University Courses

Academic Enhancement

ENGL 0100: Study Skills II (0-0)
This course will focus on skills-building activities in thesis development and paragraph structure with emphasis on grammar and usage; topic development, organization and clarity. Individual and group composition; self-peer-critique. Tutoring and individualized computer-assisted lab instruction will be available. Prerequisite: TASP score of 160-180, ENGL 0100.

ENGL 0112: Writing Skills Review: (2-0)
This course will provide study and practice in essential language skills. Emphasis upon strengthening reading vocabulary and upon composition of effective sentences and paragraphs. Tutoring and individualized computer-assisted lab instruction will be available. Course required for all students admitted conditional. Prerequisite: TASP score of 161-180, ENGL 0100.

ENGL 0101: Writing Lab (1-0)
This course will focus on individual and small group conferencing for an intensive practice in the skills needed to recognize and use edited American English. Credit for this course may not be used for completing degree requirements. Tutoring and individualized computer-assisted lab instruction will be available. Prerequisite: TASP score of 181-200, ENGL 0112.

ENGL 0300: Comprehensive Writing Skills (0-0)
This course will enhance writing skills with a major focus on the essay format. It will facilitate the student’s writing proficiency with an emphasis on development of paragraphs, themes, and reports. This is a co-requisite course for students who have not passed TASP writing and it must be taken in conjunction with ENGL 1123. Tutoring and computer assisted instruction are available.

MATH 0100: Mathematics Basics Lab (0-0)
This class will focus on computations involving integers, fractions, decimals and percents. There will be an emphasis on developing the student’s ability to translate verbal problems into mathematical statements. The fundamental properties of numbers and basic geometric concepts will be introduced. Prerequisite: TASP score of 199 or below.

MATH 0113: Basic Mathematics I (3-0)
This course will stress mastery of the skills covered in MATH 0100 and the skills needed to pass the TASP. It will concentrate on fundamental math, solving and graphing linear equations and Algebra including the use of basic operations with polynomials and quadratic functions, and geometry and reasoning. Prerequisite: TASP score of 200-215.

MATH 0123: Basic Mathematics II (3-0)
This course is an introductory course to Algebra designed to make the transition to College Algebra more successful. It provides the student with background knowledge in fundamental Algebra and skills in mathematics. It will concentrate on developing skills in solving and graphing linear equations, simplifying and factoring polynomials, solving quadratic equations and combining and simplifying rational expressions and exponents. Prerequisite: TASP score of 216-225.

MATH 0200: Basic Math II B (0-0)
This course is designed to enhance a student’s proficiency in solving problems related to Algebra. It improves skills in solving binomials, trinomials, polynomials, algebraic fractions, slopes, graphs and radical expressions. Prerequisite: Grade of ‘C’ in Basic Math II (Math 0123).
MATH 0300: Comprehensive Math Skills (0-0)
This course will enhance the student’s performance in College Algebra. It improves skills in solving quadratic equations, manipulating polynomials, radicals and exponential expressions. It develops a basic understanding of the mathematical functions and concepts necessary for successfully completing the College Algebra course. A co-requisite course for those students who have not passed TASP Math and it must be taken in conjunction with College Algebra. Tutoring and computer-assisted instruction are available. Prerequisite: TASP score of 226-229.

RDNG 0100: Reading Review Skills Level II (0-0)
This course will introduce the six basic-level TASP competencies necessary for building a strong foundation for reading comprehension: determining the meaning of words; understanding the main idea and supporting details in written material; identifying a writer’s purpose, viewpoint, and meaning; analyzing the relationship among ideas in written material and drawing conclusions; using critical reasoning skills to evaluate written material; applying study skills to reading assignments. Tutoring and computer-assisted instruction are available. Prerequisite: TASP score of 184 and below.

RDNG 0121: Reading Review Skills Level II (0-0)
This is an intermediate developmental reading course which continues the basic reading skills core sequence. Course will stress the basic-level TASP competencies: making inferences; understanding author’s purpose and tone; distinguishing between fact and opinion. Tutoring and computer-assisted instruction are available. Prerequisite: TASP score of 199-212; RDNG 0112

RDNG 0112: Reading Review Skills: Level I (0-0)
This course will focus on the fundamentals of reading; understanding definitions and explanations; grasping the main idea; understanding descriptions, narratives, and relationships; interpreting tables, graphs, and diagrams. Individual and group tutoring as well as computer-assisted instruction is required. Prerequisite: TASP score of 185-198; RDNG 0100.

RDNG 0200: Reading Skills TASP Review (0-0)
This course will stress the advanced level competencies of general problem solving and verbal reasoning associated with arguments and critically analyzing essays, articles, and short stories. Tutoring and computer-assisted instruction are available. Prerequisite: TASP score of 213-225; RDNG 0121.

RDNG 0300: Comprehensive Reading Skills (0-0)
This course will focus on the integration of advanced comprehensive reading skills as related to the college level reading course, (HIST 1313 OR 1323; POSC 1123; PSYC 1113; or ENG 2153), and it will present efficient reading techniques that will help students to maximize their reading skills. A co-requisite course for students who have not passed TASP Reading; must be taken in conjunction with one of the above-referenced college level reading courses. Tutoring and computer-assisted instruction are available, Prerequisite: TASP score of 226-229.
College of Agriculture and Human Sciences

AGEC 1233. Fundamentals of Agricultural Economics. (3-0) Credit 3 semester hours. Survey of the nature, organization, and operation of the agricultural industry; application of economic principles to production and to the marketing of farm-ranch food and fiber products; and investigation of institutions and government as they affect agriculture. *(AGRI 2317)

AGEC 2213. Marketing Agricultural Products. (3-0) Credit 3 semester hours. Study of movement of food and fiber products from the production area to the final consumer. Focus on intermediaries, including transportation agents. Efficiency of performing marketing activities under conditions for perfect and imperfect markets will be emphasized. Prerequisite: AGEC 1233 or ECON 2113 or equivalent

AGEC 2223. Food Distribution Systems. (3-0) Credit 3 semester hours. Study of the nature and functions of the various components of wholesale and retail food distribution. Facility locations, transportation, warehousing, quality control, inventory control, pricing, and other related topics. Prerequisites: AGEC 1233 and/or ECON 2123.

AGEC 3203. World Food Seminar. (3-0) Credit 3 semester hours. Orientation and introduction to domestic and international food distribution employment opportunities. Emphasis will be on providing a broader knowledge of careers in transportation, logistics, and distribution. Prerequisite: AGEC 2213, 2223 and/or ECON 2113; Participation in World Food Distribution Training Center Program and approval of the instructor.

AGEC 3213. Agricultural Policy. (3-0) Credit 3 semester hours. Study of the development of agricultural and food policies and evaluation of policies impact on producers and consumers in domestic and international markets. Prerequisite: AGEC 2213

AGEC 3223. Agricultural Financial Analysis. (3-0) Credit 3 semester hours. Introduction to principles and concepts of finance. Financial statement analysis, risk and returns, time value of money, valuation concepts, capital budgeting, investments, and cost of capital. Prerequisites: AGEC 2113 or ECON 2113 or equivalent.

AGEC 3233. Principles of Transportation. (3-0) Credit 3 semester hours. A course designed to develop basic competencies in the acquisition of transportation services for food and agricultural products. Emphasis will include: selection of transportation services, legal modes of transportation, shipping documents, rates, claims, and the changing environments for the transportation industry. Prerequisite AGEC 2213 or ECON 2113 or equivalent.

AGEC 3253. International Trade and Logistics. (3-0) Credit 3 semester hours. Development of basic competencies in international marketing of food and agricultural products. Focus will be on major markets, international competition, and the impacts of US trade policies and exchange rates on trade. Prerequisite: AGEC 2213, 3213 and/or ECON 2113 or equivalent.

AGEC 4213. Distribution Logistics. (3-0) Credit 3 semester hours. A study of logistics systems and management, including coverage of warehousing, inventory, order processing, traffic, material and handling, packaging, and customer service levels. Focus on logistics for food and agricultural products. Prerequisite: AGEC 2213 and/or ECON 2113 or equivalent.

AGEC 4223. Principles of Agri-business Management. (3-0) Credit 3 semester hours. Economic and business principles applied to the organization and operation of farms and ranches, and other agri-business industries. Prerequisite: AGEC 1233 or equivalent.

AGEC 4233. Land and Resource Economics. (3-0) Credit 3 semester hours. Analysis of the economic, political, and institutional forces involved in the control and use of land and natural resources. Emphasis on land as a factor of production in agriculture. Prerequisite: AGEC 1233 or equivalent.
AGEC 4253. **Agricultural Prices.** (3-0) Credit 3 semester hours. Theories and principles fundamental to the pricing of agriculture commodities. Special emphasis will be placed on marketing conditions affecting price levels. Price and income parity, seasonal and cyclical price variations and futures trading. Prerequisites: senior classification or approval of instructor.

AGEG 1413. **Fundamentals of Agricultural Engineering.** (2-2) Credit 3 semester hours. Introduction to the major areas of agricultural engineering with emphasis on farm workshop methods, tool identification, care and use. Course includes home woodwork. Laboratory fee required. **(AGRI 2303)**

AGEG 2423. **Agricultural Machinery.** (2-2) Credit 3 semester hours. Identification of agricultural machines and equipment; accessories, attachments, and components of agricultural tractors; inspections, adjustments, and maintenance services; and career opportunities. Laboratory fee: $15.00.

AGEG 3413. **Environmental Engineering.** (2-0) Credit 3 semester hours. Installation, operation, care and repair of ventilation, heating, lighting, water supply, sewage, refrigeration, and air-conditioning equipment. Laboratory fee required.

AGEG 4423. **Farm Drainage.** (2-2) Credit 3 semester hours. Land drainage: terracing, gully control, irrigation, and land reclamation.

AGHR 1313. **Agricultural Science and Technology.** (3-0) Credit 3 semester hours. Introduction to professions in agricultural sciences and technology. Importance of agriculture in the state, nation and world. Review of research developments; explorations of career and other opportunities and development of human resource skills needed in agriculture.

AGHR 3323. **Program Planning.** (3-0) Credit 3 semester hours. The application of strategies appropriate for delivering agriculture and human resource concepts to varied audiences. Includes the use of media, materials and supplies; procedures for management, motivation and evaluation. Prerequisite: AGHR 1313.

AGHR 3996. **Cooperative Occupational Experience in Agriculture.** (0-12) Credit 6 semester hours. Pre-baccalaureate work experience in the food and agricultural sciences commensurate with the student’s academic emphasis. Written report of activities consistent with program guidelines upon completion of experience. A minimum of 200 clock hours of supervised work activities are required. Prerequisite: Completion of 60 or more hours of credit applicable to the major emphasis.

AGHR 4413. **Special Topics.** (2-2) Credit 3 semester hours. Directed study of a problem affecting some aspect of the food and agricultural science industry. Special work in an identified area of special interest. Reports, discussion and major paper required. Laboratory fee: $15.00. Prerequisite: Advisor consent.

AGHR 4992-4993. **Independent Study.** (0-4;0-6) Credit 2, or 3 semester hours. Readings, research and/or field work on selected topics. Prerequisite: Advisor consent.

AGRO 1703. **Crop Science.** (2-2) Credit 3 semester hours. Botanical characteristics of agronomic and horticultural plants; relationship between crops and civilization in both historical and biological terms; nature of crop plants in relation to structure, physiology, environment, growth and development; crop improvement, cropping systems and practices, crop hazards and prevention. Laboratory fee: $15.00

AGRO 2603. **Environmental Soil Science.** (2-2) Credit 3 semester hours. An introduction to soils, its components and its relationship the environment. The importance of soils to man, animals and plants. Import physical properties, role of soil constituents; origin, nature, and classification of parent materials; soil genesis, classification and survey; soil fertility and chemical properties; soils and chemical pollution; soils and the world’s food supplements. Laboratory fee: $15.00
AGRO 2613. Natural Resource Conservation Management. (3-0) Credit 3 semester hours. Ecological approach to basic conservation principles, concepts and techniques underlying the management and uses of natural resources that are both efficient and sustainable.

AGRO 2623. Soil Morphology and Classification. (2-2) Credit 3 semester hours. The shape and source of soil features materials and processes involved in or produced after the formation of soil with emphasis on variations world-wide and the principles of soil classification, mapping, and interpretation. Additional topics include: soil taxonomy; land capability classification; soil survey and its utilization; and soil interpretations for non-farm uses. Prerequisite: AGRO 1703. Laboratory fee $15.00

AGRO 2633. Forage and Pasture Management. (2-2) Credit 3 semester hours. Use of forage in grassland agriculture, identification of forage grasses and legumes, cultural practices including weed control, mechanization of forage harvesting and storage; types of pastures, different systems of grazing management and utilization of forages by farm animals. Laboratory fee: $15.00

AGRO 2713. General Entomology. (2-2) Credit 3 semester hours. Insect morphology, life histories, characteristics and habits of beneficial and harmful insects and their impact on agricultural production and the environment; anatomy and physiology growth and metamorphosis, insect orders, ecological aspects and insect behavior, control of harmful insects. Laboratory fee $15.00

AGRO 2723. Horticulture. (2-2) Credit 3 semester hours. Study of the cultural practices in growing flowers, fruits, and scrubs, with emphasis on vegetable culture (growth and development). Breeding and improvement; crop establishment, fertilizing, weeding, irrigating and mulching; post harvest handling; marketing and controlling insects and diseases. Laboratory fee $15.00

AGRO 2733. Principles of Crop Production. (2-2) Credit 3 semester hours. Crop characteristics and classifications, growth patterns, soil and climate requirements (physiology), pest control, storage, distribution, and application of these principles to the management and production of field and vegetable crops for improved food, fiber, and forages. Laboratory fee: $15.00

AGRO 3633. Soil Fertility and Fertilizers. (3-0) Credit 3 semester hours. Chemical, biological and physical processes as they influence soil fertility. Manufacture of fertilizers and their reactions with soils and the soil-plant-water system.

AGRO 3643. Soil and Water Management. (3-0) Credit 3 semester hours. Sustainable soil productivity and management in agricultural systems involving resource inputs, tillage systems, erosion control, residue management, and water management for a quality environment.

AGRO 3733. Plant Pathology. (2-2) Credit 3 semester hours. Fundamental principles of plant pathology, including parasites and disease development, identification of major agronomic diseases and their biotic and abiotic causes; proper diagnosis of plant diseases, differentiation between signs and symptoms, isolation of pathogens in pure culture; environmental effects on development of infectious plant diseases; control of plant diseases. Laboratory fee: $15.00

AGRO 4613. Soil Microbiology. (2-2) Credit 3 semester hours. Role of soil microorganisms in soil-plant ecosystems. Microbial ecology, microbes in nutrient cycles important to agriculture, pesticide degradation, bacterial fertilizers, composting, waste disposal, plant microbe interactions. Laboratory estimation of soil microbial populations and measurement of important biological processes in soil and current methods. Laboratory fee: $15.00

AGRO 4623. Environmental Science (2-2) Credit 3 semester hours. Physical, chemical, biological and agricultural components of the environment and their interaction and effects on pollution and the maintenance and utilization of varied environmental systems. Prerequisite: Senior standing. Laboratory fee: $15.00
ANSC 1513. General Animal Science. (3-0) Credit 3 semester hours. Introductory course dealing with domestic farm animals common in the United States. Selection, reproduction, nutrition, management and marketing of beef cattle, swine, sheep, goats, and horses.

ANSC 2513. Animal Production and Marketing. (2-2) Credit 3 semester hours. Systematic study of methods of breeding, feeding, marketing, sanitation and management of commercial animals (swine, beef and dairy cattle, horses, goats and sheep). Laboratory fee: $15.00

ANSC 2523. Poultry Science. (2-2) Credit 3 semester hours. Knowledge of the history and development of the poultry industry; the anatomy and physiology of the domestic fowl, especially related to reproduction. Inferences of genetic, environmental and behavioral factors on embryonic development; affects of diet, drugs and toxins. Practices involve artificial incubation, breeding and rearing. Laboratory fee $15.00

ANSC 2533. Dairy Science. (3-0) Credit 3 semester hours. Branches of the dairy industry, introduction to dairy types and breeds, the major factors in the management of cattle for milk production, and the common dairy processes. Prerequisite: ANSC 1513. **(AGRI 1311)

ANSC 2543. Diseases and Sanitation. (3-0) Credit 3 semester hours. Clinical studies of the most common livestock diseases embracing anamnesis, etiology, symptoms, diagnosis, therapeutics, and prophylaxis.

ANSC 2553. Poultry Technology and Marketing. (2-2) Credit 3 semester hours. Factors affecting the physical, chemical, microbiological and functional characteristics of poultry and egg products. Product development, processing, quality packaging, and quality control concepts. Laboratory fee: $15.00

ANSC 3503. Animal Nutrition. (3-0) Credit 3 semester hours. Composition and digestibility of feed, with physiology, preparation, feeding standards, calculation and balancing rations for commercial animal (swine, cattle-beef and dairy, sheep, goats, and horses). Prerequisite: ANSC 1513.

ANSC 3513. Anatomy and Physiology. (3-0) Credit 3 semester hours. Comparative approach, anatomically and physiologically of the basic systems of the domestic animals.

ANSC 3523. Meat Science. (2-2) Credit 3 semester hours. Methods of slaughtering farm animals, processing, curing preservation and storage of meats and products. Laboratory fee: $15.00

ANSC 4533. Breeding/Genetics. (3-0) Credit 3 semester hours. Physiology of reproduction, breeding, breeding systems and practices. Application of genetic principles to the problems of animal breeding. Prerequisite: Junior standing.

DESN 1123. Design II. (2-2) Credit 3 semester hours. Basic principles applied to composition; form and function; color properties, pigment mixtures, accents, dominance, subordination; analysis of design motifs and organization. Planning and expanding the design experience through computer simulation and composition. Laboratory fee $15.00 **(ARTS 1312)

DESN 2113. Design Illustration. (2-2) Credit 3 semester hours. Principles and procedures of design illustration of apparel and accessories through use of computer-aided-, pen-and-ink, and brush techniques suitable for contour and linecut reproduction. Laboratory fee: $15.00

DESN 3123. Historic Costume Design. (3-0) Credit 3 semester hours. A study of the history of dress as associated with art, history, and ethnology. Analysis of national costumes as sources of inspiration for design. Study of fashion lay-out and design essentials. Offered alternate years. Prerequisites: Junior standing.

FDSC 3583. Food Quality Assurance and Sanitation. (2-2) Credit 3 semester hours. Examination of the elements of a comprehensive quality assurance program. Areas of study include sanitation, pest control,
waste disposal, food law regulations, sensory testing, panel selection and training, and experimental design and analysis of data. Prerequisite: Junior standing Laboratory fee $15.00

FDSC 3593. Food Bacteriology. (2-2) Credit 3 semester hours. Microbiology of human foods and accessory substances. Raw and processed foods, physical, chemical and biological phases of spoilage. Standard industry techniques of inspection and control. Laboratory fee: $15.00

FDSC 4553. Raw Materials. (3-0) Credit 3 semester hours. Problems involved with procurement, harvesting, handling and storage of fruits, vegetables, cereal, dairy products. Prerequisite: HUNF 3623 or Advisor consent.

FDSC 4573. Food Processing and Engineering. (2-2) Credit 3 semester hours. Study of the principles and practices of thermal processing, quick freezing, dehydration, fluid flows, heat transfer, pickling and juice manufacture. Prerequisite: junior standing. Laboratory fee: $15.00


HDFM 2533. The Contemporary Family in Crosscultural Perspective. (3-0) Credit 3 semester hours. Analysis of family interaction patterns, roles, and functions, throughout the life cycle as influenced by customs, cultural diversity, and socioeconomic status with implications for broader understanding of a multicultural society. Examination of public policies and procedures impacting family functioning.

HDFM 2543. Pre-Adolescent and Adolescent Development. (3-0) Credit 3 semester hours. Study and analysis of individual development from age twelve through twenty. Examination of developmental theories and current critical issues with emphasis on the role and relationships among family, peer, school and community interactions during these formative years. Observation, recording and evaluation of behaviors required.

HDFM 2553. Human Development: Life Span. (3-0) Credit 3 semester hours. The dynamic processes of co-development of the individual from conception to senescence in physical, sensory, intellectual, emotional, and social development. Pattern of self-development with focus on the interaction between and among individuals. Prerequisite: junior standing.

HDFM 3503. Early Childhood Environments. (3-0) Credit 3 Semester hours. Study and analysis of varied environments for children. Guidelines for program planning, identification and selection of creative and expressive materials and equipment, staffing, organization and management, record keeping, licensing requirements, parent/child/teacher interactions, and effective guidance techniques. Observation, participation and assessment required. Prerequisite: Junior standing.

HDFM 3513. Individual and Family Counseling Strategies. (3-0) Credit 3 semester hours. Study, assessment and application of basic interviewing and counseling strategies to include varied interviewing models, techniques and methods which facilitate individual and family interactions.

HDFM 3523. Parenting Issues and Education. (3-0) Credit 3 semester hours. Principles and patterns, philosophies and theories, methodologies and practices, and resources for the design, implementation, and evaluation of programs for enhancing parenting skills in the parent-child relationship. Prerequisite: Junior standing.

HDFM 3543. Adulthood and Aging. (3-0) Credit 3 semester hours. Examination and analysis of theoretical and empirical data related to social, economic, physical, and psychological factors influencing processes and consequences of aging. Research on a selected topic. Written report required. Prerequisite: Junior standing.

HUNF 2633. Food Service Systems. (3-0) Credit 3 semester hours. Food service organization, layout and design, equipment selection, specifications, safety, sanitation, labor and financial control, consumer distribution.

HUNF 2653. Food Principles and Meal Management. (2-2) Credit 3 semester hours. Principles of preparation, organization, and management applied to planning, preparation, serving, and marketing nutritious meals to individuals and groups at varied socioeconomic levels. Management of work areas, organization techniques, and standards for meal service and table appointments. Prerequisite: HUSC 1343. Laboratory fee: $15.00. **(HECO 1315)

HUNF 2663. Food Systems Management. (2-2) Credit 3 semester hours. Management principles, process and control strategies, roles and responsibilities in food service systems. Application of food preparation and management principles to quantity food production including menu planning, procurement, storage and distribution. Prerequisite: HUNF 2633. Laboratory fee: $15.00

HUNF 3623. Food Science and Technology. (2-2) Credit 3 semester hours. Principles and techniques of food processing and preservation and their affects on nutrient retention. Food and drug regulations, food additives and standards of identity. Prerequisite: Credit or concurrent enrollment in CHEM 2033 and 2032. Laboratory fee $15.00

HUNF 3633. Advanced Nutrition. (2-2) Credit 3 semester hours. Metabolism of the nutrients, dietary calculations and evaluation of nutritional assessments, and developments in nutritional science and their effects on health. Research and written reports on a selected nutritional issue required. Prerequisite: HUSC 1343. Laboratory fee: $15.00 Non-majors by consent of instructor.

HUNF 3653. Nutrition and Disease. (2-2) Credit 3 semester hours. Study of the physiological and metabolic anomalies in chronic and acute diseases, and principles of nutritional therapy and prevention. Computer assisted nutritional assessment and diet calculations. Prerequisites: HUNF 2653, 3633 or consent of the instructor. Laboratory fee: $15.00

HUNF 4603. Physicochemical Aspects of Food. (1-4) Credit 3 semester hours. Covers physical and chemical factors accounting for color, flavors and texture of natural and processed foods. Laboratory experiments to illustrate the effects of varying ingredients and treatment on the quality of food products. Objective testing methods to determine food quality characteristics. Prerequisites: HUSC 1343; HUNF 2653, 2663. Laboratory fee: $15.00.

HUNF 4613. Problems in Nutrition. (1-4) Credit 3 semester hours. Investigate special topics in nutrition. Research methodology and computer application including statistical analysis. Proposals prepared by students and presented to instructor for approval. Students work independently, seeking guidance as necessary. Senior standing. Laboratory fee $15.00

HUNF 4653. Nutrition throughout the Lifecycle. (3-0) Credit 3 semester hours. Comparative assessment and evaluation of nutrition and dietary requirements through the lifecycle. Pre-pregnancy, pregnancy, lactation, infancy, childhood, adolescence, adulthood, and aging. Nutrition needs on the basis of both physical growth and psychological development are emphasized. Prerequisites: HUSC 1343, HUNF 3633, 3653.

HUNF 4693. Community Nutrition and Health. (3-0) Credit 3 semester hours. Study of human nutrition and health problems from a community perspective; programs and policies related to nutrition at local, state and federal levels; approaches and techniques of effective application and dissemination of nutrition knowledge in communities. Prerequisite: HUSC 1343. Open to non-majors with consent of instructor.
HUSC 1303. Elementary Textiles. (1-4) Credit 3 semester hours. A study of fibers, yarns, fabric structure, dyes and finishes of fabrics. Analysis of fiber finish developments; properties of textile use with emphasis on aesthetic quality, mechanical properties, factors of degradation, laundering and cleaning. Review of recent textile trends. Open to non-majors. Laboratory fee $15.00 (HECO 1320)

HUSC 1313. Color and Design. (1-4) Credit 3 semester hours. Basic design principles applied to everyday living. Study of the relationship of sociological and anthropological principles to current perspectives in related art. Emphasis on art application and the use of computer simulation in the translation of theoretical concepts of space, pattern texture, line and color to the major disciplines in human sciences. Open to non-majors. Laboratory fee $15.00

HUSC 1333. Apparel Selection and Production. (1-4) Credit 3 semester hours. Application of elements and principles of color and design and of sociological and psychological concepts of behavior to contemporary apparel design and production. Analysis of the relationship of design to figure type, personality, color, and fabrication. Open to non-majors. Laboratory fee: $15.00. **(HECO 1329)

HUSC 1343. Ecology of Human Nutrition and Food. (2-2) Credit 3 semester hours. Introduction to human nutrition and food. Study of human nutritional needs and problems encountered in providing food for the satisfaction of physiological and sociocultural systems needs, and the significance of these interrelationships to health. Discussion of current nutritional issues. Open to non-majors. Laboratory fee: $15.00. **(HECO 1322, 1323)

HUSC 1351. Human Sciences Perspectives. (1-0) Credit 1 semester hour. The history and development of home economics as family, consumer and human sciences. Preparation, competencies and enrichment in the broad spectrum of human science professions; career development and career alternatives; interaction techniques for development of satisfying interpersonal skills. Open to non-majors. **(HECO 1101)

HUSC 2373. Consumers and the Market. (3-0) Credit 3 semester hours. Analysis of consumer competencies, attitudes, and concepts of the present market, market practices, aids toward intelligent buying of commodities, and the types of protection including legislation. Open to non-majors. **(HECO 1303).

HUSC 3313. Program Planning I. (3-0) Credit 3 semester hours. A study of human sciences and related programs with emphasis on the development of skills in the planning, financing, managing, and marketing of these programs to varied audiences. Includes methods of observation and assessment of human science programs and services rendered to in-school and out-of-school youth and adults. Prerequisite: Junior standing.

HUSC 3323. Program Planning II. (3-0) Credit 3 semester hours. Analysis of the application of multiple strategies appropriate for delivering human science concepts to varied audiences utilizing multifaceted mediums. Includes examination and use of media, materials, supplies, equipment, procedures for management, motivation and evaluation techniques. Prerequisite: Junior standing.

HUSC 3343. Advanced Apparel Production. (1-4) Credit 3 semester hours. Application of advanced techniques for the production of apparel using contemporary fabrics, varied fabric combinations, and variations in garment style rendered from computer designed and commercial pattern alterations. Acquisition of techniques essential for mass apparel production. Prerequisite: HUSC 1333. Laboratory fee: $15.00.

HUSC 3353. Housing and Human Environments. (3-0) Credit 3 semester hours. The physical, psychosocial, and aesthetic relationships between man and his environment with specific reference to housing. Economic, cultural and technological trends in building, equipment, living patterns and design. Comparative analysis of current housing trends and styles required. Prerequisite: Junior standing.
HUSC 3373. Child Development. (3-0) Credit 3 semester hours. Study and analysis of individual development and behavior during the early school years to adolescence with emphasis on physical, cognitive, social, language, and emotional areas. Examination of developmental and learning theories, principles of normal and atypical development and varied guidance techniques. Observation, recording and evaluation of behaviors required.

HUSC 4303. Family Consumer Economics and Management. (2-2) Credit 3 semester hours. A systems approach to family resource management through theory analysis and exploration of varying family structure, styles, and conditions. Simulated laboratory in group living required. Laboratory fee required. Prerequisite: Senior standing. Laboratory fee: $15.00.

HUSC 4306. Human Sciences Internship. (0-0) Credit 6 semester hours. Planned program of observation and entry-level work experience in selected business or industrial firms, educational or governmental agencies/organizations in the food, agricultural and/or human sciences. Prerequisite: Junior standing and advisor consent.

HUSC 4363. Family and Community Studies. (2-2) Credit 3 semester hours. Comprehensive study of the cultural, social, political, and technological influences that impact educational, business, and support service programs for individuals, families and groups in a changing society. Emphasis on philosophy, organization, planning, financing, implementation and assessment of the components of family and community service programs with special attention to the Cooperative Extension Service model. Review and evaluations of school and community based programs required. Prerequisite: Junior standing. Laboratory fee $15.00

HUSC 4993. Independent Study. (0-6) Credit 3 semester hours. Readings, research, and/or field work on selected topics. Prerequisite: consent of instructor.

MERC 3713. Evaluation of Apparel and Home Accessories. (3-0) Credit 3 semester hours. Study and analysis of design, textures and color coordination in ready-to-wear and home furnishings and accessories. Comparative examination of manufacturing, merchandising, sales and management from a retail/wholesale and consumer perspective.

MERC 3723. Apparel Selection and Evaluation. (2-2) Credit 3 semester hours. Study, analysis, and evaluation of textiles for individual apparel and household utilization. Study of fabric design, pattern design and making through use of computer simulation techniques. Comparison of methods for style and size variations, time management and garment cost. Review and analysis of current regulations for domestic and international trade relative to the textile and apparel industry. Prerequisite: DESN 2113; HUSC 1333. Laboratory fee $15.00

MERC 3743. Fashion Buying. (3-0) Credit 3 semester hours. Analysis and study of the functions in fashion retail/wholesale organizations. Focus on concepts essential for buying, distribution, merchandising and marketing of ready-to-wear.

MERC 4743. Fashion. (3-0) Credit 3 semester hours. Study of the procedures for risk management and merchandising for the fashion retailer/wholesaler. Emphasis on planning, decision-making and management of varied resources and applications through computer simulations. Course work supplemented by case studies in merchandising. Prerequisite: Senior standing

MERC 4763. Promotion and Visual Merchandising. (2-2) Credit 3 semester hours. Promotion of products through visual merchandising including fashion show production, special events, display, selling techniques and other promotional activities in industry and retailing. Coordination of buying, selling, promoting, display, and advertising functions in retail store merchandising. Prerequisite: Senior standing. Laboratory fee $15.00
**MERC 4773. Fashion Study Tour.** (0-0) Credit 3 semester hours. Observation and analysis of domestic and/or foreign costumes, textiles, apparel markets, manufactures/mills, retailers/wholesalers, historic collections and sites; professional seminars. Prerequisite: MERC 3743 or Instructor consent.

** Transfer equivalent from Texas Community/Junior Colleges.
School of Architecture Courses

ARCH 1233. Visual Communications. (1-4) Credit 3 semester hours. Multimedia techniques in graphics emphasizing orthographic projections, perspective, shade and shadow, and freehand drawing.

ARCH 1253. Architecture Design I. (1-4) Credit 3 semester hours. Study of the basic elements of design in both two and three dimensions.

ARCH 1266. Architecture Design II. (2-8) Credit 6 semester hours. Basic principles of architectural design and communication including organization, spatial sequence, relationships and problem solving using simple interior and exterior problems.

ARCH 1273. Introduction to Multimedia Computing. (2-2) Credit 3 semester hours. Development of computer literacy with emphasis on document preparation and basic computer graphics. *(ARCH 1315)*

ARCH 2006. Intensive Architecture Design I. (2-8) Credit 6 semester hours. Intensive design studio and lecture covering principles, theories, elements and problem solving in architecture and skills development in the appropriate presentation of architectural problem solutions. Prerequisite: Permission of the Dean.

ARCH 2016. Intensive Architecture Design II. (2-8) Credit 6 semester hours. Basic architectural design projects with an emphasis process and site development, function and form in an intensive design studio and lecture. Prerequisite: Arch 2006 or Permission of the Dean.

ARCH 2223. Computer Aided Design. (2-2) Credit 3 semester hours. Introduction to the range and potential of computer aided design and electronic media in problem solving and conceptual design.

ARCH 2233. History and Theory of Architecture I. (3-0) Credit 3 semester hours. Survey of the development of architecture from ancient times through the Renaissance. *(ARCH 1301)*

ARCH 2243. History and Theory of Architecture II. (3-0) Credit 3 semester hours. Survey of the development of architecture from the Renaissance period to the present. *(ARCH 1302)*

ARCH 2256. Architecture Design III. (2-8) Credit 6 semester hours. Problem solving and presentation of basic principles, concepts and ideas as applied to simple architectural problems. Prerequisite: ARCH 1266.

ARCH 2266. Architecture Design IV. (2-8) Credit 6 semester hours. Basic architectural design projects with an emphasis on site development, function, form and the design process. Prerequisite: ARCH 2256.

ARCH 2273. Materials and Methods I. (3-0) Credit 3 semester hours. Introduction to the properties and uses of natural and manufactured building materials and the effect of the nature of materials upon design.

ARCH 2693. Theory and Method in Architecture. (3-0) Credit 3 semester hours. An examination of the theoretical and formal model as they are revealed in the built environment. Studies in the major concepts, themes and practices of architecture with the intent to stimulate thought about our contemporary theoretical position. Selected research with written report.


ARCH 3256. Architecture Design V. (2-8) Credit 6 semester hours. Building design as it relates to structure, circulation, context and support systems. Prerequisite: ARCH 2266.

ARCH 3266. Architecture Design VI. (2-8) Credit 6 semester hours. Analysis and design of structures of advanced complexity with emphasis on interrelationships of building systems. Prerequisite: ARCH 3256.
ARCH 3283. Materials and Methods II. (3-0) Credit 3 semester hours. Emphasis on systems of building structures and on the interrelationships among the components of the systems, the assembly processes and project control.

ARCH 3294. Structural Systems I. (4-0) Credit 4 semester hours. A study of theory of various structural concepts. Emphasis placed on statics and strength of materials. Prerequisite: General Physics (6 semester hours).

ARCH 3453. Environmental Systems I. (3-0) Credit 3 semester hours. Fundamentals of environmental systems for buildings with emphasis on heating, cooling and distribution systems.

ARCH 3463. Environmental Systems II. (3-0) Credit 3 semester hours. Fundamentals of lighting, electric circuits and wiring design, sound systems and signaling devices. An introduction to the principles of acoustics.

ARCH 3563. Site and Urban Design. (3-0) Credit 3 semester hours. An introduction to urban planning and the analysis of site characteristics, adaptation of building to site, determination of the interrelationship of intended site use with the environment, and the consideration of climate.

ARCH 3643. Presentation Techniques. (3-0) Credit 3 semester hours. Basic graphic communications emphasizing good drafting skills in: perspective drawings, rendering techniques and model building. Prerequisite: junior standing.

ARCH 4063. Project Planning and Feasibility. (3-0) Credit 3 semester hours. Principles and practice of residential and commercial land development.

ARCH 4406. Architectural Internship. (0-0) Credit 6 semester hours. Approved summer internship in an architecture office, the building construction industry or a planning or public service agency. Prerequisite: Permission of the Dean.

ARCH 4423. Urban Planning. (3-0) Credit 3 semester hours. Study of theories and concepts concerning the structure and function of urban communities; spatial and temporal aspects of urban development; problems and consequences of planned and unplanned changes in urban society.

