems, digital filters. Prereq: 341, 353, Electrical Eng. 301-392. F, Sp

455 Introduction to Machine Design (2) Engineering stress-strain, economics, failure analysis, mechanisms, reliability, patents and product liability, design of mechanical engineering solid mechanics systems. Participation in team design effort; requires design report. Prereq: 363, 465. F

456 Introduction to Thermal Design (2) Engineering economy, optimization, design for automation, reliability, patents and product liability, design of mechanical engineering thermal-fluid systems. Participation in team design effort; requires design report. Prereq: 332, 344. Sp


462 Tool Design (3) Principles underlying tool and die design and design for manufacturing; forging fixtures; comparison of material removal methods; selection of tool material; plastics production. Prereq: Mech. Engr. 366 or Industrial Engr. 404, ES&M 321.


471 Refrigeration and Air Conditioning (3) Vapor compression and absorption cycles, heat pump systems; psychrometric processes, air washers, cooling towers; solar radiation; building heat transmission. Prereq: 332, 344.

474 Solar Energy Utilization (3) Nature and availability of solar radiation; review of heat transfer topics pertinent to solar energy collection and use; design analysis of solar energy collectors and methods of storage; selected applications. Prereq: 332, 344 or consent of instructor.

475 Thermal Engineering (3) Thermal systems with emphasis on turbomachinery, heat exchangers, combustion and system analysis and design including second law and economic analysis. Prereq: 332, 344. F, Sp

476 Thermal Engineering Design (4) Design of complete thermal-fluid system including economic, technical and optimization aspects. Participation in team design effort leading to written and oral presentations and design report. Prereq: 456. 475. Sp

481 Internal Combustion Engines (3) Thermochromical phenomena in combustion and propulsion engines. Combustion, detonation; equilibrium; dissociation; analysis of internal combustion engines using ideal and real fluids. Prereq: 332, 344.

494-495 Selected Topics in Mechanical Engineering (1-4, 1-4) Problems and topics related to development and practice in mechanical engineering. Prereq: Consent of instructor. F, Sp, Su

ENGINEERING METALLURGICAL

301 Physical Metallurgy (3) Phenomenology and micromechanisms of plastic deformation in single and polycrystalline materials. Applications of crystallography to x-ray diffraction. Diffusion in solids, diffusion equations, point defects and atomic mechanisms of displacement. Prereq: Mathematics Science 201. 3 hours or 2 hours and 1 hour lab.

302 Physical Metallurgy II (3) Recovery and recrystallization processes of cold worked structures in metals and alloys. Thermodynamics of phase equilibrium. Kinetics and morphology of phase transformations. Prereq: 301. 3 hours or 2 hours and 1 hour lab.
302 Metallurgical Thermodynamics (2) First and second laws, free energy, activity, Raoult's and Henry's laws of solutions; phase diagrams; condensed phase equilibria; phase stability; phase rule; multicomponent systems. Prereq: Chemistry 371 F.

371 Metallurgical Applications in Manufacturing and Processing (3) Fracture mechanics, fracture toughness, standards and specifications; principles of theromechanical processing for finished and semi-finished products; casting, forming, welding, machining; properties of finished products; quality control. Prereq: Materials Science 201, 202, 203 and consent of instructor.

411 Materials Process Design (3) Property control through composition, thermal and mechanical processing; material and property selection; steels and nonferrous alloys. Prereq: Materials Science 201. F

412 Design and Analysis (3) Lecture and laboratory sessions on design and performance analysis; standard test specimens, failure analysis, design projects. Prereq: Senior standing. Sp

421 Fabrication (3) Principles and processes of welding, casting and powder metallurgy; solidification, secondary and residual stress; thermal treatments including sintering; non-destructive testing. Prereq: 301, 302. 3 hours or 2 hours and 1 lab. F

422 Chemical Process Metallurgy (3) Application of chemical principles to metallurgical processes; ferrous and nonferrous pyrometallurgical refining, slag-metal equilibria; solidification, gas-metal processing. Prereq: 303. Sp

431 Mechanical Metallurgy I (3) Mechanical properties from tensile test; elastic behavior, description of stress, strain, and stress-strain relations; plane stress and plane strain loading; failure by yield; stress concentration; brittle fracture due to loading rate and to part and flaw geometry. Prereq: Materials Science 201, ESM & 321. Suggested for mechanical engineering and engineering science and mechanics majors. F

432 Mechanical Metallurgy II (3) Brittle fracture due to metallurgical and environmental factors; stress-life and strain-life fatigue analysis; residual stresses; creep and stress-rupture; finite plastic strain, ductile fracture; fabrication by forging, rolling, deep drawing, stretch forming, formability testing. Prereq: 431 or Mech. Engr. 461 (Same as Metallurgical Engineering 451.)

441 Seminar (1) Presentation and discussion of economic, political, social, ethical and other topics of significance to practicing materials engineers. Satisfactory/No credit.

451 Fracture-Safe Design (3) (Same as Engineering Science and Mechanics 453.)

ENGINEERING NUCLEAR

201-202 Seminar (1,1) Topics related to nuclear engineering. Satisfactory/No credit.


204 Thermodynamics II (3) Second law, development of entropy concept and availability. Various power plant cycles and systems. Prereq. 203.

301 Introduction to Nuclear Engineering (3) Nuclear systems, radioactive decay, cross sections, flux, heat physics, reactor theory. Prereq: Physics 232, Mathematics 231.

302 Introduction to Nuclear Reactor Theory (3) Fundamentals of nuclear fission, reactor physics, reactor cross sections, kinetics of elastic scattering, reactor kinetics, reactor systems and nuclear data. Analytical and numerical methods applicable to general criticality problems, eigenseries searches, perturbation theory, and the multigroup diffusion equations. Prereq: 301.

304 Nuclear Engineering Laboratory (3) Radiation detection and counting instrumentation, counting statistics; half life and decay schemes, gamma spectrometry, heat transfer experiments. Prereq: 305. Coreq: 302.

305 Energy Transport (3) Development of differential and integral energy conservation; conduction and convection. Radiation heat transfer; numerical methods; application to nuclear reactor fuel elements, reactor cores, and heat exchangers. Prereq: 204.

306 Designing for Energy Transport (3) Radiation heat transport; hydromechanics and heat transport in boiling and condensing systems; boiling crises; fuel element and heat exchanger thermal design; steam generator design. Prereq. 305.

310-311 Thermodynamcis (3,3) Energies and the manner in which they are transferred and transported. First and second laws of thermodynamics with applications from power cycles; transfer of heat through conductive and radiative mechanisms and development of fluid flow principles for the transport of energy. Prereq: Mathematics 241.

342 Thermal Science (3) Fluid statics; conservation equations of mass, momentum, and energy; applications to fluid flow, fluids and solids, heat conduction, thermodynamic radiation, free and forced convection. For non-departmental majors only.

401 Nuclear Reactor Theory (3) Thermal spectrum computer code, nuclear processes in fast and thermal spectra; considerations in reactor core design; equations that relate thermal and neutronic variables; power distribution calculations and reactor control methods. Prereq. 302.

402 Nuclear System Design (4) First order design and analysis of a nuclear system, interface with non-nuclear aspects of system design including system reliability and economics, class project. Prereq. 401.

403 Nuclear Engineering Laboratory (3) Cross-section measurement, diffusion problems, neutron transport, critical loading experiment, control rod calibration, statistical weight, shielding, xenon poisoning, dynamics and controls experiments. Prereq: 304 or equivalent. Coreq: 401, 405.

404 Nuclear Fuel Management (3) Topics relative to nuclear fuel cycle including mining and milling; fuel fabrication, in-core management, reprocessing and waste disposal. Economic and regulatory issues. Prereq. 302.


463 Introduction to Fusion Energy I (3) (Same as Electrical and Computer Engineering 463.)

464 Introduction to Fusion Energy II (3) (Same as Electrical and Computer Engineering 464.)

ENGINEERING POLYMER

401 Thesis (3) Investigation and report on a research problem in polymer science and engineering. May be repeated for credit. Prereq: 303.

402 Special Projects (1-3) Group or individual investigation of problems related to polymer science and engineering. May be repeated to a maximum of 6 hours. Prereq: Consent of instructor.

404 Introduction to Polymer Science and Engineering (3) Basic course on polymers. Methods of synthesis, characterization, crystallization and phase transformations; crystallographic and physical properties; rheology and processing. F

454 Polymer Processing (3) Rheological measurement; extrudate morphology; polymers and processing equipment; extrudate swelling; selected application, including screw extrusion, injection molding, extrusion, fiber spinning, structure development, properties.

ENGINEERING SCIENCE AND MECHANICS

231 Dynamics (3) Kinematics of rigid bodies; center of mass; kinetics of systems of particles; mass moments of inertia; kinetics of rigid bodies; Newton's laws, work-energy, impulse-momentum. Prereq: Basic Engr. 131, Mathematics 142.

271 Introduction to Biomedical Engineering (3) Overview of biomedical engineering; anatomy, physiology, biochemistry, bioreactors, instrumentation, and biomechanics. Coreq: Mathematics 241 or consent of instructor.

301 Seminar (1) Engineering professionalism and career planning; seminars on current topics. Satisfactory/No credit. Prereq: Junior standing in ES&M.


322 Mechanics of Materials II (3) Analysis and design of beams, stresses, reactions; bending, torsion, failure criteria, walled pressure vessels, inelastic bending and torsion, theories of failure and fatigue. Prereq. 321.


351 Engineering Analysis (3) Integration of fundamental physical laws and mathematical methods of analysis with emphasis on numerical analysis and digital computer solutions of engineering problems. Prereq. 321, 341, and Basic Engr. 101.

421 Materials of Engineering (3) Mechanical properties of engineering materials; data collection and processing; time and cyclic dependent properties. 3 hours or 2 hours and laboratory. Prereq. 321, Materials Science 201.

423 Fracture-Safe Design (3) Critical view of variables controlling fracture toughness; part and flaw geometry, temperature, loading rate, size, material; characterization of fracture toughness by stress intensity factors, strain energy release rates, J integral, COD data, transition temperature tests; use of fracture toughness data in design. 3 hours or 2 hours and laboratory. Prereq. 321 and Materials Science 201. (Same as Metallurgical Engineering 451.)

425 Principles of Nondestructive Testing (3) Principles and theory of nondestructive testing methods; liquid penetrant, magnetic particle, eddy current, acoustic emission, and radiographic methods. Laboratory. Prereq. 321, Materials Science 201. (Same as Physics 425.)

431 Fundamentals of Vibrations (3) Free and forced vibrations of single and undamped lumped parameter systems; energy methods; free vibration of continuous bodies. Prereq. 231, Mathematics 231.

433 Dynamic Systems (3) Three dimensional dynamical systems; chaotic and strange attractors; phase portraits, strange attractors, chaos; center manifold theorem; Lagrange's equations; stability; transfer functions. Prereq. 431.

435 Engineering Acoustics (3) Concepts of acoustics,
measures of sound and their units; noise generation and transmission, noise control principles and application, materials and procedures for noise abatement. Prereq: 431.

442 Fluid Mechanics II (3) Diffrential forms of the basic laws: compressible flow, isentropic flow, shocks, duct flows with heat transfer and friction; open channel flow, critical flow, energy methods; internal and external flows, separation, wakes, boundary layer and turbulent closure models. Prereq: 431, Mathematics 231.

451 Similarity and Dimensional Analysis (3) Dimensional analysis, Buckingham's theorem. Similarity and transformation from one set of experimental parameters to a set of known equations, invariance of differential equations under transformation groups; reduction of systems using group invariants. Prereq: 221, 341, Mathematics 231.

453 Project in Design and Development (3) Conceptualization, analysis, design, and presentation of an engineering science project. Prereq: 301, senior standing in E&SM, and a grade of C or better in 231, 321, 341, and 351.

455 Computer-Aided Design (3) Computer graphics and analysis programs for design of selected machine and structural components and systems; evaluation of design alternatives. Prereq 351.

461 Experimental Stress Analysis (3) Theory, techniques of implementation of stress analysis, theory and techniques of brittle coating method; introduction to other strain measuring devices. 2 hours and laboratory. Prereq: 321, E&CE 301.

463 Photomechanics (3) Photoelasticity, photoelastic coating method, More's method, interferometry and holography. 2 hours and laboratory. Prereq: 321, Physics 232.

465 Dynamic Data Acquisition (3) Use and calibration of instrumentation for measuring and recording dynamic data, such as, Fourier analysis, transfer function analysis, digital signal processing, transduction, experimental parameter estimation with applications to modal vibration analysis. 2 hours and laboratory. Prereq: 431, ECE 301.

471 Clinical Engineering and Bioinstrumentation (3) Function and characteristics of health care delivery systems including hospital organization and health care economics; development and management principles for a hospital-based clinical engineering program. Biomedical instrumentation system operational characteristics; measurement methods, custom-designed systems, equipment maintenance and control programs for hospitals. Ethical issues and professionalism in clinical engineering. Prereq: 271, E&CE 302.

473 Biomechanics (3) Mechanical properties of living tissues, principles of injury; mechanics of prostheses; material compatibility of prosthetic devices; biomechanical problems related to impact. Prereq: 321.

475 Design of Artificial Internal Organs (3) Design, development and evaluation of artificial internal organs; analysis of transport processes in therapeutic devices for design optimization; review of current available devices and federal regulations and ethical considerations. Prereq: 341, Mathematics 231.


494-495 Special Engineering Science Topics (3,3) Problems related to recent developments and practice. May be repeated once for credit. Prereq: junior or senior standing, consent of instructor.

English/Courses of Instruction 151

101 English Composition I (3) Expressive, informative, and persuasive writing, with emphasis on invention, organization, style, and revision. Practice in writing journals, letters, and reports, as well as expository and persuasive essays. Individual study of prose for meaning and ways of expressing meaning; conferences on individual writing problems. A,B,C,NC grading.

102 English Composition II (3) Analytical writing based on the study of literature and the study and practice of research methods and individual conferences. Prereq: 101. A,B,C,NC grading.

103 Writing Workshop (1) Self-paced laboratory course only for students remedied to it at the beginning of the semester by their English Composition teachers. Individual instruction in grammar, mechanics, sentence patterns, and paragraph development. To receive credit, a student must participate at least two hours per week and must also pass the 101 class in which he or she is currently enrolled. Satisfactory/No credit grading.

118 Honors English Composition (3) Open only to those students selected on the basis of placement score and high school record. Grading scale and workload the same as regular sequence. Expository and analytical writing based on the study of literature and non-fiction prose; the study and practice of research writing; individual conferences. Students receiving a grade below A or B will complete the freshman English requirements by choosing 102, a sophomore literature course in the English Department or 355, A,B,C,NC grading.

121 English Grammar Review for Foreign Students (4) Comprehensive review of English grammatical structures. Required during their first semester in the University of all foreign students who demonstrate on the English Placement Examination a need for work in English structures. Admission to this course is by the English Placement Exam only. Meets four hours a week. A,B,C,F grading.

130 Composition for Non-Native Speakers of English II (3) Writing based on reading and discussion. Emphasis on research techniques and writing research papers. Individual conferences. Admission to this course by the English Placement Exam only. A,B,C,NC grading.

132 Composition for Non-Native Speakers of English II (3) Writing based on reading and discussion. Emphasis on research techniques and writing research papers. Individual conferences. Admission to this course by the English Placement Exam only. A,B,C,NC grading.


210 Cultural Studies (3) Historical and cultural studies of 20th century. (Same as Women's Studies 301)

211 Introduction to Film Studies (3) Selected world cinema feature films. Critical techniques necessary for understanding and analysis of narrative cinema. Basic elements of film expression and contours of film history. Writing assignments.


231. American Literature I: Colonial Era to Civil War (3) Development of American literature from its beginnings to the Civil War.
412 Modern British Novel (3) Includes such authors as Lawrence, Joyce, Woolf.

422 Women Writers in England (3) Emphasis on the literary consciousness and works of British women writers in the nineteenth and twentieth centuries. (Same as Women's Studies 422.)

431 Colonial, Federal, and Early National American Literature (3)

432 American Romanticism and Transcendentalism (3)

433 American Realism and Naturalism (3)

434 Modern American Literature (3) World War I to the present.

435 American Novel Before 1900 (3) From earliest sentimental novels through Brown and Cooper, and major figures to 1900, including Hawthorne, Melville, Stowe, Clemens, and James.

436 Modern American Novel (3) Authors such as Faulkner, Steinbeck, Welty.

441 Southern Literature (3) Southern writing from colonial period into the twentieth century, including frontier humorists, local color writers, and southern literary renaissance.

442 American Humor (3) Development of American humor from the early nineteenth century into the twentieth century, with particular emphasis on Mark Twain.

443 Topics in Black Literature (3) Contents vary according to particular genres, authors, or themes from the 1845 to the present, including Langston Hughes and the Harlem Renaissance, Richard Wright and Gwendolyn Brooks, writing by black women, international black literature in English, and Black American autobiography.

451 Modern British and American Poetry (3) From Yeats and Frost to Auden, Stevens, and more recent poets.

452 Modern British and American Drama (3) O'Neill's works as precursors to modern dramatists, such as Williams, Miller, Albee, and representatives of Black theater, like Bulins and Baraka.

453 Continental Drama (3) Plays in English translation by major European writers from the late Renaissance to the present, with some emphasis on the eighteenth-century achievement.

454 Twentieth-Century International Novel (3) Such authors as Joyce, Camus, Kafka, Nabokov.

455 Persuasive Writing (3) Persuasive strategies for student and professional writing. Practice in mastering effective logical and emotional appeals.

456 Professional Writing (3) Principles and practices of student and professional writing. Practice in mastering effective logical and emotional appeals.

459 Advanced Technical Writing (3) For students planning careers in industry, education, and government who need technical writing skills. Writing of definitions, process descriptions, sets of instructions, descriptions of mechanisms, recommendation reports, abstracts, proposals, and major reports. Prereq: Junior standing in student's major or consent of instructor.

460 Technical Editing (3) Editing technical material for publication. Principles of style, format, graphics, layout, and production management. Prereq: 456 and 459, or consent of instructor.

463 Advanced Poetry Writing (3) Development of skills acquired in basic Writing Poetry course. Prereq: 463 or consent of instructor.

464 Advanced Fiction Writing (3) Development of skills acquired in basic Writing Fiction course. Prereq: 364 or consent of instructor.

471 Sociolinguistics (3) Language in relation to society. Emphasis on sociolinguistic focus. Emphasis on large-scale units: tribes, nations, social groups. Prereq: 371 or 372 or Linguistics 200 or consent of instructor. (Same as Linguistics 471 and Sociology 471.)

472 American English (3) Phonological, morphological, and syntactic characteristics of major social and regional varieties of American English with attention to their origins, functions, and implications for cultural pluralism. Prereq: 371 or 372 or Linguistics 200 or consent of instructor. (Same as Linguistics 472.)

474 Teaching English as a Second or Foreign Language (3) Grammar of English with emphasis on particular grammatical difficulties of non-native learners of English. Basic phonological structures of English. Teaching grammar and phonology to non-native speakers with some attention to contrasting analysis of English with other languages. Prereq: Second year of a foreign language. (Same as Linguistics 474.)

475 Teaching English as a Second or Foreign Language II (3) Second language acquisition theory. Issues in teaching the four language skills to learners of English. Materials and methods of language teaching and testing with emphasis on preparation of materials. Observations of and teaching with experienced staff member. Prereq. 474. (Same as Linguistics 475.)

480 British and American Balled and Folklate (3) Popular songs and folktiles of English, Scottish, and North American tradition.

481 Studies in Folklore (3) Topics vary. May be repeated with different topic. Maximum 6 hours.

482 Major Authors (3) Content varies. Concentrated study of at least one of the most influential writers in British or American literary history: e.g., Donne, Tennyson, Jane Austen, Whitman, Faulkner, Baldwin or Lawrence.

483 Special Topics in Literature (3) Topics vary. May be repeated. Maximum 6 hours.

484 Special Topics in Writing (3) Original writing integrated with reading, usually taught by a professional author. Topics vary. May be repeated. Maximum 6 hours.

485 Special Topics in Language (3) May be repeated. Maximum 6 hours with consent. (Same as Linguistics 485.)

486 Special Topics in Criticism (3) Content varies. Special topics in theoretical and practical approaches to British and American literature. May be repeated with consent of department. Maximum 6 hours.

491 Foreign Study (1-15) Seeing, studying, and writing about drama as performed in London and Stratford-upon-Avon during the summer. See page 97.

492 Off-Campus Study (1-15) Studying, and writing about drama as performed in New York City. See page 96.

493 Independent Study (1-15) Tutorial in subjects not adequately covered in regular courses. See page 96.

497 Senior Honors I (3) Admission by consent of department.

498 Senior Honors II (3) Admission by consent of department.

ENTOMOLOGY AND PLANT PATHOLOGY

306 Forest Protection (3) Biological, economic, and legal considerations of fire, pathogens, insects, vertebrates, wind, and pollutants in the forest ecosystem. 2 hours and 1 lab. Sp, E.

313 Plant Pathology (3) Principles of plant pathology illustrated by diseases of common agricultural crops. Prereq: Six hours of Biological Science. 3 hours. (Same as Botany 313.) F, E.

321 Economic Entomology (3) Structure, life history, habits and principles of control of important insect
sects of farm, garden, orchard and household. Prereq: 3 or hours of Biological Science. 2 hours and 1 lab. F, E.

325 Veterinary Entomology (3) Identification, biology, and control of arthropods that attach major livestock species. Introduction to entomology, methods of insect control, major pest species groups and problems associated with specific host production operations. Prereq: Biology 122 or equivalent. 2 hours and 1 lab. F, E.

FINANCE

301 Financial Management (3) Principles of financial management, investment, financing and asset management functions of the firm.

400 Special Topics (3) Seminar. Topic(s) announced prior to offering.

421 Investment Analysis (3) Principles and concepts of asset valuation in competitive and efficient financial markets. Basic analytical tools are developed and used to study valuation of different types of securities. Major writing requirement.

429 Portfolio Analysis and Management (3) Portfolio theory and behavior of behavior of security returns with a view to determining rational investment policy. Includes statistical analysis for risk and return of portfolio, portfolio evaluation and revision, capital market theory, and extensions of portfolio analysis. Prereq: 421.

430 Financial Markets (3) Role of short and long term financial markets in the process of capital formation and allocation. Theories and mathematics of interest rates in money and capital markets.

431 Financial Institutions (3) Management policies of financial institutions including asset, liability and capital management. Legal, economic and regulatory environment and their implications for management. Financial institutions' structure and competition and changing trends in the U.S. Financial System.

450 Financial Management: Theory and Practice (3) Decision making topics in financial management including valuation, capital budgeting under uncertainty, cost of capital, capital structure theory and dividend policy. Major writing requirement.

460 Advanced Topics in Financial Management (3) Contemporary issues in corporate finance, liquidity and current asset management, corporate growth and control, international financial management, and pension fund management. Prereq: 450.

470 Risk Management and Insurance (3) Identification, measurement and decision making with regard to insurance-type risks facing the firm. Emphasizes handling these risks in the most cost-efficient manner.

471 Estate and Financial Planning (3) Process of estate accumulation, safekeeping, and distribution, with particular emphasis on impact of insurance and taxation.

481 Real Estate Finance and Investment Analysis (3) Principles of financing and investing in real property. Utilizes discounted cash flow models and ratio analysis. Current federal tax law applicable to real property. Limited partnerships and other joint ventures. (Same as Urban Studies 481.)

482 Urban Development and Finance (3) Economic analysis of determination of urban land value and use, and discussion of current urban problems in the United States. Primary and secondary mortgage markets and economic analysis of the effects of these markets on urban development. (Same as Urban Studies 482.)

FOOD TECHNOLOGY AND SCIENCE

140 The Food Industry (3) Role of the food industry in providing an adequate, safe food supply for the United States and international markets. Interaction of the food industry with governmental agencies and consumers. 2 hours and 1 lab. F.

269 Meat Evaluation and Grading (2) Grading standards for beef and lamb; principles for evaluating beef, pork and lamb cuts. Standards for institutional meat cuts. Practice grading, judging carcasses and cuts, and application of purchase specifications. F.

360 Meat Science (2) Carcass characteristics of meat animals, muscle structure and composition, cut identification, curing, freezing and cookery. Sp.

365 Meat Science Lab (1) Slaughter and processing methods for beef, pork, lamb and poultry. Prereq: 360 or concurrent enrollment. F.

401 Food Technology and Science Seminar (1-2) Review of scientific literature, oral and written reports. May be repeated; maximum 3 credit hours. Prereq: Senior standing or consent of instructor. F, Sp.

410 Food Chemistry I (3) Reactions of proteins, enzymes, and additives in foods. Study of physico-chemical interactions of food materials. Prereq: Chemistry 110 or equivalent. 2 hours and 1 lab. F.

411 Food Chemistry II (3) Reactions of inorganic compounds, carbohydrates, lipids and vitamins in foods. Prereq: Chemistry 110 or equivalent. 2 hours and 1 lab. E.

420 Food Microbiology (2) Physical, chemical and environmental factors moderating growth and survival of foodborne microorganisms; pathogenic and spoilage organisms; quality of foods, and their control. Prereq: Microbiology 210. Coreq: 429. F.


430 Sensory Evaluation of Food (3) Principles and methods of sensory evaluation of foods. Prereq: Basic statistics. 2 hours and 1 lab. Sp.


450 Dairy Products I (3) Procurement, processing and distribution of fluid milk. Manufacture of butter, frozen and condensed dairy products. Prereq: 140 or consent of instructor. 2 hours and 1 lab. F.


460 Meat Products Technology (4) Processing methods for making cured, smoked, fresh, flaked and formed products. Effect of processing methods on product characteristics. Prereq: 360 or consent of instructor. 3 hours and 1 lab. F.

470 Food Crop Products (3) Food products from plants emphasizing types, manufacturing systems, quality attributes, storage, and processing 2 hours Biological Science. 2 hours and 1 lab. Sp-E.

480 Cereal Science and Bakery Products (3) Chemistry and technology of processing cereal grains; interactions of ingredients during production and storage of baked products. Prereq: 410 or 411 or equivalent. 2 hours and 1 lab. F-O.

493 Special Problems in Food Technology and Science (1-3) Research problems in student's area of interest. 1-3 lab hours. May be repeated; maximum 6 credit hours. Prereq: Consent of instructor. E.

FORESTRY

321 Forest Recreation (3) Philosophical foundation of recreation; planning, development, and management of forest recreation resources; interpretation of forest recreation. Overnight weekend field trips may be required. F.


324 Forest Resource Analysis (3) Growth and yield prediction; harvest determination; goal setting under multiple use concepts; approaches to regulation; financial aspects of forestry with computer simulation. Prereq: Forestry, Wildlife and Fisheries 315. Coreq: 322, 323, 324 and Entomology and Plant Pathology 306. Sp.

325 Forest Resource Inventory and Surveying (3) Volume and growth estimation; timber appraisal; surveying techniques; road layout and construction as applied to forestry; timber harvest techniques. Prereq: Forestry, Wildlife and Fisheries 313. Coreq: 322, 323, 324 and Entomology and Plant Pathology 306. Sp.

331 Wood Properties and Uses (2) Fundamental structure, properties, characteristics and distribution of wood. Prereq: 311 or consent of instructor. Coreq: 332 for Forestry and Wood Utilization majors. 1 lab. Sp.

421 Forest and Wildland Resource Economics (3) Production functions, supply-demand and market analysis; non-market programs and projects; economic analysis and decision making in the natural resource analysis; managerial economics; taxes; forest products marketing. Prereq: 324 or consent of instructor. F.

422 Forest and Wildland Resource Policy (3) Policy formulation; criteria for policy determination; federal and wildland law and regulation; theory of conflict resolution; formal and informal resolution. Prereq: Senior standing. F.

423 Forest Recreation Planning and Management (3) Planning processes, master and site planning, site design projects; management strategies, methods of visitor and recreation site management; case studies. Weekend field trips may be required. Prereq: 311 or consent of instructor. Coreq: 325, 326, 333, Ornamental Horticulture and Landscape Design 280, or consent of instructor. 1 hour and 2 labs. F.

431 Solid Wood Processing (3) Production processes for solid wood products including sawmilling, secondary machining, drying and preservation. Prereq: 331 and 332, or consent of instructor. 2 hours and 1 lab. Sp.

432 Practicum in Wood Products (2) Standard laboratory procedures used in the evaluation of wood and wood products. Plant visitations including sawmills, pulp, plywood, flooring, furniture, composite panel, and their uses and applications. Prereq: 331 or consent of instructor. Sp.

433 Wood Composites and Gluing (3) Principles of adhesion; wood adhesives; fundamentals of plywood and composite panel manufacture. Evaluating resin properties; testing bond strength and durability. Prereq: 331 and 332, or consent of instructor. 2 hours and 1 lab. F.


492 Off-Campus Internship in Forestry (1-6) Supervised field experience in approved food production, forest industry, wildland resource development projects, or other approved experiential learning experience. Prereq: Junior standing. Satisfactory/No credit only. E.

493 Independent Study in Forestry (1-15) Special research or individual problem in forestry. E.

494 Independent Study in Wood Utilization (1-15)
FORESTRY, WILDLIFE AND FISHERIES

211 Introduction to Forestry, Wildlife and Fisheries (3) History of natural resources policies and practices; social perspectives and attitudes concerning natural resources and their use; techniques of integrated natural resources management, ecological principles, current policies, social trends, and forest and wildlife resource use. Day-long field trips may be required. Sp

250 Conservation (3) Use and abuse of wildland resources. Historical perspectives and current management of forests, wildlife, and fish of North America including aspects of outdoor recreation and pollution problems. Fall

300 Current Issues in Renewable Natural Resources (154, 212, 218) Maximum 3 hours. Satisfactory/ Unsatisfactory. F or Sp

311 Dendrology/Ecology/Silvics (4) Principles of plant identification, ecological principles, characteristics of forest and associated ecosystems. Prereq: 1 year of Botany or Biology. 2 hours and 2 labs. Fall

312 Silviculture (2) Principles for treating forest stands to achieve selected objectives. Prereq: 311. Coreq: 313, 315, 1 hour and 1 lab. F

313 Measurements and Sampling (2) Measurement techniques and sampling methods for vegetation, estimation of animal populations, map and aerial photo use. Prereq: Statistics 201. Coreq: 312, 315, 1 hour and 1 lab. F

315 Forest Soils and Watershed Management (3) Soil information, properties, water relations and the basis for cation exchange, nutrient cycling. Classification and management of forest soils. Hydrology and management of water in the forest ecosystem. Coreq: 312, 313, 2 hours and 1 lab. F

316 Principles of Forest and Wildland Management (3) Land management tools and systems including planning use of forest resources, environmental impact statements and geographic information systems. Analysis of land management determinants - legal, institutional, economic and social. Theory and practice of management of organizations that administer and use forest and wildlands. Prereq: 211, 2 hours and 1 lab. F

317 Principles of Wildlife and Fisheries Management (3) Ecological relationships of wild animals with other animals and their habitats. Biological, social and economic aspects of natural resource management. Coreq: 312, 313 and 315, or consent of instructor. F

416 Planning and Management of Forest and Wildland Resource (3) Integrated forest and wildland resource management through developing land management plans and analyzing case studies including conflict resolution. Prereq: Senior standing. 1 hour and 2 labs. Sp

417 Introduction to French (3) Selected works of 17th-century French literature. Prereq: 1 year of French or equivalent. Fall

418 Survey of Francophone Literature (3) Introduction to Francophone literature. Prereq: 212, 218 or equivalent. Fall

419 Readings in French Literature (3) Readings in French literature from its earliest days through the New Wave directors. Prereq: 212, 218 or equivalent. Can be applied to major.

420 French Cinema (3) The French cinema from its earliest days through the New Wave directors. Prereq: 212, 218 or equivalent. Can be applied to major.

421 Phonetics (3) Foundation in the science of phonetics. Practical exercises and individual performance. Laboratory training highly recommended. Prereq: 212, 218 or equivalent.

422 Advanced Grammar (3) Improving one's own style studying basic and more refined structures of the French language. Prereq: 212, 218 or equivalent.

423 Advanced Conversation (1,1) Informal conversation with native speaker on contemporary topics. Stress in class contact rather than outside preparation. Meets two hours a week for one semester. Prereq. 342 or 345.

425 Introduction to Descriptive Linguistics (3) Phonetics and phonemics, morphological and syntactical structures of languages, languages, groups, dialects, and dialect geography. Application of descriptive linguistics - field linguistics, dialect study, its practical use in learning languages and in language teaching. Introduction to transformational grammar. Prereq: six hours of upper division English or six hours of upper division courses in a modern or ancient language (exclusive of German and French 301-302, courses in literature in translation, and general courses in Latin and Greek requiring no knowledge of these languages), or consent of department. (Same as German 425, Russian 425, Spanish 425 and Linguistics 425.)

426 Methods of Historical Linguistics (3) Same as Russian 426, German 426, Spanish 426 and Linguistics 426.

429 Romance Linguistics (3) Development of Classical Latin through Vulgar Latin into major Romance languages. (Same as Spanish 429 and Linguistics 429.)

430 Theatrical French (2-3) Performance in one or more French plays. Prereq: 212, 218 or equivalent and consent of instructor. Can be applied to major.

431 Highlights of French Civilization (3) Survey of French Civilization from the Gauls to World War II. Historical events, daily life, all forms of arts. Prereq: 212, 218 or equivalent.

432 Contemporary French Culture (3) French contemporary civilization and culture since World War II. Problems, trends and organization of French society today. Prereq: 212, 218 or equivalent.

440 Capstone Experience in French (4) Synthesizing senior colloquium and tutorial in which students reflect on the raison d'être of the discipline from a multidimensional point of view.

491 Foreign Study (1-15) See page 97.

492 Off-Campus Study (1-15) See page 96.

493 Independent Study (1-15) See page 96.

GEOGRAPHY

101-102 World Geography (3,3) Selected topics and world regions, especially those with problems or situations of contemporary interest, to illustrate geographical points of view, concepts, and techniques. Must be taken in sequence.

131-132 Geography of the Natural Environment (4,4) Characteristics and processes of the earth's surface and lower atmosphere; the regionalization of the world pattern of distinctive environments significant to humanity. Must be taken in sequence. 3 hours lecture and 2 hours lab per week. Not open to students who have taken 330.
141 Introduction to Economic Geography (3) Location and patterns of economic activities and major types of economies: agriculture, energy and mineral production, manufacturing, transportation, trade, and services.

310 Introduction to Maps, Aerial Photographs, and Cartography (3) Properties, sources, uses, design and production of maps, and other forms of spatial images as tools for geographical analysis. 2 hours lecture and 2 hours lab per week.

320 Cultural Geography: Core Concepts (3) Background and method of cultural geography; basic concepts and approaches, and the influence of cultural landscape, culture regions, cultural ecology, innovation and diffusion, cultural integration, and world patterns of cultural phenomena.

323 Behavioral Geography (3) Types of human behavior, such as shopping, territoriality, commuting, residential mobility, and regional consciousness as they relate to distance, natural environment, and culture. (Same as Urban Studies 323.)

324 Political Geography (3) Importance of geographical factors in understanding political relationships within and among nations; spatial implications of political decision-making processes; geography of administrative units.

330 Physical Geography: Core Concepts (3) Topics in physical geography emphasizing climate, land forms, and the circulation of water. Not open to students who have taken 131 or 132.

334 Meteorology (3) Dynamic atmosphere and resulting weather events. Nature of individual weather elements, their measurement and analysis over time and space.


361 Regional Geography of the United States and Canada (3) Physical, economic, and social distributions as they interrelate to give distinctive character to regions of the United States and Canada.

363 Geography of the American South (3) Geographical appraisal of the southeastern United States, including physical environment and human resources. Origin and development of contemporary economic and cultural traits of the area.

365 Geography of Appalachia (3) Interrelation of physical, economic, and social patterns that give distinctive character to regions in southern Appalachia. Appalachia in perspective in the current American scene.

372 Geography of Middle America (3) Physical, cultural, and economic characteristics of Mexico, Central America, and the West Indies. (Same as Latin American Studies 372.)

373 Geography of South America (3) Physical, cultural, and economic characteristics of the countries of South America. (Same as Latin American Studies 373.)

375 Geography of the Soviet Union (3) Geographical appraisal of the Soviet Union, including physical environment, economic patterns, and human resources.

379 Geography of Africa (3) Physical, cultural, and economic characteristics of Africa, with particular emphasis on the area to the south of the Sahara. (Same as African American Studies 379.)

411 Computer Mapping and Geographic Information Systems (3) Concepts, management, and presentation of digital data for spatial analysis, with emphasis on cartographic data structures. 2 hours lecture and 2 hours lab per week. Prereq: 310 and knowledge of a computer language or consent of instructor.

412 Cartography (3) Cartographic techniques applied to the design, compilation, and reproduction of maps and other graphics. 2 hours lecture and 2 hours lab per week. Prereq: 310 or consent of instructor.

413 Remote Sensing: Types and Applications (3) Principles and uses of remote sensing imagery, digital data, and spectral data, with particular emphasis on geographic interpretation and mapping techniques. Prereq: 310 or consent of instructor.

415 Quantitative Methods in Geography (3) Geographic application of statistical techniques, point pattern analysis, and analysis of areal units. Prereq: Mathematics 115 or two semesters of calculus or consent of instructor.

419 Practicum in Cartography/Remote Sensing (2-6) Supervised practice in designing and producing maps and other graphic materials in the Cartographic Services Laboratory or a similar organization. Prereq: Written consent of department prior to registration.

421 Geography of Folk Societies (3) Geographical study of folk culture, emphasizing traditional material culture and rural settlement, with examples drawn from eastern North America and selected foreign areas. Prereq: 101 or 320 or consent of instructor.

425 Historical Geography of the United States (3) Survey of the changing human geography of the United States during four centuries of settlement and development. Emphasis on changing population patterns, development of agricultural regions, and patterns of urban-industrial development. Prereq: 361 or consent of instructor.

433 The Land-Surface System (3) Nature and regional variations in relationships among surface form, water, vegetation, and surface materials. People as evaluators and agents of change. Prereq: 131-132 or 330 or consent of instructor.

434 Climatology (3) General circulation system leading to world pattern of climates. Climatic change and modification, and interrelationships of climate and human activity. Prereq: 131-132 or 330 or 344 or consent of instructor.

441 Urban Geography (3) Concepts and theories concerning development and significance of systems of cities and internal morphology of cities. Prereq: 101-102 or 141 or 340 or consent of instructor. (Same as Urban Studies 441.)

443 Rural Geography (3) Geographical appraisal of rural areas of the United States, including small towns and urban fringes. Problems and potentials of rural America. Prereq: 191-102 or 141 or 340 or consent of instructor.

445 Geography of Resources (3) Factors related to variations in resource availability from time to time and place to place, with particular emphasis upon energy and metallic resources. Prereq: 101-102 or 141 or 340 or consent of instructor.

449 Geography of Transportation (3) Examination of transportation systems, emphasizing their effects on trade patterns and development of countries, and development. Prereq: 141 or 340 or consent of instructor.

450 Process Geomorphology (3) (Same as Geology 450.)

451 Foreign Study (1-15) Prereq: Written consent of department required prior to registration. See page 97.

452 Off-Campus Study (1-15) Prereq: Written consent of department required prior to registration. See page 96.

453 Independent Study (1-15) Prereq: Written consent of department required prior to registration. See page 96.

499 Proseminar in Geography (3) Major themes in geography, especially those over the past 40 years. Required for majors. Not open to graduate students. Prereq: Senior standing and completion of at least 12 hours of major or minor requirements in geography.

100 The World's Oceans (3) Geophysical, physical, and biological aspects of oceans and human interactions with the marine environment. 3 lecture hours per week.

101-102 General Geography I, II (4, 4) 101-Physical processes within and upon the Earth's surface, including the formation of rocks, plate tectonics and earthquakes, and landscapes. 102-Fossils, evolution and ancient environments. Prereq: 101. No credit for both 102 and 197.

201 Fossils and the Meaning of Evolution (3) Theories and evidence of evolution presented in a non-technical manner, its relation to contemporary society. Topics include creationism, purpose of life, progress, 2 lecture hours and one 2-hour lab. May not be applied toward the Geology major.

203 Geology of National Parks (3) Geologically spectacular landscapes and geologic history of National parks of the world. Human attempts to preserve the Earth's Geologic heritage. 3 lecture hours, plus a field trip during the term. May not be applied toward the Geology major.

210 Basic Geology for Engineers (2) Materials and structures of the earth. For College of Engineering students only. 2 lecture hours and one 2-hour lab or field period.

310 Mineralogy (3) Crystallography and study of minerals. Laboratory includes hand specimen, optical, and x-ray methods of identification. Prereq: 101, Chemistry 125-130 or equivalent. 2 lecture hours and one 2-hour lab.

320 Paleobiology (3) Fossils and their uses in functional morphology, paleoecology, biogeography, biostatigraphy, and evolution. Prereq: 102 or consent of instructor. 2 lecture hours and one 2-hour lab or field period.

325 Geological History of Land Organisms (3) Origin and development of terrestrial organisms in space and time, with emphasis on the fossil record of land plants and vertebrates. Prereq: Elementary biology sequence or consent of instructor. 2 lecture hours and one 2-hour lab or field period.

330 Igneous and Metamorphic Petrology (3) Classification and properties of igneous and metamorphic rocks, the processes that produce them, and the tectonic environments in which they form. Prereq: 310, 2 lecture hours and one 2-hour lab.

340 Stratigraphy and Sedimentation (3) Stratigraphic principles and techniques; physical sedimentary processes and interpretation of depositional environments. Prereq: 101, 102 and 310. 2 lecture hours and one 2-hour lab or field work.

345 Geology of East Tennessee (1) Geology of the Southern Appalachians in Tennessee. Prereq: Completion of major core courses or consent of instructor. 1 lecture hour plus fieldtrips.

346 Introduction to Oceanography (4) Physical, chemical, and biological characteristics of the oceans, including tides, waves, ocean circulation, ocean basin processes, marine sedimentation, biogeochemical cycles, and food webs. Prereq: Chemistry 120-129 or recommended: 101-102. 3 lecture hours and one 2-hour lab. (Same as Botany 346.)

370 Structural Geology (4) Common geologic structures (folds, faults, cleavage) and their genesis. Laboratory includes map interpretation, cross-sections, projections, stereonets. Prereq: 101-102, Mathematics 141-142. 3 lecture hours and one 2-hour lab.

380 Resources Crises - Minerals and Energy (3) World and United States resources of minerals and energy, price and production trends, future supply of minerals and energy, national mineral and energy policies. Emphasis on appraisal of conventional and alternate energy resources. 3 lecture hours.

410 Advanced Mineralogy (3) Crystal chemistry of the rock-forming minerals. Interaction of electromagnetic radiation and crystalline solids. Optical properties of minerals, visible and infrared spectroscopy, and x-ray diffraction. Laboratory exercises emphasize thin section and x-ray diffractometer methods in mineralogy. Prereq: 310. 2 lectures, one 2-hour lab.

420 Paleoclimatology (4) Principles of ecological analysis as applied to fossils and fossil assemblages with emphasis on data collection and interpretation. Laboratory is designed around preparation of scientific reports.
based on field and laboratory analysis. Writing emphasis course. 3 lecture hours and one 2-hour lab.

421 Invertebrate Paleontology I (3) Preservation processes and geologically important representatives of Protista, Porifera, Cnidaria, Bryozoa, and Brachiopoda. Emphasis is on functional morphology, skeletal structures, ecology, and stratigraphic distribution. Prereq: 320 or consent of instructor; 2 lecture hours and one 2-hour lab.

422 Invertebrate Paleontology II (3) "Higher invertebrates" - Annelida and other worms, Mollusca, Annelida, Echinodermata, Graptolites, Conodonts, and Chordata. Emphasis is on functional morphology, skeletal structures, ecology, and stratigraphic distribution. Prereq: 320 or consent of instructor; 2 lecture hours and one 2-hour lab.

425 Evolution and the Geologic Record (3) Evolution of life viewed from the fossil record, includes mass extinctions, macroevolution, and evolutionary rates. Prereq: 320. 2 lecture hours and 1 seminar.

426 Paleobotany and Palynology (3) Evolutionary history of terrestrial plant life through examination of the fossil record of macrobotanical remains, spores, and pollen grains. Origin and diversification of Gymnosperms and Angiosperms; changes in floras through geologic time. Prereq: 102; Botany 310-320 or consent of instructor; 3 lecture hours and one 2-hour lab. (Same as Botany 426.)

440 Field Geology (6) Summer field course for advanced undergraduate geology majors and first-year graduate students in geology. Taught off-campus at the Geology Field Station and requires the full time of the student. Field techniques demonstrated, practiced, and examined in the solution of geologic problems. Prereq: Completion of major core courses and consent of instructor.

445 Regional Geology of the United States (3) Evolution of geologic provinces within the United States with emphasis on the integration of several types of geologic data. Prereq: 330, 340, 370; 3 lecture hours.

450 Process Geomorphology (3) Integrative approach to the development of the surface of the Earth based upon case histories, maps, remote sensing imagery, 2 lecture hours and one 2-hour lab. Prereq: 101-102. (Same as Geography 450.)

455 Basic Environmental Geology (3) Applications of the geological sciences toward a comprehension of the effects of geological processes on humans and the effects of human activities on the earth's environment. Prereq: 12 hours of geology courses. 2 lecture hours and one 3-hour lab or field period.

460 Principles of Geochemistry (3) Application of chemical principles to geologic problems. Emphasis on crystal chemistry and relation between basic atomic structures and behavior of elements in the Earth's crust. Prereq: Chemistry 120-130; recommended: Geology 330, 2 lecture hours and one 2-hour lab.

470 Applied Geophysics (3) Basic principles and applications of seismic, gravity, magnetic, and electrical prospecting methods. Recommended: Math 141-142 or 147-148 and Physics 131. 2 lecture hours and one 2-hour lab.

480 Principles of Economic Geology (3) Ore-forming processes, classification of mineral deposits, survey of different types of mineral deposits with examples. Prereq: 320. 3 lecture hours and one 2-hour lab. Recommended: 460. 2 lecture hours and one 2-hour lab.

480 Special Problems in Geology (1-3) Directed study or special topics. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

491 Foreign Study (1-15) See page 97.

492 Off-Campus Study (1-15) See page 96.

493 Independent Study (1-15) See page 96.

497 Health (1) Health education goals, roles, target populations in fundamental assumptions about language change through time. Non phonological linguistic change, language families. Prereq: 101-102. 2 lecture hours.

498 Business German (3) German used in fields of business, government, administration and economics. Prereq: 6 hours of upper division German excluding courses in translation and graduate reading courses. (Same as Linguistics 436.)

485 Business German (3) German used in fields of business, government, administration and economics. Prereq: 6 hours of upper division German excluding courses in translation and graduate reading courses. (Same as Linguistics 436.)

GreeK

121-122 Beginning Greek (3,3) Must be taken in sequence.

261 Intermediate Greek: Grammar Review and Readings (3) Systematic review of Attic Greek and readings from selected authors. Prereq: 122.


401 Greek Poetry (3) Epic, lyric, drama. Authors vary. Prereq: 261.

402 Greek Prose (3) History, philosophy, and oratory. Authors vary. Prereq: 261.

405-406 Selected Readings from Greek Literature (3,3) For advanced students in Greek, the study of plays, the historical writings, the poetry of ancient Greece in the original Greek. Prereq: May be repeated twice with approval of department. Maximum 9 hours. Prereq: 401-402 or consent of instructor.

Health

110 Personal Health and Wellness (3) Information and behavior necessary to approach health and wellness scientifically and to develop confidence in judgments affecting personal health and wellness. E

200 Seminar in Human Sexuality (2) Problems and responsibilities of being male and female as they relate to health and wellness. Satisfactory/No Credit only. F, Sp

225 Alcohol/Drugs and the College Student (2) Problems related to use and abuse of substances potentially harmful to health and wellness. Satisfactory/No Credit only. F, Sp

230 Cardiorespiratory Recusitation (1) Theory and skills to implement basic cardiac life support following cardiac arrest due to such conditions as heart attack, drowning, electrocution, suffocation, poisoning, decomposition, inhalation and other accidents. Educational and preventive aspects of controlling cardiovascular disease. Leads to basic life support certification. F, Sp

300 Health Education, Promotion, and Behavior (3) Health education goals, roles, target populations in
school, community and health care settings; health care-related professional roles; health behavior and intervention techniques; health appraisal techniques; health promotion strategies. F, Sp

305 The School in Community Health (2) Roles and responsibilities of teachers in school health programs, school health programs and problems of the school child, recognition and methods of handling them; healthful school environment; school health services; community control; health personnel, voluntary and official health agencies. May not be taken for credit by health majors. F, Sp

306 Health Instruction in Elementary Grades (2) Topics appropriate for school-aged children in elementary grades. Original course content emphasized. Teachers become familiar with health materials, curricula, literature, community resources and planned processes for teaching health. Prereq: 305 and admission to Teacher Education Program. F, Sp

310 Advanced First Aid and Emergency Care (3) Theory and practice of first aid and emergency care. Provides essential information for developing functional first aid capabilities of lay persons. Course leads to Advanced First Aid and Emergency Care certification. Applicant must be at least 18 years old for certification. E

325 Planning, Evaluation and Administration of Health Programs (3) Organization of health programs in school, community and health care settings at public and private levels. Plan and assess various health education and health promotion efforts. F

330 Wellness Through Health, Leisure and Physical Activity (3) Emphasis on taking personal responsibility for one's health. Includes topics related to the healthy lifestyle, and provides specific guidelines of how to change inappropriate behaviors. (Same as Physical Education 330.)

375 Health Education: Curriculum, Methodology, Communications (3) Principles of health education curriculum construction, methodology and communication strategies for teaching/transmitting health education information. Sp

380 Research and Grant Writing (2) Study and application of research methods and grant writing techniques for health education programs. Skills for reading and interpreting journal and research articles. Exercises and student projects to develop a research or grant proposal. Review of development on development and review processes. Sp

400 Consumer Health (3) Major consumer health providers and health care services; selecting, purchasing, evaluating and financing medical and health care services/products. (Same as Public Health 400.)

405 Alcoholism and Alcohol Education (3) Factors which make alcoholism a serious health and safety problem. Various types of instructional/educational and intervention programs. F, Sp

406 Death, Dying and Bereavement (3) Aspects of dying, death and handling the trauma of loss. Medical, financial, physical, legal and social implications of death. F, Sp

410 Pre-Internship Seminar (1) Objectives and policies of the internship program. Must be completed the term immediately preceding the internship. Prereq: Admission to Teacher Education Program. Satisfactory/No Credit only. E

414 Physical Activity and Fitness (2) (Same as Physical Education 414.)

416 Field Evaluation of Physical Fitness (1) (Same as Physical Education 415.)

420 Sex Education As It Relates to Human Sexuality (3) Science of human sexuality. Emphasis on the trends, issues, content of sex education. E

425 Women's Health (3) Factors influencing women's health. Physical, psychological, social implications on nation's health service delivery systems. Study of health problems/concerns of women and techniques for prevention, management with/without drugs. (Same as Wompha Studies 425.) E

430 Suicide and Crisis Intervention (3) Factors which make suicide and crisis intervention relevant to the human condition. Assessment, intervention, and prevention techniques. Sp

435 Substance Use and Abuse (3) Drug and alcohol abuse problems and suspected causes; pharmacology of drugs and effects on society; strategies for intervention and education. Sp

465 Aging and Health (3) Aging process in a health perspective as it relates to health promotion and wellness of the aged. F, Sp

470 Special Topics (1-3) For advanced students, teachers, school administrators, nurses and other para-medical personnel. Lectures, demonstrations, films, field trips, and supervised research in special health/wellness or health promotion issues. May be repeated. Maximum 12 hours. E

475 Directed Independent Studies (1) Individual identification and study of a health/wellness or health promotion problem/issue. Prereq: Consent of instructor. May be repeated. Maximum 12 hours. E

481 Internship I: Grades 7-12 (3-6) Methods and theories of teaching. Internship is completed in local public schools. Application for internship should be made upon admission to Teacher Education Program. Prereq: 410 and admission to Teacher Education Program.