ARCH 4433. Structural Systems II. (3-0) Credit 3 semester hours. A study of theory, behavior and design of structural systems in steel and timber. Prerequisite: ARCH 3294.

ARCH 4443. CAD Construction Documents and Codes. (2-2) Credit 3 semester hours. The organization, development and preparation of a complete set of working drawings using computer aided design. Prerequisite: ARCH 2223.

ARCH 4456. Architecture Design VII. (2-8) Credit 6 semester hours. Exploration of urban design and the human and environmental impact of individual designs in the built environment. Prerequisite: ARCH 3266.

ARCH 4476. Architecture Design VIII. (2-8) Credit 6 semester hours. Advanced problems in architecture and planning. Prerequisite: ARCH 4456.

ARCH 4483. Structural Systems III. (3-0) Credit 3 semester hours. Structural design and analysis of building systems in steel and reinforced concrete; long spans, lateral forces, connections, code requirements, and economics of structural systems. Prerequisite: ARCH 4433.

ARCH 4503. Methods of Research. (3-0) Credit 3 semester hours. Study and application of research and programming in architecture.
ARCH 4506. Architecture Design IX. (2-8) Credit 6 semester hours. Advanced design projects in architecture and urban design. Prerequisite: ARCH 4476.

ARCH 4513. Senior Project. (3-0) Credit 3 semester hours. A research paper or design project based upon studies accomplished in ARCH 4503. Prerequisite: ARCH 4503.

ARCH 4516. Architecture Design X. (2-8) Credit 6 semester hours. Final student design studio with projects to culminate in a synthesis of the content of the professional degree. Prerequisite: ARCH 4506.

ARCH 4523. Historic Preservation and Adaptive Reuse. (3-0) Credit 3 semester hours. Introduction to the methods and practices of preservation and reuse of architectural heritage.

ARCH 4593. Professional Practice. (3-0) Credit 3 semester hours. The ethical, legal and administrative responsibilities of the architect. Relationships between the architect, the client, and the contractor involved in comprehensive architectural services and emerging techniques of practice.

ARCH 4613. Landscape Architecture. (3-0) Credit 3 semester hours. Principles of site development as related to climate, topography, and intended use.

ARCH 4653. Alternative Energy Design. (3-0) Credit 3 semester hours. Optimum energy use strategies for buildings, energy audit methods, solar system applications, passive energy application and life-cycle cost analysis. Prerequisite: Consent of instructor.

ARCH 4673. Introduction to Interior Design. (3-0) Credit 3 semester hours. Introduction to the profession and practice of interior design.


ARCH 4776. Urban Design Studio. (2-8) Credit 6 semester hours. Projects with a focus on urban issues and context.

ARCH 4973. Special Topics. (3-0) Credit 3 semester hours. The study of various specialized fields of architecture as they relate to contemporary social issues. Topics vary by semester. Course may be repeated for credit when topics vary.

ARCH 4976. Special Topics. (2-8) Credit 6 semester hours. Design studio with a focus on a particular issue or area of architecture. Topics vary by semester. Course may be repeated for credit when topics vary.

ARCH 4986. Special Projects. (2-8) Credit 6 semester hours.

ARCH 4993, 4995. Independent Study. (0-0) Credit 3 or 5 semester hours. Readings, research, and/or field work on selected topics. Prerequisite: consent of advisor.

ARTS 1001. Art Seminar I. (1-0) Credit 1 semester hour. Informational seminar meeting once a week to allow staff members and art majors and minors to discuss contemporary visual art developments.

ARTS 1021. Art Seminar II. (1-0) Credit 1 semester hour. Informational seminar meeting once a week to allow staff members and art majors and minors to discuss contemporary visual art developments.

ARTS 1113. Design I. (1-4) Credit 3 semester hours. Study of the elements and concepts of two-dimensional design. **(ARTS 1311)
ARTS 1123. Design II. (1-4) Credit 3 semester hours. A continuation of Design I with emphasis on three-dimensional design. Prerequisite: ARTS 1113. **(ARTS 1312)

ARTS 1153. Drawing I. (1-4) Credit 3 semester hours. An introductory course investigating a variety of media and techniques. **(ARTS 1316)

ARTS 1163. Lettering Advertising Art I. (1-4) Credit 3 semester hours. A basic course in the techniques of lettering.

ARTS 1173. Graphics. (1-4) Credit 3 semester hours. Introduction to basic printmaking techniques with emphasis on the proper use of tools and equipment including the computer. Prerequisite: ARTS 1163.

ARTS 1183. Drawing II. (1-4) Credit 3 semester hours. The study of the human anatomy and structural dynamics. **(ARTS 1317)

ARTS 1203. Introduction to the Visual Arts. (3-0) Credit 3 semester hours. An introductory course emphasizing the understanding and appreciation of the visual arts: painting, sculpture and architecture. Open to all students. **(ARTS 1301)

ARTS 2133. Ceramics. (1-4) Credit 3 semester hours. Investigation and practice in ceramic processes, forming and firing techniques. **(ARTS 2346)

ARTS 2173. Advertising Art I. (1-4) Credit 3 semester hours. An introduction to advertising art problems with emphasis on typography, production techniques and the use of tools and materials including the computer.

ARTS 2183. Advertising Art II. (1-4) Credit 3 semester hours. Further exploration of graphic design problems related to the various print media with continuing emphasis on typography, production and basic techniques. Prerequisite: ARTS 2173.

ARTS 2193. Painting. (1-4) Credit 3 semester hours. Basic principles and elements of painting. Prerequisites: ARTS 1153 and 1183. **(ARTS 2316)

ARTS 2223. History of Art I. (3-0) Credit 3 semester hours. A survey of painting, sculpture, architecture and the minor arts from prehistoric times to the 13th century. **(ARTS 1303)

ARTS 2233. History of Art II. (3-0) Credit 3 semester hours. Art from the 13th Century to contemporary times including Europe, Asia, the Far East and the Americas. **(ARTS 1304)

ARTS 2243. Introduction to African Arts. (3-0) Credit 3 semester hours. Survey of the visual expressions and experiences shaping African art from its inception to the present.

ARTS 2283. Afro-American Art. (3-0) Credit 3 semester hours. A survey of Afro-American art from the post-Civil War to the present linking the arts from the African continent.

ARTS 3123. Advanced Advertising Art I. (1-4) Credit 3 semester hours. Course develops students’ ability to deal with design problems of various print media from concept through comprehensive layout including the computers.

ARTS 3133. Advanced Advertising Art II. (1-4) Credit 3 semester hours. Further development of ability to work conceptually with design problems. Prerequisite: ARTS 3123.

ARTS 4143. Graphic Design I. (1-4) Credit 3 semester hours. Exploration of advanced design problems related to multi-page pieces such as annual reports, promotional brochures, and in-house publications using the computer.
ARTS 4153. Graphic Design II. (1-4) Credit 3 semester hours. Advanced exploration of advertising design problems with emphasis on package design and point-of-purchase advertising.

ARTS 4193. Studio Thesis. (0-6) Credit 3 semester hours. Emphasis on preparing students for Senior Art Exhibition.

ARTS 4992. Independent Study in Art. (0-0) Credit 2 semester hours. Individual studies in art.

ARTS 4993. Independent Study in Studio Art. (0-0) Credit 3 semester hours. Individual studies in studio art.

CONS 3533. Managing Construction Operations. (3-0) Credit 3 semester hours. Managing construction operations from concepts of project selection, estimating, bidding, scheduling, subcontracting practices, cost tracking, project documentation, construction bonds, insurance, payments and the elements of close out. Special emphasis on the development of professional communication skills through student prepared multi-media presentations.

CONS 3633. Surveying and Soils. (2-2) Credit 3 semester hours. Principles of surveying; use of surveying instruments, topographical surveys and traverses; field practice and computations. Basic considerations of site management and soils considerations for construction projects.

CONS 3733. Subdivision and Quantification of Work. (2-2) Credit 3 semester hours. Construction project planning with emphasis on subdivision and quantification of work; quantity take-off using plans and specifications.

CONS 4403. Construction Internship. (0-0) Credit 3 semester hours. Approved summer internship in the building construction industry.

CONS 4413. Residential Construction. (3-0) Credit 3 semester hours. Residential construction processes, scheduling, subcontracting, financing, estimating, project control and current trends in site selection, design and energy efficiency.

CONS 4423. Commercial Construction. (3-0) Credit 3 semester hours. Focus on the project management of commercial construction projects ranging from high rise office buildings to small tilt-wall and pre-engineered buildings; topics include project acquisitions, mobilization, management, and close out.

CONS 4433. Industrial Construction. (3-0) Credit 3 semester hours. Introduction to industrial construction with an emphasis on process and power plant construction from a field office management perspective.

CONS 4443. Highway/Heavy Construction. (3-0) Credit 3 semester hours. Focus on the various aspects of highway/heavy construction; topics include earthmoving and paving equipment and utilization principles, pavement design and placement methods, unit price bidding methods, and a project case study.

CONS 4453. Facilities Management. (3-0) Credit 3 semester hours. Focus on the various aspects of facilities management; includes budgeting for operations and management, energy management, change management, design-build changes, in house versus out source maintenance, and contracting options.

CONS 4553. Construction Delivery Systems (3-0) Credit 3 semester hours. Methods and management techniques utilized in the building process.

CONS 4603. Construction Labor and Safety. (3-0) Credit 3 semester hours. Constitutional and legal basis of labor relations in the construction industry; craft and trade unions; dual and merit shop operations; contractor-union agreements; safety on the job site; OSHA and related regulations.
CONS 4633. Construction Law and Ethics. (3-0) Credit 3 semester hours. Delineation of contracts used in the construction industry; emphasis on understanding the functions and interrelationships of documents; review of law applied to the industry; application of the contract, and law to case studies; introduction to resources and analytical process used by construction professionals; ethics in the construction industry.

CONS 4753. Scheduling and Mobilization. (2-2) Credit 3 semester hours. Project scheduling procedures to include computer applications and resource leveling; project types, office and field planning required to initiate the work; equipment and construction methods selection processes and an examination of contractual mandates specified.

CONS 4773. Construction Project Controls. (3-0) Credit 3 semester hours. Introduction of students to construction related financial documents; includes schedule of values, labor and operations cost reports, and construction budgets, trace construction dollar flow from time sheet to balance sheet.

CONS 4821. Construction Industry Career Options. (1-0) Credit 1 semester hour. Graduating senior seminar for Construction Science majors to provide an introduction to industry options with an emphasis on ownership of a business.

CONS 4831. Starting a Construction Business. (1-0) Credit 1 semester hour. Graduating senior seminar for Construction Science majors to expose students to the basics of setting up a business.

CONS 4973. Special Topics. (3-0) Credit 3 semester hours. The study of specialized fields of construction science as they relate to contemporary issues. Topics vary by semester. Course may be repeated for credit when topic varies.

CONS 4993. Independent Study. (3-0) Credit 3 semester hours. Individual reading, research and/or field work in selected topics.

** Transfer equivalent from Texas Community/Junior Colleges.
College of Arts and Sciences

ARMY 1111-1121. Foundations of Officership I & II. (1-0) Credit 1 semester hour. Instills awareness of the role that ROTC plays in developing leaders. Students receive introductory seminar on the purpose, role, organization, and mission of the U.S. Army. Basic military skills are developed while providing students with skills and strategies that enable them to make successful transitions to university life.

ARMY 1171-1181. Leadership Laboratory I and II. (0-2) Credit 1 semester hour. Considers the fundamentals of leadership. Provides practical exercise in command, organization, and control of small elements, together with physical fitness, using U.S. Army Physical Readiness Training as a model.

ARMY 2212. Individual Leadership Studies and Team Work I. (2-0) Credit 2 semester hours. Enhances basic individual skills, while emphasizing small-unit team building. Develops student leadership potential through study and application of principles and techniques of leadership in a military environment. Topics covered include communications, map reading and land navigation, survival techniques, and customs and laws of war. Prerequisite: ARMY 1111, 1121 or consent of PMS.

ARMY 2222. Individual Leadership Studies and Team Work II. (2-0) Credit 2 semester hours. Studies principle in small-unit management, tactics, operations and leadership. Develops students' self-confidence in their leadership ability through progressive application of knowledge, decision making, communication and control. Prerequisite: ARMY 2212 or consent of PMS.

ARMY 2271-2281. Leadership Laboratory III and IV. (0-2) Credit 1 semester hour. Considers the fundamentals of leadership. Provides practical exercise in command, organization, and control of small elements, together with physical fitness, using U.S. Army Readiness Training as a model.

ARMY 3313. Principles and Techniques of Leadership and Management (3-0) Credit 3 semester hours. Studies leadership techniques and tactical operations at the small-unit level. An induction to the basic team/squad tactical employment. Instruction covers operation orders, troop leading procedures, and squad movement techniques. Individual skills in map reading, land navigation, basic rifle marksmanship and physical fitness are emphasized. Prerequisites: ARMY 2212, 2222, summer internship or consent of the PMS.

ARMY 3323. Leadership Skills and Small Unit Tactics (3-0) Credit 3 semester hours. Studies leadership techniques and tactical operations at the small-unit level. In-depth analysis of team/squad tactical procedures and techniques. Instruction covers the principals of offensive and defensive combat operations, patrolling, the decision-making process, troop leading procedures, land navigation, and operation orders. Numerous student oral presentations and practical exercises. Prerequisites: ARMY 3313 or consent of PMS.

ARMY 3371-3381. Leadership Laboratory V and VI. (0-2) Credit 1 semester hour. Considers the fundamentals of leadership. Provides practical exercise in command, organization, and control of small elements, together with physical fitness, using U.S. Army Physical Readiness Training as a model.

ARMY 4413. Leadership and Management I. (3-0) Credit 3 semester hours. Considers the role of the junior officer in the U.S. Army. Individual motivational and behavioral processes, leadership, communications, financial planning, counseling, command and staff functions are emphasized.

ARMY 4423. Leadership and Management II (3-0) Credit 3 semester hours. Pre-service overview of Army organization and general concept of operations. Includes a study of administration and logistics for junior officers, including many sub-courses in military justice, Army readiness, ethics and professionalism, and a review of the principles of war.
ARMY 4471-4481. Leadership Laboratory VII and VIII. (0-2) Credit 1 semester hour. Considers the fundamentals of leadership. Provides practical exercise in command, organization, and control of small elements, together with physical fitness, using U.S. Army Readiness Training as a model.


BIOL 1021-1031. Biology Seminar. (1-0) Credit 1 semester hour. Discussion and presentations of current biological topics by students, faculty, and guest lecturers.


BIOL 1034. Botany. (2-4) Credit 4 semester hours. Morphology and physiology of flowering plants. Structure, method of reproduction, and biotic relationships of type representatives of lower plants. Laboratory fee required. *(BIOL 1411)

BIOL 1054-1064. Anatomy and Physiology. (2-4) Credit 4 semester hours each. Structure and functions of the human body. The structure of each of the systems demonstrated by models, charts, and animal dissections with their functions studied by experiments. Laboratory fee required. **(BIOL 2401, 2402)

BIOL 1073. General Microbiology. (2-2) Credit 3 semester hours. Morphology and physiology of microorganisms related to health and sanitation; disinfection, growth, and control of those organisms causing common infectious diseases. Laboratory fee required. **(BIOL 2416)

BIOL 1111. College Biology Laboratory. (2-0) Credit 1 semester hour. Introductory laboratory course for nonbiology majors. Emphasis on basic biological principles and their application to human life. Corequisite: BIOL 1113. **(BIOL 1108)

BIOL 1113. College Biology. (3-0) Credit 3 semester hours. Introductory course for nonbiology majors. Emphasis on basic biological principles and their application to human life. Corequisite: BIOL 1111. **(BIOL 1308)

BIOL 2054. Genetics. (2-4) Credit 4 semester hours. Analysis of the structure, function, and transmission of genetic materials. Prerequisites: BIOL 1015, 1025, 1034, or equivalent. Laboratory fee required. **(BIOL 2416)

BIOL 3014-3024. Human Physiology and Anatomy. (2-4) Credit 4 semester hours each. For biology and physical education majors. Human structure, physiology, organ systems, and related principles. Prerequisites: BIOL 1015 and 1025 or equivalent. Laboratory fee required.

BIOL 3034. General Microbiology. (2-4) Credit 4 semester hours. Morphology, physiology, classification, and cultivation of the microorganism relevant to agriculture, premedicine, and industry. Prerequisites: CHEM 1033, BIOL 1015, or equivalent. Laboratory fee required.

BIOL 3044. Immunology. (2-4) Credit 4 semester hours. Fundamental aspects of immunology, antigenic systems, hypersensitivity, and serology. Laboratory fee required.

BIOL 3064. Animal Histology. (2-4) Credit 4 semester hours. Microscopic study of tissues and organs of vertebrates. Relation of structure to function. Laboratory fee required.

BIOL 3073. Molecular Biology I. (3-0). Credit 3 semester hours. The dynamics of carbohydrate, fat, protein and nucleic acid metabolism; recombinant DNA revolution, gene structure and function in specialized eukaryotic systems.
BIOL 3083. Molecular Biology II. (3-0) Credit 3 semester hours. Regulation of gene function in bacterial cells; the functioning of eukaryotic chromosomes; the extraordinary diversity of eukaryotic viruses.

BIOL 4014. Vertebrate Embryology. (2-4) Credit 4 semester hours. Structure, principles, and progress in vertebrate development. Chickens and pigs as principle laboratory materials. Prerequisites: BIOL 1015, 1025. Laboratory fee required.

BIOL 4024. Comparative Anatomy. (2-4) Credit 4 semester hours. Anatomy of organs and organ systems, their function and evolution in major vertebrate types. Prerequisites: BIOL 1015, 1025, or equivalent. Laboratory fee required.

BIOL 4034. Practicum in Biology. (0-8) Credit 4 semester hours. Recent advances in biology. Emphasis placed on investigation and inquiry as a means of acquiring knowledge in biology. Laboratory fee required.

BIOL 4051-4061. Research. (0-2) Credit 1 semester hour each. Library and laboratory work in specific biological problems.

CHEM 1011. Inorganic Chemistry Laboratory. (0-2) Credit 1 semester hour. A general laboratory course covering aspects of qualitative and quantitative analysis and determination of chemical and physical properties. Corequisite MATH 1113; CHEM 1013 or CHEM 1033. **(CHEM 1111)

CHEM 1013. General Inorganic Chemistry. (3-0) Credit 3 semester hours. This course is designed for non-majors and non-minors. This first semester course entails exploration of the fundamental concepts, laws and theory of chemistry through study of the states of matter. A descriptive view of the periodic chart, chemical properties, reactions, and chemical bonding theories and stoichiometry. Corequisite: MATH 1113. **(CHEM 1311)

CHEM 1021. Inorganic Chemistry Laboratory. (0-2) Credit 1 semester hour. The second semester continuation of CHEM 1011. A general laboratory course covering aspects of qualitative and quantitative analysis and determination of chemical and physical properties. Prerequisite MATH 1113, Corequisite: CHEM 1023 or CHEM 1043. **(CHEM 1112)

CHEM 1023. General Inorganic Chemistry. (3-0) Credit 3 semester hours. This course is designed for non-majors and non-minors This second semester course includes theories of acids, bases and salts. Elementary concepts of chemical kinetics, thermodynamics, equilibria, electrochemistry and redox reactions. An introduction to organic chemistry and selected topics. Prerequisite: MATH 1113; CHEM 1013 or CHEM 1033. **(CHEM 1312)

CHEM 1032. General Inorganic Chemistry Laboratory. (0-4) Credit 2 semester hours. For students majoring or minoring in chemistry. A general laboratory course covering aspects of volumetric and gravimetric analysis, qualitative analysis, determination of chemical and physical properties, and chemical synthesis. Corequisites: MATH 1113; CHEM 1033.

CHEM 1033. General Inorganic Chemistry. (3-0) Credit 3 semester hours. For students majoring or minoring in chemistry. Theory of matter and concepts of measurement, atoms, molecules and ions. Stoichiometry and chemical calculations, reactions in aqueous solutions, kinetics of gases, thermochemistry, atomic structure, electron configurations and chemical bonds. Prerequisite: MATH 1113. **(CHEM 1411)

CHEM 1042. General Inorganic Chemistry Laboratory. (0-4) Credit 2 semester hours. For students majoring or minoring in chemistry. A continuation of CHEM 1032. General laboratory course covering aspects of volumetric, gravimetric and qualitative analyses; determination of chemical and physical properties, and chemical synthesis. Prerequisite: MATH 1113, Corequisite: CHEM 1043.
CHEM 1043. General Inorganic Chemistry. (3-0) Credit 3 semester hours. For students majoring or minoring in chemistry. A continuation of CHEM 1033. Bonding theory and molecular structure, intermolecular forces properties of solutions, chemical kinetics, chemical equilibrium, acid-base equilibria, thermodynamics, electrochemistry and nuclear chemistry and introduction to organic chemistry. Prerequisites: MATH 1113, CHEM 1033. **(CHEM 1412)

CHEM 1051. General Inorganic Chemistry Laboratory. (0-2) Credit 1 semester hour. A laboratory course in general chemistry for students in the health sciences. **(CHEM 1105)

CHEM 1053. Introduction to General Chemistry. (3-0) Credit 3 semester hours. A course in general chemistry for students in the health sciences. **(CHEM 1305)

CHEM 1061. General Organic Chemistry and Biochemistry Laboratory. (0-2) Credit 1 semester hour. A laboratory course in general organic chemistry and biochemistry. **(CHEM 1107)

CHEM 1063. Survey of Organic Chemistry and Biochemistry. (3-0) Credit 3 semester hours. A course in general organic chemistry and biochemistry for students in the health sciences. Prerequisite: CHEM 1053. **(CHEM 1307)


CHEM 2012. Quantitative Analysis. (2-0) Credit 2 semester hours. Introduction to the principles and techniques of volumetric and gravimetric analysis employing modern instrumentation. Techniques include potentiometric, spectrophotometric, precipitation, electrochemical, and separation methods. Prerequisites: CHEM 1033-1043.

CHEM 2013. Introductory Organic Chemistry. (3-0) Credit 3 semester hours. For students majoring in agriculture and home economics. An introduction to aliphatic and aromatic compounds, fats, carbohydrates, and proteins. Prerequisites: CHEM 1013-1023 or CHEM 1033-1043.

CHEM 2032. General Organic Chemistry Laboratory. (0-4) Credit 2 semester hours. A laboratory course including qualitative and quantitative investigations focusing on preparation and characterization of organic compounds. Corequisite: CHEM 2033.

CHEM 2033. General Organic Chemistry. (3-0) Credit 3 semester hours. For chemistry majors and minors, chemical engineering, and science majors. Electronic structure and bonding, introduction to organic compounds, reactions of alkenes, stereochemistry, reactions of alkynes, electron delocalization and resonance, reaction of dienes, substitution and elimination reactions. Prerequisite: CHEM 1043.

CHEM 2042. General Organic Chemistry Laboratory. (0-4) Credit 2 semester hours. This is a continuation of CHEM 2032. Corequisite: CHEM 2043

CHEM 2043. General Organic Chemistry. (3-0) Credit 3 semester hours. For chemistry majors and minors, chemical engineering, and science majors. A continuation of CHEM 2033. Substitution and elimination reactions, spectroscopic identification of organic compounds, reactions of substituted benzenes, reactions of carbonyl compounds, bioorganic compounds and special topics in organic chemistry. Prerequisite: CHEM 2033.

CHEM 2112. Quantitative Analysis Laboratory. (0-4) Credit 2 semester hours. This course is a continuation of the CHEM 2012. Prerequisites: MATH 1113; CHEM 1033, and CHEM 1043.

CHEM 3413. Physical Chemistry. (3-0) Credit 3 semester hours. A rigorous treatment of thermodynamics (Laws), thermochemistry, application of thermodynamic laws to gases (ideal and real), chemical equilibria, ionic equilibria, and electrochemistry. Prerequisites: MATH 2043; CHEM 1043.
CHEM 3422. **Physical Chemistry Laboratory.** (0-4) Credit 2 semester hours. A laboratory course including experimental studies in chemical thermodynamics, equilibria, chemical kinetics, transport properties, spectroscopy, and molecular structure. Corequisite: CHEM 3413.


CHEM 3432. **Physical Chemistry Laboratory.** (0-4) Credit 2 semester hours. This course is a continuation of CHEM 3422. Corequisite: CHEM 3423.

CHEM 4001. **Journal Reading and Chemical Literature.** (1-0) Credit 1 semester hour. Initial instruction in the methodology and practice of efficient use of the chemical literature. Detailed study of recent developments in chemistry. Designed to develop and stimulate research attitudes. Prerequisite: major in chemistry or permission from instructor.

CHEM 4033. **Biochemistry.** (3-0) Credit 3 semester hours. A study of the chemistry of biological molecules: proteins, lipids, carbohydrates and nucleic acids. Enzyme catalysis, Bioenergetics, Metabolism of carbohydrates, fats and proteins. Interrelationship of the metabolic pathways. Prerequisites: CHEM 2012, 2033 and 2043 or permission from instructor.

CHEM 4042. **Biochemistry Laboratory.** (0-4) Credit 2 semester hours. Experiments in basic methodology for the isolation, purification and characterization of carbohydrates, lipids, proteins, nucleic acids and enzymes from natural products. Corequisites: CHEM 4033 or permission from instructor.

CHEM 4051-4061. **Research.** (0-2) Credit 1 semester hour each. Library and laboratory work on selected problems.

CHEM 4052. **Instrumental Analysis Laboratory.** (0-4) Credit 2 semester hours. Laboratory course that includes experimental applications of spectroscopy, electroanalytical methods, and chromatography. Corequisite: CHEM 4053.

CHEM 4053. **Instrumental Analysis.** (3-0) Credit 3 semester hours. An introduction to the theory and application of modern instrumentation and techniques to the analysis of chemical systems. Includes interpretive spectroscopy, computer-assigned experimentation, and the use of the chemical literature. Prerequisite: CHEM 3413-3423.

CHEM 4063. **Inorganic Chemistry.** (3-0) Credit 3 semester hours. Modern atomic theory and the Periodic System, valency and bonding. The constitution of inorganic compounds; coordination chemistry and ligand field theory. The chemistry of nonmetals including polyacids, peracids and hydrides. Reactions in nonaqueous systems. Some interstitial and nonstoichiometric compounds. Radioactivity and atomic integration. Prerequisite: CHEM 3423.

CHEM 4073. **Topics in Physical Chemistry.** (3-0) Credit 3 semester hours. Selected topics in modern physical chemistry from areas including, but not limited to electrochemistry, surface chemistry, kinetics and reaction rate theory equilibria, thermodynamics with applications to problems in chemistry and biology, computers in chemistry, and general mechanisms and pathways involved in the pollution of the environment. Prerequisites: CHEM 3413-3423 and MATH 1124-2024-2034.

CHEM 4991, 4992, 4993. **Independent Study.** (3-0) Credit 1, 2, or 3 semester hours. Readings, research, and/or field work on selected topics. Prerequisite: Consent from advisor.

COMM 1013. **Introduction to Mass Communications** (3-0) Credit 3 semester hours. A basic theory course encompassing the history and function of mass media and the communication process.
COMM 1103. Mass Media Writing. (3-0) Credit 3 semester hours. A writing course designed to introduce the method and style of writing for broadcast, print, public relations and advertising.

COMM 2113. Broadcast Writing I. (3-0) Credit 3 semester hours. Writing for television and radio with emphasis on acquiring the skills needed in gathering and producing information as news. Begins the practical application of basic principles of broadcast news writing through laboratory exercise. Prerequisites: COMM 1013 and 1103; ENGL 1123 and 1133.

COMM 2223. Broadcast Writing II. (3-0) Credit 3 semester hours. Focuses on the practical application of broadcast news writing principles by producing air quality radio and television broadcast scripts in a laboratory setting. Prerequisite: COMM 2113.

COMM 2313. News Writing and Reporting I. (3-0) Credit 3 semester hours. Fundamentals of news writing for print. Identification of newsworthy data, methods of writing leads, and news and feature stories for publication. Prerequisites: COMM 1013 and 1103; and ENGL 1123 and 1133. **(COMM 2311)

COMM 2423. Copy Editing and Production. (3-0) Credit 3 semester hours. Journalistic desk work, evaluating news copy, making good news judgment, copy editing of local wire news, headline writing, and fundamentals of page layout. Prerequisites: COMM 1013 and 1103; ENGL 1123 and 1133. **(COMM 2305)

COMM 2603. Photojournalism. (3-0) Credit 3 semester hours. Fundamentals of photographic theory and practice as a medium of communication. Practical laboratory experience in cameras, lenses, shutters, lighting, exposure, and development. Prerequisites: COMM 1013 and 11013 or consent of instructor. **(COMM 1317)

COMM 2913. Communications Technology. (3-0) Credit 3 semester hours. A study of electronic processes and applications in mass media. Emphasis on current and emerging technologies in telecommunications, radio/TV, journalism, satellite, cable, and Internet media. Prerequisites: COMM 1013.

COMM 3001. Communication Practicum I. (0-2) Credit 1 semester hour. Practical communications experiences in radio-television productions, production of student newspapers, sports information, news editing, public relations, advertising and/or speech communication public service. Prerequisite: permission of department head.

COMM 3003. Professional Internship I. (3-0) Credit 3 semester hours. One semester spent in a professional setting in a communication medium. Direct supervision by media and faculty professionals. This will be on-campus unless by permission of the department head. Prerequisites: prior completion of 18 hours of communications courses.

COMM 3103. Media Production I. (3-0) Credit 3 semester hours. A study of the theory and application of audio and video production techniques for producing content for radio, television and Internet distribution. Includes use of audio, video and computer equipment. Prerequisites: COMM 1013, 1103, 2113.

COMM 3213. Media Management. (3-0) Credit 3 semester hours. Focuses on management and its relationship to successful operation of newspapers, television and radio stations in a democratic, capitalistic framework. Covers the functions of advertising and public relations in relation to media. Prerequisites: COMM 1013, 1103 and COMM 2113, 2223 or COMM 2313, 2423.

COMM 3423. Feature and Magazine Writing. (3-0) Credit 3 semester hours. A study of techniques used for news gathering and writing for newspaper feature articles and magazines. A survey of freelance writing procedures. Prerequisites: COMM 1013, 1103 and 2313.
COMM 3703. Society and the Mass Media. (3-0) Credit 3 semester hours. A study of the significance and influence of the media upon the individual and an examination of the impact of the media upon social, political, and economic factors of society. Prerequisites: six hours of English, junior standing, COMM 1013, 1103 and consent of the instructor.

COMM 3713. Communications Law. (3-0) Credit 3 semester hours. A study of First Amendment rights and the media. Emphasis on such issues as censorship, libel, privacy, copyright, equal time, and the fairness doctrine. Prerequisites: COMM 1013 and 1103 and junior status, or consent of the instructor.

COMM 3813. Principles of Advertising. (3-0) Credit 3 semester hours. Growth, organization, and practices of the advertising industry. Consumer surveys, creative planning, and approaches to the development of advertising campaigns. Basic copywriting and production in the mass media. Portfolio project required. Prerequisites: COMM 1013 and 1103, junior status, or approval of instructor.

COMM 3823. Principles of Public Relations. (3-0) Credit 3 semester hours. Introduction to the field of public relations practice and dynamics of process. Analysis and application of public relations techniques used by various organizations. Prerequisites: six hours of English; COMM 1013 and 1103; junior status; or approval of instructor.

COMM 4003. Professional Internship II. (3-0) Credit 3 semester hours. Second semester spent in a professional setting in a communication medium. Direct supervision by media and faculty professionals. This internship will be off-campus unless by permission of department head. Prerequisites: COMM 3003.

COMM 4103. Media Production II. (3-0) Credit 3 semester hours. Advanced techniques in producing content for audio, video and Internet media. Offers studio, field and web-based production, post production using linear and nonlinear editing techniques. Prerequisites: COMM 3103.

COMM 4303. Broadcast Performance. (3-0) Credit 3 semester hours. Theory of good broadcast performance and development of personality, voice, and appearance. Laboratory experiences before camera and microphone include news readings, public affairs interviews, public service announcements, and commercial readings. Prerequisites: COMM 1013, 1103, 2113, and 2223, and SPCH 2013.

COMM 4313. News Writing and Reporting II. (3-0) Credit 3 semester hours. Advanced news writing and reporting with emphasis on actual coverage of events on a local basis. Practical experiences and advanced theory in various news situations. Prerequisites: COMM 1013, 1103 and 2313.

DRAM 1003. Introduction to Acting. (1-4) Credit 3 semester hours. This course is designed to provide the student with the fundamentals for a study of the art of performance (acting). The students will be introduced to acceptable and unacceptable acting techniques.

DRAM 1013. Stage Diction. (1-4) Credit 3 semester hours. Drills and exercises designed to improve the diction and pronunciation of the actor. Breath control, articulation, phonation, etc.

DRAM 1103. Introduction to Theatre. (3-0) Credit 3 semester hours. An orientation course exposing the student to plays and to the various technical skills involved in bringing a play to life. Designed to give the student an understanding of theatre and all its aspects. **(DRAM 1310)

DRAM 1111. Theatre Practicum. (0-3) Credit 1 semester hour. This is a workshop course in which the student is assigned to a crew for the purpose of introducing the student to the various areas of specialization in the field of Theatre. This course also provides practical application of performance and technical skills needed to enhance theatrical productions.

DRAM 1113. Introduction to Theatre Technology. (2-2) Credit 3 semester hours. An introductory course exposing students to the visual elements (scenic, costumes, lighting, sound, etc.) in a production as approached by the designer, director, and actor.
DRAM 1121. Theatre Practicum. (0-3) Credit 1 semester hour. This course is a continuation of DRAM 1111, a workshop course in which the student continues to work with assigned to a crew for the purpose of introducing the student to the various areas of specialization in the field of Theatre. This course provides the student with practical applications of performance and technical skills needed to enhance theatrical productions. Prerequisite: DRAM 1111.

DRAM 1203. Stagecraft. (1-4) Credit 3 semester hours. Fundamentals of set construction. Practical experience in building and painting stage scenery. Each student is required to assist with construction of a set. **(DRAM 1330)

DRAM 1303. Stage Makeup. (1-4) Credit 3 semester hours. Fundamentals of stage makeup: equipment and basic application of straight, character, corrective, and 3-D makeup. **(DRAM 1341)

DRAM 1323. Stage Movement. (1-4) Credit 3 semester hours. A course designed to train the student how to use his body on stage. Techniques involving the application of stage movement to music, prose, and mime. **(DRAM 1322)

DRAM 1411-1421. Acting Lab. (0-2) Credit 1 semester hour each. Drills and exercises, with presentation and execution of scenes.

DRAM 2013. Intermediate Acting. (1-4) Credit 3 semester hours. A training course providing the student with the fundamentals of ensemble acting. Includes characterization, play analysis, and stage business. Prerequisite: DRAM 1003. **(DRAM 2351)

DRAM 2111. Theatre Practicum. (0-3) Credit 1 semester hour. At this level, the student chooses specific areas of specialization in which to continue working and examining as potential career options in Theatre. Within the chosen specialization crews, the student gains practical application of performance and technical skills needed to enhance theatrical productions. Prerequisite: DRAM 1121.

DRAM 2113. Theatre History I. (3-0) Credit 3 semester hours. Origin and development of Western theatre as revealed through play; theories and techniques characteristic of each important period from the Greek to the Elizabethan. **(DRAM 2361)

DRAM 2121. Theatre Practicum. (0-3) Credit 1 semester hour. This course is a continuation of DRAM 2111. The student continues to work within chosen specialization crews for the purpose of gaining knowledge and experience in possible career options in Theatre and to gain practical application of performance and technical skills needed to enhance theatrical productions. Prerequisite: DRAM 2111.