482 Internship II: Grades 7-12 (3-6) Demonstration of professional competence in planning, instruction, and classroom management. Internship is completed in local public schools. Prereq: 481 and admission to Teacher Education Program. Satisfactory/No Credit only. Sp

483 Field Practice (8) Off-campus health internship or field practice in an educational or other agency with qualified professional. Prereq: Consent of instructor. E

510 Trends and Issues in Health Education (3) History, philosophy, principles, problems, and trends of and in health and health education. F

520 Sex Education and Human Sexuality (3) Educational and health counseling theory, techniques, materials to be used in school, community, or health care facility. Sp

530 Curriculum Development for Health Education Programs (3) Current health education curricula for elementary and secondary schools, community and health care settings. Su

540 Evaluation in Health Education (3) Principles of evaluation of health instruction and programs in regard to health knowledge, attitudes, and behavior. Construction of instruments and criticism of existing instruments. Sp

HISTORY

151-152 Development of Western Civilization (3,3) Historical survey of the civilization of the western world. 151: Ancient world to 1715. 152-1715 to present. E

157-158 Honors: Development of Western Civilization (3,3) Consent of department required. 157-F; 158-Sp

161-162 A History of World Civilization (3,3) Historical survey of world civilization. 161:Origins to 1500. 162:1500-1715. F

185-196 Afro-American History: An Introduction (3,3) Afro-American experience from 1800. Traditional African societies from which Afro-Americans emerged; evolution of prejudice and racism in America; institutionalization of slavery; free Negroes; Civil War and Reconstruction; 19th-20th century. F

202 The City in Europe, 1000-1900 (3) Urban growth, emphasizing the relationship between the economic and social foundation of the cities, their political and cultural development and their physical structure.
336 A History of Austria and Central Europe: Frontier and Nation Formation during the Central Development, as part of the Hapsburg collection of states, and its search for identity as it underwent drastic changes, from a multi-national empire and great power status to an unstable truncated republic, to an exploited Third Reich, to a four-fold Allied occupation zone, to the Weimar republic to Hitler's Third Reich, to Adenauer's Federal Republic and the present nation of two states.

337 Historical Issues (3) Broad, thematic issues in historical perspective. Lecture-discussion. Especially suitable for non-majors; also open to majors.

338 The West and the Third World Since 1870 (3) Relationships between the West and Africa, Asia, and Latin America since 1870 across a broad spectrum of critical issues. Includes dependence, nationalism, and underdevelopment, ideologies in conflict with non-Western world views, and the search for individual identity and the formation of collective identity.

339 Revolutions in Historical Perspective (3) Comparative study of major revolutions which transformed political, social, and economic structures and values, such as those in France, Russia, China, Mexico, and Iran. Contrasts and common patterns in their causes, phases and outcomes. Relations between leaders and masses. Major theories of revolution.

340 History of Russia (3,3) 340-To the middle of the 19th century. 341-From the middle of the 19th century.

341 Colonialism and Independence, 1500-1825. 342 America: Mind, Mood and Society (3) Social and political developments in antebellum America within the framework of the struggle between nationalism and sectionalism.

342 The United States during the Jacksonian Era, 1815-1860 (3) An examination of the major economic and political developments in the United States during the Civil War and Reconstruction era.

343 Rose and Society in Europe from Medieval to Modern Times (3) Relationship between the nature of war and society in Europe which covers medieval, early modern and modern warfare, culminating in the World Wars of the 20th Century.

344 American Issues: Individualism and Community (3) Ways in which Americans have shaped their lives so as to retain the benefits of individual and small group identity while seeking to achieve the purpose of collective identity and collective goal. Topics include conflicting and competing tendencies toward laissez-faire and "Americanism" and ethnic identity.

345 American Issues: War and the Peaceful Ideal (3) Evolution of the dual tendency among Americans to express abhorrence to war and imperial conquests and, to engage in war and exercise economic or политику dominance over other peoples. Topics include relationship between leaders and followers, patterns and dissent, mobilization for war, and post-war attitudes.

346 Content and Organization of Historical Writing (3) Senior Honors. Paper: (3,3) 407-Supervised reading, bibliographical search, conceptual clarification, research, 408-Organization and writing of the senior honors paper. Both are required of students working for honors in history.

347 History of Latin America (3,3) 360-Colonialism and Independence, 1500-1825. 361-National Development, 1825 to present. (Same as Latin American Studies (360-361)).

348 History of East Asia (3,3) 362-East Asia History and Culture to 1600. Chiefly China and Japan; Korea and Vietnam also included. Confucianism, Buddhism, social structure, political tradition, and Japanese feudalism. Comparison and contrast with Western history and culture. 353-Modernt East Asia since 1815. China, Korea, Vietnam. Comparative analysis: Western impact, cultural transformation, communist movement, and Japan's militarism and political and economic successes.

349 History of China (3) Changes and continuities of the world's longest uninterrupted civilization with a quarter of the human race; similarities and differences between China and Western civilizations, Chinese revolts in historical context.

350 History of Japan (3) Japanese history from mythological origins to the postwar age, with emphasis on politics and society. Topics include the influence of disease and society, Japanese feudalism, popular culture in the 1700s, the Meiji Restoration, and Japanese militarism.


352 History of the Middle East (3,3) 353-Rise and spread of Islamic civilization to the sixteenth century; 354-The Middle East from the sixteenth century to the present. Impact of the West and background of current problems in the area.

353 African History (3,3) 371-Ethnic groups of the northern and western regions of sub-Saharan Africa and the conflict and change occurring there from 1000 A.D. through the World War I era in 1919. 372-Dynamics of African independence since 1919. Achievement of independence by west African nations and the failure of Africans in the south to achieve that goal. Issues of urbanization, industrialization, and for-}

443 History of the South (3,3) 443-Old South from colonial period through the Civil War. 444-New South from Reconstruction to the Second Reconstruction.
African nations, and Apartheid and resistance in South Africa. May be repeated. Maximum 9 hours.

481 Studies in History (3) Variable content. Subject matter not covered in other courses. May be repeated. Maximum 9 hours.

482 Colloquium in History (3) Historical theme or problem; emphasis on questions and skills, with special reference to historical writing, including critical analysis of both primary and secondary sources. Recommended for seniors.

491 Foreign Study (1-15) See page 97.

492 Off-Campus Study (1-15) See page 96.

493 Independent Study (1-15) See page 96.

HOME ECONOMICS EDUCATION

210 Field Experience in Teaching Home Economics Education (1-3) May be repeated. Maximum 3 hours. Satisfactory/No Credit only. F, Sp

220 Introduction to Home Economics Educational Programs (3) School-based and community-based home economics programs. Field experience included. Sp

320 Strategies of Teaching Home Economics (3) Teaching methods, techniques, use of media. Field experience included. Prereq: 220. F

420 Curriculum Development in Vocational Home Economics (3) Program planning, evaluation, design of instruction for classroom. Prereq: 320, Admission to Teacher Education Program. To be scheduled immediately preceding student teaching. Sp

421 Teaching Occupational Home Economics (1) Methods, organization, curriculum for Home Economics Related Occupational programs. Prereq. or Coreq: 420. Sp

430 Student Teaching in Vocational Home Economics (8-15) Prereq: 420. Satisfactory/No Credit only. F

440 Teaching in Community-Based Programs (3) Planning and implementing non-formal instructional programs; methods, curriculum, delivery systems, evaluation. Includes field experience. Prereq Senior standing. (Same as CFS 440.) Sp

445 Field Experience in Community-Based Programs (1-15) Placement in Home Economics-related programs or businesses. Includes seminar. May be repeated. Prereq: Senior standing. Consent of instructor. Satisfactory/No Credit only. F, Sp

497 Honors: Home Economics Education (3-6) Issues or topics affecting home economics education, designed to meet particular interests of the student. Prereq: Junior or Senior standing and consent of instructor. May be repeated. Maximum 6 hours.

HUMAN ECOLOGY

200 Professional Orientation (3) Presentation of ecological model and its application to the enhancement of individual and family well-being; examination of the biosocial nature of human beings; nature of human environments; relationships among people and their environments. F, Sp %210 Microcomputer Applications (3) Introduction to microcomputer use and live software programs; operating systems, word processing systems, data base systems, spreadsheet programs and graphics programs; design of a management information system; spreadsheets, word processing, and database. Prereq: Declared major in College of Human Ecology. F, Sp

400 Professional Environments (3) Application of ecological model to the enhancement of individual and family well-being; interrelatedness of the specializations within human ecology and their common concern to help individuals and families manage change and technology through decision making, the management of resources, and the evolution of social policy. Prereq: 200 and 3 credit hours each in CFS, NFS, ID or TA exclusive of HE 210. F, Sp

460 Directed Study: Human Ecology (1-3) Topic arranged by individual student under supervision of faculty. May be repeated with different topic. Maximum 6 hours. Prereq: Junior or Senior standing in a major in the College of Human Ecology and consent of instructor. E

HUMAN SERVICES

220 Introduction to Human Services (3) Focus on related societal values and contemporary issues in human services. Emphasis on the various professions, settings, and roles as students examine the complexities of human needs and social problems.

230 Peoples and Problems of Appalachia (3) Exploration of life style and institutions from contemporary human services point of view. Special emphasis placed on political and economic structures of region.

330 Thinking About People (3) Development of thoughtful, informed and empathetic attitudes toward human beings; those providing services as well as those receiving service. Prereq: Progression to the major. F

380 Human Services Methodologies I (3) Basic helping skills essential to the effective delivery of Human Services. Prereq: Progression to the major or consent of instructor. F

390 Information Interpretation and Assessment (3) Information gathering and assessment for human services are examined in depth in relation to human services practice. Formulating questions, identifying relevant data, using related resources, interpreting information and applying to practical, professional setting. Prereq: Progression to the major. Sp

420 Human Services Methodologies II (3) Includes reality therapy, behavior modification, family systems, client-centered and rational emotive therapy. Discussion and role playing of methods and skills that will be used during the field experience. Prereq: Progression to the major, 220, 330, Coreq: 440. F

430 Working Within The System (3) Capstone Experience. Context within which the need for human services arises and analysis of the process through which such services are provided. Prereq: Progression to the major, 330; senior standing or consent of instructor. Sp

440 Human Services Field Work (6) Practical field experiences in appropriately organized and directed human services settings. Develops specific helping skills; involvement in roles and function of social services; and provides direct services in a supervised learning situation. For majors only. Prereq: Progression to the major, 420. Satisfactory/No Credit only. F

441 Human Services Field Work II (6) Practical field experiences in appropriately organized and directed human services settings. Develops specific helping skills; involvement in roles and functions of social services; and provides direct services in a supervised learning situation. For majors only. Prereq: Progression to the major, 380, 440, 440. Satisfactory/No Credit only. Sp

450 Special Topics in Human Services (3) Issues, methods, values, and trends with implications for helping practitioners, such as art therapy, legal and ethical issues, and self-awareness education. May be repeated. Maximum 9 hours.

451 Foreign Study (1-15) F

452 Off-Campus Study (1-15) F

453 Independent Study (1-15) F

INTERIOR DESIGN

140 Introduction to Interior Design (2) Orientation to the profession; relationship to allied fields; contemporary developments; philosophical approaches. F

150 Visual Studies (3) Classification and properties of two and three dimensional visual organization; design principles; visual and spatial elements within simple and complex visual systems; role of movement in experiencing scale and volumetric space. F

200 Human-Environment Systems (3) Role of culture in defining environment; physical, social and conceptual aspects of human-environment systems; impact of environment on human behavior, feelings and values; material-cultural properties of behavior-environment systems. (Same as Urban Studies 260.) Sp

240 Fundamentals of Interior Design I (4) Principles of spatial organization; creative problem-solving and communication techniques for micro-environment design; perspective drawing, model building, experimentation with various media. Prereq: 140, Arch 172. F

250 Fundamentals of Interior Design II (4) Problem solving, spatial organization of micro environments, interior design for space groupings; budgeting; and use of new materials. Prereq: Consent of instructor. F

270 History of Interior Architecture I (3) Interior architecture, decoration and decorative arts within cultural context, ancient through seventeenth century. Emphasis on Italy, France and England. Prereq: one semester Art History. Sp

280 Micro-Computers for Interior Design (3) Electrocrt, spreadsheets, and data-base organization and management; data-base information to relate anthropometrics to furniture dimensioning and specifications for maximizing design criteria, cost-estimating and product trade-offs in meeting budget constraints. Prereq. or Coreq: 240. Interior Design students only. F

310 Survey of Interior Design (3) Planning and organizing interiors for businesses, churches, hospitals, and offices, with emphasis on the commercial and community environments. Prereq: Consent of instructor. F

315 Survey of Contract Interiors (3) Planning and organizing interior spaces for restaurants and lodging facilities; relation of furnishings to architectural space. Prereq: Consent of instructor. F

340-350 Intermediate Interior Design I, II (4.4) Studio problems of intermediate complexity; integrates and extends previous knowledge of working drawings, materials and sources, design methods, spatial organization and planning of micro and macro environments. Prereq: Third year in Interior Design; courses must be taken in sequence. F, Sp


370 History of Interior Architecture II (3) Interior architecture, decoration and decorative arts within cultural context, seventeenth through the nineteenth centuries; emphasis on France, England and America. Prereq: 270 or consent of instructor. F

400 Proxemics (3) Analysis of spatial behavior; emphasis on cultural basis of spacing behavior. Prereq: Consent of instructor. A, Sp

410 Environment as Code (3) Advanced theoretical issues in environment as a medium of human communication. Prereq: 200, 400 or consent of instructor. A, Sp

417 Honors: Interior Design I (1-4) Advanced research in interior design problems for juniors or seniors. May be repeated. Maximum 8 hours. Prereq: Consent of Interior Design faculty. Prereq: Third year in Interior Design, 360 and consent of instructor. Sp

420 Practicum for Interior Design (15) Supervised experience in a professional design firm; business practices, project management and design philosophy. Prereq: Third year in Interior Design, 360 and consent of instructor. Sp

420 The Development of Historical Linguistics as a Science (3) Development of the scientific understanding of language change. Emergence of the Neogrammarian paradigm from 19th century intellectual trends. Impact of synchronic, descriptive, structural and transformational-generative linguistics on contemporary diachronic theory. Prereq. 6 hours of courses required for Linguistics concentration or consent of instructor.

425 Introduction to Descriptive Linguistics (3) (Same as French 425, German 425, Russian 425, and Spanish 425.)

426 Methods of Historical Linguistics (3) (Same as French 426, German 426, Russian 426, and Spanish 426.)

429 Romance Linguistics (3) (Same as French 429 and Spanish 429.)

430 The Development of Synchronic Linguistics as a Science (3) Development of the first synchronic paradigm of linguistics. Impact of social sciences on the American descriptivists. Prague School. Transliteration techniques. Prereq. 6 hours of courses required for Linguistics concentration or consent of instructor.

435 Structure of the German Language (3) (Same as German 435.)

436 History of the German Language (3) (Same as German 436.)

471 Sociolinguistics (3) (Same as English 471 and Sociology 471.)

472 American English (3) (Same as English 472.)

474 Teaching English as a Second or Foreign Language I (3) (Same as English 474.)

476 Teaching English as a Second or Foreign Language II (3) (Same as English 476.)

485 Special Topics in Language (3) (Same as English 485.)

MANAGEMENT

301 Principles of General and Operations Management (3) Basic functions of general management and the concepts and techniques used in operations management. Includes lectures and discussion/problem solving sessions. Prereq: Statistics 201.

303 Management Information Systems (3) Management information concepts. Organizational information needs, management decisions relating to technology and systems design. Data base management systems and applications development software.

311 Labor Relations and Collective Bargaining (3) American labor history, structure and philosophy of contemporary unions, nature of collective bargaining, and dispute settlement. (Same as Economics 343.)

321 Organizational Structure and Behavior (3) Behavioral processes in organizations: motivation, leadership, decision making, communication, behavioral consequences; group behavior, informal organizations, organizational structure, conflict, politics, change and development.


401 Business Strategy/Policy (3) Strategy and policy which affect the character and success of the total enterprise. Capstone course which integrates all functional areas in the formulation and implementation of strategy which will enable the organization to reach its strategic objective. Major writing requirement. Prereq: Completion of business core courses and senior standing. Must be admitted to a business major.


431 Personnel Management (3) Theory, methods and issues pertaining to successful personnel management. Prereq: 301, senior standing.

432 Implementation and Evaluation of Personnel Programs (3) Methods of identifying, developing, implementing and evaluating personnel programs. Prereq: 431, senior standing.

441 Operations Management II (3) Planning and control of operations systems. Aggregate planning; scheduling systems, materials management. Prereq: 341.

461 Database Management in Business (3) Application, logical structure, and implementation of database systems. Management of data resources to effectively support information systems in organizations. Prereq: Computer Science 261.

471 International Management (3) Factors significant to the manager in international business activities.


493 Independent Study (3) Research, readings, and special projects. Prereq: Consent of instructor. May be repeated one time for credit.

MARKETING

301 Marketing Management (3) Institutions comprising the marketing system; principal environmental opportunities and constraints facing the marketing manager. Prereq: Economics 261.

310 Buyer Behavior - Analysis for Marketing (3) Comprehensive framework of consumer behavior concepts and processes. Application to market analysis, design and control of marketing programs. Prereq: 301.

320 Marketing Research and Information Planning (3) Marketing Research process from its inception to implementation of study's results. Student should be able to critically evaluate the merit of a research project, as well as possess the ability to design a sound marketing project. Major writing requirement. Prereq: 301 and Statistics 201.

420 Promotion Management (3) Principles and practices of promotion management and their relationship to overall marketing program. Managerial focus emphasizing types of decisions continually confronting promotion executives. Prereq: 301.


440 Organizational Psychology (3) (Same as Psychology 440.)

493 Independent Study (1-6) Directed research on subjects of mutual interest to student and staff member. Prereq: Consent of instructor.

497-498 Honors I & II (3,3) Topics may include non-business marketing applications, macroenvironmental issues, market segmentation, international marketing, services marketing, marketing channels and related issues. Prereq: Consent of instructor.

MATHMATICS

110 Algebraic Reasoning (3) Algebraic functions, their properties and uses, including applications in financial mathematics and other areas. No student who has earned a grade of C- or better in any Mathematics course numbered 121 or higher may subsequently receive credit in 110. Prereq: Two years of algebra and one year of geometry in high school.

115 Statistical Reasoning (3) Introduction to probability and statistics without calculus. Not available for credit to students in the College of Business Administration. Prereq: Two years of algebra and one year of
121 Calculus A (3) For students not planning to major in science, engineering, mathematics, or computer science. Calculus of algebraic, exponential, and logarithmic functions. No student who has received credit for Math 141 or 151 with a grade of C or better may subsequently receive credit for 121. Prereq: Two years of algebra and one year of geometry in high school, plus satisfactory placement test scores, or 110, or 130.

122 Calculus B (3) Sequel to 121, including elementary matrix algebra, multivariable calculus, and optimization. No student who has received credit for 241 or 251 may subsequently receive credit for 122. Prereq: 121, or 141, or 151.

130 Precalculus (4) Review of algebraic, logarithmic, exponential, and trigonometric functions for students who satisfy the course prerequisites for 141 or 151, but whose placement test scores indicate additional preparation is necessary. Students who have earned a grade of C or better in 141 or 151 may subsequently receive credit for 130. Prereq: Two years of algebra, a year of geometry, and half a year of trigonometry in high school. Students who did not study trigonometry in high school may take the noncredit course in trigonometry simultaneously with 130.

141-142 Calculus I, II, (4,4) Standard first-year course in single variable calculus, especially for students of science, engineering, and computer science. Differential and integral calculus with applications. Credit will not be given for both 141 and 151. Prereq: Two years of algebra, a year of geometry, and half a year of trigonometry in high school, plus satisfactory placement test scores, or 130.

143-144 Microcomputer Laboratory (1,1) Optional supplement to calculus courses featuring computer programs and demonstrations and projects. Coreq: Students registering for one of these lab courses must also be registered for the corresponding calculus course.

147-148 Honors: Calculus I, II, (4,4) Honors version of 141-142 for well-prepared students. Qualified students are usually invited to enroll, but inquiries from other students having excellent high school mathematics backgrounds are welcome.

151-152 Biocalculus I, II, (3,3) For students majoring in the life sciences. Topics from calculus, including algebraic, logarithmic, and exponential functions, probability and statistics, with emphasis on applications to the life sciences. Credit will not be given for both 141 and 151. Prereq: Two years of algebra, a year of geometry, and half a year of trigonometry in high school, plus satisfactory placement test scores, or 130.

200 Matrix Computations (1) Introduction to matrix calculations, including determinants, eigenvalues and eigenvectors. For students in the College of Engineering and College of Business Statistics. Students who have completed Math 130 or 151 may not subsequently receive credit for 200. Prereq: 141-142.

221-222 Discrete Mathematics I, II, (3,3) Logic, sets, combinatorics and probability, functions and relations, induction and recursion, elementary number theory. Prereq: 141 or 151.


241 Calculus III (4) Calculus of functions in two or more dimensions. Includes solid analytic geometry, partial differentiation, multiple integration, and selected topics in vector calculus. Prereq: 141-142.

243 Microcomputer Laboratory (1) Optional supplement to 241, featuring computer demonstrations and projects. Coreq: Students registering for 243 must also be registered for 241.

247 Honors: Calculus III (4) Prereq: 147-148 or invitation of the department.

251 Matrix Algebra I (3) First course in the algebra of simultaneous linear equations and matrices. Includes Gaussian elimination, determinants, vector spaces, linear transformation, eigenvalues, and eigenvectors. Prereq: 141-142.

253 Microcomputer Laboratory (1) Optional supplement to 251, featuring computer demonstrations and projects. Coreq: Students registering for 253 must also be registered for 251.

257 Honors: Matrix Algebra I (3) Prereq: 147-148 or invitation of the department.

262 Courses of Instruction/Medical Biology

421 Combinatorics (3) Introduction to problems of selection and arrangement of objects having certain properties, such as sequences, partitions, graphs, finite fields and geometries, and experimental designs. Prereq: 221 or 251.

435 Partial Differential Equations (3) Separation of partial differential equations, least squares data fitting, interpolation, numerical algorithms and associated library software for problems of physics and engineering. Prereq: 351 or consent of instructor.

437 Partial Differential Equations (3) A second course in partial differential equations, including elliptic, parabolic and hyperbolic types; methods for solving equations, such as boundary value problems, separation of variables, Fourier series, solution of Laplace, wave, and heat equations. Prereq: 231, 241.

443 Complex Variables I (3) Introduction to the theory of functions of a complex variable, including residue theory and contour integrals. Prereq: 241; one 300 or 400-level mathematics course recommended.

444 Complex Variables II (3) Applications of complex variables to steady-state temperatures, electrostatics, and fluid flow. Prereq: 443.

445-446 Advanced Calculus I, II, (3,3) Introduction to the theory of sequences, series, differentiation, and Riemann integration of functions of one or more variables. Prereq: 341 or consent of instructor.

447-448 Honors: Advanced Calculus I, II, (3,3) Honors version of 445-446. Prereq: 341 or consent of instructor.

451 Topics in Algebra (3) Topics chosen from number theory and the theory of polynomial equations, such as the quadratic reciprocity law and Riemann separations. Prereq: 351.

453 Matrix Algebra II (3) Advanced topics in matrix theory, including the Jordan canonical form. Prereq: 251.

455-456 Abstract Algebra I, II, (3,3) Introduction to algebraic structures such as groups, rings, fields, vector spaces, and linear transformations. Prereq: 351 or consent of instructor.


460 Geometry (3) Axiomatic and historical development of Euclidean, non-Euclidean, and hyperbolic geometry stressing proof technique and critical reasoning. Models of Non-Euclidean geometries. A term paper required. Prereq: 141-142 and 221, or consent of instructor.

461 Topology (3) Includes topology of line and plane, separation properties, compactness, connectedness, continuous functions, homeomorphisms, and topological invariants. Prereq: 341 or consent of instructor.

471 Numerical Analysis I (3) Introduction to computational techniques, instabilities, and rounding. Interpolation and approximation by polynomials and piecewise polynomials. Quadrature and numerical solution of initial and boundary value problems of ordinary differential equations, including stiff systems. Prereq: 371. (Same as Computer Science 471.)


490 Readings in Mathematics (1-3) Open to superior students with consent of department head. Independent study with faculty guidance. May be repeated. Maximum 9 hours. Prereq: Consent of instructor.

499 Seminar in Mathematics (1-3) Students must register for the number of credit hours announced for a particular seminar. May be repeated. Maximum 9 hours. Prereq: Consent of instructor.

MEDICAL BIOLOGY

410 Laboratory Safety Education (2) Preparation for teachers of laboratory safety. Hazards of flammables, corrosive chemicals, isocitrate, pathogens, poisons, and equipment will be discussed. Techniques of safe operation and handling will be presented.

411 Undergraduate Research Participation (1-3) Experience in active biomedical research projects under supervision of faculty investigators. Projects in pre-medical and other biology majors may conduct their own research projects within designated areas. Prereq: Junior or seniors in good standing; permission of instructor. May be repeated with consent. Maximum 9 hours. Satisfactory/No Credit only.
MEDICAL TECHNOLOGY

410-411 Microbiology (4,4) Laboratory work in bacteriology, mycology, and parasitology. Emphasis on pathogenesis and function of microorganisms, identification of pathogens and disease causing fungi. Prereq: 310.

420-421 Clinical Chemistry (4,4) Clinical aspects of biochemistry, including overview of principles and instrumentation with emphasis on practical laboratory application of analytical procedures, specimen collection and handling, significance of results, and quality assurance. Includes blood gas analysis, including radiocommunassay, and analysis of blood and other body fluids for enzymes, hormones, and other constituents of clinical interest, utilizing both automated and manual techniques.