DRAM 2123. Theatre History II. (3-0) Credit 3 semester hours. A continuation of DRAM 2113 from the 17th century to the development of modern theatre. Prerequisite: DRAM 2113. **(DRAM 2362)

DRAM 2213. African American Theatre I. (3-0) Credit 3 semester hours. The study of the origin and development of African American Theatre and Drama from 1847 to World War I.

DRAM 2223. African American Theatre II. (3-0) Credit 3 semester hours. African American Theatre from World War I to the present.

DRAM 2303. Stage Makeup. (2-2) Credit 3 semester hours. Fundamentals of stage makeup; equipment and basic application of straight, character, corrective, and 3-D makeup.

DRAM 3013. Advanced Acting. (0-0) Credit 3 semester hours. Analysis, preparation, and presentation of monologues and scenes from plays, with emphasis on the individual actor and ensemble acting. Continuation of DRAM 2013. **(DRAM 2352)

DRAM 3103. Dramatic Interpretation. (2-2) Credit 3 semester hours. Analysis and practice of techniques in the oral interpretation of dramatic literary forms.
DRAM 3111. Theatre Practicum. (0-3) Credit 1 semester hour. A workshop course in which the student at this level assumes leadership roles within the chosen areas of specialization. The course is designed to provide the student with practical application of performance and technical skills needed to enhance theatrical productions. Prerequisite: DRAM 2121.

DRAM 3113. Contemporary Theatre. (3-0) Credit 3 semester hours. The development of modern theatre from the 19th century concept of realism-naturalism through the present movements away from realism. Prerequisite: DRAM 1103.

DRAM 3121. Theatre Practicum. (0-3) Credit 1 semester hour. This course is a continuation of DRAM 3111, a workshop course in which the student continues to explore leadership roles within the chosen areas of specialization. The course is designed to provide the student with practical application of performance and technical skills needed to enhance theatrical productions. Prerequisite: DRAM 3111.

DRAM 3123. Contemporary Theatre. (3-0) Credit 3 semester hours. The study and analysis of contemporary plays and playwrights.

DRAM 3213. Directing I. (3-0) Credit 3 semester hours. A basic course in stage direction, including play and character analysis, ground plans, movement, and business. Each student is required to do a detailed prompt book for a one-set play.

DRAM 3223. Directing II. (1-4) Credit 3 semester hours. A continuation of DRAM 3213. Practical experience in play direction. Each student is required to direct a one-act play. Provides instruction for prospective teachers. Prerequisite: DRAM 3213.

DRAM 3333. Drama Workshop I. (1-4) Credit 3 semester hours. A performance workshop format for students who have had at least three semesters of acting. The workshop will focus on the techniques/philosophies of the master teachers of acting, e.g., Uta Hagen, Robert Benedetti, Sanford Meisner, Stella Adler, Lee Strasberg, and the father of “method acting” Constantin Stanislavski.

DRAM 4111. Theatre Practicum. (0-3) Credit 1 semester hour. This is a workshop course in which the student at this level assumes full responsibility for the daily operations of his/her chosen areas of specialization. The student explores the process of pursuing a career in the chosen areas of specialization. The course is designed to provide the student with practical application of performance and technical skills needed to enhance theatrical productions. Prerequisite: DRAM 3121.

DRAM 4113. Acting Problems. (2-2) Credit 3 semester hours. An examination of problems confronting the professional actor. Course includes preparation of resumes, portfolios, audition techniques, etc. Prerequisite: DRAM 4313.

DRAM 4121. Theatre Practicum. (0-3) Credit 1 semester hour. This course is a continuation of DRAM 4111, a workshop course in which the student at this level assumes full responsibility for the daily operations of his/her chosen areas of specialization and explores the process of pursuing a career in these areas of specialization. This course is designed to provide the student with practical application of those performance and technical skills needed to enhance theatrical productions. Prerequisite: DRAM 4111.

DRAM 4313. Acting Styles. (2-2) Credit 3 semester hours. A study of acting styles: Greek, Roman, medieval, Elizabethan, and French neoclassic. Exercises in voice, movement, and manner as related to these periods. Prerequisite: DRAM 3333.

DRAM 4403. Drama Workshop II. (0-6) Credit 3 semester hours. This course provides opportunity for students to enhance their knowledge and performance of styles of acting; speaking, and movement skills through performances of scenes in a workshop format. Prerequisite: DRAM 4313.
DRAM 4441. Senior Theatre Performance. (0-0) Credit 1 semester hour. Research, practice, performance and evaluation of projects in areas of acting and directing for the senior recital.

DRAM 4993. Independent Study. (0-0) Credit 3 semester hours. Readings, research, and/or recital preparation and presentation, and/or field work on selected topics. Prerequisite: consent of advisor.

ENGL 1123. Freshman Composition I. (3-0) Credit 3 semester hours. Development of writing skills and critical reading: writing essays for a variety of purposes, development of style in paragraphs and full-length themes and introduction to argumentation and critical analysis. Prerequisite: unconditional admission to the university or satisfactory completion of ENGL 0112 or 0101. *(ENGL 1301)

ENGL 1133. Freshman Composition II. (3-0) Credit 3 semester hours. A continuation of ENGL 1123 with emphasis on critical thinking, research, documentation techniques and literary and rhetorical analysis. Prerequisite: ENGL 1123. *(ENGL 1302)

ENGL 1143. Technical Writing. (3-0) Credit 3 semester hours. Application of principles of composition and rhetoric to genres of scientific and technical writing including proposals, formal reports, presentations, business and scientific correspondence, manuals, technical articles and reports. Students will undertake a full-scale project through proposal and research with formal oral and written presentations of a documented technical project from the student’s major field of study.

ENGL 2143. Advanced Composition. (3-0) Credit 3 semester hours. Application of writing process principles to composition of complex themes, letters, research projects, and essays in literature and other selected areas. Prerequisites: ENGL 1123 and 1133. *(ENGL 1304)

ENGL 2153. Introduction to Literature. (3-0) Credit 3 semester hours. Introductory study of the form, structure, and content of literary genres; interpretation and analytical thinking and intensive writing about literature. Prerequisites: ENGL 1123 and 1133.

ENGL 2263. English Literature I. (3-0) Credit 3 semester hours. Survey of the literature of England from the Anglo-Saxon period to the late eighteenth century. Study of major writers and representative works. Prerequisites: ENGL 2153. *(ENGL 2322)

ENGL 2273. English Literature II. (3-0) Credit 3 semester hours. Continuation of ENGL 2263. Literature of England from the late eighteenth century through the twentieth century. Prerequisites: ENGL 2153. *(ENGL 2323)

ENGL 3053. Survey of African-American Literature I. (3-0) Credit 3 semester hours. An introduction of the African-American oral and literary tradition prior to 1935, including verbal art forms of the Harlem Renaissance. Prerequisites: ENGL 2153.

ENGL 3063. Survey of African-American Literature II. (3-0) Credit 3 semester hours. A study in historical and cultural context of major works by African-American writers from the Harlem Renaissance to present. Prerequisites: ENGL 2153.

ENGL 3213. The English Language. (3-0) Credit 3 semester hours. Historical survey of the phonological, grammatical, and lexical developments; principles of linguistic change in the English language. Prerequisites: ENGL 1123 and 1133.

ENGL 3223. Advanced Grammar. (3-0) Credit 3 semester hours. Study of morphology, syntax, and semantics of the English language, conventional grammatical terminology, inflectional forms, grammatical classifications, and structural patterns. Prerequisites: ENGL 1123 and 1133.

ENGL 3233. American Literature I. (3-0) Credit 3 semester hours. Literature of the United States from the colonial period to 1865, with emphasis upon the unique character of the American experience and its expression in literature. Prerequisites: ENGL 2153.
ENGL 3243. American Literature II. (3-0) Credit 3 semester hours. Literature of the United States from 1865 to the present, with emphasis upon the unique character of the American experience portrayed by the major writers of the period. Prerequisites: ENGL 2153.

ENGL 3273. The Romantic Movement. (3-0) Credit 3 semester hours. Major writers of English poetry and prose of the Romantic period, with emphasis on style, philosophy, and subject matter. Prerequisites: ENGL 2153.

ENGL 3283. Victorian Literature. (3-0) Credit 3 semester hours. Study of poetry and relevant prose of the Victorian period, with emphasis upon subject matter and literary innovations in style and form that characterize the literature. Selections made from earlier and later Victorian writers. Prerequisites: ENGL 2153.

ENGL 4213. Eighteenth-Century Literature. (3-0) Credit 3 semester hours. Period course in the poetry and prose of the neoclassical period and the pre-Romantics. Prerequisites: ENGL 1123, 1133, and 2153.

ENGL 4223. Shakespeare. (3-0) Credit 3 semester hours. Analysis of plays, texts, language, character, and conditions of the age; Shakespearean criticism and scholarship. Prerequisite: ENGL 2153.

ENGL 4243. The Novel. (3-0) Credit 3 semester hours. Studies tracing the development of the English and American novel from the 1800s to the present with representative selections from authors such as Austen, Hardy, Greene, Twain, Faulkner, and Steinbeck. Prerequisite: ENGL 2153.

ENGL 4993. Independent Study. (0-0) Credit 1, 2, or 3 semester hours. Readings, research, and/or field work on selected topics. Prerequisite: consent of department head.

FREN 1013. Elementary French I. (3-0) Credit 3 semester hours. Practice in listening, speaking, reading and writing skills in French to acquire elementary vocabulary and structures, and a general knowledge of French culture. **(FREN 1411)

FREN 1023. Elementary French II. (3-0) Credit 3 semester hours. Continuation of acquisition of language skills and culture introduced in Elementary French I. **(FREN 1412)

FREN 2013. Intermediate French I. (3-0) Credit 3 semester hours. Continuation of acquisition of language skills and culture introduced in Elementary French I and II. Prerequisite: FREN 1023 or equivalent. **(FREN 2311)

FREN 2023. Intermediate French II. (3-0) Credit 3 semester hours. Continuation of acquisition of language skills and culture on an intermediate level with emphasis on reading and discussion, grammar review and use of idioms. Prerequisite: FREN 2013. **(FREN 2312)

FREN 4993. Independent Study. (0-0) Credit 3 semester hours. Readings, research, and/or field work on selected topics. Prerequisite: consent of department head.

GEOG 1113. Introduction to Geography. (3-0) Credit 3 semester hours. A survey of the cultural and physical elements of geography, their characteristics, spatial organization, and distribution as viewed in the discipline today. **(GEOG 1302)

GEOG 1223. Introduction to Physical Geography. (3-0) Credit 3 semester hours. General introduction to the field of geography, emphasizing the study of the physical earth and of man in his physical environment. **(GEOG 1301)

GEOG 1333. Economic Geography. (3-0) Credit 3 semester hours. A commodity approach to the geography of economic activity: consideration of selected agricultural commodities and systems of land
used in different physical and cultural settings and of the role of trade and transportation in interregional relationships. **(GEOG 2312)

**GEOG 2523. Urban Geography.** (3-0) Credit 3 semester hours. Study of the form, function, classification, internal land use and structure, and intercity and city/hinterland relations of urban areas, with particular emphasis on United States. Prerequisite: GEOG 1113.

**GEOG 2633. Cultural Geography.** (3-0) Credit 3 semester hours. Economic, social, and political adjustments that man makes to various habitats and to natural environment factors.

**GEOG 2743. Geography of Africa.** (3-0) Credit 3 semester hours. Through an understanding of geographical facts, common myths associated with African history and development are dispelled. As a result, strong emphasis is placed on climates, physiography, natural resources, and social conditions in Africa. Selected countries are discussed in detail.

**GEOG 3713. Geography of Texas.** (3-0) Credit 3 semester hours. Emphasis on the geographic regions of our own state: the problems of proper adaptations of man to environment; the geographical distribution and development of natural resources in the state; and the possibilities of greater human development. Prerequisite: GEOG 1113.

**GEOG 3723. World Regional Geography.** (3-0) Credit 3 semester hours. A survey of the regions and nations of the world and the geographical foundations of their physical and cultural characteristics; a practical and systematic approach to the field of geography; a survey of the world in terms of outlook and regional types. Prerequisite: GEOG 1113.

**GEOG 3733. Political Geography.** (3-0) Credit 3 semester hours. This course examines the influence which the natural environment has on the evolution of cultures, the establishment of political boundaries and political systems and on the nature of international trade and politics.

**HIST 1313. U.S. to 1876.** (3-0) Credit 3 semester hours. American development from the period of discovery to the close of the Civil War; the colonial era; birth of a nation; the young republic; westward expansion; and sectionalism, Civil War, and Reconstruction. Lectures, special readings, discussions, supervised study, and tests. **(HIST 1301)**

**HIST 1323. The U.S.-1876 to Present.** (3-0) Credit 3 semester hours. Surveys modern American development: the industrial nation and its problems; expansionist and muckraker; the First Crusade, Normalcy and Reaction, Depression, and the New Deal; and the Second World War and after. Lectures, special readings, discussion, supervised study, and tests. (HIST 3313, 4313, 3323, or 4213 may be substituted for this course.) **(HIST 1302)**

**HIST 1333. History of Texas.** (3-0) Credit 3 semester hours. Survey of Texas starting from Spanish colonization to the present. Emphasis will be placed on contributions made to the state of Texas by various ethnic groups. **(HIST 2301, 2303)**

**HIST 1813. World Civilization to 1500.** (3-0) Credit 3 semester hours. Survey of the ancient world from the dawn of civilization in Egypt, Mesopotamia, China, India and Mesoamerica through the Middle Ages in Europe. Attention is given to political, social and economic institutions as well as art, literature and religion. **(HIST 2321)**

**HIST 1823. World Civilization Since 1500.** (3-0) Credit 3 semester hours. Survey of key developments in Western and non-Western civilizations from the Renaissance to the present. Special emphasis is placed on religious conflict, militarism, intellectual and political revolutions, formation of modern nation-states, post-colonialism, and the end of the Cold War. **(HIST 2322)**

**HIST 2313. The U.S.-1492 to 1837.** (3-0) Credit 3 semester hours. American development from the period of discovery to the close of Jacksonian Presidency. This includes the colonial era, the American
Revolution, and the Constitution, the growth of democracy in the young republic, and the conflict between sections that produced national crisis. Lectures, discussions, special maps, and written reports. Offered first semester yearly. Prerequisite: sophomore standing. Required of all majors and minors in history (in lieu of HIST 1313).

HIST 2323. The U.S.-1837 to 1898. (3-0) Credit 3 semester hours. Surveys period of bourgeois revolution and the rise of group democracy in America by examining the rise of common man, slavery-abolition-sectional imperialism, popular sovereignty-the last formula, the irrepressible conflict and the new nation, and the problems of industrialism. Also covers postwar industry, labor, and agricultural. Lectures, discussions, special maps and written reports. Prerequisite: HIST 2313. Required of all majors and minors in history (in lieu of 1323).

HIST 2413. Pre-colonial African History. (3-0) Credit 3 semester hours. Study of African history before the arrival of the Europeans which examines the growth and evolution of political, social, and economic institutions of various African countries. Special attention will be given to the western portion of Africa (Ghana, Mali, and Songhay) and areas south of the Sahara.

HIST 2423. Post-Colonial African History. (3-0) Credit 3 semester hours. Survey of African History since the end of WWII; events and issues leading up to independence; efforts at nation-building; problems of political instability and economic development.

HIST 3223. Women in History. (3-0) Credit 3 semester hours. A survey of selected issues related to the historical status of women in Africa, Asia, Europe, and the Americas, with emphasis on African-American women in the United States since slavery.

HIST 3323. Contemporary United States. (3-0) Credit 3 semester hours. Analysis of the emergence of the United States as a modern nation and examination of the changing United States’ social, political, economic, cultural and diplomatic scene with emphasis on the progressive trends, 1900 – Present.

HIST 3913. American Historiography. (3-0) Credit 3 semester hours. Survey of the writing of American history, with emphasis on social-intellectual motivation and historical theory. Representative historical literature of the following periods will be examined: colonial and revolutionary; the “Middle Period,” literary and romantic; and modern and contemporary. Lectures, discussions, independent study, and special reports. Prerequisite: junior standing.

HIST 4213. African American History to 1865. (3-0) Credit 3 semester hours. Analysis of the experiences of African Americans from colonial time to the end of the Civil War. Prerequisite: junior standing.

HIST 4223. African American History 1865-Present. (3-0) Credit 3 semester hours. Traces the social, economic, cultural, and political activities of African Americans from Reconstruction through the Civil Rights movement. Prerequisite: junior standing. (May be taken in lieu of HIST 1323.)

HIST 4313. Foreign Relations. (3-0) Credit 3 semester hours. Diplomatic history of the United States covering: the colonial background and the emergence of the cardinal principles of American foreign policy and its mechanics through the revolutionary and early national periods, the New Nationalism, Manifest Destiny and Westward Expansion, Civil War diplomacy, and projections abroad. Lectures, book reports, forums, and research projects. Prerequisite: upper-class status.

HIST 4323. Diplomatic History of the U.S. (3-0) Credit 3 semester hours. A topical survey of United States diplomacy covering: the New Manifest Destiny, and the extension of the nation’s commitments, the Great Crusade and after, the United States, the Second World War, and post-war diplomacy. Lectures, book reports, forums, and research projects. (May be taken in place of HIST 1323.)
HIST 4903. Senior Seminar. (3-0) Credit 3 semester hours. Advanced training in historical methods and historiography designed to measure student’s understanding and mastery of the discipline. Prerequisite: junior standing.

HIST 4992-4993. Independent Study. (0-0) Credit 2 or 3 semester hours. Readings, research, and/or field work on selected topics. Prerequisite: consent of advisor.

MATH 1113. College Algebra. (3-0) Credit 3 semester hours. Quadratic equations, systems of equations, logarithms, exponential and logarithmic equations, binomial theorem, progressions, permutations, combinations, and probability. **(MATH 1314)

MATH 1115. College Algebra and Trigonometry. (5-0) Credit 5 semester hours. A basic course in mathematics for students needing additional precalculus skills, including algebra and trigonometry. Topics included are linear, quadratic, and higher degree polynomial functions and identities. Combinational formulas, probability, determinants and systems of linear equations, inverse trigonometric functions, and trigonometric equations.

MATH 1123. Trigonometry. (3-0) Credit 3 semester hours. Trigonometric functions, radian, logarithms, functions of composite angles, and identities; and trigonometric equations. Prerequisite: MATH 1113 or equivalent. **(MATH 1316)

MATH 1124. Calculus with Analytic Geometry I. (4-0) Credit 4 semester hours. Functions and graphs, limits and continuity, derivatives of functions, Mean Value Theorem, applications of derivatives. Fundamental Theorem of Calculus, and applications of integrals. Prerequisite: Math 1115 or equivalent (including exposure to Maple, a computer algebraic system). **(MATH 2413)

MATH 1153. Finite Mathematics. (3-0) Credit 3 semester hours. Linear equations and applications, linear forms and system of equations, matrix algebra and applications, linear programming (linear and simplex method), probability and applications, statistics. Course designed for Business, Life and Social Science majors. Prerequisites: MATH 1113.

MATH 1213. Precalculus. (3-0) Credit 3 semester hours. Elementary logic and sets; trigonometry; conic sections; matrices; and linear transformations in two and three dimensions; parametric and polar representations; and functions and limits. Prerequisite: consent from instructor. **(MATH 2312)

MATH 2003. Elementary Statistics. (3-0) Credit 3 semester hours. Collection and tabulation of data; bar charts, graphs, sampling averages, dispersion, correlation; index numbers; normal curves; probability; and application to various fields. Prerequisite: one semester of college mathematics. **(MATH 1342)

MATH 2024. Calculus with Analytic Geometry II. (4-0) Credit 4 semester hours Applications of integrals, inverse functions, integration techniques, indeterminate forms, improper integrals, parametric equations, polar coordinates, infinite series, power series, Taylor series. Prerequisite: MATH 1124 or equivalent. **(MATH 2414)

MATH 2034. Calculus with Analytic Geometry III. (4-0) Credit 4 semester hours. Calculus of functions of several variables, calculus of vector valued functions, partial differentiation, multiple integrals. Prerequisite: MATH 2024. **(MATH 2415)

MATH 2043. Differential Equations I. (3-0) Credit 3 semester hours. Ordinary differential equations with emphasis on first-order linear and higher order ordinary differential equations with constant coefficients and some non constant coefficients. Applications. Prerequisite: MATH 2024. **(MATH 2320)

MATH 2053. Discrete Mathematics. (3-0) Credit 3 semester hours. Designed to provide a bridge between computational mathematics and theoretical mathematics. Topics include induction and recursion, combinatorics, graph theory, proofs and logic. Prerequisite: Math 1124 or equivalent.
MATH 2153. Calculus-Business, Life and Social Sciences. (3-0) Credit 3 semester hours. Derivatives, curving, sketching, and optimization techniques of differentiation. Logarithm and exponential functions with applications, integral techniques and application of integrals, multivariate calculus. Prerequisite: MATH 1153.

MATH 2163. Structure of Number System. (3-0) Credit 3 semester hours. A logical approach to elementary mathematics, with emphasis on the powers and techniques of the axiomatic approach in mathematics. Topics include sets, logic, number theory, equivalence relations and mathematical proofs in developing the characteristics of number systems. Prerequisite: MATH 1113 or equivalent.

MATH 2183. Informal Geometry. (3-0) Credit 3 semester hours. A brief development of finite geometric systems from an advanced standpoint, with attention given to intuition and didactics. Topics include deductive reasoning, metric and nonmetric geometry, transformational geometry, topological notions, graphs, and networks. Prerequisite: MATH 2163.

MATH 3013. Modern Algebra. (3-0) Credit 3 semester hours. Number theory, groups, rings, integral domains, and fields. Prerequisite: MATH 2053.

MATH 3023. Probability and Statistics. (3-0) Credit 3 semester hours. Counting problems, probability theory infinite sample spaces, random numbers and their usage, random variables, expectations, means, variances, binomial and normal distributions, random walk problems, point estimation, confidence limits, hypothesis testing, applications of Bayes’s Theorem, sums of independent random variables, law of large numbers, and central limit theorem. Prerequisites: consent from instructor and MATH 1124 or equivalent.

MATH 3033. Principles of Statistics I. (3-0) Credit 3 semester hours. An introduction to probability distributions, sampling and descriptive measures, inference and hypotheses testing, linear regression, and analysis of variance. Prerequisite: Consent from instructor.

MATH 3043. Principles of Statistics II. (3-0) Credit 3 semester hours. Design of experiments, model building, multiple regression, nonparametric techniques, and contingency tables, introduction to decision theory and time series data. Prerequisite: MATH 3033.

MATH 3073. Linear Algebra. (3-0) Credit 3 semester hours. Systems of linear equations, matrices, real vector spaces, linear transformations, change of bases, determinants, eigenvalues and eigenvectors, diagonalization and inner product spaces. Prerequisite: MATH 2024.

MATH 3103. History of Mathematics. (3-0) Credit 3 semester hours. The development of mathematical thought from ancient time to the present. Contributions by the great Greek, Roman, and German mathematicians, as well as by others. Prerequisite: consent from instructor.

MATH 3106. Introduction to Cooperative Education. (2-8) Credit 6 semester hours. Introduces the student to professional experiences and applications of mathematics in the work place. Attention is given to the role of personality attributes in success on the job; and to the role of the applied mathematician in the industrial and professional settings.

MATH 3933. Geometry. (3-0) Credit 3 semester hours. An in-depth study of the Euclidean geometry of the plane from an advanced standpoint. A brief development of different types of geometries by the use of transformations. Prerequisite: MATH 2034.

MATH 4001. Mathematics Colloquium. (1-0) Credit 1 semester hour. Detailed reports on selected topics in both theoretical and applied mathematics. Mathematics majors are required to report individually on at least one topic of a moderate degree of difficulty as a demonstration of their resourcefulness, ability, and achievement in the field of mathematics. Required of all mathematics majors. Prerequisite: Consent from instructor. May be repeated for credit.
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<td>MATH 4003</td>
<td>Mathematics Modeling and Applications</td>
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<td>MATH 4213</td>
<td>Introduction to Analysis</td>
<td>(3-0)</td>
<td>MATH 4083</td>
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MATH 4223. Introduction to Complex Analysis. (3-0) Credit 3 semester hours. The algebra of complex numbers and their geometric representation; analytic functions; and Cauchy-Reimann equations, elementary functions, complex integration, power series, calculus of residues, conformal mapping, and application. Prerequisite: MATH 2034 or consent from instructor.

MATH 4993. Independent Study. (0-0) Credit 1, 2, or 3 semester hours. Reading, research, and/or field work on selected topics. Prerequisite: consent from instructor.

MUSC 1111. University Band. (0-5) Credit 1 semester hour. An ensemble devoted to the performance of band music. **(MUSI 2123)

MUSC 1121. University Choir. (0-5) Credit 1 semester hour. An ensemble devoted to the performance of choral music. **(MUSI 1142)

MUSC 1131. Chamber Vocal Ensemble. (4-0) Credit 1 semester hours. The study of Music for vocal ensembles.

MUSC 1141. Jazz Band. (0-3) Credit 1 semester hour. An ensemble devoted to the study and performance of literature written for jazz band.

MUSC 1151. Brass Ensemble. (0-3) Credit 1 semester hour. The study and performance of literature written for brass instruments.

MUSC 1171. Percussion Ensemble. (0-3) Credit 1 semester hour. The study and performance of literature written for percussion instruments.

MUSC 1212-1222. Sight Singing and Ear Training I-II. (2-0) Credit 2 semester hours each. The development of music reading and aural comprehension. Melodic and harmonic diction. **(MUSI 1216, 1217)

MUSC 1213. Fundamentals of Music. (3-0) Credit 3 semester hours. An introduction to the basic materials of music.

MUSC 1223. Fundamentals of Music. (3-0) Credit 3 semester hours. An introduction to the basic materials of music. **(MUSC 1306)

MUSC 1233. Music Theory. (3-0) Credit 3 semester hours. The study of diatonic harmony in tonal music. Keyboard application and aural comprehension of materials are emphasized. Prerequisite: satisfactory score on the music theory placement test or the equivalent. **(MUSI 1311)

MUSC 1243. Music Theory. (3-0) Credit 3 semester hours. Continued study of diatonic harmony in tonal music. Keyboard application and aural comprehension of materials are emphasized. Prerequisite: MUSC 1233. **(MUSI 1312)

MUSC 1313. Music in Contemporary Life. (3-0) Credit 3 semester hours. The study of music of various cultures, with emphasis on such elements as melody, rhythm, form, and timbre. Musical examples from classical, folk, pop, jazz, and religious sources. **(MUSI 1301)

MUSC 1512-1522. Piano Concentration. (2-0) Credit 2 semester hours. Hanon, The Virtuoso Pianist, Part II; Czerny, The School of Velocity, first half; Bach, Two-part Inventions; Chopin, Preludes; all major and minor scales in four octaves using double and triple rhythms in various accents. Seminar performances.
MUSC 1513. Piano. (3-0) Credit 3 semester hours. The study of selected solo literature by Bach, Beethoven, Mendelssohn, Chopin, Schumann, Kabalevsky and Respighi. Technical etudes by Hanon, Czerny and Dischna. Seminar performances.

MUSC 1522. Piano. (2-0) Credit 2 semester hours. Private lessons. The study of selected solo literature, together with technical etudes for the piano.

MUSC 1523. Piano. (3-0) Credit 3 semester hours. Private lessons. The study of selected solo literature, together with technical etudes for the piano.

MUSC 1531. Piano. (1-0) Credit 1 semester hour. Major and minor scales through four flats and four sharps in one octave; simple chord progressions (I IV V I) in keys through four sharps and four flats, completion of two books (e.g., Fletcher, Thompson, Aaron and first section of Basic Piano for the College Student by Zimmerman and others; and technical studies of Clark, Burnam, etc.).

MUSC 1533-1543. Class Piano. (3-0) Credit 3 semester hours. Beginning piano studies through group instruction.

MUSC 1541. Piano. (1-0) Credit 1 semester hour. Private lessons. The study of selected solo literature, together with technical etudes for the piano.

MUSC 1612-1622. Voice Class. (1-2) Credit 2 semester hours each. Voice instruction in a group setting. Instruction includes tone production, breath support, and correct diction for singers. Nonmajors only. **(MUSI 1183, 1184)

MUSC 1621. German Diction. (1-0) Credit 1 semester hour. Phonetic sounds for singing in German. Not a course in German grammar. **(MUSI 2160)

MUSC 1631. Italian Diction. (1-0) Credit 1 semester hour. Phonetic sounds for singing in Italian. Not a course in Italian grammar. **(MUSI 1160)

MUSC 1632-1642. Voice. (2-0) Credit 2 semester hours. The study of selected solo literature and materials for the voice. Seminar performances.

MUSC 1712-1722. Brass. (2-0) Credit 2 semester hours. The study of selected solo literature and technical etudes. Seminar performances.

MUSC 1713-1723. Brass. (3-0) Credit 3 semester hours. The study of selected solo literature and technical etudes. Seminar performances.

MUSC 1812-1822. Woodwinds. (2-0) Credit 2 semester hours. The study of selected solo literature, scales and technical etudes. Required seminar performances.

MUSC 1813-1823. Woodwinds. (3-0) Credit 3 semester hours. The study of selected solo literature, scales and technical etudes. Required seminar performances.

MUSC 1912-1922. Percussion. (2-0) Credit 2 semester hours. The study of appropriate literature and technical etudes for percussion instruments. Seminar performances.

MUSC 1913-1923. Percussion. (3-0) Credit 3 semester hours. The study of appropriate literature and technical etudes for percussion instruments. Seminar performances.

MUSC 2212-2222. Sight Singing and Ear Training III-IV. (2-0) Credit 2 semester hours each. The development of reading and aural comprehension of music. Melodic and harmonic dictation. **(MUSI 2116, 2118)
MUSC 2213-2223. Music Theory. (3-0) Credit 3 semester hours each. The study of chromatic harmony in tonal music. Keyboard application, analysis, and aural comprehension of materials are emphasized. Prerequisite: MUSC 1243. **(MUSI 2311, 2312)

MUSC 2312. Music Literature. (2-0) Credit 2 semester hours. A survey of musical styles from 1400 to 1820. **(MUSI 1308)

MUSC 2322. Music Literature. (2-0) Credit 2 semester hours. A survey of musical styles from 1820 to the present. Prerequisite: MUSC 2312. **(MUSI 1309)


MUSC 2411. Strings. (1-1) Credit 1 semester hour. The study of stringed instruments through playing experiences in a group.

MUSC 2421. Brass Instruments. (1-1) Credit 1 semester hour. The study of brass instruments through playing experiences in a group.

MUSC 2431. Woodwind Instruments. (1-1) Credit 1 semester hour. The study of woodwind instruments through playing experiences in a group.

MUSC 2441. Percussion Instruments. (1-1) Credit 1 semester hour. The study of percussion instruments through playing experiences in a group.

MUSC 2511-2521. Piano. (1-0) Credit 1 semester hour. Major and minor scales in two octaves for same scales; chord progressions (e.g., I VI IV II 16 V7 I); melodic studies of Burgmuller, Op. 100; easy pieces by Schumann, Beethoven, etc.; completion of Basic Piano for the College Student by Zimmerman; harmonization of simple melodies; chorale and open score reading. Prerequisite: MUSC 1541.

MUSC 2512-2522. Piano Concentration. (2-0) Credit 2 semester hours. Hanon, The Virtuoso Pianist completed; Czerny, The School of Velocity completed; Bach, Three-part Invention; early keyboard music; Chopin, Waltzes; Haydn, Sonatas. Seminar performances. Prerequisite: MUSC 1522.

MUSC 2513-2523. Piano. (3-0) Credit 3 semester hours. Bach, Well-Tempered Clavier; French and English Suites; Scarlatti; Beethoven, Ecossaises; Sonatas, Op. 2; Rondo, Op. 51; Schuman, Op. 2, 82, 89; Mendelssohn. Variations in E Flat; Chopin, nocturnes and polonaises; Schubert, impromptus. Moments Musicaux; modern; Debussy, Bartok, Gershwin, Dello Joio, Kabalevsky, Shostakovich; technique; major and minor scales in modulatory sequence, dominant seventh, and diminished seventh arpeggios; emphasis on memorization and requirements for the upper division examination. Seminar performances. Prerequisite: MUSC 1523.

MUSC 2533-2543. Class Piano. (3-0) Credit 3 semester hours. Intermediate piano studies through group instruction.

MUSC 2613-2623. Voice. (3-0) Credit 3 semester hours. Continuation of technical studies (Vaccai Vocal Method). Literature to include German lieder, British, American, Russian, Scandinavian or Spanish songs, opera and oratorio arias. Seminar performances. Prerequisite: MUSC 1623.

MUSC 2632-2642. Voice. (2-0) Credit 2 semester hours. The study of selected solo literature and materials for the voice. Seminar performances. Prerequisite: MUSC 1642.

MUSC 2712-2722. Brass. (2-0) Credit 2 semester hours. The study of selected solo literature and technical etudes. Seminar performances. Prerequisite: MUSC 1722.
MUSC 2713-2723. Brass. (3-0) Credit 3 semester hours. The study of selected solo literature and technical etudes. Seminar performances. Prerequisite: MUSC 1723.

MUSC 2812-2822. Woodwinds. (2-0) Credit 2 semester hours. The study of selected solo literature, scales and technical etudes. Required seminar performances. Prerequisite: MUSC 1822.

MUSC 2912-2922. Percussion. (2-0) Credit 2 semester hours. The study of appropriate literature and technical etudes for percussion instruments. Seminar performances. Prerequisite: MUSC 1922.

MUSC 2913. Percussion. (3-0) Credit 3 semester hours. The study of appropriate literature and technical etudes for percussion instruments. Seminar performances. Prerequisite: MUSC 1923.

MUSC 3212. Analysis of Music. (2-0) Credit 2 semester hours. An introduction to the techniques of musical analysis as applied to different forms of music. Prerequisite: MUSC 2223.

MUSC 3222. Analysis of Music. (2-0) Credit 2 semester hours. The study of techniques of musical analysis as applied to different forms of music.

MUSC 3232-3242. Counterpoint. (2-0) Credit 2 semester hours each. The study of the technique of counterpoint through the writing of original examples. Prerequisite: MUSC 2223.

MUSC 3313. Music History. (3-0) Credit 3 semester hours. A study of musical styles, forms, and developments in western music from antiquity through the baroque period.

MUSC 3323. Music History. (3-0) Credit 3 semester hours. A study of musical styles, forms, and developments in Western music from 1750 to the present. Prerequisite: MUSC 3313.

MUSC 3423. Music Concepts II. (3-0) Credit 3 semester hours. The study of Music Concepts through the use of the keyboard instruments, directed listening experiences, and singing.

MUSC 3463. Instrumental Literature. (3-0) Credit 3 Semester hours. The study of literature for instrumental ensembles.

MUSC 3512-3522. Piano. (2-0) Credit 2 semester hours. Advanced technical studies, including Czerny, The Art of Finger Dexterity; Beethoven, Sonatas; Chopin; Etudes and Ballads; Bach, The Well-Tempered Clavichord, The English Suites and The French Suites; repertory, including solos and concertos of Classical, Romantic and Modern composers. Prerequisite: MUSC 2522.

MUSC 3513-3523. Piano. (3-0) Credit 3 Semester hours. The study of selected solo literature and technical etudes. Materials to include solos by Bach, Haydn, Brahms, Schumann, Poulenc, Fauré and Debussy; technical studies by Piscina, Czerny, Cortot. Seminar performances. Prerequisite: MUSC 2523.

MUSC 3612-3622. Voice. (2-0) Credit 2 semester hours. The study of selected solo literature and materials for the voice. Seminar performances. Prerequisite: MUSC 2642.

MUSC 3613-3623. Voice. (3-0) Credit 3 Semester hours. Advanced technical studies, 19th and 20th century French art songs; 20th century American and British songs; the study of one (1) song cycle. Seminar performances. Junior recital. Prerequisite: MUSC 2623.

MUSC 3632. Opera. (2-0) Credit 2 semester hours. The study of operatic performances and practices.

MUSC 3712-3722. Brass. (2-0) Credit 2 semester hours. The study of selected solo literature and technical etudes. Seminar performances. Prerequisite: MUSC 2722.

MUSC 3713-3723. Brass. (3-0) Credit 3 semester hours. The study of selected solo literature and technical etudes. Seminar performances. Prerequisite: MUSC 2723.
MUSC 3812-3822. Woodwinds. (2-0) Credit 2 semester hours. The study of selected solo literature, scales and technical etudes. Required seminar performances. Prerequisite: MUSC 2822.

MUSC 4012. Conducting. (2-0) Credit 2 semester hours. The study of basic conducting techniques. A general conducting course.

MUSC 4022. Choral Conducting. (2-0) Credit 2 semester hours. The study of choral conducting techniques.

MUSC 4032. Instrumental Conducting. (2-0) Credit 2 semester hours. The study of instrumental conducting techniques.

MUSC 4513-4523. Piano. (3-0) Credit 3 Semester hours. The study of selected solo literature and technical etudes. Materials to include solos by Bach, Haydn, Brans, Schumann, Poulenc, Fauré and Debussy; technical studies by Pischna, Czerny, Cortot. Seminar performances. Prerequisite: MUSC 3523.

MUSC 4512-4522. Piano. (2-0) Credit 2 semester hours. Advanced technical studies, including Czerny, The Art of Finger Dexterity; Beethoven, Sonatas; Chopin; Etudes and Ballads; Bach, The Well-Tempered Clavichord, The English Suites and The French Suites; repertory, including solos and concertos of Classical, Romantic and Modern composers. Seminar performances. Senior recital. Prerequisite: MUSC 3522.

MUSC 4532. Piano Literature. (2-0) Credit 2 semester hours. A study of piano literature from 1600 to the present.

MUSC 4612-4622. Voice. (2-0) Credit 2 semester hours. The study of selected solo literature and materials for the voice. Seminar performances. Prerequisite: MUSC 3622.

MUSC 4613-4623. Voice. (3-0) Credit 3 Semester hours. Romantic and Contemporary compositions; study one (1) opera role, one (1) oratorio, one (1) song cycle. Seminar performances. Senior recital. Prerequisite: MUSC 3623.

MUSC 4632. Opera. (2-0) Credit 2 semester hours. Continued study of operatic performances and practices. Prerequisite: MUSC 3632.

MUSC 4712-4722. Brass. (2-0) Credit 2 semester hours. The study of selected solo literature and technical etudes. Seminar performances. Senior recital. Prerequisite: MUSC 3722.

MUSC 4812-4822. Woodwinds. (2-0) Credit 2 semester hours. The study of selected solo literature, scales and technical etudes. Required seminar performances. Senior recital. Prerequisite: MUSC 3822.

MUSC 4813. Woodwinds. (3-0) Credit 3 Semester hours. The study of selected solo literature, scales and technical etudes. Required seminar performances.

MUSC 4992-4993. Independent Study. (0-0) Credit 2, and 3 semester hours. Readings, research, and/or field work on special topics. Prerequisite: consent of advisor.

NAVY 1013. Introduction to Naval Sciences. (3-0) Credit 3 semester hours. A general introduction to the naval profession and to concepts of seapower. Instruction emphasizes the mission, organization, and warfare components of the Navy and Marine Corps.

NAVY 1023. Seapower and Maritime Affairs. (3-0) Credit 3 semester hours. A survey of U.S. Naval History from the American Revolution to the present, with emphasis on major developments. Included is an in-depth discussion of the geopolitical theory of Mahan.
NAVY 2013. Leadership and Management I. (3-0) Credit 3 semester hours. A comprehensive, advanced-level study of organizational behavior and management in the context of the naval organization. Topics include a survey of the management functions of planning, organizing, and controlling; an introduction to individual and group behavior in organization; and extensive study of motivation and leadership. Practical applications are explored by the use of experiential exercises, case studies, and laboratory discussions.

NAVY 2023. Navigation and Naval Operations I. (3-0) Credit 3 semester hours. An in-depth study of plotting, including theory, principles, and procedures. Other topics discussed include tides, currents, effects of wind and weather, plotting, use of navigation instruments, types and characteristics of electronic navigation systems, and A Day’s Work in Navigation.

NAVY 3013. Navigation and Naval Operations II. (3-0) Credit 3 semester hours. A study of relative-motion vector-analysis theory, relative motion problems, formation tactics, and ship deployment. Also included is an introduction to Naval Operations and operations analysis, communications and seamanship. Prerequisite: NAVY 2023.

NAVY 3023. Naval Ships Systems I (Engineering). (3-0) Credit 3 semester hours. A detailed study of ship characteristics and types, including ship design, hydrodynamic forces, stability, compartmentation, propulsion, electrical and auxiliary systems, interior communications, ship control, and damage control.

NAVY 3103. Evolution of Warfare. (3-0) Credit 3 semester hours. This course traces historically the development of warfare from the dawn of recorded history to the present, focusing on the impact of major military theorists, strategists, tacticians, and technological developments.

NAVY 4013. Naval Ships Systems II (Weapons). (3-0) Credit 3 semester hours. This course outlines the theory and employment of weapons systems. The student explores the processes of detection, evaluation, threat analysis, weapon selection, delivery, guidance, and explosives. Fire control systems and major weapon types are discussed. Prerequisite: NAVY 1023.

NAVY 4023. Leadership and Management II (Ethics). (3-0) Credit 3 semester hours. This course is designed to acquaint graduating midshipmen with the basic elements of naval leadership, ethics, and junior officer responsibilities through the study of the Navy’s Core Values, ethics, military justice, naval human resources management, directives and correspondence, naval personnel administration, material management and maintenance, and supply systems. Prerequisite: NAVY 2013

NAVY 4103. Amphibious Warfare. (3-0) Credit 3 semester hours. An historical survey of the development of amphibious doctrine and the conduct of amphibious operations. Present-day potential of and limitations of amphibious operations including the Rapid Deployment Task force concept, are explored.

PHIL 2013. Introduction to Philosophy. (3-0) Credit 3 semester hours. Examination of selected philosophical readings concerning the theory of knowledge, the nature of being, the theory of values, social ideals and religion and other philosophical problems and issues. Reading will be taken from original western and non western sources.

PHIL 2023. Ethics. (3-0) Credit 3 semester hours. Combines the philosophical study of normative ethics with the study of contemporary applied ethics through examination of a number of tendencies and schools of ethics from various cultures, societies and historical periods. The aim of the course is to enhance the student’s awareness and sensitivity to the perplexity of morality and the moral life.

PHIL 3013. Critical Thinking. (3-0) Credit 3 semester hours. Course is designed to develop students’ ability to recognize and evaluate arguments. Focus will include: The most frequently encountered fallacies and errors in reasoning; the use/abuse of statistics; and principles of logic as applied to daily life.
PHSC 1123. Physical Science Survey. (3-0) Credit 3 semester hours. Emphasizes insight into basic physical science principles and practices. Topics include physics, chemistry, and earth science aspect dealing with the atmosphere, hydrosphere, and lithosphere. Corequisite: PHSC 1121. *(PHYS 1315)

PHSC 2103. Quantitative Physical & Biological Sciences. (3-0) Credit 3 semester hours. An interdisciplinary examination of the physical and biological sciences. The course helps students understand how quantitative tools are used in modern scientific discovery. The course includes basic concepts of mechanics, chemistry, evolutionary development, and environmental sciences. Elements from online weather studies course are included. Prerequisite: PHSC 1123.

PHSC 4014. Earth Science. (3-2) Credit 4 semester hours. Designed for science teachers in junior and senior high schools. It covers basic concepts of earth science and methods of teaching. The content covers a study of geology, meteorology, hydrology, petrology, and mineralogy. A study analysis and evaluation of some of the recent systems and techniques in the teaching of earth science. Elements from online weather studies course are included. Prerequisites: PHSC 2103.

PHSC 4024. Astronomy and Geology. (3-2) Credit 4 semester hours. An introduction to earth science concepts with a more advanced approach involving research materials, including astronomy, geology, paleontology, and field experiences as content materials. Prerequisites: PHSC 2103.

PHYSICS (PHYS)

PHYS 2013. Engineering Physics I. (3-0) Credit 3 semester hours. For engineering student, a subset of calculus based general physics for science and engineering students, PHYS 2514. Course includes measurement, statics, dynamics, mechanical energy, momentum, circular motion, and selected topics from torque, modulii, Newton universal law, and fluid mechanics. Computer-based demonstrations are included. Corequisites: MATH 1124 and PHYS 2511.

PHYS 2023. Engineering Physics II. (3-0) Credit 3 semester hours. For engineering students, a subset of calculus based general physics for science and engineering students, PHYS 2524. Course includes electricity, magnetism, and selected topics from heat, sound and light. Computer-based demonstrations are included. Prerequisites: PHYS 2013 or 2514. Corequisites: MATH 2024, PHYS 2521.

PHYS 2014. General Physics I. (3-2) Credit 4 semester hours. An introductory algebra and trigonometry based introduction to general physics with topics to include measurement system, motion, vector addition, statics, dynamics, mechanical energy, gravitation, momentum, circular motion, torque. Computer-based demonstrations are included. Prerequisites: MATH 1113 and MATH 1123, or MATH 1115. *(PHYS 1401, 1402, 2425, 2426)

PHYS 2024. General Physics II. (3-2) Credit 4 semester hours. A continuation of algebra and trigonometry based General Physics I course includes sound, heat, electricity, magnetism, and optics. Computer-based demonstrations are included. Prerequisite: PHYS 2014.

PHYS 2511. General Physics Lab I. (0-2) Credit 1 semester hour. General physics laboratory to include hands-on and computer-based experiments on measurement, vectors-force table, air track, projectile motion, static and kinetic friction, ballistic pendulum, Atwood’s machine, or blocks and incline, centripetal force, moment of inertia, oscillations – simple and physical pendulum.

PHYS 2514. General Physics for Science and Engineering I. (4-0) Credit 4 semester hours. A calculus-based general physics course to include measurements, Newton’s laws of motion, statics, dynamics, mechanical energy, impulse, momentum, circular motion, torque, stress and strain, modulii, gravitation, and fluid mechanics. Computer-based demonstrations are included. Corequisites: MATH 1124 and PHYS 2511.

PHYS 2521. General Physics Lab II. (0-2) Credit 1 semester hour. General physics laboratory to include hands-on and computer-based experiments on determination of absolute zero, linear expansion,
calorimetry, string standing waves, sound resonance, force of static electricity, Ohm’s Law, color-coded resistors, resistors in series and parallel, RC-series transient circuit, RLC-series circuit, AC circuits, concave and convex lenses, and diffraction grading.

**PHYS 2524. General Physics for Science and Engineering II.** (4-0) 4 semester credit hours. A continuation of calculus-based general physics I. Course includes optics (heat and thermodynamics, sound), electricity, magnetism, optics, and select topics from modern physics. Computer-based demonstrations are included. Prerequisite: PHYS 2013 or 2514. Corequisites: MATH 2024 and PHYS 2521.

**PHYS 3003. Physics Research Internship.** (6-0) Credit 3 semester hours. Internship for undergraduate majors in physics and for majors in applied physics related disciplines who are engaged in research/co-op in governmental or industrial labs. Prerequisites: Consent of the Advisor and Department Head.

**PHYS 3073. Optics.** (3-0) Credit 3 semester hours. Course on geometrical optics, ray tracing, plane surfaces, spherical surfaces, thin lenses, thick lenses, mirrors, stops, lens aberrations, optical instruments, wave optics, interference, Fraunhofer and Fresnel diffraction, diffraction grating, speed of light measurements, absorption and scattering, polarization, etc. Prerequisites: PHYS 2524, MATH 2024.

**PHYS 3103. Mechanics I.** (3-0) Credit 3 semester hours. The course content includes elements of vector analysis, rectilinear motion of a particle, Newton’s laws, damped and forced harmonic motion, Fourier series, motion of a particle in three dimensions, rotating coordinate systems, gravitation, central force motion. Prerequisites: PHYS 2524 or 2023, MATH 2024.

**PHYS 3113. Mechanics II.** (3-0) Credit 3 semester hours. The course content includes motion of systems of particles, center of mass and moment of inertia of rigid bodies, moments and products of inertia, principal axes, Euler’s equations, Lagrangian mechanics, coupled harmonic oscillators and normal coordinates, theory of vibrating systems. PHYS 3103.

**PHYS 3123. Electricity and Magnetism.** (3-0) Credit 3 semester hours. Basic theory of electrostatics; Coulomb’s Law, Gauss’s Theorem, simple potential theory, LaPlace’s and Poisson’s equations. Calculation of electric fields and potentials for point and continuous charge distributions. Computer-based demonstrations are included. Prerequisites: PHYS 2524 and 2521, MATH 2034.

**PHYS 3133. Electricity and Magnetism.** (3-0) Credit 3 semester hours. Theory of metallic conduction of electricity. Ohm’s Law, Kirchoff’s Law, electromagnetic induction, Maxwell’s Equations, A.C. circuits and electromagnetic radiation; appropriate demonstrations to complement the theory. Computer-based demonstrations are included. Prerequisites: PHYS 2524 and 2521, 3123.

**PHYS 3163. Mathematical Physics I.** (3-0) Credit 3 semester hours. Advanced mathematics for physicists and engineers; vector analysis, curvilinear coordinates, tensor analysis, matrices and determinants, infinite series, functions of a complex variable. Emphasis through out is on practical applications of theory and techniques as applied to problems in physics and engineering. Computer programs such as Mathematica and MATLAB will be used. Prerequisites: PHYS 2524 and 2521, MATH 2034.

**PHYS 3173. Mathematical Physics II.** (3-0) Credit 3 semester hours. A continuation of PHYS-3163. Course topics include second-order differential equations, orthogonal functions, Fourier series and integrals, gamma functions, La Place transforms, Bessel special functions, Greens functions, calculus of variations. Computer programs such as Mathematica and MATLAB will be used. Prerequisites: PHYS 3163.

**PHYS 3183. Modern Physics I.** (3-0) Credit 3 semester hours. Course content includes relativity, particle properties of waves, and wave properties of particles, atomic structure, quantum mechanics, quantum theory of the hydrogen atom. Prerequisites: PHYS 2524 and 2521, MATH 2024.
PHYS 3193. Modern Physics II. (3-0) Credit 3 semester hours. A continuation of PHYS 3183 to include many-electron atoms, molecules, statistical mechanics, Master equation, the solid state, the atomic nucleus, radioactivity, nuclear reactions, elementary particles Prerequisites: PHYS 3183

PHYS 4011-4021. Physics Seminar. (1-0) Credit 1 semester hour. Guest speakers, oral and written reports, group and/or individual study of interesting special topics in physics. Prerequisites: Consent of the Advisor and Department Head.

PHYS 4023. Introductory Quantum Mechanics I. (3-0) Credit 3 semester hours. Inadequacy of classical mechanics, wave-particle duality, wave function, uncertainty relation, Schrödinger equation, expectation values, operator formalism, measurement, the correspondence principle, etc. Prerequisites: PHYS 2524, MATH 2034, PHYS 3163.

PHYS 4033. Introductory Quantum Mechanics II. (3-0) Credit 3 semester hours. Exclusion principle, angular momentum, central forces, matrix representations of wave functions and operators, spin, eigenvalue equations, perturbation theory, Zeeman effect, quantum-statistical mechanics, etc. Prerequisites: PHYS 4023.

PHYS 4043. Astronomy and Astrophysics I (3-0) Credit 3 semester hours. An intermediate level Physics/Physical Science course including Kepler’s laws, law of gravitation, earth, moon, solar system, sun stars, stellar evolution, nucleosynthesis, quarks to quasars, pulsars, nebulae, black holes, orbital transfers, cosmology. Simulation programs will be used. Prerequisites: PHYS 2514, Math 2024.

PHYS 4063. Thermodynamics and Statistical Mechanics I. (3-0) Credit 3 semester hours. Macroscopic thermodynamic systems, kinetic theory, black body radiation, classical and quantum statistical mechanics to include Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac Statistics. Prerequisite: MATH 2034, PHYS 2524.

PHYS 4073. Thermodynamics and Statistical Mechanics II. (3-0) Credit 3 semester hours. A continuation of PHYS 4063 to include quantum statistical mechanics, approximate methods, the master equation, Ising model, Onsanger solution, Laundau approach, Mean-Field theory, block spin and renormalization-group transformation and the like. Prerequisite: PHYS 4063.

PHYS 4103. Advanced Physics Lab I. (2-2) Credit 3 semester hours. Intermediate level undergraduate physics labs and theory from areas of physics including mechanics, optics, electricity and magnetism, acoustics, harmonic motion damping, fluid dynamics, modern physics, and the like. Computer-assisted experiments employing MATLAB and Electronics WorkBench will be used. Prerequisite: PHYS 2514-2524 and 2511-2521 MATH 2034.

PHYS 4991-4992-4993. Independent Study. (0-0) Credit 1, 2, or 3 semester hours. Readings, research, and/or field work on selected topics. Prerequisite: consent of Department Head.

POSC 1113. American Government I. (3-0) Credit 3 semester hours. This is a survey course about the national and Texas constitutional development, the state and federal judicial systems, federal-state relations, citizenship, and civil liberties. Meets Texas teacher certification requirement. **(GOVT 2301)

POSC 1123. American Government II. (3-0) Credit 3 semester hours. This course surveys the national and Texas legislative and executive institutions, local government, governmental services, regulatory policies, and foreign affairs. **(GOVT 2302)

POSC 2113. Political Parties. (3-0) Credit 3 semester hours. This course is designed to study the nature, functions, evolution, and organization of the American party system.
POSC 2123. Public Administration. (3-0) Credit 3 semester hours. This course provides an examination of the organization, responsibility, personnel management, fiscal processes, functions, and problems of public administration. **(GOVT 2335)

POSC 2133. Introduction to Political Science. (3-0) Credit 3 semester hours. This is an introductory course in the study of politics, the various sub-fields in the discipline, and the variety of approaches used in the study of Political Science. (Required for all majors and minors) **(GOVT 2304).

POSC 2213. Blacks and the American Political System. (3-0) Credit 3 semester hours. This course offers a critical analysis of the position of blacks in the American politico-economic system, both historically and contemporarily.

POSC 2413. Introduction to Research in Political Science. (3-0) Credit 3 semester hours. This course introduces majors to the various methods and approaches used in the field of Political Science (Required for all majors and minors).

POSC 2503. Introduction to Global Issues. (3-0) Credit 3 semester hours. Selected issues facing the global community are examined. Issues include hunger, energy, population, war and racism. The course has interdisciplinary and cross-cultural focus.

POSC 2523. Introduction to Third World Studies. (3-0) Credit 3 semester hours. The course surveys and analyzes the social, political and economic challenges facing Africa, Asia, and Latin America.

POSC 3123. Modern Political Theory. (3-0) Credit 3 semester hours. This course is a review of the political theories from the Reformation to the present, with special attention to Machiavelli, Bodin, Hobbes, Locke, Montesquieu, Jefferson, Rousseau, Mills, Hegel, and Marx.

POSC 3213. Introduction to Public Policy Analysis. (3-0) Credit 3 semester hours. The course explores the processes involved in the formulation and implementation of authoritative decisions, with emphasis on alternative models of policy analysis and selected issues pertaining to the federal bureaucracy.

POSC 3523. Comparative Politics of Developing States. (3-0) Credit 3 semester hours. The course examines political processes in the developing nations of Africa, Asia, and Latin America, with particular attention to the problems of political integration and nation building.

POSC 3533. U.S. Foreign Policy. (3-0) Credit 3 semester hours. This is a study of the American foreign policy, including the objectives, capabilities and formulation process.

POSC 3543. International Politics. (3-0) Credit 3 semester hours. The basic problems of international politics, focusing on the power competition among states and other transnational institutions, are the major focus of this course. (Required for all majors and minors).

POSC 3553. Introduction to African Politics. (3-0) Credit 3 semester hours. This is an introductory course in the political history and development of African states.

POSC 3563. African Women in Development. (3-0) Credit 3 semester hours. The course focuses on the role of African women in development, examining the social context of women’s work, work patterns, social advancement and policy issues affecting their status in the labor market.

POSC 4103. Urban Government and Politics. (3-0) Credit 3 semester hours. This course examines the structure and functions of urban government. Considerable attention is given to the politics and current problems of metropolitan areas.

POSC 4113. American Constitutional Law. (3-0) Credit 3 semester hours. In this course, the principles of the American constitutional system, judicial interpretation and application of these principles, relative to
the powers of government and the rights of individuals, are examined in depth. (Required for all majors and minors).

**POSC 4123. The Constitution and Private Rights.** (3-0) Credit 3 semester hours. This course examines the rights and duties of United States citizenship with special attention to individual freedoms, issues of subversion, loyalty, and governmental authority, and the processes of adjudication.

**POSC 4133. The Presidency.** (3-0) Credit 3 semester hours. This course traces the evolution of the office of the President of the United States while examining presidential powers in the areas of politics, administration, legislation, war, and foreign affairs.

**POSC 4143. The Legislative Process.** (3-0) Credit 3 semester hours. The course provides a detailed study of the nature and extent of the legislative process, with special attention to the organization, procedure, and dynamics of the American legislative policy-making.

**POSC 4153. Internship in Political Science.** (3-0) Credit 3 semester hours. The student will participate full time in the ongoing work of selected governmental units. A research paper dealing with the internship experience will be required, which has to be supervised or directed by a faculty member.

**POSC 4163. U.S.-African Relations.** (3-0) Credit 3 semester hours. This course examines U.S. foreign policy toward Africa historically and contemporarily focusing on issues that influence U.S.-African relations and American foreign policy strategies and priorities affecting such relations.

**POSC 4173. International Dimensions of African Political Economy.** (3-0) Credit 3 semester hours. This course focuses on the historical dimensions of African political economy, including a cursory examination of the political and economic forces affecting development in Africa.

**POSC 4213. Seminar in Political Science.** (3-0) Credit 3 semester hours. This course is devoted to intensive reading, writing, research, and discussion focusing on selected topics.

**POSC 4223. Seminar in African Studies.** (3-0) Credit 3 semester hours. Selected issues and problems confronting African states, coupled with a cursory examination of the processes of nation-building, democratization, and of the role of religion, women and the military in development, are the main thrust of this course.

**POSC 4993. Independent Study.** (0-0) Credit 3 semester hours. Readings, research, and/or field-work on selected topics. Prerequisite: consent of advisor.

**SOCG 1013. General Sociology.** (3-0) Credit 3 semester hours. Introduction to the discipline. Focus on why and how sociologists study social and cultural phenomena such as inequality, race and ethnicity, gender, populations, family, political behavior, deviance, and social change. Prerequisite course to most other sociology courses. Required for the major and minor. **(SOCI 1301)

**SOCG 2003. Sociology of Minorities.** (3-0) Credit 3 semester hours. Sociological study of traditional minorities (race, ethnicity, and religion) and new minorities (gender, sexual orientation and disability). **(SOCI 2319, 2320)

**SOCG 2013. Sociology of Families.** (3-0) Credit 3 semester hours. Study of families as social institutions. Focus on social facts and theories of the size, composition, and life cycle of families, family violence, family diversity, family change, and myths about the family. **(SOCI 2301)

**SOCG 2023. African Family and Culture.** (3-0) credit 3 semester hours. Exploration of the institution of family from perspective of African peoples, cultures, and societies; explores issues of the Diaspora.
SOOG 2033. Social Psychology. (3-0) Credit 3 semester hours. Uses major social psychological perspectives to analyze human behavior and the importance of others in determining self-perception, attitudes, motivation, conformity, communication, altruism, and aggression. **(SOCI 2326)

SOOG 2043. Social Problems. (3-0) Credit 3 semester hours. Application of sociological principles to major social issues and problems in contemporary and global society with particular emphasis on the United States. **(SOCI 1306)

SOOG 2053. Social Deviance. (3-0) Credit 3 semester hours. Analyzes norm violation and social conformity, societal sanctions and social control. Examines the changing definitions of deviance and theoretical explanations of deviant behaviors deviant in different societies.

SOOG 3013. Urban Sociology. (3-0) Credit 3 semester hours. Study of human settlement patterns, including the origin and development of cities, types of cities, urban political economy, spatial distribution of lifestyles, urban problems and recent trends in urbanization. Examines globalization and the rise of mega-cities and homelessness.

SOOG 3023. Correctional Treatment and Public Policy. (3-0) Credit 3 semester hours. Sociological analysis of the historical development and current policies of the correctional system. Analysis of the justice process from crime to conviction: correctional systems (including jails), detention facilities to include local, state, federal and private penal systems.

SOOG 3033. Social Stratification in America. (3-0) Credit 3 semester hours. A consideration of the research findings describing the American class structure. Special attention is given to the various strata, the determinants of membership in these strata, lifestyles and life changes associated with social position and with changes in position.

SOOG 3043. Juvenile Delinquency. (3-0) Credit 3 semester hours. Sociological approaches to the nature and extent of juvenile delinquency; historical reasons for considering juvenile delinquency from adult crime perspective; influence of environments that support delinquency such as subcultures, peer groups, and gangs. Examines current societal measures used to address juvenile delinquency.

SOOG 3053. Addiction and Substance Abuse. (3-0) Credit 3 semester hours. This course is designed to examine the sources of drug abuse; review and assess the biological, psychological and social forces as causal factors of addiction.


SOOG 3073. Sociology of Drug Enforcement. (3-0) Credit 3 semester hours. Study of current and historical agencies and policies used in drug enforcement. Emphasizing the roles of drug enforcement officials in the prevention and control of drugs in society.

SOOG 3083. Sociology of Probation and Parole. (3-0) Credit 3 semester hours. Examines the organization and administration of probation and parole services, including pre-sentence investigation, probation hearings, conditions of probation, and community supervision. Examines parole administration, including operation of Parole Boards, the selection process for parole, boot camp, shock incarceration and emerging issues in probation and parole.

SOOG 3223. Political Sociology. (3-0) Credit 3 semester hours. Comparative analysis of political development and political participation including voting behavior, public opinion, political parties and elites; political power and resource distribution in groups, organizations, institutions, communities, and societies.
SOCG 4023. **Special Topics in Sociology**. (3-0) Credit 3 semester hours. Intensive study of specialized topics in sociology and contemporary social issues. May be repeated for credit when topics vary.

SOCG 4043. **Collective Behavior and Social Change**. (3-0) Credit 3 semester hours. Examines the spontaneous behavior of impermanent, unstructured collections of people, including crowds, disaster, revolutions and social movements.

SOCG 4053. **Social Statistics**. (3-0) Credit 3 semester hours. Presentation of sociological data and introduction to descriptive and inferential statistics for social science majors. Includes computer applications. Prerequisite MATH 1113.

SOCG 4063. **Demography**. (3-0) Credit 3 semester hours. Study of size, composition, growth and distribution of populations; social causes and consequences of population change; and collection and interpretation of vital statistics and census data.

SOCG 4073. **Global Sociology**. (3-0) Credit 3 semester hours. Study of the interaction of culture, technology and environment in the evolution of social life from hunting and gathering bands to global society. Explores recent theories of global society in the post-cold war world.

SOCG 4143. **Environmental Sociology**. (3-0) Credit 3 semester hours. Explores human relationship with the physical world, other animals, and with the land including raw materials. A broad historical and cultural perspective will be employed, comparative cultural analyses, changes over time in relation to progress, and current environmental problems and possible solutions.

SOCG 4633. **Cultural Sociology**. (3-0) Credit 3 semester hours. Study of culture including cultural universals, cultural conflicts, and cultural pluralism from a global perspective. Explores the effect of technology on cultural transmission and cultural change.

SOCG 4723. **Sociological Research Methods**. (3-0) Credit 3 semester hours. Introduction to methods of sociological research including experiments, survey research, secondary analysis, and observation. Includes computer applications.

SOCG 4733. **Sociological Theory**. (3-0) Credit 3 semester hours. Critical survey of major sociological theories from classical to contemporary schools of thought.

SOCG 4763. **Sociology Internship**. (3-0) Credit 3 semester hours. Placement in governmental agency, nonprofit organization or business for supervised experience in applied sociology. May require health examination or security clearance.

SOCG 4783. **Senior Seminar in Sociology**. (3-0) Credit 3 semester hours. Final integration of the major works of theory and research in sociology including subfields. Comprehensive exam and major paper required. Restricted to majors and must be taken the semester prior to graduation.

SOCG 4993. **Independent Study**. (0-0) Credit 3 semester hours. Readings, research, and/or field work on selected topics. Prerequisite: Consent of Division Head.

SOWK 2113. **Introduction to the Field of Social Work**. (3-0) Credit 3 semester hours. Introduction to the profession of social work and the institution of social welfare. Include overviews of social welfare history; the range of contemporary services and agencies, and professional values, ethics, licensing and associates. Generalist social work model presented. Involves agency experience. Required for social work major and minor.

SOWK 2133. **Social Work with Children and Families**. (3-0) Credit 3 semester hours. Examination of social and cultural constructs of childhood including history and development of child welfare services; childhood developmental stages; social policy relevant to children, families and their well-being; assessment, intervention and direct services for children and families.
SOWK 2173. Multicultural Issues in Mental Health. (3-0) Credit 3 semester hours. Exploration of the etiology and treatment modalities for addressing mental health issues with culturally diverse populations including African American, Hispanic American, and Asian American.

SOWK 3113. Social Welfare as a Social Institution. (3-0) Credit 3 semester hours. Introduces social welfare as a system of arrangements, programs, and mechanism for generalist social work practice in meeting human needs; survey of social welfare and issues related to social and economic justice.

SOWK 3123. Social Policy Analysis. (3-0) Credit 3 semester hours. Study of the history, philosophy, structure and function of social welfare services; examination of policy-making processes and models, and effects of legislation on social work practice. Utilizes interdisciplinary approach including social, political, legal, economic and administrative.

SOWK 3133. Human Behavior and the Social Environment I. (3-0) Credit 3 semester hours. Dynamics of human behavior and effects of the social environment on individual development. Process of human development adaptation from infancy through adolescence with an examination of developmental states, transitions and problems inclusive of the person in the environment.

SOWK 3143. Human Behavior and the Social Environment II. (3-0) Credit 3 semester hours. Continuation of the person in the environment emphasizing theoretical orientation, building understanding and knowledge of human behavior as influenced by bio-psycho-social-cultural factors. Emphasis on current perspectives on adulthood and aging, and theories helpful for understanding work with individuals in the context of their social environment. Prerequisite: SOWK 3133

SOWK 3153. The Criminal Justice System. (3-0) Credit 3 semester hours. Survey and comparative analysis of criminal justice systems. Effects of crime, criminal behavior, court systems, and corrections on social order.

SOWK 3163. Gerontological Social Work. (3-0) Credit 3 semester hours. Introduction of fundamentals in gerontology (theories, principles, and concepts); interdisciplinary approaches to aging and life-span development including ecological and systems perspective.

SOWK 3213. Human and Cultural Diversity Social Work. (3-0) Credit 3 semester hours. Acquisition and application of methods, theories, and skills sensitive to a wide variety of human differences for competent social work practice with diverse populations. Effects of prejudice, discrimination, and stereotyping at individual and institutional levels. Advocacy for social and economic justice specific to race, ethnicity, gender, age, religion, disability, social class, nationality, and sexual orientation.

SOWK 4123. Social Work Practice I. (3-0) Credit 3 semester hours. Introduction to generalist social work practice theory, knowledge, values, and skills in professional practice with individuals, families, and small groups. Emphasis on ecological and systems framework; presents generalist methodological approach for problem solving.

SOWK 4133. Social Work Practice II. (3-0) Credit 3 semester hours. Acquisition and application of theories and practice approaches appropriate for professional generalist social work with groups, organizations, and community systems. Emphasizes leadership roles and skills, including analyses of systems processes and interactions. Builds on problem solving approach introduced in SOWK 4123. Thirty-six (36) hours of agency volunteer service required. Restricted to social work majors. Prerequisite: SOWK 4123

SOWK 4143. Social Work Research I. (3-0) Credit 3 semester hours. Study of the research process and its application to generalist social work practice. Conceptual foundation of social work research. Quantitative and qualitative methods of inquiry, research designs, data collection, and analysis of ethical and human diversity issues in research. Introduces computer research applications in social work practice.
SOWK 4153. Social Work Research II. (3-0) Credit 3 semester hours. Advanced quantitative and qualitative methods of inquiry, research designs, and analysis of ethical and human diversity issues in social work research. Knowledge and skills in using advanced computer research applications in social work. Prerequisite: SOWK 4143

SOWK 4163. Practicum Preparation. (3-0) Credit 3 semester hours. Preparation for social work field practicum experiences. Integration of theory and practice, the use of self, and the consideration of values and issues of the social work profession in field-based settings. Restricted to Social Work majors. Prerequisite: SOWK 4123, SOWK 4133

SOWK 4176. Field Practicum. (6-0) Credit 6 semester hours. Supervised learning experience involving field-based placement in social service agency. Integration of theory and practice. All required social work foundation courses must be completed before entering practicum. Corequisite: SOWK 4183

SOWK 4183. Integrative Seminar. (3-0) Credit 3 semester hours. Analysis and evaluation of the field-based experiences. Evaluation of conceptual framework for integrating social work knowledge, skills, and values gained from field experiences including administrative issues related to practicum, agency assignments and other field related issues for resolution. All required social work foundation courses must be completed before enrolling in this course. Corequisite: SOWK 4176

SOWK 4343. Generalist Crisis Intervention. (3-0) Credit 3 semester hours. Intervention with individuals, families, and communities in crisis using the generalist social work model. Crisis assessment, management and referral.

SOWK 4353. Intervention with Addicted Family. (3-0) Credit 3 semester hours. Integration of theory and codependency, mental and physical abuse, and other obsessive behaviors.

SOWK 4363. Special topics in Social Work. (3-0) Credit 3 semester hours. Select topics of interest in the field of social work and social welfare. May be repeated for credit when topics vary.

SOWK 4993. Independent Study. (3-0) Credit 3 semester hours. Readings, research, and/or field work on selected topics. Prerequisite: Senior standing and consent of Program Director.

SPAN 1013. Elementary Spanish I. (3-0) Credit 3 semester hours. Practice in listening, speaking, reading and writing skills in Spanish to acquire elementary vocabulary and structures and a general knowledge of Hispanic culture. **(SPAN 1411)

SPAN 1023. Elementary Spanish II. (3-0) Credit 3 semester hours. Continuation of acquisition of language skills and culture introduced in Elementary Spanish I. Prerequisite: SPAN 1013. **(SPAN 1412)

SPAN 2013. Intermediate Spanish I. (3-0) Credit 3 semester hours. Continuation of acquisition of language skills and culture presented in Elementary Spanish I and II. Prerequisite: SPAN 1023. **(SPAN 2311)

SPAN 2023. Intermediate Spanish II. (3-0) Credit 3 semester hours. Continuation of acquisition of language skills and culture on an intermediate level with emphasis on reading and discussion, grammar review, and use of idioms. Prerequisite: SPAN 2013. **(SPAN 2312)

SPAN 3023. Survey of Spanish Literature I. (3-0) Credit 3 semester hours. Representative selections and masterpieces of the literature of Spain from Poema del Cid to the eighteenth century. Prerequisites: SPAN 2023 and permission of the instructor.

SPAN 3033. Survey of Spanish Literature II. (3-0) Credit 3 semester hours. Representative selections and masterpieces of the literature of Spain from 1700 to the Generation of 1898. Prerequisites: SPAN 2023 and permission of the instructor.
SPAN 3063. Spanish-American Literature I. (3-0) Credit 3 semester hours. A survey of Spanish-American literature from the period of discovery and exploration through the Modernista movement. Prerequisites 2023 and permission of the instructor.