430-431 Hematology and Clinical Microscopy (4,4) Principles, theories, and instrumentation related to qualitative and quantitative evaluation of cellular elements of blood and other body fluids; factors of hemostasis, quantitative chemical analysis of urine, and renal function studies. Emphasis on microscopic identification of cells and the significance and correlation of laboratory data.


450 Clinical Serology and Immunology (1) Performance and interpretation of broad range of clinical serology and immunology including serological diagnosis and treatment principles on principles and clinical correlation. Formal lecture series included.

460 Nuclear Medicine (1) Physical characteristics, detection and use of short half-life radioactive materials for in vivo diagnostic medical procedures and theory of in vitro procedures such as radionuclide studies which utilize radionuclides.

470 Orientation and Basic Techniques (1) For facilitation of students from campus to hospital community and clinical laboratory. Introduction to medical terminology, ethics, and health team concept. Orientation to basic techniques including procedures for collection and handling of specimens, principles of operation of many laboratory instruments, review of laboratory math, and introduction to quality control procedures. Portion of course extends over various semesters.

480 Principles of Supervision and Education in Medicine (1) Seminars in basic principles of management, supervision, and education theories and methods. Comprehensive examination covers entire course.

MEDIEVAL STUDIES

201 Medieval Civilization (3) Introduction to basic themes in medieval experience, approached from interdisciplinary points of view and including philosophy and religion, art, architecture, language and literature, social and political history.

261 Medieval Culture: Readings from the Early Middle Ages, 500-1000 (3) Critical analysis and interpretation of selected works from the early medieval period. Focuses on major types of literature produced during the period 500-1000 A.D., e.g., cultural, religious, literary; includes Anglo-Saxon, French Confessions, Boethius' Consolation, St. Gregory's Life of St. Benedict, The Life of Charlemagne, etc.

262 Medieval Culture: Readings from the Later Middle Ages, 1000-1500 (3) Critical analysis and interpretation of selected works from the later medieval period. Focuses on romantic, allegorical and mystical writings from the high and later Middle Ages, e.g., the Song of Songs, Eutychianus, and St. Bernard's Commentary on the Song of Songs. Peter Abelard's History of My Debauchery. Should be taken in sequence with 261.

312-313 Medieval History (3,3) (Same as History 312-313.)

322 Medieval Philosophy (3) (Same as Philosophy 322.)

371 Early Christian and Byzantine Art, to 1350 (3) (Same as Art 371.)

372 Northern European Painting, 1350-1600 (3) (Same as Art 372.)

381 Medieval Art of the West, 800-1400 (3) (Same as Art 381.)

382 The Art of Italy, 1250-1450 (3) (Same as Art 382.)

401 Dante and Medieval Culture (3) (Same as Italian 401.)

402 Petrarch and Boccaccio (3) (Same as Italian 402.)

403 Seminar in Medieval Studies (3) Interdisciplinary treatment of selected topics. Content varies. May be repeated.

410 Medieval French Literature (3) (Same as French 410.)

415 Medieval Architecture (3) (Same as Architecture 415.)

475 Ancient and Medieval Political Thought (3) (Same as Political Science 475.)

MICROBIOLOGY

200 Microbiology for Student Nurses (3) Only for student nurses in diploma program of hospital tutition with The University of Tennessee. Microbiological principles as they apply to nursing care of the patient, epidemiology of infection, and principles of immunity and allergy.

210 General Microbiology (3) General properties of bacteria and viruses including physiology, metabolism, genetics, applied bacteriology, pathogenesis, and immunity. May not be used as part of the major in microbiology. 2 hours and 2 labs.


319 Introductory Microbiology Laboratory (1) Basic techniques for the examination, cultivation, and identification of microorganisms. Coreq: 310, F, Sp.

400 Laboratory Problems in Microbiology (2-4) Research projects under the direction of a faculty member. May not be used for credit toward requirements for a major. May be repeated up to 8 hours. Satisfactory/No Credit only. Prereq: Consent of instructor. E.

410 Physiology and Genetics of Bacteria (3) Modern concepts of the structure and function of the bacterial cell, including metabolism, energy flow, and the transmission and expression of genetic information. Prereq: 310.

419 Bacterial Physiology and Genetics Laboratory (1) Laboratory exercises designed to accompany 410. Coreq: 410.

420 Pathogenic Bacteriology (3) Disease producing microorganisms including bacteria, rickettsia, and chlamydia. Prereq: 310.


430 Immunology (2) Principles of inflammation and immunity, including theories of formation and diversity; complement, hypersensitivities, cell cooperation and recognition in immunity, mechanisms: soluble factors. Prereq: Biology 220. (Same as Zoology 430.)

439 Immunology Laboratory (1) Laboratory exercises designed to accompany 430. Coreq: 430. (Same as Zoology 430.)


470 Microbial Ecology (3) Physiological diversity and taxonomy of microorganisms in different environments. Emphasis on the functional role of microorganisms in natural and simulated ecosystems. Prereq: 310.


480 Mycology (3) Morphology, physiology, genetics, and taxonomy of yeasts and molds; pathogenesis of disease causing fungi. Prereq: 310.

489 Mycology Laboratory (1) Laboratory exercises designed to accompany 480. Coreq: 480.

491 Foreign Study (1-15) See page 97.

492 Off-Campus Study (1-15) See page 96.

493 Independent Study (1-15) See page 96.

495 Senior Seminar (3) In-depth consideration of microbiological problems of current interest requiring an in-depth knowledge of two or more disciplines. Emphasis on original literature and the experimental basis of current knowledge. Historical background, impact on society, predictions of the future, and the basis of moral and ethical judgements. Written reports required. A capstone course. Prereq: Senior standing.

MILITARY SCIENCE

110 Basic Military Science (2) Formation and functioning of the American defense establishment, customs and traditions of the army, application of the principles of war, and current military threats faced by the United States. Introduces military skills of marksmanship and mountaineering. Prereq: United States citizen; freshman or sophomore standing. Students with higher standing require consent of instructor. Letter grade only: F, Sp.

120 Leadership Development Techniques (2) Introduction to basic leadership theory, human motivation theory, and principles of efficient and effective communications. Application of theories and principles in individual and group exercises. Prereq: 110 or consent of the Professor of Military Science. Letter grade only: F, Sp, Su.

200 Basic Military Studies - Practicum (4) 240 contact hours of instruction and evaluation at Fort Knox, Kentucky over a six week period during the summer. Prereq: United States civilian, physically qualified; at least sophomore standing with two years remaining at the University (whether undergraduate, graduate or in pursuit of additional course work; cumulative GPA 2.00 or above; legally qualified. Letter grade only. Su.

210 Basic Military Leadership (2) Preview of the leader's job with practical exercises in leadership principles and skills. Performance based program. Prereq: 110 or consent of the Professor of Military Science. Letter grade only: F, Sp, Su.

220 Basic Officer Skills (2) Small unit operating techniques to include tasks associated with military equipment, navigation, and interdiction requirements. Prereq: 110 or consent of the Professor of Military Science. Letter grade only: F, Sp, Su.


310 Leadership Development Techniques (2) Introduction to basic leadership theory, human motivation theory, and principles of efficient and effective communications. Application of theories and principles in individual and group exercises. Prereq: 110 or consent of the Professor of Military Science. Letter grade only: F, Sp, Su.

320 Basic Military Studies - Practicum (4) 240 contact hours of instruction and evaluation at Fort Knox, Kentucky over a six week period during the summer. Prereq: United States civilian, physically qualified; at least sophomore standing with two years remaining at the University (whether undergraduate, graduate or in pursuit of additional course work; cumulative GPA 2.00 or above; legally qualified. Letter grade only. Su.

310 Basic Military Leadership (2) Preview of the leader's job with practical exercises in leadership principles and skills. Performance based program. Prereq: 110 or consent of the Professor of Military Science. Letter grade only: F, Sp, Su.

320 Basic Officer Skills (2) Small unit operating techniques to include tasks associated with military equipment, navigation, and interdiction requirements. Prereq: 110 or consent of the Professor of Military Science. Letter grade only: F, Sp, Su.

Courses of Instruction/Music Education

Completion (or) regimented course structure of 310, 320, 200, 410, 420, 400. Letter grade only. 3 hours and 1 hour lab.

320 Advance Military Studies II (4) Applied leadership including operation of the military team, electronic communications, land navigation, small unit leadership, internal defense development, four field trips, and leadership laboratory. Philosophy of organization, control of tactical and administrative roles. Prereq: 310 or consent of instructor. Letter grade only. 3 hours and 1 hour lab. Sp

400 Advance Camp-Practicum (4) 249 contact hours of instruction and practical training at Ft. Lewis, Washington during the summer between the Junior and Senior year. Prereq: 310, 320. Letter grade only. Su

410 Command and Staff Functions (4) Command and staff duties and relationships including logistics, personnel systems, efficiency reports, correspondence, training management, briefings, counseling, strategic force positioning, and non-commissioned officer relationships. Prereq: 310 and 320, 400 or consent of instructor. Letter grade only. 3 hours and 1 hour lab. F

420 Military Ethics and Law (4) Military profession, ethics of military leadership, civil-military relations, ethical reasoning, staff operations, military briefings, and their variations. Studying, analyzing and interpreting staff duties and relationships including logistics, personnel systems, efficiency reports, correspondence, training management, briefings, counseling, strategic force positioning, and non-commissioned officer relationships. Prereq: 310 and 320, 400 or consent of instructor. Letter grade only. 3 hours and 1 hour lab. Sp

430 Field Experience in Music Education (1) Prereq: Consent of instructor and admission to Teacher Education Program. May be repeated. Maximum 9 hours. Letter grade only. E

410 Pre-Internship Seminar (1) Objectives and policies of the internship program. Must be completed the term immediately preceding the internship. Prereq: Admission to Teacher Education Program. Satisfactory/No Credit only. E

490 Special Topics in Music Education (3) Prereq: Consent of instructor. May be repeated. Maximum 9 hours. Letter grade only. E

493 Independent Study in Music Education (2-5) Prereq: Consent of instructor. May be repeated. Maximum 9 hours. Letter grade only. E

495 Advanced Music Methods for Elementary Teachers (3) Continuation and amplification of the concepts and skills covered in Music Education 300. Intended for Elementary Education majors. Prereq: 300 or consent of instructor. Letter grade only. Sp

MUSIC ENSEMBLE

301-501 Woodwind Choir (1,1) May be repeated.
303-503 Small Jazz Ensemble (1,1) May be repeated. Maximum 12 hours.
304-504 Jazz Ensemble (1,1) May be repeated.
305-505 Studio Orchestra (1,1) May be repeated. Maximum 12 hours.
306-506 Trombone Choir (1,1) May be repeated.
309-509 Tuba Ensemble (1,1) May be repeated.
310-510 Percussion Ensemble (1,1) May be repeated.
311-511 Marimba Choir (1,1) May be repeated.
312-512 Baroque Ensemble (1,1) May be repeated.
313-512 Synthesizer Ensemble (1,1) May be repeated.
314-514 Brass Choir (1,1) May be repeated.
315-515 Chamber Music Ensemble (1,1) May be repeated. Maximum 12 hours.
320-520 UT Singers (1,1) May be repeated. Maximum 12 hours.
330-530 Chamber Singers (1,1) May be repeated.
332-532 Collegium (1,1) May be repeated.
334-534 Saxophone Choir (1,1) May be repeated.
340-540 Opera Theatre (1,1) May be repeated.
342-542 Opera Workshop (1,1) May be repeated.
350-550 Concert Band (1,1) May be repeated.
352-552 Campus Band (1,1) May be repeated.
354-554 Varsity Band (1,1) May be repeated.
356-556 Laboratory Band (1,1) May be repeated.
359-559 Marching Band (1,1) May be repeated.
370-570 Symphony Orchestra (1,1) May be repeated.
380-580 Concert Choir (1,1) May be repeated.
382-582 University Chorus (1,1) May be repeated.
383-583 Men's Chorale (1,1) May be repeated.
389-589 Women's Chorale (1,1) May be repeated.
399-599 Accompanying (1,1) May be repeated.

MUSIC HISTORY

200 Introduction to Music Literature (3) Basic forms of music and accepted masterworks through chronological approach. For music majors and minors only.

210-220 History of Music I, II (3,3) 210 to 1750, 220 to 1750. Prereq: 200. Must be taken in sequence.

310 Introduction to African-American Music (3) History of African music: blues, gospel music, and jazz with emphasis on Black artists and their contributions. (Same as Afro-American Studies 310.)

330 Women in Music (3) History of women in music from the Middle Ages to present as composers, performers, educators, and patrons. (Same as Women's Studies 330.)

335 History of Jazz (3) Origin, development, and styles of jazz music and its exporters. Cultivation of special listening techniques. (Same as Afro-American Studies 335.)

390 World Music (3) Basic attitudes and techniques of etnomusicology. Survey of music cultures throughout the world, with emphasis on the Pacific, Near East, Asia, and Europe.

MUSICAL EDUCA
400 Music History Survey (3) History of music with emphasis on genres, style changes, and cultural forces. Various traditions from Gregorian chant to 1900. Recommended as a review course for graduate students. Prereq: Consent of instructor.

410 Music History Genre (3) Topics vary. May be repeated for credit. Maximum 6 hours.

420 History of Opera (3) Dramatic, vocal, and orchestral elements in opera of Italian, French, and German schools. 1600-present.

430 Symphonic Literature (3) Survey of literature for orchestra from Baroque to the present, with emphasis on the evolution of the symphony.

440 Music of North America (3) Folk and art music of the United States and Canada from colonial times to the present.

450 Composer Seminar (3) Life and works of a single composer. Subjects vary.

460 Music Aesthetics (3) Nature of music and musical experience, sense perception and emotions, music, and role of artist in society. Aesthetic viewpoint of individuals and historical eras through selected writings.

480 Music in Christian Worship (3) Music traditions in Christian worship, including hymnody.

490 Church Music Methods and Administration (3)

493 Independent Study (1-15) Prereq: Consent of department head. May be repeated for credit.

MUSIC INSTRUMENT

310 Brass Literature (3) Prereq: Consent of instructor.

320 Woodwind Literature (3) Prereq: Consent of instructor.

330 Percussion Literature (1) Prereq: Consent of instructor.

340-350 String Literature I, II (2,2) Survey of string techniques, issues, research and pedagogies; topical presentations by the applied string faculty and guests. 350-Development of the violin family of instruments and bows; survey of string literature, performances, and performance styles; application of historical, analytical, and pedagogical procedures to performance. Prereq: 340 and applied enrollment in strings at 300 level or consent of instructor.

410 Band Arranging (3) Study and application of techniques employed in scoring for the marching and concert bands. Prereq: Music Theory 320.

490 Instrumental Conducting (3) Knowledge and skills in instrumental conducting; various periods and compositions and relationship of different styles to the conductor's art; musical analysis and practice in conducting. Prereq: Music Education 325 or equivalent.

495 Suzuki Violin Method (2) Psychology, procedures, and literature of the Suzuki violin method and pedagogy. May be repeated. Maximum 6 hours. Prereq: Consent of instructor.

MUSIC JAZZ

110 Jazz Theory (3) Fundamentals of the jazz language, including terminology, chord symbols, chord scales, and chord progressions, plus ear-training lab. Prereq: Music Theory 110.

120 Analysis of Jazz Styles (2) Individual improvisatory styles through analysis of their transcribed solos. Teaching and function of the ear in music. Transcription of solos from recordings and preparation of analysis. Prereq: 110.

130-140 Jazz Piano I, II (1,1) Harmonic language of jazz. Interpretation of chord symbols, formulas for voicing chords, chord progressions, and fundamental melody-playing and improvisation for right hand. Must be taken in sequence.

150 Studio Guitar Styles (2) Introduction to guitar styles in jazz, rock, country, and blues idioms. Prereq: Consent of instructor.

160 Introduction to Styles in Jazz Drumming (2) Examination of the technique, techniques, and performance styles; analysis of jazz drumming with emphasis on the groove. Prereq: Consent of instructor.

210-220 Jazz Improvisation I, II (2,2) Study and application of principles of improvisation, including nomenclature, chord progressions, chord scales, patterns, melodic development, and tone styles. Prereq: Consent of instructor.

310 Jazz Composition and Arranging (2) Prereq: Consent of instructor.

320 Jazz Band Arranging (2) Arranging and scoring for the Big Jazz Band. Prereq: Consent of instructor.

410 Advanced Improvisation (3) Development of individual skills and solving individual problems in jazz improvisation. Prereq: 210 and 220.

420 Jazz Pedagogy (1) Methods and materials relating to teaching of jazz, designing and administering jazz programs, and institutional techniques for jazz ensembles. Prereq: Studio Music and Jazz major or consent of instructor.

MUSIC KEYBOARD

110-120 Class Piano I, II (1,1) Development of keyboard skills in reading, technique, repertoire, harmonization, and transposition. Must be taken in sequence.

210-220 Class Piano III, IV (1,1) Continuation of 110-120. 220 completes piano competency requirement; must be taken in sequence.

230 Keyboard Harmony (1) Melody harmonization, figured bass realization, and improvisation. Prereq: Music Theory 110-120.

240 Church Service Playing I (1) Practical skills applicable to the use of the organ in church services, including improvisation, hymn playing, and accompanying. Prereq: 230 and organ proficiency at the 200 level.

310-320 Church Service Playing II, III (1,1) Continuation of 240. Prereq: 240.

330 Sight Reading at the Keyboard (1) Prereq: Consent of instructor.

410 Early Keyboard Literature (2) Keyboard music through the baroque period, with primary emphasis on music for the harpsichord. Prereq: Music History 210-220.

420-430 Piano Literature I, II (2,2) 420-From 1750 to middle 19th century. 430-Middle 19th century to the present.

440-450 Piano Pedagogy I, II (2,2) Pedagogical methods and materials related to the development of pianists; specific programs based on pupil aptitude, background, and collaborator teaching experience. Must be taken in sequence. Prereq: Consent of instructor.

460-470 The Organ and Its Literature I, II (3,3) Development of the organ and organ literature from the Middle Ages to the present; problems of style and interpretation; pedagogical literature and methods; organ design. Prereq or Coreq: Music History 220 and consent of instructor.

480-490 Teaching Class Piano I, II (1,1) Historical survey and evaluation of teaching materials and methodology for college and/or adult beginning piano classes, with collaborative teaching experience. Prereq: Consent of instructor.

495 Suzuki Piano Method (3) Study of the psychology, procedures, and literature of the Suzuki Piano Method. Prereq: Consent of instructor.

MUSIC PERFORMANCE

103-203-303-403-503 Flute (1-4) May be repeated.

105-205-305-405-505 Oboe (1-4) May be repeated.

110-210-310-410-510 Bassoon (1-4) May be repeated.

115-215-315-415-515 Clarinet (1-4) May be repeated.

120-220-320-420-520 Saxophone (1-4) May be repeated.

125-225-325-425-525 Horn (1-4) May be repeated.

130-230-330-430-530 Trumpet (1-4) May be repeated.

135-235-335-435-535 Trombone (1-4) May be repeated.

140-240-340-440-540 Baritone (1-4) May be repeated.

145-245-345-445-545 Tuba (1-4) May be repeated.

150-250-350-450-550 Percussion (1-4) May be repeated.

155-255-355-455-555 Voice (1-4) May be repeated.

160-260-360-460-560 Violin (1-4) May be repeated.

165-265-365-465-565 Viola (1-4) May be repeated.

170-270-370-470-570 Cello (1-4) May be repeated.

175-275-375-475-575 Strings (1-4) May be repeated.

176-276-376-476-576 Electric Bass (1-4) May be repeated.

179-279-379-479-579 Guitar (1-4) May be repeated.

180-280-380-480-580 Piano I (1-4) May be repeated.


190-290-390-490-590 Organ (1-4) May be repeated.

294-394-494-594 Composition (1-3) May be repeated. Prereq: Consent of instructor.

395-495-595 Composition with Electronic Media (1-3) May be repeated. Prereq: Consent of instructor.

496 Composition for Media (2) May be repeated. Prereq: Consent of instructor.

499 Improvisation (1-2) May be repeated. Prereq: Consent of instructor. Cannot be used to satisfy applied music requirement.

MUSIC THEORY

110-120 Theory I, II (3,3) Materials of music including basic elements through triads and seventh chords and modulation. Exercises in writing and analysis of music with emphasis on common practice.

130-140 Ear Training I, II (1,1) Development of proficiency in identifying and notating melodic, harmonic and rhythmic models. Includes computer lab. Must be taken in sequence. Should be taken concurrently with 110-120. A,B,C,NC grading.

210-220 Theory III, IV (3,3) Materials of music with emphasis on literature of Classic, Romantic, and contemporary periods. Exercises in writing and analysis. Must be taken in sequence. Prereq: 120 or consent of instructor.


250 Composition (2) Writing short vocal and instrumental compositions. Prereq: 220 or consent of instructor. May be repeated for credit. Maximum 4 hours.

290 Sound Recording Techniques (3) Theory and applications of tape recording's sound reproduction
and reinforcement systems. Topics include room acoustics, audio measurements, microphones, studio and real-time processing, noise reduction, mixing, editing, monitors, system wiring, and maintenance.

310 Form and Analysis (3) Study and practice in analysis of forms of musical structural units to large compound forms. Prereq: 220.

320 Instrumentation (3) Basic techniques in scoring for voices; brass, woodwind, and string choirs; and percussion. Prereq: 220 or consent of instructor.

390 Sound Synthesis Techniques (3) Studio and real-time applications of synthesizers. Historical background, theoretical concepts, equipment interface and usage, analysis of sounds and compositions. Prereq: 290 or consent of instructor.

400 Survey of Music Theory (3) Emphasis on harmonic practice of Baroque, Classic, and Romantic periods. Exercises in writing and analysis. Recommended as a pre-requisite for graduate students. Prereq: Consent of instructor.

420 Orchestration (3) Advanced techniques in instrumental writing with emphasis on scoring for the concert orchestra. Prereq: 320.

430-440 Counterpoint I, II (3, 3) 430-Species counterpoint in modal and tonal styles with emphasis on works of Palestrina and J.S. Bach. Prereq: 220. 440-Writing of contrapuntal forms of the 18th century and fugue and canon from the 18th through the 20th centuries. Prereq: 430.

493 Independent Study in Music Theory (1-15) May be repeated for credit. Prereq: Consent of department head.

MUSIC VOICE

110 Class Voice I (1) Development of basic vocal skills. May be repeated for credit. Maximum 2 hours.

120 Class Voice II (1) Prereq: Consent of instructor. May be repeated for credit. Maximum 2 hours.

210 Vocal Techniques in Popular Music (1) Development of performance techniques in Broadway and other contemporary music styles. Prereq: Consent of instructor. May be repeated for credit. Maximum 4 hours.

220 Introduction to Music Theatre Technology (2) Stage technology unique to lyric stage.


240-250 Diction I, II (2, 2) Sounds by phonetic symbols. Opera and art songs used for examples. Performance practice.

330 Opera Production (1-3) Supervised work on opera productions. May be repeated for credit. Prereq: Consent of instructor. Maximum 12 hours.

410-420 Song Literature I, II (2, 2) 410-German songs; 420-French, Italian, Russian, Scandinavian, Czechoslovakian, British, and American art songs.

430 Styles in Opera Acting (2) Study and practice of styles in opera acting based on historical and national characteristics. Prereq: 230.

440 Projects in Opera Theatre (1-3) May be repeated for credit. Prereq: Consent of instructor. Maximum 5 hours.

450-460 Pedagogy I, II (1, 1) 450-Concepts and approaches to teaching singing (past and present); 460-Vocal teaching materials; includes collateral teaching experiences. Prereq: Consent of instructor.

NURSING

214 Integrated Biomedical and Health Sciences (1-3) Examination and application of selected theories from physics and chemistry, microbiology, and nutrition to nursing process. Each module carries one credit. Prereq: One year of biology or chemistry and consent of faculty.

301 Pharmacology (3) Biochemical and pharmacological effects of therapeutic drugs on the human body; positive and negative reactions to drugs and interactions between drugs. 100-10 and 6 semester hours of anatomy and physiology.

302 Introduction to Professional Nursing (9) History, philosophy, and scope of nursing practice with emphasis on nursing process; cognitive and psychomotor skills necessary for effective nurse/client interactions. Clinical and laboratory experiences emphasize the nursing process and its application to the care of individuals whose health problems require in-patient services. 6 lectures, 3 lab. Coreq: 301 and 304.

304 Nursing Assessment and Health Promotion (4) Development of data collection, family, and physical dimensions of health assessment. Collection, analysis, and application of assessment data in formulation of health-oriented nursing diagnoses and use of the nursing process in promotion of wellness. Evolution and expansion of the nursing role in health promotion and education. Laboratory sessions for development of health assessment skills. 3 lectures, 1 lab. Coreq: 301, 302.

305 Transition to Professional Nursing (4) Current status of professional nursing: utilization of the nursing process in a changing health care delivery system. Philosophical and conceptual framework of the baccalaureate nursing program and selected physiological and behavioral interventions for client problems whose health problems require in-patient services. 3 lectures, 1 lab. For RN's only.

311 Acute Care Nursing (10) Continuation of 302 with emphasis on theoretical and behavioral dimensions which underlie or are associated with more complex and critical illnesses of adults and children. Clinical laboratory experiences in adult and pediatric acute care settings for enhanced knowledge and skill in providing nursing care for children and adults with complex and critical illnesses. 6 lectures, 4 lab. Prereq: 301, 302 and 304.

312 Acute Care Nursing Theory (6) Theoretical component of 311. For RN's only. Prereq: 305.

313 Introduction to Nursing Research (3) Language of research; types of research designs, methodological approaches, sampling, data analysis, and significance of findings. Evaluation of existing and ongoing nursing research studies. Prereq: 302 or consent of instructor.

315 Clinical Nursing Practicum (2) Application of nursing theories, principles, and concepts to care of hospitalized clients. Prereq: 305. Prereq: or Coreq: 312. For RN's only. Satisfactory/No Credit only.

317 Wellness and Lifestyle (3) Models of wellness and holistic health within the framework of modern medicine, eastern philosophies, and recent discoveries about the interaction of mind and body. Biopsychosocial interactions of lifestyle and genetic risk factors for cardiovascular and malignant diseases, wellness potential, and potential longevity. Process of lifestyle changes will be facilitated by faculty. Open to undergraduate students in all colleges.

401 Family Health Nursing (6) Nursing needs of families in health and in crisis. Provision of comprehensive care to families in the childbearing and childrearing phases of family development. Application of theories of human growth and development, family dynamics, and crisis intervention to provision of nursing care to families whose health problems require in-patient services. To those experiencing such health problems or complications as congenital anomalies, high risk birth, disturbed parentchild relationships, or psychosomatic disturbances. 3 lectures, 3 lab. Prereq: All 300 level nursing courses.

402 Family Health Nursing Theory (3) Theoretical component of 401. For RN's only. Prereq: 312.

403 Community Health Nursing (4) Application of the nursing process to individuals, families, and groups in home and community settings with special emphasis on health promotion, disease prevention, and coping with communicable diseases. Epidemiological approach is used to identify aggregates within the population that are at risk for illness, disability, or premature mortality. Prereq: 312. Related to community health nursing.

404 Nursing Management and Strategies (8) Theories, concepts, and principles of organization, planning, decision making, and management with emphasis on management of nursing care for groups of clients; exposure to a variety of nursing service organization models, staff scheduling patterns, evaluation of legal, ethical, political, and social trends and nursing issues with implications for nursing practice; in depth study of a topic of particular interest to the student. 5 lectures, 3 lab. Prereq: 10 credits of 400 level nursing courses.

406 Nursing Leadership (3) Theories, concepts, and principles utilized to deliver and manage nursing care for individuals and families experiencing normal and abnormal health states. Prereq or Coreq: 401 or 411. For generic MSN students only.

411 Psychosocial Long-Term Nursing (6) Nursing needs of clients whose health problems are of a developmental, emotional, or long-term nature. Equal emphasis on prevention, health promotion, and rehabilitation. Nursing laboratory/case studies with a psychosocial and chronic illness emphasis in a variety of acute, extended care, and rehabilitation facilities. 3 lectures, 3 lab. Prereq: All 300 level nursing courses.

412 Psychosocial Long-Term Nursing Theory (3) Theoretical component of 411. For RN's only. Prereq: 312.

450 Physiological Principles (3) Concepts and principles of normal human physiology; tissue and organ physiology as a basis for integration of system physiology for usefulness in analysis and significance of findings. Evaluation of existing and ongoing nursing research studies. Prereq: 302 or consent of instructor.

493 Independent Study (1-3) Nursing or health-related topic not covered in other nursing courses. Prereq: Senior standing or permission of instructor.

NUTRITION AND FOOD SCIENCES

100 Introductory Nutrition (3) Nutritional concepts; current consumer issues in nutrition; nutritional needs through life cycle; international nutrition concerns and/or issues. A student who has received credit for NFS 107 or 300 may not receive credit for this course. F, S

101 Food Principles (3) Food selection, safety, preparation, evaluation, meal planning, service. 2 hours and 1 lab. Sp

105 Food for the Next Century (3) Interdependence of people on this planet for food; global perspective from United States point of view. F

107 Honors: Introductory Nutrition (3) Nutritional concepts; current consumer issues in nutrition; nutritional needs through life cycle; international nutrition concerns and/or issues. A student who has received credit for NFS 106 or 300 may not receive credit for this course. F, S

120 Introduction to Tourism, Food and Lodging Administration (3) Economy; basic operating systems, organization structure; problem areas in hospitality complex. F

126 Front Office Management (3) Front office procedures within context of overall operation of a hotel/motel; includes reservation systems, equipment, accounting
procedures, settlement procedures, public relations and management. A. Sp

200 Physiological Chemistry (3) Metabolism of carbohydrates, lipids, and nitrogenous compounds; role of vitamins and minerals as co-enzymes and prosthetic groups. Prereq: Chemistry 110 or equivalent. F

201 Food and Clinical Analysis (4) Principles, procedures, instrumentation for analysis of food and body fluids. Prereq: 200 with a grade of C or better for NFS majors. 2 hours and 2 labs. Sp

220 Foodservice Systems Administration (3) Management concepts, processes, resources in foodservice systems; decision-making and problem solving principles. F

300 Fundamentals of Nutrition (3) Nutrition in normal and altered health states during life cycle; nutritional analysis of diets. Prereq: Chemistry 110 or equivalent, Zoology 230. A student who has received credit for NFS 100 or 107 may not receive credit for this course. Sp

301 Nutrition for Educators (3) Principles of nutrition, biochemistry and physiological properties of food related to functional and nutritional properties, application of food principles to meal planning, and computer applications. Prereq: 100 or 107, 201, Micro 210. 3 hours and 1 lab. Must be taken in sequence. F, Sp

311-12 Science of Food (4). Chemical and physical properties of food related to functional and nutritional properties, application of food principles to meal planning, and computer applications. Prereq: 100 or 107, 101 or 311, 220, Micro 210 or PH 310, progression into TF&LA or consent of instructor. Coreq: 321 or 322. Sp

320 Quantity Food Procurement, Production and Service (2) Principles for determining needs, procuring, storing, producing and serving foods in volume. Prereq: 100 or 107, 101 or 311, 220, Micro 210 or PH 310, progression into TF&LA or consent of instructor. Coreq: 321 or 322. Sp

321 Quantity Food Procurement, Production and Service Laboratory (1) Application of principles in determining needs, procuring, storing, producing and serving foods in volume. Prereq: 100 or 107, 101 or 311, 220, Micro 210 or PH 310, Coreq: 320. Sp

322 Quantity Food Procurement, Production and Service Observation (1) Application of principles in determining needs, procuring, storing, producing and serving foods in volume. Prereq: 100 or 107, 101 or 311, 220, Micro 210 or PH 310, Coreq: 320. Sp

323 Field Experience in Tourism, Food and Lodging (2) Supervised educational experiences in selected local food and lodging operations; discussion, seminar. Prereq: 320, 321 or 322, progression into TF&LA program. Satisfactory/No Credit only. F

324 Tourism and Travel Administration (3) Economic and social forces influencing domestic and international tourism; services, functions of retail, wholesale travel agencies. Prereq: 120. F

325 Hospitality Sales (3) Products, services and sales conditions within industry; emphasis on integrating computer systems and sales approach. Prereq: 324 or equivalent, professional marketing. A. Sp

326 Food and Lodging Cost Control (3) Budget, cost analysis; computer, financial statement use in decision making in lodging and foodservice systems. Prereq: 324, 325, 200. F

410 Professional Issues in Dietetics (1) Dietetic registration, licensure, third party payments; dietetic practice; marketing dietetics; internship application preparation; dietetic policy in dietetic practice. Prereq: Senior standing. F

411 Nutrition in Disease (4) Metabolic processes of diseased organs and/or tissues, dietary modifications required. Prereq: 312, 313. F

412 Food and Nutrition Resources Management (3) Integration of community food and nutrition resources; geographic, social, economic, educational, cultural, health characteristics, research and analysis of food and nutritional problems and the need for services by individuals in community; public policy. Prereq: 411. Sp

413 Experimental Food Science (3) Individual and group laboratory experimentation in food science; microcomputer applications. Prereq: 312, PSSc 471. 1 hour and 2 labs. F

414 Nutrient-Drug Interactions (2) Nutrient effects on efficacy and toxicity of drugs; drug effects on absorption, metabolism of nutrients. Prereq: 300 or equivalent. A. Sp

420 Advanced Field Experience in Tourism, Food and Lodging (5) Supervised educational experiences in selected tourism, food or lodging operations followed by a two-day seminar, Offered only in summer semester. Students enrolled in this course may not enroll in any other courses. Prereq: 323, Accounting 202. Economics 201, Marketing 310, Business Law 310, Statistics 201, progression into TF&LA program. Satisfactory/No Credit only. Sp

422 Food and Lodging Personnel Development (3) Training programs; personnel management procedures and policies; application of the human resources for lodging and foodservice systems. Prereq: 320, 420 or consent of instructor. F

423 Foodservice Systems Design and Equipment (3) Physical plant design, layout, equipment system analysis; equipment selection, purchase. Prereq: 320 or consent of instructor. A. F

424 Lodging Administration (3) Marketing and financing techniques in lodging administration; travel market plans; feasibility studies; accounting systems; computer information systems. Prereq: 420. Sp

425 Hospitality Law (3) Legal rights and responsibilities of staff, management and guests. Prereq: 324, Business Law 301 or consent of instructor. Sp

426 Convention Management (3) Scope and segments of convention market including requirements meeting individual needs; methods and techniques for outstanding service. Prereq: 323, Marketing 310. A, Sp

429 Marketing of Hospitality Services (3) Strategies and techniques for maximizing demand for hotel/motel properties; development of marketing plans; promotion, public relations; market analysis; competitive analysis; planning and projecting maximum revenue and profit potential. Prereq: 324, Marketing 310, or consent of instructor. F

440 Special Topics: Tourism, Food, and Lodging Administration (1-3) Developments, issues, and problems in Tourism, Food and Lodging Administration; topics vary. Prereq: 324 or equivalent, progression into TF&LA or consent of instructor. May be repeated. Maximum 3 credits. E

450 Special Topics: Nutrition and Food Sciences (1-3) Developments, issues and problems in Nutrition and Food Sciences; topics vary. Prereq: Junior or Senior standing in NFS or consent of instructor. May be repeated. Maximum 3 credits. E

487 Honors: Nutrition and Food Sciences (1-3) Senior project. Prereq: Senior standing and consent of instructor. E

492 Field Experience: Nutrition and Food Sciences (1-3) Prereq: Junior or Senior standing, consent of instructor. Satisfactory/No Credit only. E

493 Directed Study: Nutrition and Food Sciences (1-3) Individual student/faculty experience. Prereq: Junior or Senior standing and consent of instructor. Satisfactory/No Credit only. E

494 Directed Study: Tourism, Food and Lodging Administration (1-3) Individual student/faculty experience. Prereq: Junior or Senior standing, consent of instructor. Satisfactory/No Credit only. E

497 Honors: Tourism, Food and Lodging Administration (1-3) Senior project. Prereq: Senior standing, consent of instructor. E

498 Honors: Tourism, Food and Lodging Administration (1-3) Senior project. Prereq: Senior standing, consent of instructor. E

499 Honors: Tourism, Food and Lodging Administration (1-3) Senior project. Prereq: Senior standing, consent of instructor. E

530 Plant Materials (2) Identification, classification and design uses of ornamental plants including trees, shrubs, vines and herbaceous plants and generally excluding those covered in 220. Prereq: 220 or consent of instructor. 2 labs. Sp

320 Plant Propagation (3) Physiology, methodology, and environmental requirements for propagation. Prereq: 110 and 8 hours Botany or consent of instructor. 2 hours and 1 lab. E

340 Turfgrass Management (3) Practical turfgrass management concepts and techniques related to establishment; basic applied fertility programs, mowing, and irrigation practices, and thatch and contamination control; insect control and weed control. Prereq: 110, Plant and Soil Science 210 and 8 hours of Botany or consent of instructor. 2 hours and 1 lab. F

530 Landscape Design (3) Basic material and design, introduction to the landscape design and contracting industry; application of landscape materials, wood, concrete and masonry construction; site drainage, and landscape grading. Prereq: 280. 2 hours and 1 lab. F

560 Practicum in Landscape Construction (3) Practical experience in implementation of landscape design projects. Directed lab and field instruction in planting operations and basic landscape construction including interpreting and implementing landscape design drawings and specifications. Prereq: 360. 200 or 2 lab hours. Sp

370 Grounds Maintenance (3) Identification and understanding of maintenance tasks; transplanting, soil amendments, growth control, irrigation, climate protection and guest control. Maintenance and use of equipment; maintenance practices. Prereq: 110. 2 hours and 1 lab. F

380 Supplemental Landscape Design Graphics (2) Refinement of graphic skills. Sketches, elevations, sections, isometric views, perspectives. Letting, plan graphics, color rendering, and other visual presentation media. Prereq: 280. Two 2 hour labs. F
410 Nursery Management and Production (3) Management methods as applied to retail and wholesale nurseries and landscape contracting firms. Methods of producing liners, container and field-grown woody ornamental plants. Prereq: 220, 330, and Plant and Soil Science 210. 2 hours and 1 lab. Sp

440 Advanced Turfgrass Management (4) Principles and scientific basis of turfgrass culture, adaptation, ecology, physiology, soil fertility, and grass nutrition; climatic influences on grass culture; physiology of clipping and water management; design, construction, and management of golf courses; physiological influences of pest infestation and control measures. Prereq: 340 or consent of instructor. 3 hours and 1 lab. Sp

450 Specialty Landscape Construction (2) Design, materials, and construction techniques for specialized components of the landscape industry. Irrigation systems, outdoor lighting, pools and other water features, and interior space construction. Prereq: 350. Two hour labs. F

460 Professional Practices in Landscape Construction and Management (2) Professionalism, salesmanship, proposals, bidding, estimating, specifications, and contract management in landscape services industry. Computer technology applicable to landscape construction and contracting industry. Includes principles of construction by industry representatives. Prereq: 350 or consent of instructor. 2 hours. F

480 Advanced Landscape Design (4) Comprehensive application of landscape design skills. Design applications involving site layout, landscape grading, applied landscape construction, and planting design. Analysis, programming, design, detailing, estimating, and specifying applicable to a variety of landscape projects. Prereq: 290, 350, and 380. 1 hour and 2 three hour labs. Sp

490 Seminar (1) Current problems in ornamental horticulture and landscape design. Prereq: Senior standing. Sp

492 Off-Campus Internship (1-3) Work experience in applied profession or turf or landscape industry. May be repeated. Maximum of 6 credits. E

493 Individual Problem Study (1-3) May be repeated. Maximum of 6 credits. E

PHILOSOPHY

110 The Human Condition: Value and Reality (3) The meaning of man, the existence of God, meaning of freedom in the will, human nature and values.

111 The Human Condition: Knowledge and Reality (3) The place of mind in a material universe and the nature and possibilities of human knowledge. May be taken before 110.

120 Foundations of Western Thought: Antiquity through 1500 (3) Plato, Late Antiquity and the Medieval Period.

121 Foundations of Western Thought: 1500 through Early Twentieth Century (3) Development of Rationalist and Empiricist thought. Nineteenth Century and early Twentieth Century Philosophy. May be taken before 120.

130 Informal Logic (3) Analysis, evaluation, and construction of reasoning in ordinary language.

135 Formal Logic (3) Introduction to formal deductive systems: propositional and predicate logic.

200 Special Topics (3) When content varies, may be repeated. Maximum 6 hours.

240 Ethics (3) Theories of ethical values.

290 Social and Political Philosophy (3) Basic problems and concepts of social and political philosophy.

320 Ancient Western Philosophy (3)

322 Medieval Philosophy (3) Development of medieval thought from St. Augustine to William of Occam. Secondary and primary sources. (Same as Medieval Studies 322.)

324 Seventeenth- and Eighteenth-Century Philosophy (3)

326 Nineteenth- and Twentieth-Century Philosophy (3)

335 Intermediate Formal Logic (3) Metatheory of formal logic and philosophy of logic. Prereq: 135 or consent of instructor.

342 Business Ethics (3) Ethical problems as they confront both business as a social institution and individuals in business.

344 Professional Responsibility (3) Critical analysis of selected classic texts from philosophy, religious studies, and social sciences dealing with responsibility and the nature of professionalism. Theoretical principles and analytical skills applied to selected case studies and other detailed descriptions of professional practice from engineering/architecture; business/ accounting; and at least one of law/politics; helping professions (social work, human services, ministry); teaching. (Same as Religious Studies 344.)

345 Medical Ethics (3) Ethical issues in medicine such as abortion, euthanasia, human experimentation, fairness in health care delivery and the doctor-patient relationship. (Same as Religious Studies 345.)

349 War and Morality (3) Moral justification for war (justus in bello). Legal and moral constraints in war (ius in bello).

350 Aesthetics (3) Philosophical discussion of art.

353 Philosophy and Literature (3) Nature of literature; philosophical assumptions in literary works.

360 Introduction to Philosophy of Science (3) Standard topics in philosophy of science; scientific method, nature of laws and theories, problem of induction, explainability, measurement. No background in logic is presupposed.

363 Conceptual History of Science (3) Historical evolution of thought in astronomy, mechanics, and the study of living things from the Greeks through the early twentieth century. Prereq: 8 hours of physical science or consent of instructor.

370 Philosophy of Religion (3) Analysis of basic issues of religion. (Same as Religious Studies 370.)

374 Philosophy and Religion of India (3) (Same as Religious Studies 374.)

375 Buddhist Philosophy and Religion (3) (Same as Religious Studies 375.)

379 Religion and Philosophy in China (3) (Same as Religious Studies 379.)

380 The Concept of Woman (3) The nature of woman as it has been conceived by major western philosophers from Plato to Simone de Beauvoir. (Same as Women's Studies 380.)

382 Philosophy of Feminism (3) Various feminist theories and their application to social issues of concern to women today. (Same as Women's Studies 382.)

390 Philosophical Foundations of Democracy (3) Philosophical problems relating to the nature and justification of the central values, principles, and concepts of democratic society.

393 Marxism (3) Basic philosophical issues in Marxist thought: ideology, dialectics, praxis, the critique of modern society.

395 Existentialism (3) Themes related to freedom and finitude in the tradition that begins with Kierkegaard and Nietzsche, and extends to Heidegger and Jaspers, Sartre and Merleau-Ponty.

400 Special Topics (3) When content varies, may be repeated. Maximum 6 hours.

411 Modern Religious Philosophies (3) (Same as Religious Studies 411.)

412 Classical Indian Systems of Philosophy: The Moksha Tradition (3) (Same as Religious Studies 412.)

420 Topics in History of Philosophy (3) One or more figures or movements from antiquity through mid-twentieth century. Prereq: 6 hours of philosophy or consent of instructor. When content varies, may be repeated. Maximum 9 hours.

425 American Philosophy (3) Colonial to early 20th Century. Prereq: 6 hours of philosophy or consent of instructor.

430 Topics in Logic (3) Prereq: 6 hours of logic or consent of instructor. When content varies, may be repeated. Maximum 6 hours.

440 Contemporary Ethical Theory (3) Topics in meta-ethics or ethics. Prereq: 6 hours of philosophy or consent of instructor.

446 Theoretical Issues in Medical Ethics (3) Prereq: 240 or 345 or consent of instructor. (Same as Religious Studies 446.)

460 Philosophy of Science (3) Methodological and conceptual issues in the natural and social sciences: patterns of theory modification and replacement, the nature of explanation and causation, the status of theoretical entities. Prereq: 360 and one year of natural or social science, or consent of instructor.

465 Philosophy of History (3) Speculative and critical aspects of philosophy of history. Prereq: 6 hours of philosophy or consent of instructor.

473 Philosophy of Mind (3) Problems of mind and body in relation to consciousness and personal identity. Prereq: 6 hours of philosophy or consent of instructor.

475 Analytic Metaphysics and Epistemology (3) Topics in metaphysics and epistemology in recent Anglo-American tradition. Prereq: 6 hours of philosophy or consent of instructor.

476 Philosophy of Language (3) Survey of issues such as meaning, reference, and truth. Prereq: 6 hours of philosophy or consent of instructor.

479 Studies in Recent Continental Philosophy (3) Selected thinkers or topics from areas such as Existentialism, Phenomenology, Hermeneutics, Structuralism, Post-Structuralism. Prereq: 6 hours of philosophy or consent of instructor. When content varies, may be repeated. Maximum 6 hours.

491 Foreign Study (1-15) See page 97.

492 Off-Campus Study (1-15) See page 96.

493 Independent Study (1-15) See page 96.

PHYSICAL EDUCATION

100 Orientation to Physical Education (2) Overview of the professional and disciplinary areas in physical education with special emphasis on introductory field experiences.

102 PE Major: Basketball (1) Fundamentals of basketball, including individual and team skills with concentration on techniques for effective teaching of these fundamentals.

103 PE Major: Tennis (1) Development of skills, rules and game strategies to an intermediate level in tennis with application to the various techniques of teaching.

104 PE Education Major: Gymnastics I (1) Beginning to intermediate skills in tumbling and on selected men’s and women’s gymnastics apparatus. Tumbling skills include forward, backward, and balance skills. Apparatus include vaulting, balance beam, and pommel horse. Special emphasis on teaching techniques, safety, progression, and spotting.

105 PE Major: Folk and Square Dance (1) Basic folk and square dance steps, patterns and designs with emphasis on skill development, terminology, etiquette and teaching techniques.

106 PE Major: Track and Field (1) Basic skills of track and field with consideration of techniques for effective teaching.

271 PE Major: Soccer/Softball (1) Basic fundamentals, including individual and team skills with consideration of techniques for effective teaching.
272 PE Major: Volleyball (1) Elementary and intermediate volleyball skills, general rules, and strategy related to the game of volleyball with particular emphasis on teaching techniques and skill development.

273 PE Major: Golf (1) Fundamental skills, general rules, and strategies related to the game of golf with emphasis on skill development and teaching techniques.

274 Physical Education Major: Gymnastics II (1) Beginning to intermediate skills in tumbling and on selected men's and women's gymnastics apparatus. Tumbling skills will include twisting skills, kips, and combinations of previous skills. Apparatus will include uneven bars, horizontal bar, parallel bars, and still rings.

275 PE Major: Ballroom Dance (1) Basic ballroom dance patterns and designs, terminology and etiquette with application to the various techniques of teaching.

290 Human Motor Behavior (3) Theories and principles explaining motor behavior; psychological factors related to and/or affecting motor skill acquisition and performance. Prereq: At least sophomore standing.

291 Sport in American Society (3) For all university undergraduates on the study of sport in American society from a sociological perspective. (Same as Sociology 291.)

292 Field Studies I (3) Builds on observational techniques from Physical Education Orientation. Provides opportunities to lead, instruct, manage and test individuals and/or small groups in K-12 physical education settings. Involves peer teaching and video-taped analyses. Prereq: 100.

311 Coaching Football (1) Theoretical and practical application of various coaching techniques in football for the prospective secondary/college coach. Includes analysis and selection of appropriate game plans, specific conditioning and training programs, practice organization, player evaluation, scouting, individual and team offensive and defensive Prereq: Consent of instructor.

312 Coaching of Basketball (1) Individual and team fundamentals for the high school coach; conditioning, schedule making, and other business arrangements. Prereq: Consent of instructor.

313 Coaching of Track and Field (1) Coaching methods and training techniques for various track and field events, including experience observing and working at meets and practices. Prereq: Consent of instructor.

314 Coaching of Gymnastics (1) Fundamentals used in the coaching and judging of competitive men's and women's gymnastics. Emphasis on the safety and sportsmanship of competitive gymnastics skills. Prereq: Consent of instructor.

315 Coaching of Baseball/Softball (1) Theoretical and practical application of various coaching techniques in baseball/softball for the secondary/college coach. Topics include analysis and selection of appropriate game plans, specific conditioning and training programs, practice organization, player evaluation, scouting, individual and team offensive and defensive strategies. Prereq: Consent of instructor.

321 World History of Sport and Physical Education (2) Historical survey of the development of sport and physical education from ancient primitive to twentieth century civilization. Prereq: Admission to Teacher Education Program or progression to the major.

322 Fitness Activities (2) Methods of instructing and leading fitness activities, including jogging, exercise tests, water activities, and fitness games. Prereq: At least junior standing and progression to the major.

325 Athletic Training Techniques (2) Prevention of athletic injuries through sound conditioning programs and practices; recognition and immediate treatment of injuries. Prereq: Progression to the major.

326 Practicum in Preschool Aquatics (2) Individualized planning and teaching of aquatic experiences to 3 to 5 year-old children within the context of a broad-based motor development program.

330 Wellness Through Health, Leisure, and Physical Activity (3) (Same as Health 330.)

332 Applied Anatomy (3) Structure and roles of bones, joints and muscles in human movement and exercise. Prereq: 100 and admission to Teacher Education Program or progression to the major.

335 Approaches to Physical Education for Children (3) Contemporary approaches with emphasis upon movement education. Prereq: Admission to Teacher Education Program.

345 Educational Games, Dance, and Gymnastics I (1) Selection, presentation, and evaluation of games/sports and creative dance forms for children. Prereq: Admission to Teacher Education Program.

356 Human Growth and Motor Development (4) Evolution of movement patterns in the context of structural and functional development, analysis of changes in motor performance and underlying attributes across the lifespan. Prereq: Admission to Teacher Education Program or progression to the major.

372 Philosophy of Sport and Physical Education (2) Theories of reality and values as they apply to sport with emphasis on ethical issues. Prereq: Admission to Teacher Education Program or progression to the major.

380 Special Topics (1-3) Study in selected disciplinary or professional areas of Physical Education. May be repeated. Prereq: Progression to the major.

391 Psychology of Coaching (2) Major topics and theories dealing with social-psychological factors affecting and relating to sport performance, with practical implications and applications to teaching and coaching. Prereq: Admission to Teacher Education Program or progression to the major.

405 Sociology of Sport (3) Social meaning, organization and process of sport. Difference between sport and play and games, social stratification and sport, sport as an occupation, place of sport in mass culture, sport sub-culture, social influence of modern or competitive sport and cultural milieu. Prereq: 291 or Sociology 285, or permission of instructor. (Same as Sociology 465.)

409 Measurement and Evaluation of Physical Education (1) Relationship of measurement and evaluation in Physical Education. Critique, selection, and administration of appropriate affective, sport skill, and knowledge assessment instruments for children through adult age group. Prereq: Junior standing and admission to Teacher Education Program or progression to the major.

410 Pre-Internship Seminar (1) Objectives and policies of the internship program. Prereq: Completion of the term immediately preceding the internship. Prereq: Admission to Teacher Education Program. Satisfactory/No Credit only. Sp, Su

411 Adapted Physical Education (3) Developmental and educational objectives for children with special educational needs. Prereq: Junior standing and permission of advisor. Prereq: Consent of instructor.

412 Practicum in Adapted Physical Education (1) Teaching those with special education needs. Observation and assistance to physical education teachers who teach in schools for the handicapped and/or in institutions which many handicapped individuals are mainstreamed. Prereq: Progression to the major. Coreq: 411.