SPAN 3093. Hispanic Civilization and Culture I. (3-0) Credit 3 semester hours. Main currents of the intellectual, political, and economic history of Spain. Prerequisite: SPAN 2023.


SPAN 3213. Spanish Composition. (3-0) Credit 3 semester hours. Practice in written composition. Salient principles of grammar and syntax in written work. Prerequisite: SPAN 2023.

SPAN 4003. Hispanic Civilization and Culture II. (3-0) Credit 3 semester hours. Main currents of the intellectual, political, and economic history of Mexico in particular and of Latin America in general. Prerequisite: SPAN 2023.

SPAN 4043. Spanish Phonetics. (3-0) Credit 3 semester hours. A practical study of the principal constituents of Spanish pronunciation, articulation, and accentuation. Prerequisites: SPAN 2023, 3203 and 3213 or permission of course instructor.

SPAN 4063. Spanish Applied Linguistics. (3-0) Credit 3 semester hours. Practical study of the application of linguistics to the teaching of Spanish phonology, morphology, syntax, vocabulary, literature, and culture. Prerequisites: SPAN 2023, 3203 and 3213 or permission of course instructor.

SPAN 4993. Independent Study. (0-0) Credit 1, 2, or 3 semester hours. Readings, research, and/or field work on selected topics. Prerequisite: consent of department head.

SPCH 1001. Forensics Practicum. (0-1) Credit 1 semester hour. A practice course for students participating in the university forensics program of intra/intercollegiate speech contest activities. May be taken for one hour credit per semester for a total of three hours.

SPCH 1003. Fundamentals of Speech Communication. (3-0) Credit 3 semester hours. Focuses on the principles of oral communication; practical applications and theoretical formulations are achieved through preparation, delivery, and evaluation of informative, persuasive, and celebratory speeches.

SPCH 2013. Voice and Diction. (3-0) Credit 3 semester hours. An analysis of the scientific aspects of oral communication: anatomy and physiology of the mechanisms of respiration, phonation, resonance, and articulation. Includes coverage of the International Phonetic Alphabet and an analysis of vowels and consonants and standards of pronunciation. Prerequisite: SPCH 1003.

SPCH 2103. Interpersonal Communication. (3-0) Credit 3 semester hours. A study of human symbolic behavior and its effects on people. Emphasizes practical and theoretical implications of face-to-face interaction in social, business, and professional settings. Prerequisite: SPCH 1003.

SPCH 2113. Argumentation and Debate. (3-0) Credit 3 semester hours. An intensive study of the advocacy system with special emphasis on issues identification, use of evidence, and logical proof: extensive practice in argumentative speaking using current CEDA, NDT, and UIL debate topics. Prerequisite: SPCH 1003.

SPCH 2223. Small Group Communication. (3-0) Credit 3 semester hours. Emphasizes the role of oral communication in the dynamics of small group behavior. Group presentations focus on fact-finding, information-sharing, and problem-solving/decision-making processes. Prerequisite: SPCH 1003.

SPCH 3223. Persuasion. (3-0) Credit 3 semester hours. A study of the nature, necessity, and ethics of persuasion. Study of the organization and adaptation of persuasive techniques to achieve personal and
public goals, and extensive practice in the construction and presentation of persuasive speeches. Prerequisites: SPCH 1003 and six semester hours of English.

**SPCH 4013. Business and Professional Speaking.** (3-0) Credit 3 semester hours. Presents issues and methods of communication training appropriate to business and the professions. Participants assess methods of training and apply them to presentational speaking. Prerequisites: SPCH 1003 and six semester hours of English.

**SPCH 4123. Organizational Communication.** (3-0) Credit 3 semester hours. An advanced course in management of human resources through communication skills in interviewing, briefing, consulting, and decision-making; focuses on analyzing and evaluating patterns of communication within social, cultural, industrial, and academic organizations. Prerequisites: SPCH 1003 and six semester hours of English.

** Transfer equivalent from Texas Community/Junior Colleges.
College of Business

ACCT 2113. Financial Accounting. (3-0) Credit 3 semester hours. An introduction to the communication of relevant financial information to investors, creditors, and analysts. Emphasis is placed on the accounting information cycle and the preparation of the three major financial statements: the balance sheet, income statement and statement of cash flow. *(ACCT 2301, 2401)

ACCT 2123. Managerial Accounting. (3-0) Credit 3 semester hours. Instruction in the managerial decision-making functions using accounting information. Review to internal accounting information systems for planning, monitoring, and cost control. Emphasis on manufacturing cost, budgeting, product pricing, and decision making. Prerequisite: ACCT 2113. **(ACCT 2302, 2402)

ACCT 3213. Intermediate Accounting I. (3-0) Credit 3 semester hours. Analysis of special problems and theories of current assets and corporation accounting. Capital stocks, surplus and dividends, treasury stocks, cash, receivables, inventories, net income concepts, and corrections of prior years’ earnings. Prerequisites: ACCT 2113 and 2123.

ACCT 3223. Intermediate Accounting II. (3-0) Credit 3 semester hours. Continuation of ACCT 3213 with emphasis on the interpretation of data relative to managerial decision making. Investments, fixed assets, liabilities and reserves, analysis of operations, ratios, and statements of application of funds. Prerequisite: ACCT 3213.

ACCT 3313. Cost Accounting. (3-0) Credit 3 semester hours. The fundamental accounts of a manufacturing concern; treatment of raw materials, labor cost, and overhead as these effect the selling price of finished goods. Prerequisite ACCT 2123.


ACCT 3343. Federal Income Tax II. (3-0) Credit 3 semester hours. Federal income tax code as they apply to C corporations, S corporations and partnerships. Prerequisites: ACCT 3333.

ACCT 3393. Accounting Internship I. (0-0) Credit 3 semester hours. Supervised full time, off-campus training in industry, government or other agencies. Individual conferences, company performance evaluations and written reports required. The duration of the program will be one regular semester or two consecutive summer terms. Prerequisites: Accounting major, completion of 9 hours in accounting including ACCT 3213 or approval of department head.

ACCT 3493. Accounting Internship II. (0-0) Credit 3 semester hours. Supervised full-time, off-campus training in industry, government or other agencies. Individual conferences, company performance evaluations and written reports required. The duration of the program will be one regular semester or two consecutive summer terms. Prerequisites: accounting major, completion of 12 hours in accounting, including ACCT 3213, ACCT 3313 or approval of department head.

ACCT 4213. Advanced Accounting. (3-0) Credit 3 semester hours. Analysis of special problems and theories relative to partnership operations, receivership, compound interest and annuities, estates and trust, branch operations, and consolidated statements. Prerequisite: ACCT 3223 or equivalent.

ACCT 4223. Auditing. (3-0) Credit 3 semester hours. Principles and procedures of public accounting, auditing, theory, internal control, development of audit programs, evidential matter and reporting. Prerequisite: ACCT 3223.

ACCT 4313. Accounting Information Systems. (3-0) Credit 3 semester hours. Study of overall data flow systems emphasizing financial data and computerized systems of accounting. Covers flow and logic
concepts, and development of meaningful control concepts and data reporting techniques. Prerequisites: Senior classification and completion of 6 semester hours of accounting.

**ACCT 4323. Fund Accounting.** (3-0) Credit 3 semester hours. Features of budgetary and fund accounting as applied to not-for-profit organizations such as colleges and universities, and governmental units. Prerequisite: ACCT 3223.

**ACCT 4383. Accounting Theory.** (3-0) Credit 3 semester hours. An examination of the historical development and theoretical structure of accounting theory through the study of the concepts, principles, and postulates upon which accounting theory rests. Prerequisite: ACCT 3223.

**ACCT 4991-4992-4993-4996. Independent Study.** (0-0) Credit 1, 2, 3, or 6 semester hours. Reading, research, and/or field work on selected topics. Prerequisite: Consent of advisor.

**ECON 2113. Principles of Microeconomics.** (3-0) Credit 3 semester hours. Analysis of the principles and problems of production and distribution, market structure, business enterprise, and comparative economic systems. **(ECON 2302)**

**ECON 2123. Principles of Macroeconomics.** (3-0) Credit 3 semester hours. Analysis of the principles and problems of money and banking, national income, public finance, international trade, and economic growth. **(ECON 2301)**

**ECON 3313. Economic Development.** (3-0) Credit 3 semester hours. A study of the economic factors affecting economic growth and development. Emphasis is on experience of third world countries. Prerequisite: ECON 2123.


**ECON 3343. Economic and Human Resources.** (3-0) Credit 3 semester hours. Examines population growth, poverty, discrimination, human resource development, and training and education. The course is oriented toward explaining the principles, effects, and policies related to each topic. Prerequisites: ECON 2113 and 2123.

**ECON 4213. Intermediate Microeconomic Analysis.** (3-0) Credit 3 semester hours. Analysis of the principles governing price and output decisions of business firms, and the allocation of resources under various market structures. Prerequisite: ECON 2113.

**ECON 4223. Intermediate Macroeconomic Analysis.** (3-0) Credit 3 semester hour. Analysis of determinants of the aggregate level of employment, output and income of an economy. Prerequisite: ECON 2123.

**ECON 4303. Money and Banking.** (3-0) Credit 3 semester hours. Money, credit, commercial and central banking, financial intermediaries, treasury operations, monetary theory and policy, and foreign exchange. Prerequisite: ECON 2123.

**ECON 4343. International Trade.** (3-0) Credit 3 semester hours. Principles and practices of foreign trade with special emphasis on international economic relations. Analysis of foreign exchange, balance of payments, foreign investment, tariff history and policy, and currency problems. Prerequisite: ECON 2123.

**ECON 4353. Urban Economics.** (3-0) Credit 3 semester hours. Economic analysis of the major problems facing urban areas. Study of the theory of urban industrial and residential locations, including patterns of urban growth and development. Prerequisite: ECON 2123.
**ECON 4373. Economic Research.** (3-0) Credit 3 semester hours. Introduces the fundamentals of systematic social science research methods commonly used in economics and business disciplines. Includes problems of measurement, study design, sampling, reliability, validity, and ethical considerations.

**FINA 2103. Personal Financial Management and Planning.** (3-0) Credit 3 semester hours. Covers the basics of the personal money management and financial planning. The areas covered include personal investments in stocks and bonds, auto and home financing, insurance needs, retirement and estate planning.

**FINA 2203. Legal Environment of Business.** (3-0) Credit 3 semester hours. A study of the legal aspects of the business environment and the legal rights and potential liabilities of business persons. The presentation of law as an expanding social and political institution in the environment of business.

**FINA 2213. Business Law.** (3-0) Credit 3 semester hours. The basic law of contracts, Uniform Commercial Code, sales, secured transactions and bankruptcy. Also covers partnerships, corporations and securities. ***(BUSI 2301)*

**FINA 3103. Principles of Finance.** (3-0) Credit 3 semester hours. Fundamental tools and techniques applicable to financial planning of incorporated and unincorporated businesses, emphasizing the problems of acquisition, supervision, and allocation of resources. Prerequisites: ACCT 2113 and 2123.

**FINA 3113. Real Estate Principles.** (3-0) Credit 3 semester hours. An introduction to the study of the economic and legal environment in which real property is transferred and used.

**FINA 3333. Investment Analysis.** (3-0) Credit 3 semester hours. Survey of the risks and returns of investment media in relationship to the investment objectives of individual and industrial investors. Includes an examination of the capital markets, information flows, and analytical techniques in terms of their impact upon the valuation process. Prerequisite: FINA 3103 or approval of department head.

**FINA 3383. Financial Markets and Institutions.** (3-0) Credit 3 semester hours. Analysis of the major financial markets and their interrelationship through interest rates and prices, as well as flow of funds and price behavior of the market as a whole. Also, the role of financial institutions in the flow of funds and their regulation. Prerequisites: ECON 2123 and FINA 3103.

**FINA 3393. Finance Internship I.** (0.0) Credit 3 semester hours. Supervised full time training in industry, government or other agencies for junior level finance majors. Individual conferences, company performance evaluations and written reports required. The duration of the program will be one regular semester or two consecutive summer terms. Prerequisite: FINA 3383 and junior standing or approval of the department head.

**FINA 4213. Managerial Finance.** (3-0) Credit 3 semester hours. Issues and problems faced by financial managers with emphasis on financial analysis, capital budgeting, capital structure, dividend policy, and corporate restructuring. Prerequisite: FINA 3103.

**FINA 4313. Investment Management.** (3-0) Credit 3 semester hours. Principles of portfolio management. Investment selection and timing techniques. Prerequisites: FINA 3103 and 3333.

**FINA 4353. International Finance.** (3-0) Credit 3 semester hours. International financial markets and the flow of funds, exchange rates, parity relationships and arbitrage. Exchange rate risk and its management, short and long term financing, asset and liability management, capital budgeting, and direct foreign investments for multinationals. Also addresses international banking issues. Prerequisites: FINA 3103, ECON 2113, and ECON 2123.

**FINA 4383. Seminar in Finance.** (3-0) Credit 3 semester hours. In-depth study of topics related to the financial management of business operations. Topics may include markets for corporate control, international finance, and speculative markets. Prerequisite: Approval of department head.
FINA 4393. Finance Internship II. (0.0) Credit 3 semester hours. Supervised full-time training in industry, government, or other agencies for senior level finance majors. Individual conferences, company performance evaluations and written reports required. The duration of the program will be one regular semester or two consecutive summer terms. Prerequisite: FINA 4213 and senior standing or approval of the department head.

FINA 4993. Independent Study in Finance. (0-0) Credit 3 semester hours. Reading, research, and/or field work on selected topics. Prerequisite: Consent of advisor.

MGMT 1013. Introduction to Business. (3-0) Credit 3 semester hours. An overview of business operations and the role of business in modern society. Topics of current interest to the business community will be introduced.

MGMT 2391-2393. Cooperative Education I. (1-3) Credit 1 or 3 semester hours. Cooperative program in approved private and public business organizations engaged in planning, organizing, activating, and controlling functions in producing and distributing goods and services. Written reports indicative of student’s work experience are required. Prerequisite: 30 hours of college-level course work.

MGMT 3013. Business Statistics. (3-0) Credit 3 semester hours. Statistical concepts, collection and presentation of data, measures of central tendency and dispersion, index numbers, probability concepts, probability distributions, sampling and linear regression. Prerequisites: MATH 1153 or equivalent.

MGMT 3023. Quantitative Methods. (3-0) Credit 3 semester hours. Application of probability theory and statistical inferences, decision-making under uncertainty, and quantitative techniques in solving business problems. Prerequisite: MGMT 3013.

MGMT 3103. Principles of Management. (3-0) Credit 3 semester hours. Fundamentals of organization and administration. Planning, organizing, directing, coordinating, and controlling business activities. Goal setting: models for thinking about organizations; organization design; information systems; models for understanding individual behavior; job performance and job satisfaction; motivation and leadership; behavior in work groups; careers in business.

MGMT 3113. Introduction to Organizational Behavior. (3-0) Credit 3 semester hours. Considers elements of several management theories and the implications of individual and group behavior for organizational effectiveness. Topics include perception; learning; personality; group dynamics; norms; intergroup relations; motivation; conflict and change. Prerequisite: MGMT 3103.

MGMT 3333. Small Business Management. (3-0) Credit 3 semester hours. A study of the unique and distinct problems encountered by the small business organization. This course covers the topics of locating, financing, staffing, marketing, and regulating the small business. Emphasis will be placed on small business management techniques as they apply to service, retail, and production-oriented small businesses. Prerequisite: MGMT 3103.

MGMT 3343. Management Systems. (3-0) Credit 3 semester hours. Application of management processes to complex interdisciplinary organizational environments through the study of program and project management. Uses typical project management microcomputer software for project planning; resource allocation; project budgeting; and control of project cost, schedule and performance. Prerequisite: MGMT 3103.

MGMT 3353. Human Resource Management. (3-0) Credit 3 semester hours. Systematic approach to human resource utilization. Topics include selection, training, promotion, compensation, labor relations, workplace dysfunctions, management of change and human resource accounting. Prerequisite: MGMT 3103.
MGMT 3363. Industrial Relations. (3-0) Credit 3 semester hours. A study of the philosophical, strategic, and behavioral aspects of labor-management relations as it relates to organizing, union contract negotiation and administration within the private and public sectors. Prerequisite: MGMT 3103.

MGMT 3391-3393. Cooperative Education II. (1-3) Credit 1 or 3 semester hours. Cooperative program in approved private and public business organizations engaged in planning, organizing, activating, and controlling functions in producing and distributing goods and services. Written reports indicative of student’s work experience are required. Prerequisite: 60 hours of college-level course work, MGMT 2393.

MGMT 4303. Strategic Management and Business Policy. (3-0) Credit 3 semester hours. A capstone course to acquaint the student with strategic management and business policy. Focuses on management of the entire business. Uses the concepts, skills and tools of the entire business curriculum to develop in-depth situational appraisals, and specific recommendations regarding strategies, and their implementation and control. Prerequisites: MGMT 3103, MRKT 3103, FINA 3103, senior standing.

MGMT 4313. Business and Society. (3-0) Credit 3 semester hours. A survey of the critical current issues in business and their relationship to government and the larger society. Ethical guidelines and principles are examined, and the traditional and contemporary views of the business community toward its general environment are surveyed. Prerequisites: MGMT 3103 and MGMT 3113.

MGMT 4333. Production and Operations Management. (3-0) Credit 3 semester hours. Major functions, departmental activities, and policies for manufacturing firms and service organizations. Organization for production and analysis of production methods. Prerequisite: MGMT 3013 and MGMT 3103.

MGMT 4383. Management Seminar. (3-0) Credit 3 semester hours. Directed study of selected problems in the area of management which require a multidisciplinary approach and analysis. Prerequisites: MGMT 3103 and MGMT 3103.

MGMT 4391-4393. Cooperative Education III. (0-0) Credit 1 or 3 semester hours. Cooperative program in approved private and public business organizations engaged in planning, organizing, activating, and controlling functions in producing and distributing goods and services. Written reports indicative of student’s work experience are required. Prerequisites: 90 hours college-level work, MGMT 2393, MGMT 3393.

MGMT 4413. International Environment of Business. (3-0) Credit 3 semester hours. Analyzes the environment-cultural, political, legal, geographical, etc.-in which international businesses operate as well as various managerial activities appropriate for an international organization. Topics will include multinational enterprises, global competition, managing political risks and negotiations, international laws, U.S. trade policies, strategies for U.S. firms, expatriation and repatriation, challenges for U.S. firms, etc. Prerequisite: MGMT 3103.

MGMT 4423. Management Methods. (3-0) Credit 3 semester hours. Application of management concepts and analytical tools to scenario-based business situations likely to be encountered by newly-hired graduates. Strong emphasis is placed on methods for developing operational solutions that can be implemented in the typical workplace. Prerequisites: MGMT 3103 and MGMT 3013.

ADSY 1013. Introduction to Management Information Systems. (3-0) Credit 3 semester hours. An introduction to the role, concepts and terminology of microcomputers. Experience using current word processing, spreadsheet and database management software packages under Windows environment. Use of Internet tools to search and access information related to business applications. **(BCIS 1301)

ADSY 2123. Information Systems Applications. (3-0) Credit 3 semester hours. An extension of ADSY 1013. Includes case-based problems and management decision-making drills with alternative computer-based solutions structure. Extensive applications of contemporary microcomputer software packages to
problem solving in functional areas of business. Recommended as an elective course for non-ADSY majors. Prerequisite: ADSY 1013. **( BCIS 1401)

ADSY 2153. Structured Programming. (3-0) Credit 3 semester hours. An Intro. to Management Info. Systems, problem solving, algorithms, and structured program design. Language syntax, control structures, arrays, functions, and VBasic programming. **(BCIS 1332)

ADSY 3303. Business Communications. (3-0) Credit 3 semester hours. Development of psychologically sound business communications in correct and forceful English, organization and preparation of reports used in business and techniques of collecting, interpreting, and presenting information useful to management. Prerequisites: ENGL 1123, 1133.

ADSY 3323. Data Communications. (3-0) Credit 3 semester hours. Fundamentals of data communication, transmission facilities and devices, encoding and processing, transmission errors, multiplexing, line control procedures. Communication circuits, network architecture and design, and communication protocols. Prerequisite: ADSY 1013.

ADSY 3393. Information Systems Internship I. (0-0) Credit 3 semester hours. Supervised full-time training in industry, government or other agencies for junior level information systems majors. Individual conferences, company performance evaluations and written reports required. The duration of the program will be one regular semester or two consecutive summer terms. Prerequisite: Junior standing and 9 semester hours of information system courses or approval of the department head.

ADSY 3413. Data Files and Databases. (3-0) Credit 3 semester hours. Stresses basic knowledge in data structures, data modeling, and data dictionaries. Describe main features of linked-list, hierarchical, network, and relational models. Create logical model and draft appropriate schema and subschema to problems in a business environment. Prerequisite: ADSY 1013.

ADSY 3423. Information Systems Analysis and Design. (3-0) Credit 3 semester hours. Emphasis on analysis, design and implementation through data flow analysis and the systems development life cycle. The value of a structured project to computer systems development as well as prototyping are reviewed. Includes a Computer Aided Software Engineering (CASE) application project and major technical writing component. Prerequisite: ADSY 1013.

ADSY 3433. JAVA Applications for Business. (3-0) Credit 3 semester hours. This course introduces the basic as well as advanced syntax of JAVA language. Students will use object-oriented programming concepts to develop business applications using the JAVA programming language. Prerequisite: ADSY 2153.

ADSY 4393. Information Systems Internship II. (0-0) Credit 3 semester credit hours. Supervised full-time training in industry, government or other agencies for senior level information systems majors. Individual conferences, company performance evaluations and written reports required. The duration of the program will be one regular semester or two consecutive summer terms. Prerequisite: Senior standing and 12 semester hours of information system courses or approval of department head.

ADSY 4433. Distributed Systems. (3-0) Credit 3 semester hours. Examination of local and wide area networks, and protocols and software used in them. Issues in the design and implementation of distributed systems. Client/ server architecture, distributed process management, concurrence control, deadlock, and recovery. Prerequisite: ADSY 3323.

ADSY 4463. Advanced Programming Methods. (3-0) Credit 3 semester hours. A systematic approach to the design, construction and management of large computer programs, emphasizing programming style, documentation, and debugging techniques. Advanced features of VBasic, common data and file structures and algorithms, advanced programming methodology, computer crime prevention and security. Prerequisite: ADSY 2153.
ADSY 4503. Decision Support Systems. (3-0) Credit 3 semester hours. Introduces the concepts, roles, and benefits of computer technology that supports managerial decision making process. Includes discussion of the use of neural networks, genetic algorithms, intelligent agents, group decision support systems and other cutting-edge technologies to support decision-making. Reviews latest software and hardware resources. Prerequisite: ADSY 3423.

ADSY 4993. Independent Study. (0-0) Credit 3 semester hours. Reading, research, and/or field work on selected topics. Prerequisite: consent of advisor.

MRKT 3103. Principles of Marketing. (3-0) Credit 3 semester hours. A study of the importance of marketing in the American economy. An intensive examination of basic marketing variables (product, place, promotion, and price) from the viewpoint of management.

MRKT 3313. Retail Management. (3-0) Credit 3 semester hours. The nature and functions of retail outlets in the marketing structure are studied. Managerial policies and methods of providing goods and services to the ultimate consumer are also studied. Prerequisite: MRKT 3103.

MRKT 3323. Salesmanship. (3-0) Credit 3 semester hours. Concepts of effective selling, including selection of salesmen and their training, management, and evaluation, are studied. The basic steps in the selling process are stressed. Prerequisite: MRKT 3103.

MRKT 3333. Consumer Behavior. (3-0) Credit 3 semester hours. An analysis of the processes underlying the purchasing behavior of consumers. Included is a review of the applicable theories and concepts that are utilized from psychology, sociology, social-psychology and anthropology. Prerequisites: MRKT 3103, SOCG 1013, and PSYC 1113.

MRKT 3333. Advertising. (3-0) Credit 3 semester hours. Fundamentals of the communication process in mass promotion (planning, creating the message, media selection, implementation, and measuring the results). Prerequisite: MRKT 3103.

MRKT 3343. Marketing Research. (3-0) Credit 3 semester hours. Application of the scientific method to the process of obtaining information for structuring marketing strategy and tactics. Emphasis is placed on the role of research in the solution of marketing problems. Prerequisites: MRKT 3103, MGMT 3013.

MRKT 4353. International Marketing. (3-0) Credit 3 semester hours. International marketing opportunities and principles. Marketing tools as a means of adapting the individual domestic business line and its marketing methods to the international environment. Prerequisites: MRKT 3103 and junior standing.

MRKT 4373. Sales Management. (3-0) Credit 3 semester hours. A study of sales management through the use of analytical and problem-solving skills. Managerial responsibilities such as sales force production, sales planning, training of sales men, sales compensation, establishing territories, and controls are covered. Prerequisites: MRKT 3103 and MRKT 3323.

MRKT 4393. Marketing Communications. (3-0) Credit 3 semester hours. An examination of the functions of the promotion-mix elements: advertising, personal selling, publicity and sales promotion. Prerequisites: MRKT 3103 and MRKT 3333.

MRKT 4413. Distribution Management. (3-0) Credit 3 semester hours. An analysis of the policies, decisions, and planning related to the distribution of goods and services for consumer and industrial sectors. Covers concepts related to physical distribution and marketing channels. Prerequisite: MRKT 3103.

MRKT 4423. Fundamental of E-Marketing. (3-0) Credit 3 semester hours. Focuses on key marketing issues in E-Commerce via the Internet. Explores concepts of customer relationship management, online communities, and web brand development. Prerequisite: MRKT 3103.
MRKT 4493. Marketing Strategy and Analysis. (3-0) Credit 3 semester hours. Capstone course for marketing major that should be taken in the student’s last semester. Highly applications-oriented. Course utilizes the case method, projects and problems designed to develop and analyze marketing strategies emphasizing the dynamics of three major foci -customer, competition, and the capabilities of the organization. Prerequisites: MRKT 3103 and MRKT 3333 and senior standing.

** Transfer equivalent from Texas Community/Junior Colleges.
College of Education

CUIN 3003. Educational Foundations. (3-0) Credit 3 semester hours. An examination and study of the structure, culture and organization of the American public school and its curriculum. The course requires field-based experiences. Prerequisites: Admission to teacher education and permission from the Department of Curriculum and Instruction.

CUIN 3013. Educational Psychology. (3-0) Credit 3 semester hours. An examination and study of human growth and development and principles of assessing/evaluating students’ educational progress. The course requires field-based experiences. Prerequisites: Admission to teacher education and permission from the Department of Curriculum and Instruction.

CUIN 4003. Instructional Planning and Assessment (Secondary). (3-0) Credit 3 semester hours. Instruction and practice in planning instructional lessons. Developing and applying teacher-made tests to assess secondary student progress. The course requires field-based experiences. Prerequisites: Admission to teacher education, CUI 3003 and CUI 3013.

CUIN 4013. Instructional Methods and Classroom Management (Secondary). (3-0) Credit 3 semester hours. Instruction and practice using various teaching strategies and management techniques for the secondary classroom. The course requires field-based experiences. Prerequisite: Admission to teacher education, CUI 3003 and CUI 3013.

CUIN 4103. Instructional Planning and Assessment. (3-0) Credit 3 semester hours. Instruction and practice in planning instructional lessons, developing and applying teacher-made tests to assess elementary students’ progress. The course requires field-based experiences. Prerequisites: Admission to teacher education, CUI 3003 and CUI 3013.

CUIN 4113. Instructional Methodology and Classroom Management. (3-0) Credit 3 semester hours. Instruction and practice using various teaching strategies and management techniques for the elementary classroom. The course requires field-based experiences. Prerequisites: Admission to teacher education, CUI 3003 and CUI 3013.

CUIN 4403. Student Teaching/Elementary I. (3-0) Credit 3 semester hours. Supervised practicum experiences in a field setting devoted to elementary instruction. Required of students seeking additional teacher certification in an area of specialization and/or All-Level certification. Prerequisite: Admission to Student Teaching.

CUIN 4416. Student Teaching/Elementary II. (6-0) Credit 6 semester hours. Supervised practicum experiences in a field setting devoted to elementary education classroom instruction. Required of students seeking only teacher certification in elementary education. Prerequisite: Admission to Student Teaching.

CUIN 4433. Student Teaching/Early Childhood Education. (3-0) Credit 3 semester hours. Supervised practicum experiences in a field setting devoted to early childhood classroom instruction. Prerequisite: Admission to Student Teaching.

CUIN 4443. Student Teaching/Special Education. (3-0) Credit 3 semester hours. Supervised practicum experiences in a field setting devoted to special education classroom instruction. Prerequisite: Admission to Student Teaching.

CUIN 4813. Student Teaching Secondary - All Level. (3-0) Credit 3 semester hours. Supervised practicum experiences in a field setting devoted to secondary education. Required of students seeking All-Level certification. Prerequisite: Admission to Student Teaching.

CUIN 4826. Student Teaching Secondary II. (6-0) Credit 3 semester hours. Supervised practicum experiences in a field setting devoted to secondary education classroom instruction. Required of students
College of Education Courses

seeking only one teacher certification in secondary education. Prerequisite: Admission to Student Teaching.

**ECED 3003. Introduction to Early Childhood.** (3-0) Credit 3 semester hours. Historical, philosophical, and social foundations of early childhood years to include: understanding the principles of underlying social and emotional developments of the young child and the nature of the learner. Observation is included.

**ECED 3013. Health/Motor/Physical Development.** (3-0) Credit 3 semester hours. Fundamentals of health/motor/physical stages and characteristics of development in early childhood with emphasis on health problems common during early childhood; health and safety practices for young children; includes special needs related to young children.

**ECED 4003. Communication and Language Development.** (3-0) Credit 3 semester hours. An overview of theories related to language development and communication usage to demonstrate diverse patterns of verbal and nonverbal communication in the development of the young child. Prerequisites: ECED 3003 or permission of ECED Coordinator.

**ECED 4013. Young Child/Cognitive Development.** (3-0) Credit 3 semester hours. An examination of theories and models in the development of cognition to include stages of development and their characteristics; special needs related to cognition and implications for young children. Prerequisites: ECED 3003, HUSC 3373 or permission of ECED Coordinator.

**ECED 4023. Program Organization.** (3-0) Credit 3 semester hours. A survey of programs for young children to include criteria for the selection and evaluation of the physical environmental needs of children; emphasis will be placed on legislation and public policy as it affects the school, children and their families. Prerequisites: ECED 3003 through ECED 4013 and HUSC 3373 or permission of ECED Coordinator.

**ECED 4113. Instructional Strategies.** (3-0) Credit 3 semester hours. A study of instructional strategies for teaching content to include methodology, setting goals/objectives, evaluating, and creating a conducive learning environment. Emphasis will be placed on alternative instructional strategies and procedures. (15 clock hours of simulated and practical experiences included). Prerequisites: completion of all requirements and permission of ECED Coordinator.

**ECED 4123. Clinical Experiences.** (3-0) Credit 3 semester hours. Field-based experiences involving young children in a classroom setting to include 45 clock hours of classroom observation, recording behavior, planning activities, providing for individual needs, working with other professionals, understanding conference techniques, and professional ethics. Complete all prerequisites: Prerequisites: completion of all requirements and permission of ECED Coordinator.

**HLTH 1023. Human Sexuality.** (3-0) Credit 3 semester hours. Examination of the foundations and characteristics of the American family; factors involved in learning sex roles, biological and emotional motivations, preparation for marriage, family planning, and parental roles.

**HLTH 1063. Environmental Health.** (3-0) Credit 3 semester hours. Health aspects of environment, including health problems related to water, air, and noise pollution, pesticides, population, and radiation.

**HLTH 2003. Personal Health and Wellness.** (3-0) Credit 3 semester hours. Study of the personal health concepts with emphasis on body systems, emotional health, drug use and abuse, disease, nutrition, and family and community health. Theory and practice in developing, implementing and evaluating philosophies of wellness programs.

**HLTH 2023. Communicable and Noncommunicable Diseases.** (3-0) Credit 3 semester hours. Nature, prevention, control, and treatment of communicable, chronic, degenerative, and idiopathic human disease, with principles related to causality of disease and to the body’s ability to resist.
HLTH 2033. Aging, Death and Dying. (3-0) Credit 3 semester hours. Examination of the aging process and health problems of the elderly; differing perceptions of death; dimensions of death and dying; euthanasia; and grief and mourning.

HLTH 3003. Health Education for the Elementary School. (3-0) Credit 3 semester hours. Fundamentals of health including health problems, interests, school health appraisal, and promotion of a healthful environment. Emphasis on health agencies and organizations on the local, state, and national levels.

HLTH 3013. Nutrition. (3-0) Credit 3 semester hours. Basic scientific information on nutrition and on its relationship to the biological needs of humans. An analysis and review of the selection and quality of nutrients essential to growth, development, and efficiency.

HLTH 3033. Research and Contemporary Issues in Health. (3-0) Credit 3 semester hours. Scientific examination of current health concepts. Emphasis on those curricular and evaluative concepts necessary for selecting, appraising, utilizing and analyzing health related materials, resources, and instruments.

HLTH 3043. Consumer Health. (3-0) Credit 3 semester hours. Investigation and analysis of consumer health problems, with emphasis on the function, organization, and administration of public health services at the local, state, regional and national levels.

HLTH 3053. Public and Community Health. (3-0) Credit 3 semester hours. Focus on the aspects of the community that relate to health; identification and analysis of community health programs; organizational patterns and functions of voluntary and governmental health agencies; organizing the community for health action; and coordination of school and community health programs.

HLTH 3093. Drugs and Health. (3-0) Credit 3 semester hours. Focus on substances that modify human behavior and emotions; the nature of drugs; historical and contemporary use; drug abuse; social implications; development and implementation of drug programs; and legislative implications.

HLTH 4063. Health and Communities. (3-0) Credit 3 semester hours. Principles of community health education as a foundation for subsequent consideration of health issues and problems of populations. Indepth focus on assessment and analysis of specific health problems in defined population of client organizations, institutions, and/or community members. Prerequisites: Junior standing and consent from Department Head for non-majors.

HLTH 4073. Community Health Planning and Assessment. (3-0) Credit 3 semester hours. Examines the relationship of community health planning and assessment to health education in both urban and rural communities. Emphasizes theory processes and methods applicable to the health care services delivery system. Prerequisites: Junior standing and consent from Department Head for non-majors.

HLTH 4083. Problem Solving and Evaluation for Community Health Programs. (3-0) Credit 3 semester hours. Evaluation of psycho-social-cultural health problems and influences on human behavior and health education strategies and outcome measurement. Prerequisites: Junior standing and consent from Department Head for non-majors.

HLTH 4991. Independent Study. (0-0) Credit 1 semester hour. Reading, research, and/or field work on selected topics. Prerequisite: Consent of advisor.

HLTH 4993. Independent Study. (0-0) Credit 1, 2, or 3 semester hours. Readings, research, and/or field work on selected topics. Prerequisite: Consent from advisor.

HUPF 1011-1411. Human Performance Activity Courses in Sports, Aquatics, Dance, Fitness, and Personal Defense. (0-2) Credit 1 semester hour. Instruction is offered at beginning levels of skills with emphasis on the development of total fitness and recreational skills for leisure time. All classes are coeducational.
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**HUPF 1012. Sports Skills I.** (2-0) Credit 2 semester hours. Theory and application of fundamental skills in flag and touch football, soccer, wrestling and gymnastics I.

**HUPF 1082. Fundamentals of Basic Movement.** (1-2) Credit 2 semester hours. Theory and practice in movement improvisation, exploration, and rhythmic exercising methods, and fundamentals of presenting creative and rhythmic activities to elementary age children.

**HUPF 1112. Sports Skills II.** (2-0) Credit 2 semester hours. Emphasis given to theory and application skills for fundamentals in badminton, bowling, tennis, and racquetball.

**HUPF 1172. Foundations I** (2-0) Credit 2 semester hours. Foundations of health and human performance. Areas of concentration will focus on history and philosophy, developmental stages, movement-related experiences and career development in health and human performance.

**HUPF 1272. Foundations II** (2-0) Credit 2 semester hours. Areas of concentration will focus on current health and human performance programs, physical fitness, and conditioning and self-analysis.

**HUPF 1312. Sports Skills III.** (2-0) Credit 2 semester hours. Emphasis given to theory and application skills for fundamentals in physical fitness, conditioning and self-analysis, archery, and softball.

**HUPF 1401. Restricted Performance Activities.** (0-2) Credit 1 semester hour. (Adapted to individual need and capacity.) Theory and practice of body mechanics, and techniques of relaxation; also quiet games, walking, calisthenics, and health films. Written recommendation of a physical is required.
HUPF 1411. Restricted Performance Activities. (0-2) Credit 1 semester hour. (Adapted to individual need and capacity.) Theory and practice of forming habits for good posture; also table tennis, rope jumping, goal shooting, walking and calisthenics. Prerequisite: HUPF 1401. Written recommendation of a physical is required.

HUPF 1412. Sports Skills IV. (2-0) Credit 2 semester hours. Emphasis given to theory and application skills for fundamentals in aerobics, body mechanics, folk and ballroom dance, and modern dance.

HUPF 2011-4431. Human Performance Activity Courses in Sports, Dance, and Aquatics. (0-2) Credit 1 semester hour. Designed for the student with intermediate and/or advanced levels of skills; emphasis is on the development of total fitness and recreational skills for leisure time. All classes are coeducational.

2011 Modern Dance II
2021 Tap Dance II
2031 Gymnastics II
2041 Badminton and Tennis II
2051 Basketball and Volleyball II
2061 Folk and Ballroom Dance II
2071 Modern Jazz II
2081 Golf and Archery II
2091 Swimming III
2101 Advanced Basketball
2111 Advanced Volleyball
2121 Competitive Swimming
2131 Softball, Track, and Field II
2141 Flag Football and Track II
2151 Ballet II
3421 Restricted Movement
4431 Restricted Movement


HUPF 2023. First Aid, Safety, and CPR. (3-0) Credit 3 semester hours. Certification program (The American Red Cross) for emergency care procedures for illness, injuries, and cardiopulmonary resuscitation.

HUPF 2032. Life Saving. (1-2) Credit 2 semester hours. Demonstration and practice in the fundamentals of life saving: opportunity for completion of requirements for the American Red Cross Senior Life Saving Certificate. Prerequisite: Proficiency in five basic strokes (front and back crawls; elementary back, side and breast strokes) or permission from the instructor.

HUPF 2043. Coaching Individual and Dual Sports. (3-0) Credit 3 semester hours. Designed for majors with intermediate and advanced skills; deals with strategy, rules, and court layouts, with special emphasis on fundamentals and materials for individual and dual sports. Prerequisites: HUPF 1091, 1101, 1281 and 1291.

HUPF 2052. Theory and Practice of Intramural Sports. (1-2) Credit 2 semester hours. Theory and practice in organizing and conducting tournaments, meets, and field days.

HUPF 2053. Recreation for the Aged. (3-0) Credit 3 semester hours. A study of the nature, scope, and significance of leisure and recreation. Emphasis is placed on methods and materials for planning, organizing, and conducting social activities for the aged in a variety of social situations.
HUPF 2063. *Outdoor Performance Activities.* (3-0) Credit 3 semester hours. Introduction to outdoor activities with emphasis on principles and purposes; skills and activities for individual and group activities; practices and skills of low and high intensity levels.

HUPF 3012. *Water Safety Instruction.* (1-2) Credit 2 semester hours. Swimming and lifesaving skills required for water safety instruction. Opportunity for completion of requirements for the American Red Cross Water Safety Instructor’s Certificate. Prerequisite: Current Red Cross Senior Life Saving Certificate.

HUPF 3023. *Applied Anatomy and Kinesiology.* (3-0) Credit 3 semester hours. A scientific study of the muscles and human movement. Prerequisites: BIOL 1054, 1064 or equivalent; HUPF 1082 or equivalent.

HUPF 3033. *Movement Activities for Elementary Children.* (3-0) Credit 3 semester hours. Theory of human performance for young children; classroom demonstration and field laboratory assignments. Emphasis is placed on stages of development and gross motor skills. Prerequisites: HUPF 1151 and 1261.

HUPF 3053. *Theory and Practice of Officiating.* (3-0) Credit 3 semester hours. Treats the theory and practice of officiating selected sports; emphasis on rules, mechanics, and officiating individual, dual and team sports. Prerequisites: HUPF 2043, 3063.


HUPF 3083. *Theory and Practice of Coaching II.* (3-0) Credit 3 semester hours. Theory and strategy of coaching baseball/softball, track and field, and soccer. Prerequisites: HUPF 1161, 1181, and 1221.

HUPF 3421. *Restricted Performance Activities.* (0-2) Credit 1 semester hour. (Adapted to individual need and capacity.) Theory and practice of physical fitness techniques; also shuffleboard, horse shoes, dance, volleyball, health and safety films, walking and calisthenics. Prerequisite: HUPF 1411. Written recommendation of a physical is required.

HUPF 4032. *Advanced Athletic Injuries.* (2-0) Credit 2 semester hours. This course provides the student athletic trainer with knowledge of clinical techniques, rules and regulations governing licensure and certification. Emphasis will be given to application techniques and therapeutic modalities.

HUPF 4033. *Measurement and Evaluation.* (3-0) Credit 3 semester hours. A study of various kinds of tests and test usage in the field of health and human performance includes practical experience in the construction and administration of tests and in the use of elementary statistics to interpret test scores. Prerequisites: 12 hours of advanced Human Performance.

HUPF 4042. *Athletic Injuries and CPR.* (1-2) Credit 2 semester hours. Theory and practice of prevention and treatment of athletic injuries; laboratory experience in techniques of massaging and bandaging; emergency care procedures for cardiopulmonary resuscitation.

HUPF 4053. *Special Topics in Health and Human Performance.* (3-0) Credit 3 semester hours. Detailed study of selected topics and activities. Class meets once per week. Consent of the instructor and department head. Cross listed with HLTH 4053. Prerequisite: 12 hours of advanced Human Performance.

HUPF 4062. *Correctives.* (1-2) Credit 2 semester hours. A study of the general organization of programs of therapeutic exercise, recreational sports, and aquatic skills for use in correctional procedures; evaluation and classification of exercises; practice in planning and presenting activities for special programs. Prerequisite: 9 hours of Human Performance.

HUPF 4073. *Research and Contemporary Issues in Human Performance.* (3-0) Credit 3 semester hours. Scientific examination of current human movement concepts. Emphasis on curricular and evaluative concepts designed to assist the student in selecting, appraising, utilizing and analyzing
movement related materials, resources, and instruments. Prerequisite: 12 hours of advanced Human Performance.

**HUPF 4083. Administrative Management of Human Performance Programs.** (3-0) Credit 3 semester hours. Principles and fundamentals in the organization, administration and supervision of the health, human performance, intramural, and athletic programs. Prerequisite: 12 hours of advanced Human Performance.

**HUPF 4093. Practicum in Athletic Training.** (3-0) Credit 3 semester hours. Designed to acquaint the Athletic Trainer Intern, Pre-Physical Therapist, and Sports Certified Specialist with the principles of application for an orthopedic examination of the joints and muscles. A hands-on clinical approach to physical assessment and rehabilitations techniques involving basic theories and principles as they relate to applied human anatomy.

**HUPF 4196. Internship in Health and Human Performance.** (6-0) Credit 6 semester hours. Supervised study and practice in community, recreation, sports, fitness and rehabilitation centers, hospitals, clinics and other approved agencies, organizations and institutions. Prerequisites: Senior standing and approval from the Department Head.

**HUPF 4431. Restricted Performance Activities.** (0-2) Credit 1 semester hour. (Adapted to individual need and capacity.) Theory and practice of adaptive corrective exercises; also archery, badminton, arts and crafts, musical games, calisthenics, and isometric exercises. Prerequisite: HUPF 3421. Written recommendation of a physical is required.

**HUPF 4991-4992-4993. Independent Study.** (0-0) Credit 1, 2 or 3 semester hours. Readings, research, and/or field work on selected topics. Prerequisite: consent from advisor.

**RDNG 3603. Evaluation of Reading Performance.** (3-0) Credit 3 semester hours. Application of basic measurement and evaluation techniques to reading performance.

**RDNG 3623. Linguistics in Reading Instruction.** (3-0) Credit 3 semester hours. A study of the relationships between language dialect, linguistics phonics, and reading. Applications of linguistics to reading.

**RDNG 3643. Methods of Teaching Elementary Reading.** (3-0) Credit 3 semester hours. Analysis of various approaches and methods used in teaching reading in the elementary grades.

**RDNG 4633. Developmental Reading.** (3-0) Credit 3 semester hours. Strategies for sequential skills development in basic reading instruction to emphasize identification of reading levels, and auditory and visual diagnosis.

**RDNG 4653. Foundations of Reading Instruction.** (3-0) Credit 3 semester hours. Stages in the development of reading ability. Emphasis of readiness, experiential backgrounds, individual needs and interests and enrichment.

**RDNG 4673. Clinical and Laboratory Experiences in Reading.** (3-0) Credit 3 semester hours. Preparation, review, and analysis of case studies, research reports, trends, and issues in the teaching of reading.

**SPED 3003. Introduction to Exceptional Children.** (3-0) Credit 3 semester hours. Basic theories and concepts related to identification and classification of exceptional children and youth. Prerequisite: Junior status.

**SPED 3013. Psychology of Retardation.** (3-0) Credit 3 semester hours. An introduction to the psychology of mental retardation in children and youth. Prerequisite: SPED 3003 or enrolled concurrently.
SPED 4003. Psychology of Behavior Disorders. (3-0) Credit 3 semester hours. Various theoretical aspects of the behavior of children with severe disturbance to mild emotional problems. Prerequisites: SPED 3003 and SPED 3013.

SPED 4013. Language and Communication Problems. (3-0) Credit 3 semester hours. An overview of particular communication problems as they relate to the oral language skills of the exceptional learner. Prerequisite: SPED 3003 and SPED 3013.

SPED 4023. Psychometrics for Exceptional Children and Youth. (3-0) Credit 3 semester hours. Legal implications of the assessment of children exhibiting the characteristics of behavior disorders, learning disabilities, and/or mental retardation. Prerequisites: SPED 3003 through SPED 4013.

SPED 4033. Consultation. (3-0) Credit 3 semester hours. Models of consultation; interpersonal communication skills; problem-solving approaches; effective interaction with colleagues, paraprofessionals, and parents; transitional mandates; and planning/conducting in-service training for professionals. Prerequisites: SPED 3003 through SPED 4023.

SPED 4113. Methods for Teaching Exceptional Children. (3-0) Credit 3 semester hours. Study of instructional problems teaching retarded, behavioral, and/or learning-disabled children and youth; organization of special classes; and curriculum adaptations. Includes 15 clock hours of field-based experiences with exceptional learners. Prerequisite: permission of SPED Coordinator.

SPED 4123. Practicum. (3-0) Credit 3 semester hours. Field-based experiences involving exceptional learners in classroom activities. Activities include 15 clock hours of classroom observation, concepts and skills associated with referrals of classroom problems, tests and evaluation procedures. Prerequisites: SPED 3003 through SPED 4033. SPED 4123 must be taken concurrently with SPED 4113.

VOED 4103. Development, Organization and Use of Instructional Materials. (3-0) Credit 3 semester hours. Preparation of lesson plans and instructional sheets according to approved formats and designs. Study of available instructional materials and their adaptations: sources of materials and teaching aids; and organization of instructional materials for maximum effective use in teaching.

VOED 4203. Instructional Methods. (3-0) Credit 3 semester hours. Brief review of how people learn. Evaluation of various teaching methods and adaptation of instructional methods to various types of lessons for effective instruction. Includes analysis for lesson content, preparation of lesson plans, and student presentation of various types of lessons.

VOED 4303. Shop Organization and Classroom Management. (3-0) Credit 3 semester hours. A study of organizing classroom and training laboratories for efficient instruction and class management. Covers grading, keeping records, taking inventory, purchasing supplies, equipment specifications, equipment installation, climatic conditions, lighting, safety, and accident prevention.

VOED 4403. Occupational Analysis and Course-making. (3-0) Credit 3 semester hours. A study of analysis techniques and guidelines. Includes analysis for individual occupations, review of systems analysis and organizing, preparing, and assembling courses.

VOED 4603. Aims and Objectives of Vocational Education. (3-0) Credit 3 semester hours. Study of the goals and outcomes of vocational and career education. Considers the history and aims of administration of vocational and career education; federal structure for administration of vocational education; and economic, social and educational values of vocational education.

VOED 4803. Human Relations. (3-0) Credit 3 semester hours. The study of personal relationships, drives and motivations, and interdependence of people in a democratic society. Considers the positive ideals of youth and adults. Examines qualities of leadership; principles of interests; principles involved in teaching ideals; behavioral problems; factors behind good human relations; and group dynamics.
College of Engineering Courses

CHEG 2013. Materials Science. (3-0) Credit 3 semester hours. Chemical bonding, atomic order and disorder, transport properties, single phase and multiphase materials, heat treatment, corrosion, and composites. Prerequisite: CHEM 1043.

CHEG 2043. Chemical Engineering Thermodynamics I. (3-0) Credit 3 semester hours. Introduction to chemical engineering calculations. PVT properties of fluids, equations of state. First and second laws of thermodynamics. Applications to heat effects and flow processes. Prerequisites: CHEM 1043, and PHYS 2013.


CHEG 2123. Engineering Materials in Society. (3-0) Credit 3 semester hours. Covers general concepts of today’s engineering materials and the applications, future, and impacts of new materials on our society. Basic principles and properties of metals, alloys, composites, polymers, and ceramics will be studied, and concepts of nanomaterials and smart materials will be introduced. The prospects of future development of new materials in industries and medical applications will be discussed. Prerequisite: MATH 1113 or equivalent.

CHEG 2156. Chemical Engineering Internship I. (0-0) Credit 6 semester hours. This course is an internship program of work experience with an approved engineering firm. Prerequisite: Consent of advisor.

CHEG 3003. Engineering Economy. (3-0) Credit 3 semester hours. Fundamental concepts of economic principles. Evaluation of engineering alternatives, economic significance of engineering proposals; interest, description, analysis, and forecasting. Prerequisite: MATH 2024.

CHEG 3011. Chemical Engineering Laboratory I. (0-3) Credit 1 semester hour, Quantitative experimental study of properties of fluids, fluid mechanics, metering, and heat transfer. Operation and evaluation of equipment, techniques of graphical and statistical data analysis. Strong emphasis is placed on safety, report writing and oral communication. Corequisite: CHEG 3013.


CHEG 3023. Unit Operations. (3-0) Credit 3 semester hours. Application of transport theory to the design of equipment for the pumping and transfer of fluids through pipes, heat exchange, interphase transfer of heat and mass for the separation and purification of process streams. Prerequisites: CHEG 3013

CHEG 3043. Equilibrium Stage Separation Processes. (3-0) Credit 3 semester hours. Applications of heat and mass balances and phase equilibria to the design of staged separation processes. Use of graphical methods such as McCabe Thiele and Ponchon Savarit for the treatment of binary systems. Application to distillation, absorption, stripping, and extraction. Prerequisites: CHEG 2053 and 3053.

CHEG 3051. Professional Engineering I. (0-3) Credit 1 semester hour. Fundamentals of engineering and related science subjects including chemistry, computers, dynamics, electric circuits, engineering economics, ethics, fluid mechanics, materials science, mathematics, mechanics of materials, statistics, and thermodynamics. Passing a mock exam for “fundamentals of engineering” is a requirement of passing this

CHEG 3063. Chemical Reaction Kinetics and Reactor Design. (3-0) Credit 3 semester hours. Application of fundamental concepts of reaction stoichiometry, chemical and biochemical kinetics, and equilibria to the interpretation of reaction rate data. Application of reaction rate and heat and mass transfer correlations to the design of batch reactors, continuous staged reactors, and tubular reactors. Prerequisites: MATH 2043 and CHEG 3053.

CHEG 3156. Chemical Engineering Internship II. (0-0) Credit 6 semester hours. This course is an internship program of work experience with an approved engineering firm. Prerequisite: Junior or senior standing and consent of advisor.

CHEG 4011. Chemical Engineering Laboratory II. (0-3) Credit 1 semester hour. Continuation of CHEG 3011, but directed to separation processes such as gas absorption, fractional distillation, extraction, and drying. Study of reaction rates and equilibria in simple chemical systems. Emphasis is placed upon experimental data required for the scale-up to commercial scale equipment. Prerequisite: CHEG 3011.


CHEG 4033. Process Dynamics and Control. (3-0) Credit 3 semester hours. Dynamic response and control of chemical process equipment such as reactors, heat exchangers, distillation columns. Use is made of fundamental techniques of servomechanism theory such as block diagrams, transfer functions, and frequency response; stability analysis and control loop design. Unsteady state modeling and computer simulation of simple control systems. Prerequisites: CHEG 3063 and MATH 4173.

CHEG 4043. Chemical Process Design and Analysis. (3-0) Credit 3 semester hours. Use of material and energy balance calculations, thermodynamics, transfer operations, reaction kinetics and process economics for the synthesis and analysis of chemical processing systems. Design alternatives are analyzed by the use of case studies, computerized flowsheet modeling and simulation, and optimization methods. Safety and design codes are emphasized. Prerequisites: Senior standing in the chemical engineering major. Chemical Engineering students must have completed all junior CHEG courses with a grade of “C” or better.

CHEG 4103. Special Topics in Chemical Engineering. (3-0) Credit 3 semester hours. This course presents selected current and emerging topics in chemical engineering depending on need as determined by the department faculty. Prerequisite: Consent of advisor.

CHEG 4133. Process Modeling and Simulation. (3-0) Credit 3 semester hours. Construction and solution of mathematical models of process units and integrated systems for computer simulation. Both steady and dynamic models will be developed. Students will make use of one or more of the commercial flowsheet simulation programs for the analysis of specific systems. Prerequisites: senior standing in the chemical engineering major. Chemical Engineering students must have completed all junior CHEG courses with a grade of “C” or better.

CHEG 4153. Bioengineering. (3-0) Credit 3 semester hours. Design and analysis of biochemical systems with applications in biomedical engineering and metabolic processes, enzyme catalyzed reactions and
product separation, biomass production, and wastewater treatment. Emphasis is placed upon the application of biochemical systems structure, reaction kinetics, transport processes, and control in the design and use of biochemical reactors and separation units. Prerequisites: Senior standing in any engineering major. Engineering students must have completed all junior engineering courses in their respective majors with a grade of “C” or better.

CHEG 4163. Engineering Optimization. (3-0) Credit 3 semester hours. Optimization methodology, with a major focus on the techniques and stratagems relevant to engineering applications arising in design, operations and analysis, is emphasized. This includes linear, dynamic and nonlinear optimization techniques applied to engineering examples drawn from the chemical, industrial and mechanical engineering fields. Prerequisite: senior standing in any major engineering discipline. Engineering students must have completed all junior engineering courses in their respective majors with a grade of “C” or better.

CHEG 4183. Design of Process Engineering Systems. (3-0) Credit 3 semester hours. The course will stress the interdisciplinary nature of systems design and will include structural, hydraulic, process, utilities and control concepts. Development of one or more selected applications in optimal design of continuous and batch systems. Studies will involve the use of computer-aided design, cost estimation, engineering data bases, and project scheduling. Prerequisite: senior standing in any major engineering discipline. Engineering students must have completed all junior engineering courses in their respective majors with a grade of “C” or better.

CHEG 4473. Senior Design and Professionalism I. (1-4) Credit 3 semester hours. This is a capstone engineering design of an industrial or advanced team project. Elements of ethics and professionalism in engineering practice are integrated into the project experience. Design achievements are demonstrated with written reports, oral presentations, and professional standards and ethics examinations. Corequisite: CHEG 4043 or 4183. Course equivalents: CVEG 4473, ELEG 4473 or MCEG 4473.

CHEG 4483. Senior Design and Professionalism II. (1-4) Credit 3 semester hours. A continuation of CHEG 4473 with required design modifications of the team projects necessary to produce a working prototype of the designs initiated in Senior Design and Professionalism I. Design results are presented in a formal, final oral presentation as well as a final report. Professionalism elements reinforce the importance of professional ethics, corporate culture, life-long learning, and globalization. Prerequisite: CHEG 4473. Course equivalents: CVEG 4483, ELEG 4483 or MCEG 4483.

CHEG 4991-4992-4993. Independent Study. (1, 2 or 3-0) Credit 1, 2, or 3 semester hours. Readings, research and/or field work on selected topics. This course is intended as a curriculum supplement for highly motivated students with special areas of interest. An individualized course of study, planned by student and advisor, is executed under the direction of the advisor. Prerequisite: consent of advisor and department head approval.

COMP 1003. Introduction to Computer Education. (3-0) Credit 3 semester hours. Emphasis on microcomputer applications such as word-processing, spreadsheets, presentation managers, E-mail, and the world-wide web. This will enable students to communicate ideas in written documents and presentations, to retrieve and process data, and to share information and technologies with others. This course will also provide students with basic concepts of hardware, software, number systems, basic computer organization, programming, and application of computers to data processing and information management in such areas as business, communication, records, economics, and technical statistics. The course will develop students’ computer skills to a level appropriate as a role model for the next generation.

COMP 1013. Introduction to Computer Science. (3-0) Credit 3 semester hours. Fundamentals of computer science and programming that include algorithm definition, concepts, semantics and logic. Topics covered include fundamental data types (character, integer, and floating-point) and their binary representations and limits, arithmetic and logical operators and precedence, program structure and flow, branching and looping, functions and parameters, and basic input and output methods. An introduction to top-down, modular design and implementation of programs in a high-level, object-oriented language such as C++ will be emphasized, including the basics of separate compilation and linking of modules. A general
survey of basic hardware and software concepts is included. The course also includes standards of ethical and professional conduct and the learning objectives embodied in the expected outcomes for Computer Science graduates. **(COSC 1306)**

**COMP 1133. Visual Basic Programming.** (3-0) Credit 3 semester hours. Fundamentals of programming in Visual Basic including an extensive examination of Graphical User Interface programming, creating classes, Dynamic Data Exchange, Object Linking and Embedding (OLE) and creating OLE Servers. The course also covers client/server development using the built-in database jet engine and using Open Database Connectivity (ODBC) to access other popular database systems.

**COMP 1143. C++ Programming Language.** (3-0) Credit 3 semester hours. Fundamentals of object-oriented programming using the C++ language. Covers the object-oriented concepts of inheritance, polymorphism, implementing hiding, date abstraction parameterization, and software reuse.

**COMP 1211. Computer Science Lab I.** (0-2) Credit 1 semester hour. A laboratory course in programming for computer science or related fields. Language concepts of input/output, constants, data types including arrays and records, variables, expressions, statements, iterations and selections. A high-level language will be used to illustrate these concepts. Co-requisite: COMP 1213.

**COMP 1213. Computer Science I.** (3-0) Credit 3 semester hours. Introduction to modern problem solving and programming methods intended for students who plan to concentrate in computer science or a related field. Special emphasis is placed on top-down, modular design and implementation of robust and easily maintainable programs in a high-level, object-oriented language such as C++. Topics introduced include external files, control structures, loops, scope, functions, output formatting, inline functions and function templates, enumerated data type, arrays, structures, exception handling. Co-requisite: COMP 1211, MATH 1124. Prerequisite: COMP 1013 or consent of advisor.

**COMP 1221. Computer Science Lab II.** (0-2) Credit 1 semester hour. Continuation of COMP 1211, this is the second laboratory course in programming for computer science or related fields. Practical exercises utilizing the concepts introduced in COMP 1223, including the basic concepts of complex data structures. A high-level object-oriented language such as C++ will be used to illustrate these concepts. Emphasis will be on object-oriented programming. Co-requisite: COMP 1223.

**COMP 1223. Computer Science II.** (3-0) Credit 3 semester hours. Study of the logical design and internal operation of digital computers and programming using a macro assembly language. Several practical exercises will be used to illustrate machine structures and programming techniques for a typical microprocessor environment, such as the Intel processor/IBM PC architecture. Prerequisites: COMP 1213 and COMP 1211. Co-requisite: COMP 1221.

**COMP 2013. Data Structures.** (3-0) Credit 3 semester hours. Credit 3 semester hours. Fundamental data structures including binary files, stacks, queues, recursion, advanced linked lists, trees, and graphs with their implementation and applications will be covered. Topics also include data compression, heap, priority queue, and sorting techniques. Prerequisites: COMP 1223 and COMP 1221. **(COSC 2315, 2415)**

**COMP 2033. Assembly Language.** (3-0) Credit 3 semester hours. Study of the logical design and internal operation of digital computers and programming using a macro assembly language. Several practical exercises will be used to illustrate machine structures and programming techniques for a typical microprocessor environment, such as the Intel processor/IBM PC architecture. Prerequisites: COMP 1223 and COMP 1221. **(COSC 1320, 1419, 1434, 2419, 2425)**

**COMP 2103. Discrete Structures.** (3-0) Credit 3 semester hours. A bridge course between data structures/discrete mathematics and analysis of algorithms. Topics include reviews of functions and relations and basic combinatorics (set operations, counting, combinations, and permutations). The course also includes introductions to prepositional and predicate logic, discrete probability theory, recursive definitions, computational complexity, and proof techniques including mathematical induction. The
concepts are illustrated by applications involving graphs, trees, networks and related algorithms. Prerequisites: MATH 2053, COMP 1223 and COMP 1211.

COMP 3003. Introduction to Web Design and Multimedia. (3-0) Credit 3 semester hours. The role of Internet, and Internet tools in business; design and development of simple Internet applications using HTML; basics of scripting languages; development of home pages incorporating graphics, and multimedia. Prerequisite: Consent Of Advisor.

COMP 3033. Digital Logic Circuits. (3-0) Credit 3 semester hours. The design and implementation of digital logic circuits. Combinational and sequential circuit analysis. Digital circuit design optimization methods using random logic gates, multiplexers, decoders, registers, counters, and programmable logic arrays. Prerequisite: COMP 2033.

COMP 3043. Computer Organization. (3-0) Credit 3 semester hours. The study of a computer as a series of levels, each one built on its predecessor. Digital logic level, the microprogramming level, the conventional machine level, the operating systems level, and the assembly language level. Prerequisite: COMP 2033.

COMP 3053. Analysis of Algorithms. (3-0) Credit 3 semester hours. Introduction to algorithm design and analysis, computational complexity, and NP-completeness theory. The course will emphasize how to design and choose appropriate algorithms and data structures to solve a given problem efficiently. Design methods covered will include divide-and-conquer techniques, greedy methods, and dynamic programming. Prerequisites: COMP 2013 and COMP 2103.

COMP 3063. Operation Systems. (3-0) Credit 3 semester hours. Basic functions of operating systems including device management, multi-programming, job management, memory management, and input/output processing. Prerequisites: COMP 2013 and COMP 3043.

COMP 3113. Object-Oriented Analysis and Design. (3-0) Credit 3 semester hours. Application and benefits of the object-oriented software process model. Special consideration will be given to concepts, models, notations, and methods required to effectively and efficiently design and implement complex software applications using a practical, state-of-the-art object-oriented method. Concepts intrinsic to object-oriented technology such as data abstraction, encapsulation, inheritance and polymorphism will also be covered. State-of-the-art design and implementation tools, such as the universal modeling language (UML) and a high-level object-oriented language such as C++ will be used to illustrate these concepts. Prerequisite: COMP 2013.

COMP 3143. Introduction to Java. (3-0) Credit 3 semester hours. An introduction to the Java Programming language. Includes coverage of Java Development Kit (JDK), applications, creating applets for enhancing web page and introduction to object model, object oriented programming. Prerequisite: Proficiency in at least one programming language.

COMP 3203. System Analysis and Design. (3-0) Credit 3 semester hours. Studying analytical models of system design with emphasis on evaluating system for efficiency, maximum utilization and appropriateness, and on structuring and designing systems. Prerequisites: COMP 1223 and COMP 1221.

COMP 3213. Graphics and Visual Computing. (3-0) Credit 3 semester hours. Principles of interactive computer graphics; Topics include fundamental techniques in graphics, graphic systems, graphic communication, geometric modeling, rendering, computer animation, visualization and virtual reality and other recent developments in computer graphics. Prerequisites: COMP 2013 and COMP 2103.

COMP 3223. Software Engineering. (3-0) Credit 3 semester hours. Formal software development, including the software life-cycle, modular and top-down design, validation and verification, and maintainable systems. Prerequisite: COMP 2013.
COMP 4001. Ethics and Social Issues in Computing. (1-0) Credit semester hour. Social and ethical implications of computing. Topics include history of computing, social context of computing, methods and tools of analysis, professional and ethical responsibilities, risks and liabilities of computer-based systems, intellectual property, privacy and civil liberties. Prerequisite: Senior standing.

COMP 4053. Parallel Algorithm Design. (3-0) Credit 3 semester hours. Hardware organization of vector, array, and parallel processors for high performance computations. Study of interconnection networks and parallel processing. Automatic vectorization and parallelization of scalar programs. Implementation of parallel algorithms for scientific applications. Prerequisites: COMP 3043 and COMP 3053.

COMP 4063. Artificial Intelligence. (3-0) Credit 3 semester hours. Introduction to artificial intelligence and expert systems. Topics covered will include heuristic search methods, first-order logic, forward and backward inference, knowledge representation, and machine learning, including neural networks. Prerequisite: COMP 3053.

COMP 4072. Senior Design Project I. (2-0) Credit 2 semester hours. This is the first part of a two-part senior design course for computer science majors. Students will do computer systems design; work as a design-team member; conceptual design methodology, design evaluations, total project planning and management techniques, design optimization, systems manufacturing cost considerations. Emphasis is placed upon students’ activities as design professionals. Prerequisite: Senior standing.

COMP 4073. Special Topics. (3-0) Credit 3 semester hours. Selected current and emerging topics in Computer Science. Course may be repeated for credit when topics vary. Prerequisite: Consent of advisor.

COMP 4082. Senior Design Project II. (2-0) Credit 2 semester hours. This course is a continuation of COMP 4072. Students should complete the design project in this course, give a formal presentation and submit a bound research paper. Students will be introduced to proposal writing, patents, and literature searches. Prerequisite: COMP 4072.

COMP 4083. Senior Project II. (3-0) Credit 3 semester hours. This course is a continuation of COMP 4072. Students should complete and implement the design project in this course, make a formal presentation, and submit a bound research paper. Students will be introduced to proposal writing, patents, literature searches, and professional standards in writing and presentation. Prerequisite: COMP 4072.

COMP 4113. Programming Language Design. (3-0) Credit 3 semester hours. Overview of programming languages, syntactic and semantic specification virtual machines and fundamental issues in language design. Analysis of imperative, object-oriented, and declarative language paradigms. Several programming languages will be analyzed. Prerequisites: COMP 2013 and COMP 2103.

COMP 4123. Computer Networks. (3-0) Credit 3 semester hours. Introduction to the networking of computer systems. This course includes the study of both local area networks (LAN) and wide area network (WAN) data transmission, communications software, the architecture of networks, and network communication protocols. Prerequisite: COMP 3063.

COMP 4133. Formal Languages and Automata. (3-0) Credit 3 semester hours. Introduction to formal grammars, including Backus-Naur notation. The formal theory behind the design of a computer language is studied. The corresponding types of automata that may serve as recognizers and generators for a language will be described. Prerequisites: COMP 2013 and COMP 2103.

COMP 4843. Human–Computer Interaction. (3-0) Credit 3 semester hours. Focuses on the dynamics of human-computer interaction (HCI). Provides a broad overview of HCI as a sub-area of computer science and explores user-centered design approaches in information systems applications. Addresses the user interface and software design strategies, user experience levels, interaction styles, usability engineering, and collaborative systems technology. Students will perform formal software evaluations and usability tests. Prerequisite: COMP 3223.
COMP 4943. Simulation and Modeling & Analysis. (3-0) Credit 3 semester hours. Use of logical and mathematical models to represent and simulate events and processes as well as computer, information, and communications systems. Introduction to computer modeling techniques and discrete-event simulation, model development and testing, and output and problem analysis. The application of these techniques to a multiprocessor system model and an Ethernet model. The course includes an examination of model and simulation development programs such as GPSS, SIMULA, and SIMSCRIPT. Prerequisites: COMP 1223, COMP 1221 and MATH 3023 or consent of advisor.

COMP 4953. Database Management. (3-0) Credit 3 semester hours. File structures and access methods, database modeling design and user interface, components of database management systems. Information storage and retrieval, query languages, high-level language interfaces with database systems. Prerequisite: COMP 2013.

COMP 4993. Independent Study. (0-0) Credit 3 semester hours. Reading, research and/or field work on selected topics. Prerequisite: Consent of instructor.

CPET 1013. Computer Application to Engineering Technology I. (2-2) Credit 3 semester hours. A course in computer application to engineering technology covering C++ programming subroutines, computer operating systems, scientific word processors, data tabulation and analysis. Development of techniques in assignment layouts, signal analysis and the use of simulated software included. *(COSC 1300)*

CPET 1023. Computer Application to Engineering Technology II. (2-2) Credit 3 semester hours. A continuation of CPET 1013 in C++ programming techniques, programming languages, screen editor, and ORCAD software. Development of techniques and skills in statistical analysis, simulated software and related scientific software packages included.

CPET 2006. Cooperative Education I. (0-6) Credit 6 semester hours. A cooperative arrangement between the University and a company or government agency that provides experiences for students majoring in Computer Engineering Technology. The work assignment must be commensurate with the student’s major. A subsequent written report is required. Prerequisite: Department head’s approval is required.

CPET 2111. Digital Logic Laboratory. (0-3) Credit 1 semester hour. Laboratory experiments and reports in combinational and sequential logic using logic gates and flip-flops, and other logic devices. Experiments stress applications in Computer Engineering Technology. Prerequisite: credit for or concurrent enrollment in CPET 2113.

CPET 2113. Digital Logic Circuits. (3-0) Credit 3 semester hours. Digital logic with topics in number systems and codes, Boolean algebra and logic minimization methods, and combinational and sequential logic using logic gates and flip-flops and other logic devices. Applications in Computer Engineering Technology are stressed. Prerequisites: Credit for or concurrent enrollment in CPET 2111.

CPET 3013. Software Engineering Technology I. (2-2) Credit 3 semester hours. Using a high level programming language for software and hardware design. Advanced concepts in a high level programming language manipulating files, tasking and real time interfacing with the computer hardware, Prerequisite: CPET 1013

CPET 3031. Modern Programming Techniques Lab. (0-3) Credit 1 semester hour. This course will emphasize applications in software methodology. Students will be introduced to software development environment. Rapid prototyping of requirements and team projects will be introduced, each tied to the relevant topics that are being taught in the lecture class of CPET 3033. Prerequisites: Concurrent enrollment in CPET 3033.
CPET 3033. Modern Programming Techniques. (2-2) Credit 3 semester hours. Structure methods of developing complex computer programs. Top down design, hierarchy diagrams, HIPO charts, composite design, structure analysis, and team-programming. Students will develop and write sections of complex programs. Prerequisite: CPET 1013.

CPET 3161. CPU Architecture Hardware Laboratory. (0-3) Credit 1 semester hour. Laboratory experiments to determine performance characteristics of commercially available microcomputers. Write codes for 8-bit through 32-bit processors to exercise the hardware. Prerequisite: Credit for or concurrent enrollment in CPET 3163.

CPET 3163. CPU Architecture Hardware. (3-0) Credit 3 semester hours. The performance characteristics of commercially available computers. Students will study 8-bit through 32-bit processors. Selection and use of processors. Prerequisites: CPET 2113 and credit for or concurrent enrollment in CPET 3161.