413 Special Practicum in Adapted Physical Education (1) Two sections including an on-campus field program in K-12 athletics and special education. Prereq: At least one year of college work in physical education, teacher, physical or occupational therapist, at a school for the handicapped. May be repeated. Maximum 3 hours.

414 Physical Activity and Fitness (2) Relationship of exercise to fitness and health, exercise composition, health low back, and stress. Prereq: 200 and admission to Teacher Education Program or progression to the major. (Same as Health 414.)

415 Field Evaluation of Physical Fitness (1) Measurement and evaluation of cardiorespiratory function, body composition, and body weight. Upper and lower back. Emphasis on tests that can be used in large groups at the minimum of equipment. Prereq: Progression to the major. Coreq: 414. (Same as Health 415.)

416 Athletic Coaching Field Experience (1) Practical experience in coaching and related responsibilities. May be repeated. Maximum 2 hours. Prereq: Approval of instructor.

420 Methods in Physical Education (3) Application of theory and styles of teaching to learning environments, including providing opportunities for developing and evaluating lessons concerning strategies, and skills for physical activity, games, and sport. Prereq: Consent of instructor. Prereq: Minimum 6 credits in Physical Education Major courses and admission to Teacher Education Program.

422 Applied Kinesiology (3) Human movement with emphasis on biomechanical principles and their application to movement and neuromuscular function. Prereq: 322 and admission to Teacher Education Program or progression to the major.

423 Readings in Physical Education (2) Current and classic literature in physical education.

424 Program Planning in Physical Education (2) Curriculum, program planning and development in K-12 physical education. Prereq: Admission to Teacher Education Program or progression to the major.

426 Practicum for Physical Education Majors (1-10) Experience in the classroom or local public schools. Prereq: Consent of instructor and progression to the major.

442 Administration of Physical Education and Athletics (2) Topics in organizational concepts and management strategies as related to physical education programs and athletics in the public schools. Prereq: Admission to Teacher Education Program or progression to the major.

450 Field Studies II (3) For physical education majors to design and implement learning units and evaluation techniques appropriate for K-12 physical education settings. Includes video-taping of learning experiences in the school setting. Prereq: 292 and 466 and admission to Teacher Education Program.

466 Motor Development Laboratory: Preschool or Primary (3) Application of selected perceptual-motor development, movement education, and pedagogical concepts to performance assessment and motor task acquisition and performance to normally developing preschool or primary grade children. Participation in intra- or inter-disciplinary research projects. Prereq: 450 and admission to Teacher Education Program.

481 Internship I: Grades K-12 (3-6) Methods and theories of teaching. Internship is completed in local public schools. Application for internship should be made upon admission to Teacher Education Program. Prereq: 481 and admission to Teacher Education Program. Satisfactory/No Credit only. F

482 Internship II: Grades K-12 (3-6) Demonstration of professional competence in planning, instruction, and classroom management. Internship is completed in local public schools. Prereq: 481 and admission to Teacher Education Program. Satisfactory/No Credit only. Sp

493 Directed Independent Studies (1-3) Independent study in a specialized area with physical education. May be repeated. Maximum 9 hours. Prereq: Consent of advisor and progression to the major.

PHYSICAL EDUCATION SERVICE PROGRAM

200 Special Topics (2)

201 ARC WSI-Handicapped (1)

202 Badminton (2)
203 Elementary Ballet I (2)
204 Elementary Ballet II (2)
205 Basketball (1)
206 Bowling (2)
209 Flag Football (1)
210 Folk and Square Dance (1)
211 Golf (2)
212 Handball (2)
213 Ice Skating (1)
214 Elementary Jazz I (2)
215 Elementary Jazz II (2)
216 Martial Arts: (Special Topics) (1)
219 Coed Gymnastics: Men's Apparatus (1)
220 Elementary Modern Dance I (2)
221 Elementary Modern Dance II (2)
222 Paddleball (1)
223 Personal Safety and Self-Defense (1)
224 Physical Fitness: Conditioning (1)
225 Physical Fitness: Exercise to Music (1)
226 Physical Fitness: Exercise and Weight Control (1)
229 Physical Fitness: Jogging (1)
230 Physical Fitness: Swimming (1)
231 Physical Fitness: Walking (1)
232 Racquetball I (1)
233 Racquetball II (1)
234 Soccer (1)
235 Social Dance (1)
236 Softball (1)
239 Swimming I: Elementary (2)
240 Swimming II: Lifesaving (2)
241 Swimming III: WSI (2)
242 Tae Daniel I (2)
243 Tap Dance I (2)
244 Tap Dance II (2)
245 Tennis I (1)
246 Tennis II (1)
247 Track and Field (1)
249 Tumbling I (1)
250 Tumbling II (1)
251 Volleyball (2)
252 Weight Training (2)
253 Coed Gymnastics: Women's Apparatus (1)
254 Yoga and Relaxation (1)

PHYSICS

121-122 Introductory Physics (3,3) For students whose major is outside the physical sciences. Concepts of physics developed by observation of phenomena and logical reasoning. Prereq: Algebra.

131-132 Fundamentals of Physics: Mechanics and Heat (4,4) For engineers and liberal arts majors in mathematics and the physical sciences. Basic Engineering 131-132 is equivalent course for engineers. Must be taken in sequence. Coreq: Mathematics 141-142. 3 hours lecture, 2 hours lab.

137-138 Honors: Fundamentals of Physics: Mechanics and Heat (4,4) For physicists and engineers. Honors for physics and engineering majors and qualified students from other disciplines. Must be taken in sequence. Coreq: Mathematics 141-142. 3 hours lecture, 2 hours lab.

141-142 Nature of the Physical World (3,3) Concepts, vocabulary, and principles of physical sciences to establish a unified picture of the physical universe. Principles of mechanics, electricity, and wave motion are developed and applied to fields such as solar systems, atomic and molecular behavior, radiation, dynamic changes in atmospheres and in earth's crust. 142-Principles applied to topics such as stellar and galactic phenomena, nuclear energy, cosmology, atmospheric and oceanic phenomena, drifting continents, and science and society. Must be taken in sequence. 3 hours lecture including demonstration lab.

145 Physics of Athletic Activity (3) Principles of physics, particularly mechanics and energy with emphasis on student's athletic sport. Related topics include statics, equilibrium, linear and angular motion, momentum, forces, work, and energy. 3 hours lecture and demonstration.

151-152 Elements of Physics for Computer Scientists (4,4) For students majoring in computer science. Principles of mechanics, heat and thermodynamics, wave motion and sound, electricity and magnetism, light, relativity, and modern physics. Must be taken in sequence. Coreq: Mathematics 141-142. 3 hours lecture, 2 hours lab.

181 Physics of Music (3) Production, transmission, and reception of sound waves. Frequency, intensity, timbre. Basic acoustics of instruments and voice. 3 hours lecture and demonstration.

221-222 Elements of Physics (4,4) Basic physical principles and applications required in medical, dental, veterinary and pre-veterinary programs. Waves, motion and sound, electricity and magnetism, modern physics. Must be taken in sequence. 3 hours lecture, 3 hours lab. Prereq: Mathematics 121-122 or 141-142 or 151-152.

231 Fundamentals of Physics: Electricity and Magnetism (3) For engineers and liberal arts majors in mathematics and the physical sciences. Required of all engineering students. Prereq: 131-132 or Basic Engineering 131-132. Coreq: Mathematics 231. 2 hours lecture, 3 hours lab/recitation.


237 Honors: Electricity and Magnetism and Light (4) Honors course for selected students admitted on basis of performance in 131-132. Prereq: 131-132 or Basic Engineering 131-132. Coreq: Mathematics 231. 3 hours lecture, 3 hours lab.

238 Honors: Wave Motion and Modern Physics (4) Honors course for selected students. Continuation of 237. Prereq: 237. Coreq: Mathematics 241. 3 hours lecture, 3 hours lab/recitation.


321 Thermal Physics (3) Concepts of temperature and heat; laws of thermodynamics; elementary statistical mechanics; applications to physical and chemical problems. Prereq: 311 or 231 and consent of instructor.


341-342 Structure of Matter (3,3) 341-Subatomic physics; including physics of the nucleus and elementary particles. 342-Many body problems of molecules and condensed matter. May be taken in either order. Prereq: 340.

361-362 Electronics Laboratory (3,3) Electronic components, circuits and instruments for physicists, with emphasis on application of simple circuits to instruments and devices. 361-Principles for computer scientists, including fundamental network theorems, complex impedance and admittance, frequency response and resonance, feedback, operational amplifiers, oscillators, and various semiconductor devices, as applied to scientific instrumentation. 362-Digital electronics, including elementary building blocks of relevance to data acquisition systems, digital-to-analog conversion, analog to digital conversion, simple applications of microprocessors. Prereq: 222 or 232. 6 hours lab per week.

400 Senior Seminar (1-3) Topic of current interest. Prereq: Introductory Physics. May be repeated with consent of department. Maximum 6 hours.

401 Background of Physics (2) Historical development and philosophical foundations of natural science. Classical theories of gravitation, electromagnetism, and relativity. Utilizing mathematical principles underpinning the physical sciences. Readings from important original papers, thought-provoking problems and order-of-magnitude calculations comparing different branches of classical physics. Written report on independent study. Prereq: Senior standing in Physics or consent of instructor.


421 Modern Optics (4) Transmission of light in uniform, isotropic media, reflection and transmission at interfaces; mathematics of wave motion and interference effects. Rudiments of Fourier optics and holography. Prereq: 321 or 232 and consent of instructor. 3 hours lecture, 3 hours lab.

425 Principles of Non-Destructive Testing (3) (Same as Engineering Science and Mechanics 425.)


461-462-463 Modern Physics Laboratory (3,3,3) Variety of experimental techniques, including spectroscopy, microwaves, laser interferometry, recombination, detectors and statistical analysis, applied to experiments in nuclear, atomic, molecular, and solid state systems. Classical physics and electronics for advanced undergraduates. Prereq: 232 and a basic knowledge of circuits.

471-472 Health Physics (3,3) Radioactivity, interaction of electromagnetic radiation with matter, radiation exposure units and units, point kernel and extended sources, x-rays and gamma rays, neutron activation, interaction of charged particles with matter, stopping power, and energy distributions, counting statistics, shielding, dosimetry, waste disposal, criticality prevention, radiation biology and ecology. Prereq: 340 or 341.

490 Senior Seminar (1-3) Topic of current interest. May be repeated with consent of department. Maximum 6 hours.
PLANT AND SOIL SCIENCE

210 Introduction to Soil Science (4) Differences in soil characteristics, processes, and biological properties of soil; relation of soils to land use and pollution; soil management relative to tillage, erosion, moisture supply, temperature, aeration, fertility, and plant nutrition. Introduction to fertilizer chemistry and use. Prereq: Chemistry 130 or equivalent. 3 hours and 1 lab. F

230 Introduction to Crop Science (3) Fundamentals of structure, classification, growth and reproduction of higher plants and use of plant products basic to plant science. Principles and methods of growing several of the world's important agronomic, fruit and vegetable crops, detailing their origin and cultural requirements. Prereq: Botany 110, 120 or Biology 110, 120. Sp

292 Soil Morphology (1) Intensive course involving description, classification, growth and reproduction of soils. Preparation for regional and national soil judging contests. Prereq: 210 and consent of instructor. May be repeated. Maximum 4 hours. 1 hour and 1 lab. F, Sp

311 Soil Fertility (3) Influence of soil properties on plant nutrient availability and uptake. Principles of fertilizer use and their reaction in soils. Prereq: 210. 2 hours and 1 lab. Sp

312 Soil and Water Conservation (3) Principles, practices and control of soil erosion by water and wind, and the control of water content of soils; techniques for soil conservation; minimum and no-tillage farming; forest management; soil-water-plant relationships. Prevention of soil, water, and air contamination in agriculture. Prereq: 210. 2 hours and 1 lab. Sp

331 Field and Forage Crops (3) Agronomic principles of crop production and management. Crop improvement, cropping systems, tillage, fertilization, pest management, harvest and utilization of major field and forage crops. Prereq: 210 or 230. 2 hours and 1 lab. Sp

332 Fruit Crops (3) Fundamentals of site selection, fruit propagation, tree training, pest control and related management factors for deciduous fruit crops will be emphasized. Prereq: 230. 2 hours and 1 lab. F-A

333 Vegetable Crops (3) Characteristics, economic importance, adaptability and production of vegetables for fresh and processing markets with emphasis on both warm and cool season crops. Prereq: 210 or 230. 2 hours and 1 lab. Sp-A

334 Weed Management (3) Principles of weed interference, integrated management, herbicide selectivity and behavior, specific recommendations for various crop and non-crop situations. Prereq: 210. 2 hours and 1 lab. F

392 Practicum in Agriculture (2-4) Working with agricultural-related enterprises in area of student's career interest. May not be used as 300-level prerequisite for any course in Plant and Soil Science. Prereq: Consent of advisor and faculty committee.

401 Seminar (1) Current topics in the plant and soil sciences. Techniques of effective oral and written professional presentation; professional ethics; review of literature; assignments for written and oral presentations. Senior standing. Sp

411 Soil Microbiology (3) Soil microbial population and the soil ecosystem; microbial transformations of inorganic and organic compounds; decomposition of residues; dynamics of soil organic matter. Prereq: 210 and Biochemistry 311 or consent of instructor. F

412 Soil Genesis, Classification and Mapping (3) Soil genesis and formation; observing and describing morphology of agricultural and forest soils; chemical and physical properties, classification, mapping. Two Saturday field trips required. Prereq: 210 or consent of instructor. 2 hours and 1 lab. Sp

413 Soil Chemistry (3) Structure and chemical properties of soil materials with emphasis on the colloidal fraction as it relates to exchange, chemical equilibria, soil acidity, oxidation-reduction, weathering, nutrient availability and waste disposal. Prereq: 311 or consent of instructor. F

414 Soil, Land Use and the Environment (3) Soil as an environmental component; soil properties affecting land use. Soil as a resource in development planning including none engineering aspects of site selection for buildings and use, soil modification, resource data in land use; recognition and prevention of soil pollution. Prereq: 210 or consent of instructor. Sp-A

431 Crop Physiology and Ecology (3) Plant physiology and ecology applied to crop production. Effects of environmental factors on physiological processes. Prereq: 230, Botany 321. 2 hours and 1 lab. F-A

433 Agricultural Pesticides (3) Regulation of pesticide development, manufacture, transportation, marketing and use. Structure, use, mode of action, degradation and environmental impact of pesticides used in agriculture, forestry and related areas. Prereq: 1 year biological sciences and 1 semester chemistry. 2 hours and 1 lab. Sp

453 Principles of Plant Breeding (3) Genetic principles and techniques used in crop improvement. Prereq: Biology 220 or equivalent. 2 hours and 1 lab. Sp

471 Statistics for Biological Research (3) Notation, descriptive statistics, probability, distributions, confidence intervals, student's t and chi-square tests, analysis of variance, mean separation procedures, linear regression and correlation. Prereq: Math 121 or equivalent. 3 hours and 1 rec. F

493 Problems in Plant and Soil Science (1-3) Special research or library problems in plant and soil science. May be repeated. Maximum 6 hours. E

POLITICAL SCIENCE

101 United States Government and Politics (3) Introduction to fundamental institutions and processes of American National Politics including the constitution, voting, presidency, congress and the courts.

102 Introduction to Political Science (3) Analysis of politics and political systems in various countries.

107 Honors: United States Government and Politics (3) Analysis and exploration of the American political system for students with superior ability. Admission by permission of department for students with at least a B average; entering freshmen accepted on basis of strong placement scores and high school record.

301 Introduction to Political Analysis (3) Nature, character, and functions of research design, data collection, and statistical techniques used in the study of politics.

310 Political Community (3) Examination of a variety of value systems and social and political structures related to political community.

311 Contemporary Issues in American Public Policy (3) Selected public policy issues confronting the nation, including the background, nature, and effects of present policies, and options for the future.

312 Popular Culture and American Politics (3) Popular culture related to American politics and government focusing on the influence of film, television, fiction, music, drama, art and sports.

315 Tennessee Government and Politics (3) Major elements in Tennessee government and politics.

320 State Government and Politics (3) Setting, institutions, and processes of government in the fifty states; generalizations and comparisons, with emphasis on federalism and inter-governmental relations.

321 Urban Politics and Process (3) Development of politics and policy-making in the modern American city. (Same as Urban Studies 321.)

322 Minority Group Politics in the United States (3) Content varies. May be repeated with the consent of the department. Maximum 6 hours. (Same as Afro-American Studies 322.)

330 Law in American Society (3) Law as a process through which social problems are addressed in the United States. Examples from case law, legislation, and administrative regulation.

331 Judicial Process (3) Courts as components of political systems, and public policy formulation through judicial decision making.

340 Introduction to Public Administration and Public Policy (3) Public agencies, their organization, personnel, and financial management and administrative responsibility; the policy-making process; political environment.

350 Political Change in Developing Areas (3) Characteristics and problems of political changes with primary focus on developing areas.

355 Latin American Government and Politics I (3) Introduction to contemporary conditions in Latin America. (Same as Latin American Studies 355.)

361 Politics in Western Democracies (3) Political culture patterns, and institutions of Western democratic systems.

365 Introduction to International Relations (3) Resource availability, international economics, international security and peace (imperialism, war, diplomacy, the balance of power, international law and international organization).

366 United States Foreign Policy Process (3) Processes whereby United States foreign policies are made and implemented, focusing on interaction within federal bureaucracy and roles of the President, Congress, the press, and public opinion.

370 Contemporary International Problems (3) Analysis of current international events.

374 American Political Thought (3) Major themes and ideas in American political thought related to the development of American political institutions, values, and practices.

387-388 Junior Honors Seminar (3,3) Required of honors majors; admission with consent of department.

410 Special Topics in United States Government and Politics (3) May be repeated with consent of department. Maximum 6 hours.


420 Political Attitudes and Opinions (3) Nature, formation, development, and dissemination of politically relevant attitudes and opinions in the American political system.

421 Political Parties and Interest Groups (3) Role of political parties and organized groups in American politics and government.

422 Political Campaigns and Elections (3) Nature of
campaigns and elections in the American political process.

430 United States Constitutional Law: Sources of Power and Restraint (3) Judicial review, constitutional powers of the President and Congress, federalism, sources of regulatory authority, and constitutional protection of political and economic rights.

431 United States Constitutional Law: Civil Rights and Liberties (3) Current issues in civil rights and liberties including: first amendment freedoms, equal protection, privacy and the rights of the accused.

440 Public Management and Human Resources (3) How to mobilize and manage technical and human resources in pursuit of public sector organization goals.

441 Budgetary Process and Financial Management (3) Fiscal planning, budget and expenditure processes in government, their policy and administrative implications.

442 Administrative Law (3) Legal dimensions of administrative power and procedures, and constitutional controls over administrators.

452 Black African Politics (3) Recent evolution and current political environment of Black African nations. (Same as Afro-American Studies 452.)

454 Government and Politics of China and Japan (3) Political structure, government and political processes in China and Japan.

455 Latin American Government and Politics (3) Selected topics on Latin American political dynamics, including consideration of leading theoretical explanations. (Same as Latin American Studies 453.)

459 Government and Politics of the Soviet Union (3) Origins and development of the Soviet political system, and selected policy areas.

460 Revolution (3) Characteristics, theories, and consequences of revolution with particular focus on left-wing revolutions and movements.

461 Policy Making in Democracies (3) Comparative approach to theory and process of making public policies.

463 Contemporary Middle East Politics (3) Governments and movements in the Middle East, their characteristics, bases, and interrelationships.

464 Special Topics in Comparative Government (3) May be repeated with consent of department. Maximum 6 hours.

469 Soviet Foreign Policy (3) Soviet international behavior since 1917 and selected problems of Soviet foreign policy post World War II.

470 International Law (3) Nature and development of international law and compliance with it. Particular attention to function of international law in the context of international conflict.

475 Ancient and Medieval Political Thought (3) Major western political thinkers from Socrates to Marsilio of Padua. (Same as Medieval Studies 475.)

476 Modern Political Thought (3) Major western political thinkers from Machiavelli to Marx.

487-488 Senior Honors Thesis and Seminar (0-6) Required of honors majors; admission with consent of department. Students register for zero hours credit fall semester and six hours credit in spring semester. Credit is granted on completion of thesis.

491 Foreign Study (1-15) See page 97.

492 Off-Campus Study (1-15) See page 96.

493 Independent Study (1-15) See page 96.

PORTUGUESE

111-112 Elementary Portuguese (3,3) Introduction to Portuguese. May not be taken for credit by students with two years of high school or one year college Portuguese. Must be taken in sequence. Language Laboratory required.

211-212 Intermediate Portuguese (3,3) Stresses reading, writing, listening, and speaking of Portuguese to prepare for upper division courses in the language. Must be taken in sequence. Language Laboratory required.

300 Portuguese for Spanish Speakers (3) Accelerated class for beginning students of Portuguese with a strong background in another Romance language. Introduction to grammar; reading and culture of Portugal and Brazil. Prereq: 3 hours at 300 level in another Romance language or equivalent.

311 Asuntos de Luso-Brazilian Literature (3) Luso-Brazilian literature, with emphasis on contemporary works. Genres may vary. Prereq: 212 or equivalent. (Same as Latin American Studies 311.)

323 Conversation and Composition (3) Development of speaking habits in writing and reading in Portuguese; some review of grammar. Prereq: 212 or 300 equivalent.

431-432 Directed Readings in Brazilian and Portuguese Literature (3,3) May be repeated with consent of instructor. (Same as Latin American Studies 431-432.)

491 Foreign Study (1-15) See page 97.

PSYCHOLOGY

110 General Psychology (3) Introduction to primary approaches to the study of human behavior and experience.

117 Honors: General Psychology (3) Enriched introduction with extra readings. Prereq: Consent of instructor.

210 Biological Basis of Behavior (3) Survey of theories and research concerning the role of genetic factors, nervous systems, and other biological influences on behavior. Recommended: 110 or equivalent.

220 Behavior and Experience: Humanistic Psychology (3) Behavioral and phenomenological analysis of individuals and their development in Portugal; some review of current trends in psychological thought. Prereq: 210, 220, and 300 or 330.

300 Child Psychology (3) The natural child from conception through infancy, childhood, and adolescence. Physical, cognitive, social, and emotional development. Prereq: 110 or equivalent and 200 or 210.

310 Learning and Thinking (3) Survey of theory and findings of research concerning both humans and nonhumans. Prereq: 110 or equivalent. Recommended: 210, 220.

320 Motivation (3) Survey of theories and related research; discussion of applications. Prereq: 110 or equivalent. Prereq: 210, 220.


359 Laboratory in Human Relations (3) Interpersonal relations and communication through structured experiences in small groups. Prereq: 110 or equivalent, and consent of instructor. May be repeated. Maximum 6 hours.

360 Social Psychology (3) Theories, methods, and findings of research concerning individual behavior in a social context. Prereq: 110 or equivalent.

370 Ethology and Sociobiology (3) Basic concepts in the evolutionary approach to behavior, including applications to psychology, the social sciences, and the arts. (Same as Zoology 370.)

382 Contemporary Topics in Psychology (3) Current issues or problems, such as architectural psychology, impact of technology, artificial intelligence, or stereotypes. Different topic each semester. Prereq: 110 or equivalent. May be repeated. Maximum 9 hours.

385 Statistics in Psychology (3) Descriptive statistics, hypothesis-testing and statistical inference. Basic parametric and non-parametric tests. Prereq: Mathematics 110. Not open to students with credit in Mathematics 116, Statistics 201, or equivalent.

395 Methods of Research in Psychology (3) Fundamentals in the design, conduct, and interpretation of research, including theoretical development, experimental design, data collection, and statistical analysis.

396 Laboratory in Psychology (2-3) Introduction to techniques used in the laboratory to study different topics in psychology, such as perception, memory, learning, and social behavior. Supervised experience in the use of laboratory apparatus, collection and interpretation of data. Different topic each semester. Prereq: 110 or equivalent, 210, 220, 385, 395. May be repeated. Maximum 9 hours.

399 Supervised Research and Field Work (1-3) Field experience in community-based research and service settings. Prereq: 110 or equivalent, 210, 220, 385, 395. May be repeated. Maximum 12 hours in 399, 485, 491, 492, and 493 combined may be applied toward the major.


409 Group Facilitation (3) Study of theory and techniques through supervised experience in small groups. Prereq: 359 and consent of instructor. May be repeated. Maximum 6 hours.


424 Psychology and the Law (3) Psychological aspects of legal systems. Prereq: 110 or equivalent, upper division standing and consent of instructor.

430 Health Psychology (3) Psychological factors related to health and illness, including stress, personality, and environment. Applications of psychological treatment to physical illness. Prereq: 110 or equivalent, 210.

434 Psychology of Gender (3) Biological, psychological, and social factors in gender. Importance of gender roles and stereotypes for behavior and experience. Prereq: 110 or equivalent, 210, 220. (Same as Women's Studies 434.)

440 Organizational Psychology (3) Social-psychological analysis of organizations, emphasizing role theory, systems theory. Prereq: 360. (Same as Management 440.)


460 Comparative Animal Behavior (3) (Same as Zoology 450.)

469 Comparative Animal Behavior Laboratory (3) Coreq: 450. (Same as Zoology 459.)

461 Physiological Psychology (3) Nervous system and physiological correlates of behavior. Biological basis of emotion, learning, memory and stress. Prereq: 110 or equivalent, 210, and one year of Biology or Zoology introductory sequences or equivalents.

469 Laboratory in Physiological Psychology (3) Laboratory studies of nervous system and physiological correlates of behavior. Coreq: 461.

470 Theories of Personality (3) Major theories of human personality and their development. Prereq: 220 and 300 or 330.

480 Theories of Learning (3) Classical and current approaches to learning and cognition. Prereq: 310.

482 Topics in Psychology (3) Intensive analysis of special topics, such as Afro-American Psychology or exploration of cognitive mummy. Prereq: 385.
o or equivalent. Recommended: 210, 220, 385, 395. May be repeated. Maximum 9 hours.