CPET 3231. Microprocessor Assembly Language Laboratory. (0-3) Credit 1 semester hour. Exercises in basic mnemonic instructions for microprocessors/microcomputers and the implementation of algorithms in software and firmware for various types of engineering technology applications. Prerequisite: Credit for or concurrent enrollment in CPET 3233.

CPET 3233. Microprocessor Assembly Language. (3-0) Credit 3 semester hours. Basic Mnemonic instructions for microprocessor/microcomputer and the implementation of algorithms in software and firmware for various types of engineering technology applications. Prerequisites: CPET 2113 and credit for or concurrent enrollment in CPET 3231.

CPET 3251. Digital Hardware Design Laboratory. (0-3) Credit 1 semester hour. Laboratory experiments in design of digital computers and computer controlled devices. The internal operation of a microprocessor and computer. Registers and timing control, programmable gate arrays, array processors as computer models. Prerequisite: credit or concurrent enrollment in CPET 3253.

CPET 3253. Digital Hardware Design. (3-0) Credit 3 semester hours. Basic concepts used on the design of digital computers and computer-controlled devices. The internal operation of a microprocessor and computer. Registers and timing control, programmable gate arrays, array processors as computer models. Students will use individual board computers for doing simulation. Prerequisites: CPET 2113 and credit for or concurrent enrollment in CPET 3251.

CPET 4013. Software Engineering Technology II. (2-2) Credit 3 semester hours. Introduction to software engineering development and management for microprocessor base systems. The course will introduce microprocessor software systems development, and the study of advanced analysis on microprocessor software engineering systems. Prerequisite: CPET 3013.

CPET 4061. Data Communication Methods Laboratory. (0-3) Credit 1 semester hour. Laboratory experiments in data communication devices. Modems, multiplexers, concentrators, protocols, error checking, front-end processors, USARTS, simplex/duplex transmission, and telecommunications. Prerequisite: Credit for or concurrent enrollment in CPET 4063.

CPET 4063. Data Communication Methods. (3-0) Credit 3 semester hours. Functional and operational aspects of data communication devices and software, including modems, control units, multiplexers, concentrators, front-end processors, codes and procedures, protocols, error checking, and networking. Prerequisites: CPET 3163 and credit for or concurrent enrollment in CPET 4061.

CPET 4082-4092. Senior Project. (1-3) Credit 2 semester hours each. A two-semester sequence for individual projects supervised by a faculty member of the department. The portions of the first semester course (4082) are devoted to group discussion of professional aspects of engineering technology: research writing, engineering ethics, research protocols, patent considerations. A written proposal describing the
project is required. Oral presentation throughout the semester on the research project using a conference style format. Prerequisite: Senior standing in the department and permission of the instructor required.

**CPET 4111. Applications of Microprocessor Software Laboratory.** (0-3) Credit 1 semester hour. Exercises in industrial applications programs. Use of micro assemblers to write floating point mathematical routines, special purposes languages. Engineering Technology applications are stressed. Prerequisite: Credit for or concurrent enrollment in CPET 4113.

**CPET 4113. Software Applications of Microprocessors.** (3-0) Credit 3 semester hours. Assembler-level programming of microprocessors and microcomputers with emphasis on writing industrial application programs. Use of micro assemblers to write floating point mathematical routines, special purpose languages, simulate other microprocessor instructions sets, generate relocatable code, and linking leaders. Applications for Engineering Technology are stressed. Prerequisites: CPET 3233, MATH 2014, and credit for or concurrent enrollment in CPET 4111.

**CPET 4151. Micro Computer Peripheral Hardware Laboratory.** Prerequisite: Credit or concurrent enrollment in CPET 4153.

**CPET 4153. Micro Computer Peripheral Hardware.** (3-0) Credit 3 semester hours. The elements of microprocessor peripheral hardware and its interfacing. Students will configure and construct microprocessor systems. Topics include series and parallel I/O devices, DMA and interrupt control devices, bus arbitration, and memory management units. Prerequisites: CPET 3163, and credit for or concurrent enrollment in CPET 4151.

**CPET 4181. Single Chip Microprocessor Laboratory.** (0-3) Credit 1 semester hour. Experiments with single chip microprocessors to study hardware limitations, hardware flexibility, and capabilities of 8-bit, 16-bit and 32-bit intelligent devices. Applications of single chip microprocessors in Engineering Technology. Prerequisite: Credit for or concurrent enrollment in CPET 4183.

**CPET 4183. Single Chip Microprocessors.** (3-0) Credit 3 hours. A study of the hardware limitations of a single chip system. Hardware flexibility and capabilities of eight-bit, 16-bit, and 32-bit intelligent devices. Applications for Engineering Technology are stressed. Prerequisite: CPET 2113 and credit for or concurrent enrollment in CPET 4181.

**CPET 4361. Computer Networking Laboratory.** (0-3) Credit 1 semester hour. Experiments and reports involving the hardware and software for computer networks. Experimental topics include LANS, WANS, networking components and techniques, standards and protocols, and networks on a chip. Prerequisite: Credit for or concurrent enrollment in CPET 4363.

**CPET 4363. Computer Networking.** (3-0) Credit 3 semester hours. A study of the hardware and software in computer networks. Topics include LANS, WANS, networking components and techniques, standards and protocols, networks on a chip, and networking trends. Prerequisites: CPET 4063 and credit for or concurrent enrollment in CPET 4361.

**CPET 4381. Digital Signal Processing Applications Laboratory.** (0-3) Credit 1 semester hour. Experiments in Signal Processing using commercial DSP processors for performing various image and speech processing tasks. Emphasis on learning DSP programming techniques. Prerequisite: CPET 3233 and credit for or concurrent enrollment in CPET 4383.

**CPET 4383. Digital Signal Processing Applications.** (3-0) Credit 3 semester hours. Analog-to-digital and digital-to-analog conversion, discrete-time systems, discrete Fourier Transforms, applications in areas of speech recognition, and digital image processing. Architecture and programming of DSP processors. Prerequisite: CPET 2113 and credit for or concurrent enrollment in CPET 4381.

**CPET 4391. Programmable Microcontrollers Laboratory.** (0-3) Credit 1 semester hour. Laboratory experiments using microcontrollers to control various devices. Read input from sensors, perform analysis
through software, then provide corresponding control signals. Interfacing microcontrollers to computers. Prerequisite: Credit for or concurrent enrollment in CPET 4393.

**CPET 4393. Programmable Microcontrollers.** (3-0) Credit 3 semester hours. Introduction to programmable microcontrollers, application of microcontrollers in industrial environment for controlling machines and devices. Downloading control software to microcontrollers from computers. Prerequisite: CPET 3253 and credit for or concurrent enrollment in CPET 4391.

**CVEG 2043. Engineering Mechanics I.** (3-0) Credit 3 semester hours. Fundamental concepts and principles; vector algebra and applications; equilibrium of particles and rigid bodies in two and three dimensions, moments and couples; distributed forces, centroids, moments of inertia, friction, introduction to analysis of structures. Prerequisites: PHYS 2013.

**CVEG 2053. Engineering Mechanics II.** (3-0) Credit 3 semester hours. Kinematics and kinetics of particles and of rigid bodies as applied to engineering problems; Newton's laws of motion; work and energy; impulse and momentum; translations; rotation; plane motion; motion about a point; general motions; and periodic motions. Prerequisite: CVEG 2043.

**CVEG 2061. Mechanics of Materials Laboratory I.** (0-3) Credit 1 semester hour. Determination of selected mechanical properties of several engineering materials, including iron-carbon alloys, aluminum alloys, bricks, wood, and plastics, standard methods of testing and procedures; instrumentation and interpretation of results; and presentation of results in reports and report writing. Corequisite: CVEG 2063.

**CVEG 2063. Mechanics of Materials I.** (3-0) Credit 3 semester hours. Behavior of engineering materials, plane stress, plane strain, stress-strain relationship, shear and moment diagrams, torsion, flexural and combined loadings. Introduction to deflections, concepts of stress at a point; stresses in pressured containers; and theories of failures and thermal stresses. Prerequisite: CVEG 2043 or CVEG 2454 and MATH 2024.

**CVEG 2123. Engineering and the Environment.** (3-0) Credit 3 semester hours. An introduction to the design of systems, processes and facilities and their impact on the environment. Topics include safety, waste management and ecological aspects with the focus on sustainability and environmental protection. Prerequisite: MATH 1113 or equivalent.

**CVEG 2454. Statics and Dynamics.** (4-0) Credit 4 semester hours. Fundamental concepts; equilibrium of particles and rigid bodies; centroids; moments of inertia; friction; introduction to analysis of structures. Kinematics and Kinetics of particles and of rigid bodies; equations of motion; work and energy; impulse and momentum. Prerequisites: PHYS 2013.

**CVEG 3024. Geotechnical Engineering.** (3-3) Credit 4 semester hours. Index and strength properties of soil; moisture and its movement in soil; moisture density relationships; settlement; consolidation; permeability; foundations; retaining walls; stability of slopes; testing of soil for index and strength properties; soil classification; soil exploration and identification; and laboratory sessions. Prerequisite: CVEG 2063.

**CVEG 3031. Concrete Laboratory.** (0-3) Credit 1 semester hour. Determination of mechanical and strength properties in the laboratory, according to standard methods, of cement, concrete, and its ingredients. Prerequisites: CVEG 2061 and 2063

**CVEG 3041. Surveying.** (0-3) Credit 1 semester hour. Principles of surveying; use of surveying instruments, topographical surveys and traverses; field practice and computations. Prerequisite: MATH 1124.

**CVEG 3051 Professional Engineering I** (0-3) Credit 1 semester hour. Fundamentals of engineering and related science subjects include chemistry, computers, dynamics, electric circuits, engineering economics, ethics, fluid mechanics, materials science, mathematics, mechanics of materials, statistics, and
thermodynamics. Passing a mock exam for “fundamentals of engineering” is a requirement of passing this course. Prerequisite: junior standing in engineering major. Course equivalence: CHEG 3051, ELEG 3051 or MCEG 3051.

**CVEG 3063. Hydraulics.** (2-3) Credit 3 semester hours. Fluid statics; pressure on submerged bodies; continuity equation; Bernoulli equation; principles of momentum and energy; fundamentals of hydraulic modeling; open channel flow; pressure conduit flow; flow measurement; laboratory sessions on selected topics. Prerequisites: CVEG 2053 and MATH 2043.

**CVEG 3073. Structural Analysis I.** (3-0) Credit 3 semester hours. Analysis of determinate structures; reactions, member forces of trusses, shears and bending moments of beams and frames; influence lines; moving loads; deflections; analysis of indeterminate structures by approximate method and energy method; computer application. Prerequisite: CVEG 2063.

**CVEG 3156. Civil Engineering Internship I.** (0-0) Credit 6 semester hours. An internship program of work experience with an approved engineering oriented firm or agency or consulting firm or engineering public service agency serving the civil engineering profession. A comprehensive written report of the work-learning experience is required. Prerequisite: Approval by the Chairman.

**CVEG 3213. Elements of Environmental Engineering.** (3-0) Credit 3 semester hours. Basic Principles of environmental engineering; environmental thermodynamics, material balance, reaction kinetics and reactor design concepts applied to environmental engineering; applications to waste treatment process design; Overview of water, soil, and air pollution. Prerequisite: CVEG 2123 or an engineering 2000 level course.

**CVEG 3223. Waste Management.** (3-0) Credit 3 semester hours. Historical perspectives, legislative trends and regulations of solid and hazardous waste management; sources, characteristics and engineering principles of solid and hazardous waste; treatment and disposal methods for solid and hazardous wastes. Prerequisite: CVEG 3213.

**CVEG 3233. Water Quality Management.** (3-0) Credit 3 semester hours. Water quality characteristics (physical, chemical and biological); mathematical models to describe the movement of contaminants in the water bodies including rivers, lakes, oceans and groundwater; Contaminant interactions with soil, air and water. Prerequisite: CVEG 3213.

**CVEG 3243. Fundamentals of Air Pollution and Control.** (3-0) Credit 3 semester hours. Fundamentals of air pollution; regulatory aspects; effects and sources of air pollution; atmospheric physics and chemistry; simple air quality models; basics of air pollution control. Prerequisite: CVEG 3213.

**CVEG 4013. Reinforced Concrete.** (3-0) Credit 3 semester hours. Properties of concrete and reinforcements; design methods; codes; load; flexure, shear, bonds, and deflections; analysis and design of different kinds of beams and columns; introduction to design of footings, slabs, and retaining walls; and introduction to computer-aided design. Prerequisite: CVEG 2063.

**CVEG 4024. Environmental Engineering.** (3-3) Credit 4 semester hours. Environmental problems; water requirements and waste volumes; water supply, treatment, and distribution; disposal of solid waste; disposal of wastewater and wastewater collection systems; wastewater treatment; and air pollution control. Prerequisite: CVEG 3063.

**CVEG 4053. Transportation Engineering.** (2-3) Credit 3 semester hours. Transportation systems; history; types; investigation; planning and design of highways, waterways, airports, pipelines, beltways; construction, and operation; urban renewal problems; rapid and mass transit; and introduction to testing of bituminous materials according to standards. Prerequisite: Senior standing and approval by advisor.
CVEG 4063. Water Resources Engineering. (3-0) Credit 3 semester hours. Control and utilization of water; flood control; water distribution systems; open channel flows; hydraulic structures; and model studies. Prerequisite: CVEG 3063.

CVEG 4083. Structural Design. (2-3) Credit 3 semester hours. Design of tension and compression members, trusses, buildings and bridges, rolled steel beams, plate girders, riveted, welded and pinned joints; introduction to design of multistory frames and plastic analysis; and timber structures. Prerequisite: CVEG 3073.

CVEG 4093. Systems Engineering. (3-0) Credit 3 semester hours. Introduction to systems analysis and design; problem modeling; optimization; linear programming; dynamic programming; network analysis; critical path; economic analysis; and decision theory. Prerequisites: MATH 3023.

CVEG 4103. Special Topics. (3-0) Credit 3 semester hours. Selected current and emerging topics in Civil Engineering depending on need determined by the department. Prerequisites: senior standing and approval by the advisor.

CVEG 4123. Hydrology. (3-0) Credit 3 semester hours. Hydrologic cycle; precipitation; run-off; infiltration; hydrological analysis; unit hydrograph; statistical methods; surface and ground water; flood forecasting; flood routing; flood control; and computer applications. Prerequisite: CVEG 3063.

CVEG 4143. Engineering Construction. (3-0) Credit 3 semester hours. Modern construction methods; history, organization management, planning, and machinery; importance of working drawings programming and economy of good planning; and importance of inspection and checks, including visits to works and reports on such visits. Corequisite: CVEG 3024.

CVEG 4156. Civil Engineering Internship II. (0-0) Credit 6 semester hours. An internship program of advanced work experience with an approved engineering oriented firm, or agency, or consulting firm, or engineering public service agency providing practical work experience of the profession on the job. A comprehensive written report of the work-learning experience is required. Prerequisite: Approval by the Chairman.

CVEG 4473. Senior Design and Professionalism I. (1-4) Credit 3 semester hours. This is a capstone engineering design of an industrial or advanced team project. Elements of ethics and professionalism in engineering practice will be integrated into the project experience. The design achievement will be demonstrated by written report, oral presentation, and professional standards and ethics examinations. Prerequisite: CVEG 3024, CVEG 3073, senior standing and approval by the advisor. Course equivalence: CHEG 4473, ELEG 4473 or MCEG 4473.

CVEG 4483. Senior Design and Professionalism II. (1-4) Credit 3 semester hours. A continuation of CVEG 4473 with required design modifications of the team project necessary to produce a working prototype of the design initiated in Senior Design and Professionalism I. Results of the design are presented in a formal, final oral presentation, as well as final report. Professionalism education will reinforce the importance of professional ethics, corporate culture, life-long learning, and globalization. Prerequisite: CVEG 4473. Course equivalence: CHEG 4483, ELEG 4483 or MCEG 4483.

CVEG 4991-4992-4993. Independent Study. (0-0) Credit 1, 2, or 3 semester hours. Readings, research, and/or field work in selected topics. Prerequisite: consent of advisor.

ELEG 1043. Computer Applications in Engineering. (2-2) Credit 3 semester hours. C-Programming language; fundamentals, program looping, conditioning statements, arrays, functions, structures, character strings, pointers, preprocessors, input and output. Engineering problem solving using computers, use of engineering software and commercial packages. Prerequisite or corequisite: MATH 1113. **(COSC 1300)
ELEG 2023. *Network Theory I.* (3-0) Credit 3 semester hours. Study of basic circuit laws and theorems. Study of circuit analysis techniques, use of controlled sources, and transient and sinusoidal circuit analysis. Prerequisites: PHYS 2023, MATH 2024; Prerequisite or corequisite: MATH 2043.

ELEG 2053. *Introduction to Electrical Engineering.* (3-0) Credit 3 semester hours. Introductory course for non-majors. Basic circuit theory, analysis of DC circuits; transient analysis of RLC circuits; steady state analysis; transformers; dc machines and induction motors; diode circuits; operational amplifiers; numbering systems, logic gates and combinational circuits. Corequisite or prerequisite: MATH 2043, and Prerequisite: PHYS 2023.

ELEG 2083. *Introduction to Digital Signal Processing (DSP) Solutions.* (2-2) Credit 3 semester hours. Introduction to signal processing for discrete-time and continuous-time signals. Survey of filtering techniques. Basic principle of frequency response, Fourier Transform and Z-transform. Basic principles of computer-based signal processing. Prerequisite: ELEG 1043

ELEG 2313. *The Digital Information Age.* (3-0) Credit 3 semester hours. Introductory course for non-engineering majors. Introduction to the ideas and principles of digital information systems. The topics include digital sensors, digitizing analog signals, digital logic, computers, information coding, transmission and manipulation. Applications include digital scales, air-bag inflation systems, smart cards, bar-code scanners, digital cellular telephony, and modems. Prerequisites: MATH 1113 or equivalent.


ELEG 3013. *Network Theory II.* (3-0) Credit 3 semester hours. Continuation of transient and sinusoidal analysis. Study of average and RMS power, polyphase circuits, complex frequency, frequency response, and magnetic circuits. Prerequisite: ELEG 2023.

ELEG 3021. *Logic Circuits Laboratory.* (0-3) Credit 1 semester hour. Experimentation in combinational and sequential logic circuitry. Design of counters, adders, digital display circuitry, shift registers, and control logic. Prerequisite or corequisite: ELEG 3063.

ELEG 3023. *Signals and Systems.* (3-0) Credit 3 semester hours. Basic discrete and continuous time signals, properties of systems, linear time invariant systems, Fourier analysis, z-transformers, LaPlace Transform. Prerequisite: ELEG 3013.

ELEG 3033. *Physical Electronics.* (3-0) Credit 3 semester hours. Crystal structure; atomic bonding; phase relationships and kinetics. Band theory, Fermi-Dirac Statistics; conduction and introduction to semiconductor device physics. Introduction to MOS fabrication and design. Prerequisites: PHYS 2023, CHEM 1033; Prerequisite or corequisite: MATH 2043.

ELEG 3041. *Microelectronic Processing and Characterization Lab.* (0-2) Credit 1 semester hour. Basic processes of microelectronic fabrication; doping, oxidation, photolithography, etching, metallization and clean room practices. Basic materials and device characterization. Prerequisite or corequisite: ELEG 3033.


ELEG 3051. *Professional Engineering I.* (0-3) Credit 1 semester hour. Fundamentals of engineering and related science subjects including chemistry, computers, dynamics, electric circuits, engineering
College of Engineering Courses

- Economics, ethics, fluid mechanics, materials science, mathematics, mechanics of materials, statistics, and thermodynamics. Passing a mock exam for “fundamentals of engineering” is a requirement of passing this course. Prerequisite: junior standing in engineering major. Course equivalents: CHEG 3051, CVEG 3051 or ELEG 3051.

**ELEG 3063. Logic Circuits.** (3-0) Credit 3 semester hours. Numbers systems and codes. Boolean algebra and logic minimization methods. Combinational and sequential design using logic gates and flip flops. Prerequisite: ELEG 2023

**ELEG 3156. Engineering Internship I.** (0-0) Credit 6 semester hours. An internship program or work experience with an approved engineering firm or engineering oriented business agency, planning, public service agency, or consulting firm, providing an introduction to the profession. Prerequisite: approval by the chairman of the department.

**ELEG 4003. Communication Theory.** (3-0) Credit 3 semester hours, Fourier transforms, signal spectra, correlation, convolution, and sampling. Transmission and processing of signals, system representation, filters, signal distortion, linear, angle and pulse modulation. Effect of noise interference on communications. Prerequisites: ELEG 3023 and ELEG 3043.

**ELEG 4011. Electronics Laboratory.** (0-3) Credit 1 semester hour. Applications of semiconductors diodes. Operational characteristics of transistor amplifiers (inverters, emitter follower, difference, etc.) FET characteristics and applications. Operational amplifier characteristics and circuit implementation. Frequency response of amplifiers. Prerequisite: ELEG 3011, Prerequisite or corequisite: ELEG 3043

**ELEG 4013. Electromechanical Energy Conversion.** (3-0) Credit 3 semester hours. Electric and magnetic devices, force and torque measurements, iron core transformers, single phase and polyphase power circuits analysis. Introduction to per unit system. Prerequisites: MATH 4173 and ELEG 3013.

**ELEG 4021. Power Laboratory.** (0-3) Credit 1 semester hour. Operational characteristics of DC and AC machines; power circuit analysis. Prerequisite or corequisite: ELEG 4013.

**ELEG 4023. Power Systems Engineering.** (3-0) Credit 3 semester hours. Elementary synchronous machines. General considerations of power generation, transmission, distribution and utilization, survey of load flow, faults, transient stability and economic power dispatch. Prerequisite: ELEG 4013.

**ELEG 4031. Communications Lab.** (0-3) Credit 1 semester hour. Laboratory practice of communications theory, AM and FM modulation, transmission and reception. Analysis of signals and effect of noise interference on communications. Prerequisite or corequisite: ELEG 4003.

**ELEG 4033. Electromagnetic Field Theory I.** (3-0) Credit 3 semester hours. Review of relevant mathematics, electricity, and magnetism. Study of dielectrics, Poisson’s and LaPlace’s equations, magnetic flux, magnetic fields, and magnetic boundary conditions, Ampere’s Circuital law, time varying fields and Maxwell’s equations. Prerequisites: ELEG 2023 and MATH 4173.

**ELEG 4043. Electronics II.** (3-0) Credit 3 semester hours. Design and analysis of single and multistage transistor amplifiers, difference amplifiers, frequency response of amplifiers. Feedback concepts. Analysis and design using discrete and integrated devices. Prerequisite: ELEG 3043.

**ELEG 4053. Digital Signal Processing.** (3-0) Credit 3 semester hours, Introduction, review of signals and systems, sampling and z-transforms, discrete Fourier transform, fast Fourier transform, nonrecursive filter design, recursive filter design. Use of Matlab and DSP’s in signal analysis. Prerequisite: ELEG 3023.

**ELEG 4073. Servomechanism and Control Systems.** (3-0) Credit 3 semester hours. Model of physical systems, system responses, system characteristics, stability design, frequency response analysis and design, discrete -time systems. Prerequisites: ELEG 3023 and MATH 4173.
ELEG 4103. Special Topics. (3-0) Credit 3 semester hours. Selected current and emerging topics in Electrical Engineering. Courses may be repeated for credit when topics vary. Prerequisite: Consent of advisor


ELEG 4156. Engineering Internship II. (0-0) Credit 6 semester hours. An internship program or work experience with an approved engineering firm or engineering oriented business agency, planning agency, public service agency, or consulting firm which provides an introduction to the profession. Prerequisite: approval by the chairman of the department.


ELEG 4223. Electronic and Photonic Materials and Devices. (3-0) Credit 3 semester hours. Properties of insulators, conductors, semiconductors, electro-optical and magnetic materials. Basic operation of opto-electronic devices and systems. Prerequisite: ELEG 3033

ELEG 4243. Power Electronics. (3-0) Credit 3 semester hours. Characteristics of solid state power switches, controlled rectifiers and inverters; DC choppers; AC power controllers; applications to power supplies, electric machine drives, HVDC power transmission and space power systems. Prerequisite: ELEG 3043; Prerequisite or corequisite: ELEG 4013.

ELEG 4253. Computer Interfacing and Communications. (3-0) Credit 3 semester hours. Hardware and software aspects of interfacing microcomputers to memory, peripheral and communication devices. Prerequisite: ELEG 3063: Prerequisite or corequisite: ELEG 4303.

ELEG 4263. VLSI Circuit Design. (3-0) Credit 3 semester hours. Analysis and design of monolithic integrated circuits, device modeling; CAD tools and computer-aided design, design methodologies of VLSI circuits. Prerequisite: ELEG 3043, 3063; Prerequisite or corequisite: ELEG 4043

ELEG 4273. Analog and Mixed Signal Techniques I. (3-0) Credit 3 semester hours. Overview of analog and digital logic circuits, mixed signal circuits and systems, mixed signal test specification process, DC and parametric measurements, tester hardware, DSP-based testing, simulation and design techniques, power management circuits and systems. Prerequisites: ELEG 3043 and ELEG 3063. Corequisite: ELEG 4003

ELEG 4283. Reliability Analysis of Electrical Facilities. (2.5-1) Credit 3 semester hours. Overview of reliability and probabilistic theory, Monte Carlo simulations, preventive and predictive maintenance methodology, computerized maintenance management systems, generation, transmission and distribution networks and loads, field study and power deregulation. Prerequisites: MATH 3023 and ELEG 4013


ELEG 4293. Analog and Mixed Signal Techniques II. (3-0) Credit 3 semester hours. Sampled channel testing. Focused calibrations, DAC testing, ADC testing, DIB design. Design for test (DFT), Data Analysis and Test Economics. Current issues relating to Mixed Signal Systems. Prerequisite: ELEG 4273
ELEG 4303. Introduction to Digital Design. (3-0) Credit 3 semester hours. Memory and programmable logic, register transfer and computer operations, control logic design, computer instructions and addressing modes, design of a CPU input-output communication memory management. Prerequisite: ELEG 3063, 3021.

ELEG 4313. Broadband Communication Systems I. (3-0) Credit 3 semester hours. Introduction to types of high-speed communication system (broadband), telephone subscriber loop environment, twisted-pair channel modeling, transceiver front-end noise models. Channel capacity testing and analysis techniques of XDSL systems. XDSL modulation techniques and deployment considerations. Prerequisites: ELEG 3023

ELEG 4323. Broadband Communication Systems II. (3-0) Credit 3 semester hours. Topics include Hybrid Circuits, Analog Front end precision issues, channel equalization, Echo cancellation, Error Correction and Trellis Coding. Varieties of Digital Subscriber Line (XDSL), testing issues relating to XDSLs. Standards and standard related issues with emphasis on Asymmetric Digital Subscriber Line. Prerequisite: 4313

ELEG 4393. Computer Organization and Design. (3-0) Credit 3 semester hours. Computer interconnection structures, operating systems, microprocessors, RISC processors, and multiprocessors. Prerequisite or corequisite: ELEG 4303.

ELEG 4473. Senior Design and Professionalism I. (1-4) Credit 3 semester hours. This is a capstone engineering design of an industrial or advanced team project. Elements of ethics and professionalism in engineering practice will be integrated into the project experience. The design achievement will be demonstrated by written report, oral presentation, and professional standards and ethics examinations. Prerequisites: CHEG 3003, ELEG 3063, ELEG 3043 and senior standing. Course equivalence: CHEG, CVEG or MCEG 4473.

ELEG 4483. Senior Design and Professionalism II. (1-4) Credit 3 semester hours. A continuation of ELEG 4473 with required design modifications of the team project necessary to produce working prototype of the design initiated in Senior Design and Professionalism I. Results of the design are presented in a formal, final, oral presentation, as well a final report. Professionalism education will reinforce the importance of professional ethics, corporate culture, life-long learning and globalization. Prerequisite: ELEG 4473. Course equivalence: CHEG, CVEG or MCEG 4483.

ELEG 4991-4992-4993. Independent Study. (1-0, 2-0, 3-0) Credit 1, 2, or 3 semester hours. Readings, research, and/or field work on selected topics. Prerequisite: consent of advisor.

ELET 1111. Direct Current Circuits Laboratory. (0-3) Credit 1 semester hour. The application of Ohm’s Law, Kirchhoff’s Law, and related theories to the principles of electricity and magnetism in conductors and insulators. Prerequisite: credit for or concurrent enrollment in ELET 1113.

ELET 1113. Direct Current Circuits. (3-0) Credit 3 semester hours. Basic principles of electricity, magnetism, conductors insulators, electric theory, Ohm’s Law, Kirchhoff’s Laws, characteristics of series and parallel DC circuits, and basic instruments used in electronics. Prerequisite: credit for or concurrent enrollment in ELET 1111.

ELET 1141. Alternating Current Circuits Laboratory. (0-3) Credit 1 semester hour. The application of Kirchhoff’s Law and related theories to the principles of AC circuits, impedance and phasor experiments. Prerequisite: Credit for or concurrent enrollment in ELET 1143.

ELET 1143. Alternating Current Circuits. (3-0) Credit 3 semester hours. A study of alternating current circuits, AC generation, transmission, transformers, frequency, and impedance and phasor calculations. Prerequisites: ELET 1113, and credit for or concurrent enrollment in ELET 1141.
ELET 2006. Cooperative Education I. (0-6) Credit 6 semester hours. A cooperative arrangement between the university and a company or government agency that provides experiences for students majoring in Electrical Engineering Technology. The work assignment must be commensurate with the student’s major. A subsequent written report is required. Prerequisite: Department Head’s approval is required.

ELET 2221. Basic Electronics I Laboratory. (0-3) Credit 1 semester hour. The implementation of semiconductors in electronic circuits and the analysis of basic amplifiers. Prerequisite: credit for or concurrent enrollment in ELET 2223.

ELET 2223. Basic Electronics I. (3-0) Credit 3 semester hours. Principles of elementary electronics circuit design and analysis. Solid state diodes, bipolar and MOSFET transistors, biasing techniques DC and AC load lines. Analysis of basic amplifiers. Prerequisites: MATH 1113, and credit for or concurrent enrollment in ELET 2221.

ELET 2251. Basic Electronics II Laboratory. (0-3) Credit 1 semester hour. The implementation of semiconductors in A-F and R-F amplifiers, oscillators, and filters circuits. Prerequisite: credit for or concurrent enrollment in ELET 2253.

ELET 2253. Basic Electronics II. (3-0) Credit 3 semester hours. Analysis and design using single and multi-stage semiconductor technology in amplifiers. Typical industrial applications of rectifiers, operational amplifiers, A-F and R-F amplifiers, filter circuits, and oscillators. Prerequisite: ELET 2223 and credit for or concurrent enrollment in ELET 2251.

ELET 2903. Modern Electronic Test Instruments. (3-0) Credit 3 semester hours. The analysis of a variety of sophisticated electronic instruments used in the computer, electronic and electrical fields that includes Broadband Spectrum Analyzers, Signature Analyzers, Programmable Function Generators, and test instruments on the market. The theory of operation of each instrument will be covered along with typical circuit measurements. Corequisite: ELET 2223 or instructors permission.

ELET 3003. Antennas and Transmission Systems. (3-0) Credit 3 semester hours. Topics that will be covered are VSWR, application of Smith charts, characteristic of antennas, characteristic of transmission lines, fiber optics used in data transmission, characteristic impedance of transmission lines, antenna gain calculations, antenna patterns, antenna grounding, microwave antenna considerations, and field strength measurement. Prerequisites: MATH 2024 and ELET 2253.

ELET 3023. Computer Applications to Electrical Problems. (3-0) Credit 3 semester hours. The development of orderly methods of solving current voltage relations problems, circuit law problems, and electronics problems with the use of the computer. Prerequisite: CPET 1013.

ELET 3241. Network Analysis Laboratory. (0-3) Credit 1 semester hour. Laboratory experiments in the areas of basic circuits laws, network theorems, circuit analysis techniques, use of controlled sources, transient, and sinusoidal circuit analysis. Prerequisite: credit for or concurrent enrollment in ELET 3243.

ELET 3243. Network Analysis. (3-0) Credit 3 semester hours. Review of basic circuit laws and network theorems. Study of circuit analysis techniques, use of controlled sources, transient, and sinusoidal circuit analysis. Computer usage is emphasized in determining steady-state and transient solutions. Prerequisite: ELET 1143 and credit for or concurrent enrollment in ELET 3241.

ELET 3451. Robotics I Laboratory. (0-3) Credit 1 semester hour. Experiments with and testing of robotic devices, including sensors, motion systems, electronics components, and control. Prerequisite: Credit for or concurrent enrollment in ELET 3453.

ELET 3453. Robotics I. (3-0) Credit 3 semester hours. Applications of robotic devices, including sensors, motions systems, electronic components, and control systems. Basic programming of robots. Prerequisite: Credit for or concurrent enrollment in ELET 3451.
ELET 3521. Instruments and I/O Transducers Laboratory. (0-3) Credit 1 semester hour. Laboratory experiments in the theory and application of electrical and electronic measuring instruments and input/output transducers. Prerequisite: Credit or concurrent enrollment and ELET 3523.

ELET 3523. Instruments and I/O Transducers. (3-0) Credit 3 semester hours. The theory and applications of electrical and electronic measuring instruments and input/output transducers. Topics include analog and digital instruments and transducers. Prerequisites: ELET 2223 and credit for or concurrent enrollment in ELET 3251.

ELET 3603. Digital Integrated Circuits Devices and Applications. (3-0) Credit 3 semester hours. A treatise of LSI and VLSI devices to include memories, interfacing, data transfer, and arithmetic logic units. The application and programming of Motorola’s 68000 and Intel’s 80286 microprocessors will be covered. Prerequisites: Credit for ELET 3601.

ELET 3701. Communication Circuits I Laboratory. (0-3) Credit 1 semester hour. Laboratory experiments in the areas of RF circuits including impedance matching, RF power amplifiers, wideband amplifiers, RF oscillators, and phase shift oscillators. Prerequisite: credit for or concurrent enrollment in ELET 3703.

ELET 3703. Communication Circuits I. (3-0) Credit 3 semester hours. RF circuits including impedance matching, RF power amplifiers, wideband amplifiers RF oscillators, phase shift oscillators, AM, FM, and PM circuits. Prerequisites: ELET 2223, and credit for or concurrent enrollment in ELET 3703.

ELET 4082. Senior Project I. (1-3) Credit 2 semester hours. A two-semester sequence for individual projects supervised by a faculty member of the department. The portions of the first semester course (4082) are devoted to group discussion of professional aspects of engineering ethics, research protocols, patent considerations. A written proposal describing the project is required. Oral presentation throughout the semester on the research project using a conference style format. Prerequisite: Senior standing in the department and permission of the instructor required.

ELET 4092. Senior Project II. (1-3) Credit 2 semester hour. A two-semester sequence for individual and/or team projects supervised by a faculty member of the department. The portions of the second semester course (4092) are devoted to group discussion of professional aspects of engineering technology: research writing, engineering ethics, research protocols, patent considerations. Oral presentations throughout the semester culminating in a final written report. Prerequisite: Senior standing in the department, permission of the course instructor required, and ELET 4082.

ELET 4241. Operational Amplifier Theory and Applications Laboratory. (0-3) Credit 1 semester hour. The application of designing and evaluating differential and operational amplifier circuitry, feedback configurations, linear and nonlinear circuitry. Prerequisite: credit for or concurrent enrollment in ELET 4243.

ELET 4243. Operational Amplifier Theory and Applications. (3-0) Credit 3 semester hours. The design and evaluation of differential and operational amplifier circuitry, feedback configurations, operational amplifiers, errors compensation, linear and nonlinear circuitry. Prerequisites: ELET 2253, MATH 2014, and credit for or concurrent enrollment in ELET 4241.