489 Supervised Research (1-9) Prereq: Consent of instructor. May be repeated. Maximum 12 hours in 399, 489, 491, 492, and 493 combined may be applied toward the major.

491 Foreign Study (1-15) Prereq: Consent of instructor. May be repeated. Maximum 12 hours in 399, 489, 491, 492, and 493 combined may be applied toward the major.

492 Off-Campus Study (1-15) Prereq: Consent of instructor. May be repeated. Maximum 12 hours in 399, 489, 491, 492, and 493 combined may be applied toward the major.

493 Independent Study (1-15) Prereq: Consent of instructor. May be repeated. Maximum 12 hours in 399, 489, 491, 492, and 493 combined may be applied toward the major.

496 Senior Seminar: Great Ideas in Psychology (3) Key ideas that have shaped conceptions of human-kind. Exploration of historical development, scientific evolution, and larger social context. Prereq: Consent of instructor and senior standing.

**PUBLIC HEALTH**

300 Introduction to Public Health (3) Aspects of public health including discussion of contemporary and controversial health issues. E

305 Communicable and Noncommunicable Diseases (3) Modern concepts of diseases; etiology of common communicable and chronic disease problems including prevention and control. Prereq: 1 year of biological science or consent of instructor. F, Sp

310 Environmental Management and Control (3) Contemporary principles of control of disease-producing agents in our environment. Emphasizes concepts for effective application of control principles to vocational endeavors and/or daily living activities. Includes: Drinking water quality (chemical, physical and biological), waste management (liquid, solid and hazardous), vector control, safe food management, recreational sanitation and safety to include pool management, shelter hygiene (homes, child care, schools, hospitals, etc.), occupational health and safety. F, Sp

400 Consumer Health (3) (Same as Health 400.)

410 Health in the Work Environment (3) Fundamental activities involved in field of industrial health aimed at reducing health problems for employees. Emphasis on workplace health hazards and problems of concern to nurses, medical staff, management, engineers and safety personnel. Prereq: 210, 220, 385, 395. May be repeated. Maximum 9 hours.

419 Maintenance and Management of Recreation and Sports Related Facilities (3) Principles for operationalizing modern facility maintenance systems and management strategies for recreation/sports related facilities and settings. Cost tracking, inventory systems, specialized maintenance techniques, safety guidelines, maintenance management systems and security. Prereq: 309 or consent of instructor. F

420 Principles of Therapeutic Recreation (3) Principles and practices in therapeutic recreation including activity analysis, activity and program selection adaptation, individual assessment, treatment plans and professional issues. Prereq: 309 or consent of instructor. Sp

430 Organization and Administration of Leisure Service (3) Principles of administration applied to provision of leisure services offered by public, private and/or commercial enterprises. Organizational structures, personnel management, evaluation, legal authority, introduction to budgeting and fiscal procedures. Prereq: 310 or consent of instructor. F

440 Dimensions of Private and Commercial Recreation Businesses (3) Nature and function of recreation in private, commercial, and industrial settings. Development of management and marketing methods and services offered in leisure market, factors influencing participation, management considerations, and research in commercial recreation and tourism. Prereq: 110, junior standing or consent of instructor. Sp

450 Specialized Study in Leisure Education (1-4) Special interest leisure activities for developing positive attitudes toward leisure. Contribution of leisure to mental and physical health. May be repeated. Maximum 6 hours. E

490 Practicum in Recreation (12) Full time practice in approved recreation agency. Emphasis on supervisory and administrative procedures. Prereq: 290, 390, senior standing. Satisfactory/No Credit only. E

**RECREATION AND LEISURE STUDIES**

110 Foundations for Leisure Studies and Services (3) Focuses on understanding concepts, principles, and practices relevant to providing leisure service including philosophy, history and theory, programming, economics, leadership, and a survey of leisure services organizations and occupational opportunities. F

210 Dynamics of Recreation Leadership (3) Theoretical practices and concepts as they apply to all roles of recreation leadership. F

220 Introduction to Therapies and Medical Termi-
412 Classical Indian Systems of Philosophy: The Moksha Tradition (3) Selected writings and philosophical problems of the Sankhya, Yoga, Vedanta, Buddhism, or Jainism. Prereq: Religious Studies/Philosophy 374 or consent of instructor. (Same as Philosophy 572.)

416 Jesus and Paul Compared (3) Central ideas and concepts of each person compared with equivalent concepts in the other. Advanced study of the Gospels and Epistles of Paul, involving extensive independent research.

421-422 Elementary Sanskrit I, Elementary Sanskrit II (3,3) 421-Introduction to the grammar of classical Sanskrit. 422-Introduction to the reading of epic and classical Sanskrit texts. Prereq: 421 or consent of instructor.

425 Seminar in Western Religions (3) Selected figures, themes, movements, and problems. Prereq: Consent of instructor. Variable content. May be repeated. Maximum 6 hours.

430 Seminar in American Religion (3) Selected figures, themes, movements, and problems. Prereq: Consent of instructor. Variable content. May be repeated. Maximum 6 hours.

435 Seminar in Asian Religions (3) Selected figures, themes, movements, and problems. Prereq: Consent of instructor. Variable content. May be repeated. Maximum 6 hours.

440 Seminar in Comparative Religion (3) Selected figures, themes, movements, and problems. Prereq: Consent of instructor. Variable content. May be repeated. Maximum 6 hours.

446 Theoretical Issues in Medical Ethics (3) (Same as Philosophy 446.)

462-463 Intermediate Sanskrit I/Intermediate Sanskrit II (3,3) 462-Advanced grammatical constructions and reading of epic and classical religious and narrative texts (e.g., Bhagavad Gita, Mokshadharma, Ramayana, Kathasaritsagara). Prereq: 422 or consent of instructor. 463-Continued reading of classical religious and narrative texts. Introduction to classical Sanskrit grammar. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

469 Readings in Selected Languages Related to Religious Studies (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

472 Off-Campus Study (1-15) See page 96.

543 Independent Study (1-15) See page 96.

549 Seminar in Religious Studies (3) For advanced students in Religious Studies; required for majors. Selected topics, themes, and function of myth in religion, problem of evil, transcendence, theories of religion, hermeneutics, integrating various disciplines involved in study of religion. Prereq: Consent of instructor. May be repeated. Maximum 6 hours.

RURAL SOCIOLOGY

380 Rural Sociology (3) Topics include cultural variability, reference group theory, social stratification, major social institutions, demographic changes, rural community and decision making, diffusion of technology and rural industrialization. Prereq: Sophomore standing. (Same as Sociology 380.)

480 Diffusion of Agricultural Technology (3) Diffusion and communication processes whereby new technology spreads from scientists to change agents and then to farmers. Innovation-decision process; communication behavior, mass media, role of professional change agents, opinion leadership and consequences of change. Prereq: 380 or consent of instructor. (Same as Sociology 480.)

RUSSIAN

101-102 Elementary Russian (4,4) Must be taken in sequence.

101-202 Intermediate Russian (4,4) Must be taken in sequence.

221-222 Russian Literature in English Translation (3,3) Nineteenth and twentieth-century Russian literature. Writing-emphasis courses. No foreign language credit.

226 Russian Philosophical and Theological Thought (3) Development of philosophical thought in Russia from the Middle Ages to the Revolution. Emphasis on expression of this thought in Russian literature and literary criticism. No knowledge of Russian required.


311-312 Russian Composition and Conversation (3,3) Practice in writing and speaking; grammar review and vocabulary building. Prereq: Completion of 202.

321 Works of Dostoevsky in English Translation (3) Crime and Punishment, Brothers Karamazov, and other works.

322 Works of Tolstoy in English Translation (3) War and Peace, Anna Karenina, and other works.

326 Special Topics in Russian Literature in English Translation (3) Topics vary and are announced in advance. Student suggestions for topics are welcome. No foreign language credit. May be repeated once.

371-372 Background and Main Currents of Russian Culture (in English) (3,3) Interdisciplinary approach to the appreciation of the language, religion, literature, art, music, history, geography, and social problems of Russia. No knowledge of Russian required.

401-402 Advanced Grammar, Conversation and Composition (3,3) Prereq: 312 or equivalent.

425 Introduction to Descriptive Linguistics (3) (Same as German 425, French 426, Spanish 425 and Linguistics 425.)

426 Introduction to Historical and Comparative Linguistics (3) (Same as German 426, French 426, Spanish 426 and Linguistics 426.)

450 Selected Topics in Russian and East European Studies (3) Interdisciplinary seminar on a selected topic using a comparative approach.

451-452 Senior Seminar (3,3) For majors in Russian: minors admitted at the discretion of the instructor. Intensive study of language, literary style, and literary criticism based on selected major novels.

491 Foreign Study (1-15) See page 97.

493 Independent Study (1-15) See page 96.

RUSSIAN AND EAST EUROPEAN STUDIES

410 Selected Topics in Russian and East European Studies (3) Interdisciplinary seminar on a selected topic using a comparative approach. Requires research using Russian language sources, regardless of country, and a paper of 25-30 pages.

SAFETY

400 Directed Independent Study (1-3) Individual identification and study of safety or safety education problem/issue. Specific proposal must be made to instructor before registration. May be repeated. Maximum 12 hours. Prereq: Consent of instructor.

414 Driver and Traffic Safety Education (3) Preparation of teachers of driver education in schools and col-
442 Advanced Driver and Traffic Safety Education (3) Teaching driver education through use of simulation, multimedia, and multiple-car driving range. Emphasis placed on teaching skills and supervision. 2 hours and 2 labs. Sp.

443 Sports and Recreational Safety (3) Accident prevention and injury control in sports activities; philosophy of sports safety, human environmental factors and interpersonal relations in sports injury and control, risk-taking and decision solution strategies; and contributions of sports medicine to safety. 3 hours and 2 labs. Sp.

452 General Safety (3) Principles, practices, and procedures in general safety. Safety problems in school, traffic, recreation, industry, home, and other public areas. E.

470 Special Topics (1-3) Study in selected disciplinary or professional areas of safety. May be repeated. Maximum 12 hours.

SOCIAL WORK

200 Introduction to Social Work (3) Emergence of the social work profession; professional mission; knowledge, skills, and values; practice settings; client groups; helping services; career patterns; practice methods. Designed to assist students to consider their ability for work in social work.

250 Social Welfare (3) Development, structure and function of the social welfare institution. Analysis of social welfare programs and impact of the institution on society.


312 Social Work Practice I (3) Knowledge, values, and skills for entry level generalist practice in a variety of settings. The social work problem-solving process, different size client systems, ethnic-sensitive assumptions, and the workers' regard for person-environment configuration. Concurrent skills laboratory. Prereq: Initial progression. Pre or Coreq: 314.

313 Social Work Practice II (3) In-depth study of generalist practice with individuals and families. Practice for developing competencies, including working with people of diverse backgrounds. Concurrent skills laboratory. Prereq: Initial progression, 312. Coreq: 310 and 380.

314 Human Behavior and the Social Environment (3) Interpersonal theory of behavior, social, cultural, environmental and psychological factors in human behavior. Person-in-environment over the life span with special attention to diversity, impact of racism, sexism, and other sociocultural factors. Integration of knowledge into a social work practice perspective. Prereq: Initial progression.


412 Social Work Practice III (3) Generalist practice with emphasis on groups and communities, including treatment theories, techniques, and issues. Prereq: Full progression. Coreq: 480.


460 Integrative Seminar (2) Social work content for entry-level professional practice and current issues influencing the profession. Includes development of a portfolio reflecting BSW competencies. Prereq: Full progression. Coreq: 481.


SOCIOLOGY

100 General Sociology (3) Major concepts and theoretical approaches of sociology with emphasis on culture, socialization, social organization, and social stratification.

110 Social Problems and Social Change (3) Increasingly acute and intense problems such as alcoholism, violence, crime, inequality, lifestyle preferences, and environmental abuse within the context of social change. Assessment of control strategies. May be taken instead of 100.

200 Sociological Analysis (3) Selected set of contemporary issues emphasizing theoretical and logical structure of the issues and development of data needed to enter into informed debate on the issues. Students are expected to develop their own analytical arguments. Prereq: English 102 or consent of instructor.

220 Interpersonal Communication (3) (Same as Speech 230.)

232 Varieties of Religious Community (3) (Same as Religious Studies 332.)

291 Sport in American Society (3) (Same as Physical Education 291.)

310 American Society (3) Institutional organization of contemporary American society with particular attention to major social values.

311 Family (3) Theoretical frameworks and methodological approaches; their application in the sociological study of past and present family forms.

319 Sociology of Religion (3) Interrelationship of society, culture, and religion. (Same as Religious Studies 319.)

320 Interpersonal Communication Processes (3) (Same as Speech 320.)

321 Sociological Theory (3) Survey of contemporary issues and problems in sociological theory with an emphasis on their historical development and their importance for the field. Students are required to form critical appraisals of the topics addressed.

330 Computers and Society (3) History of computing and sociocultural implications; capabilities of computer applications in various fields; social, cultural, and economic impacts.

331 Sociological Research (3) Selected issues in philosophy of social science, research design, sampling, methods of data collection and interpretation. Requires written research report.

336 Elementary Social Statistics (3) Statistics used in social research; elementary descriptive techniques; measures of central tendency, dispersion; elementary statistical inference; tests of significance for parametric and non-parametric data.


343 Race and Ethnicity (3) Social sources of racial and ethnic cleavages and social, economic, and political consequences. Emphasis on race and ethnicity in the United States. (Same as Afro-American Studies 343.)

344 Power and Society (3) Sociological analysis of the formation and application of nation state policies. Examination of who gets what, why and how. Emphasis on contrasting explanations of the control of the state and the relative autonomy of the state.

345 Collective Behavior and Social Movements (3) Collective phenomena leading to social change. Response to disaster, popular crazes, and social protest and development, organization, and function of social movements. Emphasis on American cases.

346 Organization of Occupations (3) Occupations and professions as interest groupings in work settings and the wider community.

350 Criminology (3) Systemic inquiry into alternative definitions of crime, statistical distribution of different types of crime causation, and responses to crime, principally by the police.


352 Deviance and Social Control (3) Deviant, their lifestyles, social organization, and social control.

360 Environment and Resources (3) Relationship between scarcity of natural resources and changes in societal beliefs and social structure. Topics include social and physical limits to growth and collective action problems.

363 The City (3) The revolutionary impact of cities and city life as seen from an ecological perspective. The organization of life in cities into communities, neighborhoods, and other territories. Urban planning and problems.

370 Social Psychology (3) Social psychological analysis of social behavior emphasizing its acquisition, its enactment, and its dynamic nature.

375 Gender in Society (3) Exploration of gender in society utilizing various sociological perspectives with special focus on the relationships between social structures, social roles, and gender identities. (Same as Women's Studies 375.)

380 Rural Sociology (3) (Same as Rural Sociology 380.)

400 Special Topics (3) Variable topics. Scope of subject matter determined by students and instructor with consent of department. Prereq: Determined by department. May be repeated. Maximum 6 hours.

405 Sociology of Sport (3) Social meaning, organization, and processes of sport as an element of social action. (Same as Physical Education 405.)

413 Formal Organization (3) Organizational models, typologies, and theories; hierarchies of authority; communication, interpersonal relations in work settings; organizational change.

414 Organization of Medical Care (3) Organization of health care facilities, staff-patient relationships, demographic characteristics, and prevalence of disease.

415 Sociology of Aging (3) How roles and statuses change throughout the life course. Major social institutional; the impact that the rapidly increasing number of older people have on society, the effect of society on older people.

446 The Modern World System (3) Critical examination of the political-economic system as a social system, its coherence, boundaries, regions, member groups, cleavages, and patterns of conflict. Analysis of who gets what, why, and how in the global political economy.

451 Criminal Justice (3) A critical assessment of the criminal justice apparatus and its components. Brief examination of the police, with most of the emphasis on the criminal courts and institutions and programs such as the prison, probation, and parole. Analysis of their operation and impacts. Prior completion of 350 is recommended.

455 Society and Law (3) How laws and legal processes are affected by social change, the social impact of legal sanctions, relations between law and social justice.

459 Organizational and Corporate Crime (3) Crime and deviance committed by organizations. Case studies of corporate and organizational crime, the organizational dynamics of crime, and theories of corporate crime, and organized responses to this type of crime by governmental regulatory agencies.

462 Population (3) Demographic factors and social structure; trends in fertility, mortality, population growth, migration, distribution, and composition; population policy.
492 Off-Campus Study (1-15) Prereq: Advance departmental approval of number of hours and topics. May be repeated. Maximum 15 hours. See page 97.

493 Independent Study (1-15) Prereq: Advance departmental approval of number of hours and topics. May be repeated. Maximum 15 hours. See page 96.

SPANISH

111-112 Elementary Spanish (3,3) (Introduction to Spanish. May not be taken for credit by students with two years of high school or one year college Spanish. Must be taken in sequence. Language Laboratory required.

211-212 Intermediate Spanish (3,3) Reading, writing, listening and speaking of Spanish to prepare for upper division courses in the language. Must be taken in sequence. Language Laboratory required. Prereq: 111-112 or equivalent.

217-218 Honors: Intermediate Spanish (3,3) Honors course for students of superior ability in Spanish. Incoming freshmen are admitted on the basis of a diagnostic test. High school average and performance on the ACT. Classes normally held to a maximum of 15 students. Students follow enriched program with continuous emphasis upon speaking ability and with an introduction to reading literary selections. Students who earn an A or B in 218 receive credit for 300. Prereq: 111-112 or equivalent.

291 Spanish Literature in English Translation (3) From the Golden Age, Don Quixote, the picaresque novel, and St. John of the Cross, to the modern, Unamuno, Lorca, Ortega, and Cela. No foreign language or major credit.

292 Spanish American Literature in English Translation (3) Contemporary Spanish American fiction: such as Borges, Fuentes, Marquez, Asturias. No foreign language or major credit.

300 Spanish Translation (3) Development of linguistic skills through a factory work in courses above 300. Recommended for students who would benefit from additional training beyond 212 in the skills of speaking, reading and writing Spanish. Particular attention for preparation to read Hispanic literature and other advanced-level material.

311 Aspects of Spanish Literature (3) Introduction to Spanish literature, using selections from prose, drama and poetry of the medieval, Golden Age and modern periods. Required of all majors. Prereq: 212, 218 or equivalent.

312 Aspects of Spanish American Literature (3) Introduces the study of Spanish American literature, with emphasis on contemporary works. Genres may vary. Prereq: 212, 218 or equivalent. (Same as Latin American Studies 312.)

323-324 Intermediate Conversation and Composition (3,3) Designed to improve proficiency in oral and written communication in Spanish.

412 Phonetics (2) Prereq: 212, 218 or equivalent.

422 Advanced Grammar (3) Finer points of grammatical structures. Required of all majors. Native speakers must receive permission from the instructor to take this course. Prereq: 212, 218 or equivalent.

423-424 Advanced Conversation and Composition (3,3) Advanced conversation and written skills in Spanish for pre-professionals.
to management of business processes. Prereq: Consent of department head. E

456 Undergraduate Seminar (1) Directed readings and active participation in the Department's undergraduate seminar program. Prereq: Senior standing and consent of Chairperson of Statistics Department. Undergraduate Affairs Committee. Satisfactory/No credit only. May be repeated. Maximum 2 hours.

492 Internship (1-6) Supervised off-campus experience in application of statistical principles and methods in business, industry, government, or other professional environment, culminating in a written report. Prereq: Permission of the Chairperson of the Statistics Department Undergraduate Affairs Committee. Letter grade or Satisfactory/No credit. May be repeated. Maximum 6 hours.

493 Independent Study (2-6) Faculty directed reading and investigation of specific topic in probability or statistics culminating in a written report. Prereq: Two courses in statistics and permission of the Chairperson of the Statistics Department Undergraduate Affairs Committee. Letter grade or Satisfactory/No credit. May be repeated. Maximum 6 hours.


TECHNOLOGICAL AND ADULT EDUCATION

161 Graphic Communications (3) Drafting as a means of communication in technology. Orthographic and multiview drawing; conventional practices, pictorial techniques and applications, sheet metal development and auxiliary view drawing, Sketching, dimensioning, board work, and CAD. F

163 Power and Energy Systems (3) Autorev technology and internal combustion engines. Includes various prime movers, methods of utilization, distribution, and transmission of power. Engine tune up and overhaul and small engine maintenance and repair is stressed through experimental and applied laboratory experiences. F

165 Woods Technology (3) Processes, tools, equipment, and products of the woodworking industry. Importance of safety and using hand tools and basic machinery. F

166 Metals Technology (3) Processes, equipment, materials and products of metal working industries. Processes in machine, foundry, forging, heat treat- ment, sheet metal and fabrication. F

201 Field Experience in Vocational Technical Education (1) Field experience in public school programs in dis- trictive education. May be repeated. Maximum 3 hours. Satisfactory/No Credit only. E

230 Typewriting and Shorthand Proficiency (3) Proficiency credit for students planning to certify in business education and office technology who have typewritten and/or shorthand courses. Prereq: Depart- ment approval. E

261 Architectural Graphics (3) Graphical representation and architecture. Principles of construction, working drawings for a residential dwelling, and CAD techniques. Prereq: 161 or consent of instructor. Sp

263 Basic Electricity/Electronics (3) Operation and characteristics of electrical systems and devices; includes general DC/AC theory and application, use of electronic measuring instruments; circuit analysis, introduction to semi-conductors and various laboratory experiences that involve the function of different types of circuits. Prereq: 163 or consent of instructor. Sp

265 Construction Technology (3) Residential con- struction, including site selection, foundations, framing, roofing, interior, and exterior finishes. Prereq: 165 or consent of instructor. Sp

266 Machine Tool Processes (3) Function, care, set- up, operation and theory of basic machine tools. Prereq: 166 or consent of instructor. Sp

326 Micro Business Applications (3) Operating and programming microcomputers. BASIC language is used and programming examples are oriented in business applications. Prereq: Admission to Teacher Educa- tion Program. F

350 Related and Applied Theory in Occupations (1-15) Applicants must show evidence of bonafide occupa- tional experience compatible with State Plan requirements. Written theory tests and the submission of a comprehensive portfolio are used to award variable credit. Measures evaluated by technical special- istic and departmental faculty. May be repeated. Maximum 6 hours. Prereq: Chairperson of departmental and departmental approval. E

351 Manipulative Skills in Occupations (1-15) Applicants must show evidence of bonafide occupational experience compatible with State Plan requirements. Written theory tests and a comprehensive portfolio are used to award variable credit. Measures evaluated by technical specialist and departmental faculty. May be repeated. Maximum 6 hours. Prereq: Chairperson of departmental and departmental approval. E

352 Practicum in Industrial Education (1-3) Updating and upgrading experiences in non-traditional settings for technical teachers. May be repeated. Maximum 6 hours. Satisfactory/No Credit only. E

354 Job Analysis Techniques and Curriculum Dev- elopment (3) Instructional materials development utilizing the techniques of job analysis. F

355 Microcomputer Applications in Technology (3) Use and applications of microcomputers for educations, business, and industry. Implications and impact of microcomputers on occupations and everyday living. Open lab for required hands-on experience in opera- tion and programming. F

356 Lab Organization, Management, Maintenance, and Safety (3) Principles of classroom and laboratory organization, maintenance, safety, and management in vocational and technical laboratories. Sp

361 Graphic Reproduction Processes (3) Principles of printing, duplicating, photography, and other forms of graphics communication; includes laboratory experi- ence in SLR camera applications, camera copy preparation, line and halftone photography, layout, typesetting, and offset printing. Prereq: Admission to Teacher Education Program. F

363 Applications of Integrated Electronics (3) Electric circuit analysis and IC applications; including amplifiers, switching and timing circuit, oscillators and the basic components of digital and electronic devices through lecture and laboratory experi- ences. F

366 Manufacturing Technology (3) Manufacturing system, including research and developing products, preparing to produce, producing, marketing, and ser- vicing products. Prereq: 165, 166, and admission to Teacher Education Program. Sp

372 Job Analysis (3) Applied techniques of job analy- sis to determine job descriptions, training requirements, performance standards and sequence of training technical personnel. F

373 Instructional Techniques in Industrial Education (3) Application of learning theories, motivational tech- niques, instructional strategies to technical and related subjects. F

374 Planning Instruction for Human Resource Devel- opment (3) Selection, design, and development of performance-based training programs. Prereq: 372 or consent of instructor. Sp

401 Utilization of Community Resources (3) Strategies for developing linkages between vocational education and the private sector through advisory committees, councils and working partnerships. Furniture and equipment and the management of public relations programs. Prereq: Three years of teaching experience. A

410 Pre-Student Teaching Seminar (1) Objectives and policies of the student teaching program. Must be completed the term immediately preceding stu- dent teaching. Prereq: Admission to Teacher Education Program. Satisfactory/No Credit only. F, Sp

413 Special Topics in Technological and Adult Edu- cation (1-3) Topics to be assigned. May be repeated. Maximum 6 hours. E

414 Individual Study in Technological and Adult Edu- cation (3) Prereq: Consent of supervising instructor with prior formal approval in the office of the depart- ment head. May be repeated. Maximum 6 hours. E

415 Coordination Techniques (3) Necessary procedures, duties and responsibilities to implement, maintain, and evaluate a successful cooperative education pro- gram. A

420 Introduction to Adult Education (3) Breadth of adult education activities and the diversity of adult clientele, including opportunities for professional prac- tice apart from traditional instructional settings. A

421 Adult Education Program Design and Management (3) Processes of program development and special application to adult training programs. Sp

422 Adult Development and Training (3) Application of adult development concepts to design and man- agement of training programs for adults. Sp

430 Principles and Organization of Business Marketing Education (3) Historical background and develop- ment needs. Principles of vocational education in business and marketing, curriculum implications, estab- lishing, evaluating, and improving the programs. Prereq: Admission to Teacher Education Program. F

431 Word Processing and Office Technology (3) Word processing concepts and applications, methodology for teaching word processing and machines. Prereq: Advanced typewriting skill and permission of instruc- tor. Sp

432 Methods and Materials in Business and Marketing Education (3) teaching techniques, aids and evalua- tion in subject matter fields. Prereq: Admission to Teacher Education Program. Sp

433 Methods in Office Technology (3) Materials, meth- ods, evaluation procedures, and current research in typewriting, shorthand, and other office procedures. F

434 Methods in Accounting and Data Processing (3) Methods, materials, evaluation procedures, and recent research in accounting and data processing. Auto- mated accounting is introduced. Prereq: Admission to Teacher Education Program. F

436 Supervised Occupational Experience (3) Practi- cal field experience in business and marketing settings under the supervision of practitioner and depart- mental representative. May be repeated to a maximum of 3 credits. E

439 Areas of Marketing (3) Marketing, personnel develop- ment, operations and management as these affect the instructional leadership program in marketing education. Sp

440 Special Topics in Business and Marketing Education (1-3) Topics to be assigned. May be repeat- ed. Maximum 9 hours. E

450 Seminar in Industrial Education (1-3) Current issues, innovations, problems, and other topics asso- ciated with technical programs. May be repeated. Maximum 6 hours. A

454 Training Aids Development (3) Study and prepa- ration of instructional aids and non-print media commonly used by technical instructors and trainers. F

455 Performance-Based Evaluation (3) Assessing the effectiveness of training through the development of performance-based measures; evaluation of incum- bent worker job performance. Sp

456 Organization and Operation of VICA/HOSA (3) Planning, organizing and implementing youth-club activi- ties in vocational-technical programs. A

459 New Developments in Industrial Education (3)
Developments, significant problems and recent trends in materials and functioning are identified by coordinating instructor with conjunctive knowledge of resource personnel. May be repeated. Maximum 6 hours. E
464 Methods and Mediation in Technology Education (3) Methods and media used in teaching technology education in secondary public schools. Prereq: Admission to Teacher Education Program. A
465 Materials and Processes (3) Materials relative to specifications, testing, and methods to classify and categorize materials. Determining correct processes to meet industrial product needs. Prereq: Consent of instructor.
466 Course Construction in Technology Education (3) Selection and arrangement of course content. Planning, instructional objectives, project/product selection, assignments and evaluation. Prereq: Admission to Teacher Education Program. A
469 Plastic Technology (3) Characteristics and applications of thermoplastic and thermosetting materials. Plastics production equipment related product design and processing of plastics. Prereq: 165 and admission to Teacher Education Program. A
470 Training for Human Resource Development (3) Organization and management of training, including roles and functions performed and the needs, benefits, and productivity of training systems. F
471 Principles of Supervision (3) Problems of motivation, communication, interpersonal relationships and leadership. Sp
479 Internship in Human Resource Development (5-10) Assisting, planning and drafting techniques, and evaluating the effectiveness of training programs in an industrial setting. E
481 Student Teaching: Grades 7-12 and Adults (10) Full-time experience in classroom and laboratory teaching and related responsibilities under the direct supervision of a master teacher in the content area. Prereq: Admission to Teacher Education Program. E

TEXTILES AND APPAREL
101 Apparel Construction (3) Garment construction focused on decision making and time management; pattern alterations, fitting and quality of construction. Not available for credit for departmental majors. F, Sp
120 Textiles I (3) Consumer-oriented textiles: fibers, fabric construction and finishes in relation to use, serviceability and care of apparel and household fabrics. Laboratory examination of fibers, yarns, fabrics and finishes. E
230 Apparel Evaluation (3) Analysis of construction techniques to ascertain cost/equality relationships; elements and principles of design in relation to garment construction. Prereq: 120. F
232 Design Analysis (3) Apparel design analysis based on flat patterns, draping, finishing and techniques; comparison of methods for style variations and costings of garments. Sp
310 Principles of Merchandising (3) Buying practices, procedures, problems, activities, techniques, underling concepts fundamental to merchandising. Prereq: Accounting 201. F
320 Textiles II (3) Recent developments in fibers, fiber structure, yarn processing, yarn structure and fabric construction; dyeing, finishing and properties of textile performance and evaluation; legislation and standards. Prereq: 120, Chemistry 100-110 or 120-130. F
330 Apparel Production (3) Industrial methods in garment production; focus on stages of production, plant layout, costing and quality control. Prereq: 230. F
345 Fashion in History (3) Development of apparel styles in western civilization from middle ages to present; factors associated with origin, adoption and abandonment including historic, social and economic settings. F
350 Consumers in the Market (3) Consumer decision-making and problems in the domestic and international marketplace; consumer issues and policies, emphasis on consumer choice, information, consumer protection and current issues. Prereq: Economics 201. Sp
390 Introduction to Field Experience (1) Interviews, placement and planning for field experience. Prereq: Approved application for field experience. Sp
410 Retail Management (3) Retail sector of economy from management perspective; decision-making in retail operations; promotion, pricing, financial planning and control, computer application, product mix-strategy. Prereq: 2 semesters Marketing. Sp
415 Fashion Promotion (3) Advertising and special purpose media used to promote fashion merchandise; evaluation of retail sales promotion activities. Sp
420 Textile Microscopy and Physical Testing (3) Microscopic techniques applied to textile fibers, yarns and fabrics; standard methods and equipment used in physical testing. Prereq: 300. F
422 Textile Fiber Chemistry (3) Chemistry of textile fibers; emphasis on structure, preparation and reactions; implications relating to dyeing and finishing of fabrics. Prereq: Chemistry 350. Sp
450 Textile and Apparel Economics (3) Economics of the United States textile, apparel and fiber industries; emphasis upon production, distribution, institutions, impact upon consumers; international and domestic issues. Prereq: 300 or consent of instructor. Sp
492 Field Experience in Merchandising, Apparel or Textiles (6) Off-campus, cooperative program with business establishments which merchandise or manufacture textiles and/or apparel. Prereq: Coreq: 490. F
493 Directed Study (1-3) Individual problems for Junior and Senior students with special interests in textiles, merchandising or apparel. Prereq: Junior or Senior standing, consent of instructor. E
495 Special Topics (3) Topics in textiles, merchandising, and/or apparel. May be repeated. Maximum of 9 hours. Prereq: Junior or Senior standing, consent of instructor. E
497-498 Honors: Textiles and Apparel (3) Individual problems for Junior and Senior students showing special ability and interest in textiles and apparel. Prereq: Recommendation of Department Head. E

THEATRE
100 Introduction to Theatre (3) Understanding theatre: thought, philosophy, aesthetics, and production practices. 210-211 Survey of World Drama (3,3) 210-Includes Greek, Roman, Medieval, Elizabethan, and Eastern forms of drama. 211-Covers 19th century, as well as realism through contemporary drama. 220-221 Acting (3,3) 220-Improvisations, theatre games, acting skills. 221-Use of acting skills in extensive scene work. 226 Voice and Diction (3) Voice production; attention to individual speech problems. 245 Basic Stage Costuming (3) Costume design and construction; basic theory and technique. Production participation required. Prereq: 100
250 Introduction to Scenery Technology (3) Techniques of scenery and stage properties construction. Production participation required. Prereq: 426 Advanced Phonetics (3) Phonetic aspects of contemporary roles. Prereq: 100
260 Fundamentals of Lighting and Sound Production (3) Survey of practical information on electricity, physics, psychology, and instrument engineering as it relates to stage lighting and sound production. Emphasis on hands-on skills in labs.
310-311 History of the Theatre (3,3) 310-Drama in production with particular emphasis in theatre architecture, scene design, and acting styles Antiquity to Renaissance. 311-The European and modern theatres.
312-313 History of the American Theatre (3,3) Development of theatre as social institution in American life. 312-From its beginnings to 1900. 313-From 1900 to present.
320 Advanced Acting (3) Special problems in contemporary roles. Prereq: 220-221 and consent of instructor.
340 Introduction to Costume Design (3) Development of research and rendering skills. Prereq: 245 or consent of instructor.
345 Costume Construction (3) Study and practice of costumes in costume construction. Includes stitching, cornet, millinery, and crafts. Production participation is required.
355 Introduction to Scenic Design (3) Introduction to art and craft of scenic design.
362 Introduction to Lighting Design (3) Mechanics and theory of stage lighting; problems in basic lighting practice. Prereq: 220.
380 Theatre Practicum: Production (1-3) Supervised work on departmental productions. Available for credit only to theatre majors or with consent of department. Prereq: Consent of instructor. May be repeated. Maximum 3 hours.
381 Theatre Practicum: Performance (1-3) Supervised work on departmental productions. Available for credit only to theatre majors or with consent of department. Prereq: Consent of instructor. May be repeated. Maximum 3 hours.
401 Principles of Theatrical Design (3) Fundamental principles of design; visual and structural relationships. Projects will be assigned to develop understanding and production. 409 Stage Make-Up (2) Problems in make-up design and application, character analysis, physiognomy and chiaroscuro. Prereq: 100.
410 Dramatic Theory and Criticism (3) Theatre aesthetics from Aristotle to the present.
420 Special Studies in Acting (3) Content varies. Exercises in selected concentrated areas such as Shakespeare, technique, applications, e.g., Greek, movement, humor. Prereq: 320.
426 Advanced Phonetics (3) Phonetic aspects of contemporary dialects of the English language. Prereq: Consent of instructor.
430 Principles of Play Directing (4) Problems in composition, dramaturgy, movement. Prereq: 220, 221 and consent of instructor.
445 Advanced Costume Construction (3) Advanced construction technique, such as tailoring, vacuum forming, plastic molding, and cobbling. Prereq: 345 or consent of instructor.
446 Costume Patternmaking (3) Draping patterns for period costumes. Includes corsetry and the study of historic patterns 1500-1900. Prereq: 345 or consent of instructor.
450 Advanced Scenery Technology (1) Study and practice of theatre woodworking; production participation will be required. Prereq: 250. Graduate credit available to theatre M.F.A. students only.
451 Advanced Scenery Technology (2) Study and practice of metalworking and plastics for theatrical productions; production participation will be required. Prereq: 250. Graduate credit to theatre M.F.A. students only.
452 Advanced Scenery Technology III (3) Study and practice of stage rigging for theatrical productions; preparation of stage settings, design, and planning. Prereq: 250. Graduate credit available to theatre M.F.A. students only.

454 Scenery Painting (2) Introduction to materials, techniques, and principles of the craft. Emphasis on gaining skill and understanding through studio experience. Prereq: Consent of instructor.


460 Advanced Lighting and Sound Technology (3) Projects in lighting and sound coordination. May include opera, dance, musical theatre, and "rock videos". Final projects will be live productions. Emphasis on developing artistic sensitivity and subtleties in control. Prereq: 259.

461 Special Effects in Lighting and Sound (4) Projects in special effects including creative application of technology. Problem solving, drafting, and execution of effects for production emphasized. Production participation required. Prereq: 260 or instructor's permission.

462 Advanced Lighting Design (3) Advanced problems in lighting design and theory including areas such as lighting musical theatre, opera, and dance. Prereq: 262 or consent of instructor.

463 Sound Design (3) Sound design for the performing arts. Overview of equipment and acoustical factors that affect sound production. Sound designs will be plotted from selected plays. Final projects will be mixed, edited, and used for production.

465 Introduction to Lighting Design for Non-Designers (3) Theory and practice of stage lighting design with emphasis on the relationship between designers and non-design practitioners such as directors, actors, choreographers, architects, etc. Not open for option in lighting design.

470-471 Playwriting (3,3) Advanced instruction in the writing of plays. Prereq: Consent of instructor.

480 Theatre Practicum: Production (1-3) Continuation of 380. Prereq: Consent of instructor. For theatre majors only. May be repeated. Maximum 3 hours.

481 Theatre Practicum: Performance (1-3) Continuation of 381. Prereq: Consent of instructor. For theatre majors only. May be repeated. Maximum 3 hours.

491 Foreign Study (1-15) See page 97.

492 Off-Campus Study (1-15) See page 96.

493 Independent Study (1-15) See page 96.

TRANSPORTATION AND LOGISTICS

301 Introduction to Logistics (3) Business logistics as a functional area within the firm, and as a strategic element of the marketing mix. Role of materials management and physical distribution, and activities such as inventory control, order processing and information flow, transportation, warehousing, purchasing, inventory, and system design and organization.

302 Transportation Principles and Policies (3) Transportation and distribution as a vital part of the nation's economic and social structure; U.S. transportation system; society's demands for mobility and policies of public and private sectors to meet those demands. Prereq: Math 110 or 111 and 120; BUS 203.

400 Special Topics in Transportation and Logistics (3) Seminar in current problem areas in transportation and logistics. Topic announced prior to offering. May be repeated once for credit. Prereq: Consent of instructor.

401 Materials and Traffic Management (3) Planning and management of logistics activities including purchasing, transportation, storage and control, and supply system. Emphasis on general principles, techniques, and organizational structures for various industries. Prereq: 301.

402 Transportation Operations and Cost Management (3) Freight and passenger carrier operations with the development of carrier costs and their control, considered by each mode individually and in coordination with each other. Prereq: 302.


493 Honors: Executive-in-Residence in Transportation and Logistics (3) Student interaction with top-level logistics and transportation executives. Focus on the strategic decision-making process. Prereq: Consent of instructor.

UNIVERSITY HONORS

118-128 Honors: First Year (3,3) Small seminar classes taught by faculty from all undergraduate colleges of the university. Open to first and second year students on the basis of GPA, test scores, or professorial recommendation. Topics vary. May be repeated.

218-228 Honors: Second Year (3,3) Small seminar classes taught by faculty from all undergraduate colleges of the University. Not open to first year students; open to all other students with a GPA of 3.25 or greater. Topics vary. May be repeated.

318-328 Tennessee Scholars Seminar (1,1) Sequence limited to and required of all Tennessee Scholars each year. May be repeated. Maximum 8 hours. Satisfactory/No Credit grading only.

418-428 Honors: Senior Colloquium (3,3) Small group studies of selected topics, issues, or problems. Open to juniors and seniors with a GPA of 3.25 or greater. May be repeated.

491 Honors: Foreign Study (3-15) Open to any undergraduate honors student. Proposals must be approved in advance. See the Director of University Honors for further information.

492 Honors: Off-Campus Study (3-15) Open to any undergraduate honors student. Proposals must be approved in advance. See the Director of University Honors for further information.

493 Honors: Independent Study (3-15) Open to any undergraduate honors student. May be used by Tennessee Scholars preparing their senior projects. Proposals must be approved in advance. See the Director of University Honors for further information.

UNIVERSITY STUDIES

101 Freshman University Seminar (Seminar) Introduction to university education as an adventure in personal growth and professional development. A/B/C/NC grading. Open only to freshmen, transfer students, and re-entry students, or by permission of instructor.

210-220 Case Studies (4,4) Variable content using case studies and problem-solving approaches to explore interdisciplinary issues. Includes a one-hour learning laboratory. Open only to students enrolled in a University Learning Community.

310-320 Special Topics in University Studies (3,3) Interdisciplinary approaches to issues transcending the boundaries of a single discipline. Topics may be selected by faculty or students through arrangements with the University Studies Program. Taught by faculty from throughout the University (often team-taught). Extensive use of films, field trips, student discussion. May be repeated. Maximum: 9 hours.

410-420 Advanced Topics in University Studies (3,3) Interdisciplinary research approaches to major issues transcending the boundaries of a single discipline. Topics may be selected by faculty or students through arrangements with the University Studies Program. Taught by faculty from throughout the University (often team-taught). Extensive use of films, field trips, student discussion. May be repeated. Maximum: 9 hours.

URBAN STUDIES

200 Human-Environment Systems (3) (Same as Interior Design 200.)

250 Introduction to Urban Studies (3) Multidimensional nature of urban studies. Includes lectures by specialists presenting the approach of their disciplines to Urban Studies; application of general approaches to a specific issue; and collaborative teaching involving most faculty of Urban Studies.

312: Urban Politics and Process (3) (Same as Political Science 312.)

322 Behavioral Geography (3) (Same as Geography 322.)

350 Practicum in Urban Studies (3-6) Student and faculty member team, in conjunction with the East Tennessee Design Center, study a selected problem or aspect of the modern city.

401 The City in the United States (3) (Same as Planning 401.)

402 Survey of Planning (3) (Same as Planning 402.)

441 Urban Geography (3) (Same as Geography 441.)

450 Directed Field Work (3-15) Participant observation and directed field research. Projects are presented to Urban Studies students and faculty.

454 Cities and Urban History (3) (Same as History 454.)

460 Seminar in Urban Studies (3-6) Variety of disciplines used to approach student selected problem. Prereq: 250, 350 and senior status. Student may not take 460 prior to having taken 450, except with prior permission of the Urban Studies Committee.

464 Urban Ecology (3) (Same as Sociology 464.)

481 Real Estate Finance and Investment Analysis (3) (Same as Finance 481.)

482 Urban Development and Finance (3) (Same as Finance 482.)

WILDLIFE AND FISHERIES SCIENCE

341 Law Enforcement and Public Relations (3) Fundamentals and general principles of local, state and federal laws and regulations governing natural resources and their management. Principles and practices of interacting with the public.

441 Wildlife and Fisheries Techniques (3) Capturing and handling fish and wildlife; population restoration; food handling; animal care; design and control marking techniques; fish culture systems; management plans; track and sign identification. Prereq: Forestry, Wildlife and Fisheries 317 or Ecology 230, and 6 hours of mathematics, 2 hours and 1 lab.

443 Fisheries Science (3) Quantification and management of freshwater fisheries including population estimation, age and growth, biological assessment, and stocking. Prereq: Forestry, Wildlife and Fisheries 317 or Biology 230, and 6 hours of mathematics, 2 hours and 1 lab.

444 Ecology and Management of Wild Mammals (3)
Biological and ecological characteristics of game mammals and endangered mammals. Current principles and practices of wildlife management. Prereq: Forestry, Wildlife and Fisheries 317 or Biology 230. 2 hours and 1 lab. F

445 Ecology and Management of Wild Birds (3) Biological and ecological characteristics of game birds, endangered birds, and bird pests. Current principles and practices of wild bird management. Prereq: Forestry, Wildlife and Fisheries 317 or Biology 230. 2 hours and 1 lab. F

493 Independent Study in Wildlife and Fisheries Science (1-15) Special research or individual problem in wildlife and fisheries science. E

WOMEN'S STUDIES

210 Images of Women in Literature: Biography and Autobiography (3) Introduction to women's journals, diaries, biographies and autobiographies.

215 Images of Women in Literature: Fiction, Poetry, Drama (3) Introduction to the study of women through the roles and stereotypes portrayed in a variety of literary genres (fiction, poetry, and drama), including works from diverse historical periods and cultures.

220 Women in Society (3) Role played by women in various societies during different historical periods, factors which have limited women's participation in society, social scientists' assumptions about women.

230 Marriage and Family: Roles and Relationships (3) (Same as Child and Family Studies 220.)

310 Emergence of the Modern American Woman (3) Role of women in the development of American civilization and values. Major topics include women's legal and political status, the emergence and development of feminism, women and the creative arts, and women's roles in industrial and post-industrial American society.

324 Women in French Culture (3) (Same as French 324.)

330 Women in Music (3) (Same as Music: History 330.)

332 Women in American Literature (3) (Same as English 332.)

375 Gender in Society (3) (Same as Sociology 375.)

380 The Concept of Woman (3) (Same as Philosophy 380.)

382 Philosophy of Feminism (3) (Same as Philosophy 382.)

383 Women in the Greek and Roman World (3) (Same as Classics 383.)

400 Topics in Women's Studies (3) Content varies. May be repeated.

410 Psychology of Sex Role Development (3)

422 Women Writers in England (3) (Same as English 422.)

425 Women's Health (3) (Same as Health 425.)

432 Women in European History (3) (Same as History 432.)

434 Psychology of Gender (3) (Same as Psychology 434.)

453 Women in American History (3) (Same as History 453.)

466 Rhetoric of the Women's Rights Movement (3) (Same as Speech 466.)

483 Afro-American Women in American Society (3) (Same as Afro-American Studies 483.)

483 Independent Study (1-15) Registration by consent of chair of Women's Studies. See page 96.

ZOOLGY

117-118 Honors: Fundamentals of Zoology (4,4) For superior students in any field; open to students with a minimum ACT composite score of 27 or a minimum college GPA of 3.2, or consent of instructor. Students not achieving at least a B in the first semester must complete the second semester with Biology 130. Must be taken in sequence. 117-Cellular processes, genetics, and development. 118-Physiology, phylogeny, and ecology. 3 hours combined lecture and lab. May not receive credit for 117-118 and Biology 110-120 or Botany 110-120.

210-220 Human Biology (3,3) For non-majors; not available as prerequisite or major credit in Zoology or Biology. May be taken out of sequence. 210-Diversity of life forms, uniqueness of humans, cell biology, genetics, reproduction, prenatal development. 220-Human physiology and ecology.

230 Human Physiology (5) Fundamentals of human physiology, primarily from the perspective of cellular and organ-system interactions. Credit may not be applied toward Zoology major. Prereq: One year of college chemistry, 4 hours and one lab.

240 Human Anatomy (3) Gross and microanatomy of the human. Credit may not be applied toward Zoology major. Prereq: One year of introductory biology or Zoology 230 or equivalent. 2 hours and 1 lab.

301 Special Topics (1-2) Topics of current interest. Consult departmental listing for topics offered. May be repeated but maximum of 2 credit hours may be applied toward the Zoology major.

302 Zoology Colloquium (1) Weekly discussions of topics of current interest. Intended for premed and prospective medical students.

310 Bioethics (3) Relationships between biological discoveries and human values. Open discussions of selected dilemmas arising from new knowledge about evolution of behavior, genetics, reproduction, medicine, and environment.

322 Physiology of Reproduction and Lactation (3) (Same as Animal Science 322.)


350 Comparative Vertebrate Biology (4) Origins, phylogeny, diversity and functional anatomy of vertebrates. Laboratory involves dissection of shark, cat, and selected other vertebrates. 2 hours and 2 labs.

360 Comparative Invertebrate Biology (4) Origins, phylogeny and functional anatomy of invertebrates with emphasis on diversity of life forms and adaptations to specific local environments. 2 hours and 2 labs.

370 Ethology and Sociobiology (3) (Same as Psychology 370.)

380 General Entomology (3) Introduction to insects: basic structure, physiology, behavior, evolution and classification of insect orders. 2 hours and 1 lab.

400 Undergraduate Research (2) Research projects under supervision of faculty. Prereq: Junior or senior standing and prior consent of instructor. May be repeated. Maximum of 4 hours may be applied toward the Zoology major.

402 Practicum in Zoology (2) Participation in individualized practical applications of zoology in conservation, government, and industry. Prereq: Biology 210, 220, 230 and prior consent of instructor.

403 General Genetics Laboratory (2) Experiments designed to illustrate basic principles of inheritance; primary material used is Drosophila. Prereq: Biology 220. 2 labs.

404 Cytological Technique (2) Practical experience with a variety of techniques including microscopy, embedding and sectioning, chromosome preparations, autoradiography, in situ hybridization, histochemistry, and immunofluorescence. Prereq: Biology 210, 2 labs.

405-406 Minicourse in Zoology (1) Selected advanced topics in zoology, concentration in time and subject matter determined by consultation and departmental listing for topics offered. Prereq: As announced. May be repeated for credit but a maximum of 3 hours may be applied toward the Zoology major.

409 Perspectives in Zoology (2) Critical analysis of selected readings in biology. Prereq: Senior standing.

410 Advanced Cell Biology (3) Molecular and supramolecular structure and functions of eukaryotic cells including regulatory mechanisms, physiology, biochemistry, and cellular interactions. Prereq: Biology 210, 220. 2 hours and 1 lab.

415 Parasitology (3) Parasitic relationships: physiological, ecological, evolutionary and economic aspects. Prereq: Biology 230 or consent of instructor. 2 hours and 1 lab.

420 Cell and Tissue Structure and Function (4) Animal cells and tissues at light and electron microscope levels. Prereq: Biology 210. 2 hours and 2 labs.

430 Immunology (3) (Same as Microbiology 430.)

439 Immunology Laboratory (1) (Same as Microbiology 439.)


445 Comparative Animal Physiology (3) Comparison of diverse physiological mechanisms aiding in adaptation to particular habitats and lifestyles. Prereq: Biology 210, 230, 2 years of chemistry; recommended: 380.

449 Laboratory in Physiology (2) Prereq or Coreq: 440 or 445.

450 Comparative Animal Behavior (3) Principles and methods of ethology with emphasis on ecological, developmental, physiological and evolutionary aspects. Coreq: 459. (Same as Physiology 450.)

459 Comparative Animal Behavior Laboratory (3) Introduction to observational and experimental research in ethology. Coreq: 450. (Same as Psychology 459.)

460 Evolution (3) Modern concepts of animal evolution.

465 Human Genetics (3) Genetic and molecular principles and problems of human inheritance. Prereq: Biology 220.

470 Aquatic Ecology (3) Introduction to the physicochemical nature of inland waters with description of biotic communities and their interrelationships. Prereq: Chemistry 120-130 and Biology 230, 2 hours and 1 lab.

472 Arachnology (3) Biology of spiders, mites, scorpions and relatives. Prereq: 360 or 380. 2 hours and 1 lab.

473 Herpetology (3) Biology of amphibians and reptiles with emphasis on ecology and adaptive radiation. Prereq: Biology 230. 2 hours and 1 lab.

474 Ichthyology (3) Evolution, classification, paleobiology, ecology, population and field identification of fishes. Prereq: Zoology/210. 2 hours and 1 lab.

475 Mammalogy (3) Evolution, classification, biogeography, ecology, behavior and functional anatomy of mammals. Prereq: Biology 230 or equivalent. 2 hours and 1 lab.

476 Mammalogy (3) Evolution, classification, biogeography, ecology, behavior and functional anatomy of mammals. Prereq: Biology 230 or equivalent. 2 hours and 1 lab.

480 Physiology of Exercise (3) Functions of the body in muscular work: physiological aspects of fatigue,
training and adaptation to the environment. Prereq: 230 or 440. 2 hours and 1 lab.

490 Comparative Endocrinology (3) Comparative analysis of physiology and morphology of endocrine glands in vertebrates and invertebrates, their role and interaction in maintenance of the organism and species. Prereq: 440 or equivalent.

491 Foreign Study (1-15) See page 97.
492 Off-Campus Study (1-15) See page 96.
493 Independent Study (1-15) See page 96.