ELET 4471. Control Systems Laboratory. (0-3) Credit 1 semester hour. The laboratory testing of automated controlled circuitry designed and developed with electrical engineering techniques. Automated controlled circuits designed with digital filter circuits will be tested. Prerequisite: credit for or concurrent enrollment in ELET 4473.

ELET 4473. Control Systems. (3-0) Credit 3 semester hours. The application of control and automated systems to computers. The analysis and design of transducers and signal converters for process control.
The development of electrical circuitry to be used in computer programming. Prerequisites: ELET 2253 and credit for or concurrent enrollment in ELET 4471.

ELET 4513. Advanced Integrated Circuits. (3-0) Credit 3 semester hours. Fabrication of LSI and VLSI devices. Design considerations of PROM, EPROM, EEPROM devices and LIFO, FIFO memories. Students will be required to write computer programs that will perform typical dynamic testing of integrated circuits.

ELET 4801. Communications Circuits II Laboratory. (0-3) Credit 1 semester hour. Laboratory experiments in the areas of analog and digital data communication techniques. Prerequisite: ELET 4803.

ELET 4803. Communication Circuits II. (3-0) Credit 3 semester hours. Analog and Digital Data communications techniques including PPM, PWM, FSK, DM, PAM, and PCM. Data Modem, digital coding/decoding, Interfacing and Codec circuits. Prerequisites: ELET 3703 and credit for or concurrent enrollment in ELET 4803.

ELET 4901. Communication Circuits III Laboratory. Credit 3 semester hours. Students will perform laboratory experiments that support the topics covered in ELET 4903. Students will perform experiments that involve the transmission and reception of voice, video and data. Prerequisite: Concurrent enrollment in 4903.

ELET 4903. Communication Circuits III. (3-0) Credit 3 semester hours. The study of the licensing procedures employed by the United States Federal Communications Commission. Topics include the study of the hardware and documentation required for radio and television stations and CATV systems in the U.S. Prerequisite: ELET 4803.

GNEG 1011-1021. Engineering Professional Concepts. (1-1) Credit 1 semester hour. Professional orientation and synthesis. Introduction to engineering practices and methods of analysis. Written and oral presentations and discussions by students, faculty, and visiting professionals on topics of timely interest relative to the engineering professional and professional development.

GNEG 1013. Modern Engineering. (3-0) Credit 3 semester hours. An introduction to various engineering fields of study. The scope includes the impact of engineering on civilization, role of engineers in economic development, ethics and professional practice, and modern developments in engineering.

GNEG 2013. Logical Reasoning and Decision Analysis. (3-0) Credit 3 semester hours. An introduction to logical and decision analysis in a variety of fields. The scope includes an introduction to Boolean logic and logic flow diagrams; deductive reasoning; and use of criteria and logic trees to analyze and improve decisions. Prerequisite: MATH 1113.

GNEG 2151. Engineering Research I. (0-0) Credit 1 semester hour. Research methodology course, the content of which includes an introduction to scientific method, formulation of research question, development and implementation of research plan, analysis and evaluation of results, and reporting of findings. Prerequisite: consent of instructor and research advisor.

GNEG 2156 and 3156. Engineering Cooperative Education I and II. (0-0) Credit 6 semester hours. A cooperative program of engineering with an approved engineering-based industry, engineering consulting firm, or governmental regulatory agency engaged in planning and administration of engineering functions. The student receives related engineering assignments in a real work situation. The assignment is commensurate with the theoretical engineering experience of the student.

GNEG 3113. Introduction to Engineering Project Management. (3-0) Credit 3 semester hours. An introduction to engineering project management. The scope includes principles of project management and elements of engineering economics: defining project scope; identification of tasks; work breakdown
structure; scheduling and resource allocation; budget management; and estimation of project costs including time value of money. Prerequisites: GNEG 1013 and MATH 1113.

**GNEG 3151. Engineering Research II.** (0-0) Credit 1 semester hour. This is a course of research activities consisting of library, laboratory, or other research activities on selected problems. Results of the research are presented in formal, oral, and written presentations. Prerequisites: GNEG 2151 and consent of instructor and research advisor.

**GNEG 4151. Engineering Research III.** (0-0) Credit 1 semester hour. A continuation of GNEG 3151; in-depth research on selected problems. Results of the research are presented in formal, oral, and written presentations. Prerequisites: GNEG 3151 and consent of instructor and research advisor.

**MCEG 1213. Creative Engineering I.** (2-2) Credit 3 semester hours. A study of the engineering profession, practice, and ethics. Introduction to design methodology, CAD tools for engineering design and presentations. Engineering applications of spreadsheet. Corequisite or prerequisite: MATH 1123 or MATH 1115.

**MCEG 1223. Creative Engineering II.** (2-2) Credit 3 semester hours. An application of the engineering design process to team projects; the production of physical models or prototypes, oral presentations, and written design project reports are required. Prerequisite: MCEG 1213; Corequisite or prerequisite: PHYS 2013.

**MCEG 2013. Thermodynamics I.** (3-0) Credit 3 semester hours. First Law, transformation of energy, theoretical limitations, Second Law, absolute temperature, entropy, and available energy, properties of gases, liquids, and vapors, and irreversibility. Prerequisites: MATH 2024, PHYS 2013.

**MCEG 2023 Materials Science and Engineering.** (3-0) Credit 3 semester hours. This course is focused on relationship between mechanical properties and microstructure, mechanical behavior and property control of engineering materials, such as metals, alloys, and composites. Concepts of dislocations, phase diagrams, various bonding, crystal structures, and solidification are also included. Industrial applications of the engineering materials are discussed. Prerequisite: CHEM 1033 or equivalent.

**MCEG 2123. Energy Systems.** (3-0) Credit 3 semester hours. Surveys sources of energy including crude oil, natural gas, coal, solar, wind, nuclear, and hybrid sources. Various energy conversion processes will be discussed including thermal, hydro-electric, nuclear, and alternative methods. Applications to be discussed include power generation, transportation, and data communication. Prerequisite: MATH 1113 or equivalent.

**MCEG 3011. Measurement and Instrumentation Laboratory.** (0-3) Credit 1 semester hour. The scope of this course includes fundamentals in measurement theory, statistical analysis of experimental data, uncertainty, accuracy assessments, and calibration techniques. The course includes the use and applications of Instruments for measuring area, pressure, time, speed, temperature, strain, hardness, and deflection. Prerequisites: PHYS 2023, PHYS 2521.

**MCEG 3013. Heat Transfer.** (3-0) Credit 3 semester hours. Study of the fundamental modes of heat transfer; conduction, convection, and thermal radiation, separately and in combination. Theoretical, numerical, and design methods of analysis of steady, transient, single, and multidimensional problems will be emphasized. Prerequisites: MCEG 3063; Corequisite or prerequisite: MATH 4173.

**MCEG 3021. Thermal Science Laboratory.** (0-3) Credit 1 semester hour. This course includes experimental investigation of the performance of various thermal systems, such as engines, combustion unit, heat exchangers, nozzles, boilers and turbomachinery. Prerequisites: MCEG 3011, 3023; Corequisite or prerequisite: MCEG 3013.
MCEG 3023. Thermodynamics II. (3-0) Credit 3 semester hours. Continuation of Thermodynamics I, including various power cycles, refrigeration cycles, fluid flow, combustion process, and advanced concepts of gas dynamic such as shock waves. Prerequisite: MCEG 2013.

MCEG 3031. Manufacturing Processes Laboratory. (0-3) Credit 1 semester credit hour. This lab includes experiments for metal identification, machinability of materials, effects of factors on surface roughness measurement, material removal rates, and cutting tool force analysis. It also includes illustrations of casting, forging, rolling, and powder metallurgy. Student will be required to design a structure part and perform manufacturing operations. Prerequisite or corequisite: MCEG 3033.

MCEG 3033. Manufacturing Processes. (3-0) Credit 3 semester hours. This course provides the concepts that deals in the conversion of materials into products. It includes measurement and quality assurance, and processes of casting, forming, material removal, and joining. In addition, it involves the study of computer numerical control machines, manufacturing systems, and automation. Prerequisites: MCEG 2023; corequisite or prerequisite: CVEG 2063.

MCEG 3041. Fluid Mechanics Laboratory. (0-3) Credit 1 semester credit hour. This lab focuses on flow visualization; velocity, viscosity, minor loss, and volume flow rate measurement; pipe friction measurement for incompressible and compressible flows; flow through nozzles and diffusers; pumps and fan characteristics; performance of pumps connected in series and parallel; lift and drag force measurement; and open channel flow measurement. Corequisite or Prerequisite: MCEG 3063.

MCEG 3043. Machine Design I. (2-2) Credit 3 semester hours. Fundamentals of mechanical design methodology, design of machine elements for static and fatigue failure, individual projects and classroom discussions of various design solutions. Prerequisites: CVEG 2063 and MCEG 1223.

MCEG 3051. Professional Engineering I. (0-3) Credit 1 semester hour. Fundamentals of engineering and related science subjects including chemistry, computers, dynamics, electric circuits, engineering economics, ethics, fluid mechanics, materials science, mathematics, mechanics of materials, statistics, and thermodynamics. Passing a mock exam for “fundamentals of engineering” is a requirement of passing this course. Prerequisite: junior standing in engineering major. Course equivalence: CHEG 3051, CVEG 3051 or ELEG 3051.

MCEG 3053. Kinematic Design and Analysis. (2-2) Credit 3 semester hours. This course includes the theory and application for the kinematic design of mechanisms. The students will be required to use computers to model, analyze, and synthesize mechanical systems. Prerequisites: MCEG 1223 and CVEG 2053.

MCEG 3063. Fluid Mechanics. (3-0) Credit 3 semester hours. The fundamental conservation laws in fluid statics and dynamics are derived and solved analytically and numerically. Other topics include analysis of viscous and inviscid flow; laminar and turbulent flows in pipes and on external surfaces; open channel flow; hydraulic machinery; and introduction to compressible flow. Direct applications to problems encountered in practice and in engineering design will be covered. Problem solving and design application will be emphasized. Prerequisites: MCEG 2013; Corequisite or prerequisite: MATH 2043.

MCEG 3073. Automatic Controls. (3-0) Credit 3 semester hours. Analysis and synthesis of continuous time control systems, transfer function, block diagrams, stability, root locus, state space representation, design considerations for feedback control system. Prerequisites: MATH 4173, and ELEG 2053 or 2023.

MCEG 3156. Mechanical Engineering Internship I. (0-0) Credit 6 semester hours. An internship program of work experience with an approved engineering firm. Prerequisites: Junior standing.

MCEG 3193. Introduction to Robotics. (3-0) Credit 3 semester hours. Fundamental topics in Robotics covering configuration (forward and reverse) kinematics, motion kinematics, force/torque relations and trajectory planning. Rudiments of dynamics and position control are also introduced. Prerequisites: MATH 4173 and Junior standing.
MCEG 4011. **Mechanical Systems Laboratory.** (0-3) Credit 1 semester hour. This course includes laboratory experiments in kinematics, vibrations, and feedback controls for mechanical systems. Prerequisites: MCEG 3053; corequisite or prerequisite: MCEG 4063.

MCEG 4043. **Machine Design II.** (2-2) Credit 3 semester hours. This is a design course featuring a design project using strength of materials, kinematics of machines, machine element design (e.g., gears and shafts), and CAD. Prerequisite: MCEG 3043 and 3053.

MCEG 4063. **Dynamic Systems and Controls.** (3-0) Credit 3 semester hours. The scope of this course includes mathematical modeling, analysis, and feedback control of dynamic systems. Topics include free and force vibrations of single and multiple degrees of freedom systems. Transient, steady-state, and stability of linear feedback control systems will be studied in the course. Prerequisites: MCEG 3053 and MATH 4173.

MCEG 4093. **Finite Element Analysis and Design.** (3-0) Credit 3 semester hours. An introduction to finite element analysis as a modern computational tool to solve boundary value problems. Applications will be in structural mechanics, fluid flow, and heat transfer. Design and computer projects included. Prerequisite: CVEG 2063; corequisite or prerequisite: MCEG 3013.

MCEG 4123. **Energy System Design.** (3-0) Credit 3 semester hours. A design course emphasizing heat exchangers, heat pipes, heat reclamation devices, piping systems, and solar heating and cooling systems. Prerequisite: MCEG 3013 and 3023.

MCEG 4143. **Engineering Information Technology.** (3-0) Credit 3 semester hours. This course focuses on the use of modern information technology tools as well as linking some available tools used in several engineering applications including thermal analysis, fluid flow analysis, electrical power and current distribution and management through the use of commercial softwares such as STAR-CD, FLOWTHERM, TRNSYS, PSPICE, MULTI SIM, VHDL, etc. Prerequisite: MATH 4173.

MCEG 4156. **Mechanical Engineering Internship II.** (0-0) Credit 6 semester hours. Continuation of MCEG 3156. Prerequisites: Senior standing.

MCEG 4163. **Special Topics.** (3-0) Credit 3 semester hours. Selected current and emerging topics in mechanical engineering depending on need determined by the department. Prerequisite: Consent of advisor.

MCEG 4183. **Gas Dynamics.** (3-0) Credit 3 semester hours. Fundamentals in compressible fluid flow, one dimensional and two dimensional flow, subsonic and supersonic flow. Topics include isentropic flow, normal and oblique shock, Prandtl-Meyer Flow, flow with friction and heat transfer, and various engineering applications. Prerequisites: MCEG 3023, 3063.

MCEG 4473. **Senior Design and Professionalism I.** (1-4) Credit 3 semester hours. This is a capstone engineering design of an industrial or advanced team project. Elements of ethics and professionalism in engineering practice will be integrated into the project experience. The design achievement will be demonstrated by written report, oral presentation, and professional standards and ethics examinations. Prerequisites: MCEG 3043; corequisite or prerequisite: MCEG 3013.

MCEG 4483. **Senior Design and Professionalism II.** (1-4) Credit 3 semester hours. A continuation of MCEG 4473 with required design modifications of the team projects necessary to produce a working prototype of the designs initiated in Senior Design and Professionalism I. Results of the design are presented in a formal, final oral presentation, as well a final report. Professionalism education will reinforce the importance of professional ethics, corporate culture, life-long learning, and globalization. Prerequisites: MCEG 4473.
MCEG 4991-4993. Independent Study. (1-0, 3-0) Credit 1 or 3 semester hours. Readings, research, and/or field work on selected topics. Prerequisite: Consent of advisor.

MCET 3103. Mathematical Applications for Technology. (3-0) Credit 3 semester hours. A survey of appropriate concepts and techniques from methods with applications to the solution of problems in technology. Prerequisite: MATH 2024.

TECH 1002. Engineering and Technology Seminar. (2-0) Credit 2 semester hours. Introduction to the engineering, technology, architecture and computer science fields of study. The history and development of technology and how it effects multi/interdisciplinary studies. Scope and future of the fields of study and examination of the role of professionals in a highly technological society. Content designed especially for assisting students in learning to cope successfully in various interdisciplinary fields of study.

TECH 1033. Engineering Graphics. (2-4) Credit 3 semester hours. Introduction to graphics with emphasis on drafting techniques: use of instruments, lettering, geometric construction, multiview projections, auxiliary and sectional views, dimensioning, and pictorial drawings. **(ENGR 1304)

TECH 1103. Computer-Aided Drafting I. (2-2) Credit 3 semester hours. This course is an introduction to computer-aided drafting and design. Use of microcomputers and of multiview and sectional drawings. File maintenance and an introduction to plotting applications.

TECH 1113. Communication Technology. (3-0) Credit 3 semester hours. A study of the technologies employed in the communication process. Topics include: the various technical communication systems, introduction to graphics communication, electronic and telecommunication systems and satellite systems. Prerequisite: None

TECH 1123. Introduction to Technology. (3-0) Credit 3 semester hours. Provides students an opportunity to explore and experience a large variety of tools, materials, and processes associated with technology. Designed to assist individuals in identifying their areas of interests. Topics such as communications technology, energy technology, production technology, computer applications, research and development are included.

TECH 1243. Production Technology. (2-4) Credit 3 semester hours. A study in the production and planning; design and installation of integrated systems of materials, equipment and personnel; and measurement, testing and management of quality control in the manufacturing and construction industries. Prerequisite: TECH 1123

TECH 2003. Basic Computer Automated Manufacturing. (2-2) Credit 2 semester hours. An introductory study of Computer Integrated Manufacturing with emphasis on how subsystems apply to manufacturing applications. The integration of robotics, computers and other machines will be emphasized. Prerequisite: Department Head approval.

TECH 2103. Computer-Aided Drafting II. (2-) Credit 3 semester hours. This course is a continuation of TECH 1103. Use of microcomputers to generate complex engineering drawings and designs. Advanced techniques for data input and drawing generation. Dimensioning, data base management, preparation of isometric drawings and introduction to 3D drawings, and plotting techniques. Prerequisites: Departmental approval.

TECH 2163. Architectural Drafting. (2-4) Credit 3 semester hours. Application of basic drafting of architectural working drawings to plans and sections and elevations. Building details are studied using standard components obtained from such references as Sweet’s Catalog and Architectural Graphic Standards. Prerequisite: Departmental approval.

TECH 2303. Photography I. (2-2) Credit 2 or 3 semester hours. A study of the equipment, procedures, and processes that make photographs and of the ability to communicate through this medium. Instruction encourages competency development. Covers advanced scientific principles of optics, theory of light,
camera handling, composition, film processing, print finishing, and photographic evaluation. Prerequisite: Departmental approval.

**TECH 2313. Quality Assurance.** (3-0) Credit 3 semester hours. An introduction to the concepts of applied quality control systems. This course deals with the problems and solution of how to achieve better quality in the production and manufacturing of products or systems. Topics covered include quality responsibility, control chart methods, sampling techniques, and reliability applications as they relate to engineering and technical products or systems. Prerequisite: Departmental approval.

**TECH 3004. Principles of the Computer Integrated Manufacturing System.** (2-2) Credit 3 semester hours. A study of techniques of computer integrated manufacturing. Topics will include principles of automation in manufacturing, programmable automation based machines and the integration of robotics and CNC machines into the CIM system. Prerequisites: TECH 2003

**TECH 3013. Industrial Design.** (2-4) Credit 3 semester hours. Introduction to industrial design. Includes the creative process, objectives of design, standard parts and materials commonly used, and basic manufacturing practices to create useful products. Prerequisite: Departmental approval.

**TECH 3103. Manufacturing Processes.** (2-4) Credit 3 semester hours. An analysis of activities related to the production and distribution of goods and services. Instruction includes materials processing, management, and the free enterprise system. Prerequisite: Departmental approval.

**TECH 3113. Energy and Power Technology.** (3-0) Credit 3 semester hours. Considers techniques employed for using and controlling energy to perform work. A study of the generation, conversion transmission, control and use of power. Instruction includes exploration in mechanical, pneumatics, and fluid power. Prerequisite: Departmental approval.

**TECH 3123. Technology of Materials.** (2-4) Credit 3 semester hours. A study of tools, materials and processes common to wood, metals, plastics, and composites industries. Practical applications in the use and shaping of these materials into useful products. Including application and use of CNC machines. Prerequisite: Departmental approval.

**TECH 3203 Engineering and Technical Communications.** (3-0) Credit 3 semester hours. Oral and written presentations and documentations that focus on scientific and technical communications. Intended for professionals preparing for basic and applied sciences, engineering and technology fields of study. Emphasizes principles and use rather than use - it offers functional explanations rather than formal rules. Prerequisite: ENGL 1133.

**TECH 3223. Electromechanical Drafting.** (2-4) Credit 3 semester hours. Electrical and electronic graphic symbols and terminology. Study of the basic types of electronic drawing block, single line, and schematic lines. Layout and development of mechanical chassis and housings are included. Prerequisites: Departmental approval.

**TECH 3233. Industrial Management and Supervision.** (3-0) Credit 3 semester hours. Principles of industrial management and supervision. Study of industrial organization, production and quality control, plant layout and planning, manufacturing cost analysis, and time and motion. Prerequisite: junior standing.

**TECH 3383. Pipe Drafting.** (2-4) Credit 3 semester hours. Vocabulary and definition of pipe drafting. Fundamental pipe symbols and single line drawings, including standard equipment and fittings. Dimensioning and isometric pipe drafting. Study of flow sheets as related to piping systems and structural systems for pipe supports. Prerequisite: Departmental approval.

**TECH 4072. Senior Project I.** (1-3) Credit 2 semester hours. This is the first part of a two part senior project course for technology majors. Students will be involved with a special project selected by the student or advisor. Consideration is given to taking a project from the planning stage to implementation. Prerequisite: Senior Standing.
TECH 4082. Senior Project II. (1-3) Credit 2 semester hours. Continuation of TECH 4072. Students will complete the project. An oral presentation and written report are required. Prerequisite: TECH 4072.

TECH 4103. Advanced Computer Aided Design. (2-2) Credit 3 semester hours. A special problems course in which students may use various CAD software to design and to develop standard engineering documentation to meet specific applications. Students will develop skill in the management of the total CAD system with emphasis on teamwork in the work environment. Prerequisite: Departmental approval.

TECH 4113. CAD Programming and Customization. (1-3) Credit 3 semester hours. An advanced class designed to provide instruction in techniques of designing and customizing CAD programs to specific needs. Topics will include a study of languages and software, techniques of enhancing CAD software, and programming and customization techniques. Prerequisite: Senior classification and Department Advisor approval.

TECH 4123. Manufacturing Technology Problems. (2-4) Credit 3 semester hours. A class for advanced students wanting to study problems in manufacturing technology. Courses may be repeated for additional 3 hour credit with in-depth extension of previous problem class. Prerequisite: Senior classification and Department Advisor approval.

TECH 4273. Industrial Safety Management. (3-0) Credit 3 semester hours. A comprehensive, in-depth study of accident prevention and safety administration, emphasizing management aspects of safety. This course uses the most recently developed techniques for implementation of successful accident prevention techniques. Prerequisite: Advisor approval.

TECH 4303. Construction Processes. (1-4) Credit 3 semester hours. A study of the construction industry. Instruction includes a managed production system study in which roads, tunnels, bridges, dams, and buildings are produced and serviced on the site. Experiences are provided in planning, site preparation, scheduling work, contracting, construction of a structure, support systems, and assembling models. Prerequisite: Departmental approval.

TECH 4313. Transportation Systems. (3-0) Credit 3 semester hours. A study of transportation systems. An analysis of transportation in terms of land, sea, air, and aerospace vehicles. An analysis of the factors which affect design, safety, materials, control and ecological effects of transportation systems. Prerequisite: Junior Standing.

TECH 4403. Machine Drafting. (2-4) Credit 3 semester hours. A study of working drawings as applied to the machine shop with emphasis on relationship of views and dimensioning, correct interpretation of scale measurement and tolerance, and the application and interpretation of symbols and notes. Prerequisite: TECH 1033.

TECH 4993. Independent Study. (3-0) Credit 3 semester hours. Reading, research, and/or field work on selected topics. Prerequisite: Consent of department head.
University Courses

School of Juvenile Justice and Psychology

CRJS 1111. Introductory Seminar in Criminal and Juvenile Justice. (0-0) Credit 1 semester hour. An overview of the professional opportunities available in criminal justice, juvenile justice and related fields. Students will be introduced to the importance of professional relationship building, the value of internships, and the myriad professional job opportunities available in both juvenile and criminal justice.

CRJS 1123. Crime in America. (3-0) Credit 3 semester hours. Presentations from active practitioners and researchers in the field of criminal justice on the current state of crime in America. The course includes an examination of the statements of offenders themselves on the nature of their criminality.

CRJS 1133. Principles of Criminal Justice. (3-0) Credit 3 semester hours. Principles of philosophy and history of criminal justice including the constitutional restraints imposed on criminal justice officials. Emphasis will be on the criminal justice officials’ role in the prevention and control of crime and delinquency. **(CRIJ 1301, 1314)

CRJS 2413. Police Systems and Practices (3-0) Credit 3 semester hours. A study of the structural aspects and principles of personnel management, program development, fiscal management, and other major components of police organization. **(CRIJ 2332)

CRJS 2423. Introduction to Criminal Investigation and Identification. (3-0) Credit 3 semester hours. A survey of scientific crime detection methods, the identification and presentation of evidence, instrumentation, and crime report writing. **(CRIJ 2314)

CRJS 2433. Police Community Relations. (3-0) Credit 3 semester hours. An examination of various aspects of police-community relations. It includes the effects of various forms of policing styles on community dynamics, misperceptions and bias on the part of both communities and the police. Other topics include civil rights and civil liberties as they relate to law enforcement policy. **(CRIJ 2318, 2326)

CRJS 2513. Corrections: Systems and Practices (3-0) Credit 3 semester hours. An examination of the organization, administration and management of correctional facilities and programs in the United States. It includes a study of the populations served, sentencing structures and their outcomes for the individuals, families and communities involved.

CRJS 2523. Alternatives to Incarceration. (3-0) Credit 3 semester hours. An examination of various correctional alternatives to incarceration including probation, parole, developments in the technological monitoring of offenders, and community-based reintegration and rehabilitation efforts. **(CRIJ 1321)

CRJS 2613. Court Systems and Practices. (3-0) Credit 3 semester hours. The legal procedures for arrest, complaint, presentation before the magistrate, grand jury consideration, indictment or waiver, arraignment, and the admissibility of evidence on these issues; pretrial matters, postverdict motions, sentencing, and appeal. **(CRIJ 1306)

CRJS 2643. Criminal Procedure. (3-0) Credit 3 semester hours. An examination of the Fourth, Fifth and Sixth Amendments regarding search and seizure, warrant requirements, the right to counsel, confessions, and the admissibility of evidence. **(CRIJ 2323)

CRJS 2663. Evidence Law. (3-0) Credit 3 semester hours. A study of Evidence Law with an emphasis on burden of proof, relevance, judicial notices, real and demonstrative evidence (including documents), the Hearsay Rule and its exceptions, privileges, unlawfully obtained evidence, and presumptions of guilt and innocence.
CRJS 2713. Juvenile Justice Systems. (3-0) Credit 3 semester hours. An overview of the Juvenile Justice System including research and theoretical perspectives. It includes an in-depth study of the system and early decision-making process with focus on the police, the juvenile courts and the limits on juvenile sanctions. Community-based corrections with a historical perspective on juvenile probation and juvenile aftercare are also examined. A thorough working knowledge of institutionalization in terms of the treatment of juvenile offenders is provided.

CRJS 2723. Theories and Development of Juvenile Gangs. (3-0) Credit 3 semester hours. This course is a comprehensive, in-depth coverage of historical, and contemporary reactions to juvenile gangs. Among the key areas to be covered will be the legal and social definitions of juvenile delinquency, the theories, the social context, and the institutional responses. An understanding of public policy and its impact on juvenile gangs will complete the course.

CRJS 2743. Law of Juvenile Justice. (3-0) Credit 3 semester hours. The course offers an examination of both substantive and procedural laws related to juvenile justice including criminal law, criminal procedure, evidence and family codes. The course also examines the institutions that enforce these laws and the principal actors involved. Finally, the course examines current trends and projections in juvenile justice.

CRJS 2813. Computer Applications in Criminal Justice. (3-0) Credit 3 semester hours. An introduction to the interface necessary for functioning effectively in the field of criminal justice. This includes a review of common software programs utilized by various criminal justice entities. Such programs include security databases, graphics, spreadsheets, data analyses and Web design as they may be utilized in specific criminal justice contexts.

CRJS 3313. Policy Analysis: Prevention and Control. (3-0) Credit 3 semester hours. A systematic examination of various crime control efforts involving primary and secondary prevention and the implementation of treatment programs.

CRJS 3443. Patrol Administration. (3-0) Credit 3 semester hours. A study of patrol functions, techniques, problems in personal safety, public relations, and crime prevention.

CRJS 3453. Traffic Administration. (3-0) Credit 3 semester hours. An analysis of state vehicle laws, routine traffic duties of a law enforcement officer such as accident investigation and reports.

CRJS 3623. Criminal Law I. (3-0) Credit 3 semester hours. A study of basic principles of substantive criminal law which include definitions of crimes against persons. Emphasis is on the Texas Penal Code as it pertains to murder, capital murder, voluntary homicide, criminal negligence, homicide, and sexual offenses. **(CRIJ 1310).

CRJS 3633. Criminal Law II. Credit 3 semester hours. A study of the basic principles of substantive criminal law which includes definitions of crime against property. Emphasis is on the Texas Penal Code related to arson, robbery, burglary, theft, forgery, embezzlement, and false pretense.

CRJS 3733. Juvenile Probation and Parole. (3-0) Credit 3 semester hours. A survey and analysis of juvenile probation aftercare. The course addresses the history and legal aspects of probation, role and responsibilities of the juvenile probation officer including pre-sentence investigation reports, conducting risk assessment, case planning, caseload supervision, probation officer safety, professional ethics, and trends in the field.

CRJS 3823. Criminal Justice Research Methods I. (3-0) Credit 3 semester hours. An introduction to research techniques such as formulating research questions, research design, and data collection methods such as surveys and case studies. The course also examines research ethics, locating data and navigating the special requirements for conducting research with protected populations such as incarcerated adults and juveniles. Students are also introduced to computer applications for research.
CRJS 3933. Minorities and the Criminal Justice System. (3-0) Credit 3 semester hours. An analysis of problems frequently encountered by minorities in the American justice system. This includes police-minority confrontations, an examination of possible bias throughout various levels of the justice system and the contributions of minority criminal justice practitioners, scholars, and activists to the development of the field of criminal justice.

CRJS 4323. Criminal Justice Management Principles. (3-0) Credit 3 semester hours. A study of basic criminal justice management theories and contemporary practices. This includes an examination of the unique behaviors, social skills and organizational techniques necessary for the criminal justice professional to be successful in various settings. Special attention is given to relating effectively with superiors, colleagues, subordinates and various members of the public impacted by criminal justice agencies.

CRJS 4416. Undergraduate Internship in Criminal Justice. (0-0) Credit 6 semester hours. A student may be required to satisfactorily complete a minimum of three month’s internship in an approved criminal justice setting preferably between the junior and senior year. This internship program is specifically designed to acquaint the student with practical aspects of criminal justice.

CRJS 4653. Constitutional Rights of the Criminally Accused. (3-0) Credit 3 semester hours. A study of the rights of the criminally accused according to the United States Constitution.

CRJS 4833. Seminar: Criminal Justice Research Methods II. (0-0) Credit 3 semester hours. Direction in performing an original research project. This involves an examination of how a choice of research question influences methodology. Basic statistical concepts and techniques for obtaining and analyzing large quantitative data sets will be reviewed. The course also examines techniques for conducting qualitative research and a familiarity with the latest qualitative research software packages.

CRJS 4913. Study of Criminal Justice Systems Abroad. (3-0) Credit 3 semester hours. An analysis of criminal justice programs and institutions outside of the United States.

CRJS 4923. Criminology. (3-0) Credit 3 semester hours. Focus will be a comprehensive analysis of the sociological, psychological and biological aspects of deviant human behavior.

CRJS 4943. Seminar: Contemporary Issues in Criminal Justice. (0-0) Credit 3 semester hours. Focus on recent significant and controversial issues which affect the administration of justice especially in law enforcement, the courts and corrections.

CRJS 4953. Seminar: Special Topics in Criminal Justice. (0-0) Credit 3 semester hours. This course has a revolving theme from semester to semester. Theme areas include but are not limited to policing, courts, corrections, ethics, women and crime, economics and crime, white collar crime, terrorism, consensual crime, victimology, alternative dispute resolution, media influences and special topics in juvenile justice. (May be repeated once for credit as the course theme changes). Department approval required.

CRJS 4963. Philosophy of Crime. (3-0) Credit 3 semester hours. An examination of religious and economic principles as they shape the definition and response to crime. This includes an analysis of specific concepts such as guilt, shame, care, love, desire and dignity on the evolution of deviance and crime across time and place in the western world.

CRJS 4983. Ethical Decision-Making in Criminal Justice. (3-0) Credit 3 semester hours. An overview of ethical theories, concepts, and issues. Illustrates the major unethical themes common in Criminal Justice management. Illustrates ethical dilemmas in policing, courts, prisons, community corrections, and crime prevention. The class works together to develop foundational ethical truths upon which to logically develop practice of moral decision making.

CRJS 4993. Independent Study. (0-0) Credit 3 semester hours. Readings, research or fieldwork on selected topics. Prerequisite: Consent of advisor.
**PSYC 1111. Introductory Seminar in Psychology.** (1-0) Credit 1 Semester hour. Introductory seminar designed to prepare psychology majors for the academic study of psychology. Required of all psychology majors. Corequisite: PSYC 1113. To be taken as a supplement to general psychology.

**PSYC 1113. General Psychology.** (3-0) Credit 3 semester hours. Introduction to fundamental psychological concepts derived from the application of scientific method to the study of behavior. **(PSYC 2301)**

**PSYC 2423. Developmental Psychology.** (3-0) Credit 3 semester hours. This course surveys the content, theories and methods used by developmental psychologists to study child and adolescent development. Topics covered will include conception, genetics, prenatal development and physical, motor, perceptual and social development from infancy to early adolescence. Theories of social and cognitive development will be covered. Prerequisite: PSYC 1113. **(PSYC 2308)**

**PSYC 2513. Psychology of Personality.** (3-0) Credit 3 semester hours. Personality theories, major concepts, methods and problems in the field of psychology. Analysis of theories of personality, with emphasis on personality development in the normal population. Evaluation of theories in the field of psychology. The development of personality as a pattern of strivings manifested in interpersonal relations. The coverage of constitutional, psychological, social and cultural factors in the development and adjustment of the normal individual. **(PSYC 2316)**

**PSYC 2613. Statistics for Psychology I.** (3-0) Credit 3 semester hours. Introduces basic statistical concepts and the relevance of statistics in the behavioral sciences. Explores the fundamentals of descriptive statistics, elementary probability and sampling methods, and distributions. The student will be introduced to computer applications such as Statistical Package for the Social Sciences. Prerequisite: MATH 1113, College Algebra, or above.

**PSYC 3223. Abnormal Psychology.** (3-0) Credit 3 semester hours. Disorders in personality and behavior are emphasized. Examines organic and functional types of psychological abnormality. Some emphasis is given to the ways in which personality may become disordered. Evidence and theories on causation are considered together with the challenges of treatment.

**PSYC 3233. Psychological Testing.** (3-0) Credit 3 semester hours. Study of human learning with particular attention to applications in the classroom. Includes laboratory experience in the use of the standardized school tests and practice in devising teacher-made tests. Emphasis is on original research literature and on individual projects. Prerequisite: PSYC 2613.

**PSYC 3433. Experimental Psychology.** (3-0) Credit 3 semester hours. Principles of experimental design, evaluation of research procedures, training in the use of standard apparatus, and repetition and extension of selected classical experiments in psychology. Prerequisite: nine hours of psychology classes.

**PSYC 3613. Statistics for Psychology II.** (3-0) Credit 3 semester hours. Applies statistical techniques in the field of psychology. Covers the use of large and small samples for statistical inference, linear and multiple regression, time series models and forecasting, nonparametric methods, the chi square test for cell probabilities, and contingency tables. Statistical packages for the social sciences will be studied in depth. Prerequisite: PSYC 2613.

**PSYC 3813. Applied Psychology.** (3-0) Credit 3 semester hours. Critical consideration of fields of applied psychology, including current research and application in the fields such as clinical, counseling, and industrial psychology. Prerequisites: PSYC 2613 and 3233.

**PSYC 4253. Introduction to Clinical Psychology.** (3-0) Credit 3 semester hours. A survey of counseling and interview techniques and use of psychological test findings in support of counseling procedures. Prerequisites: six hours of 2000 through 3000 level courses in psychology.
PSYC 4443. Research Methods in Psychology. (3-0) Credit 3 semester hours. Work in designing and carrying on research projects both in laboratory and in more life-like situations. The use and understanding of appropriate statistical procedures are emphasized. Prerequisite: PSYC 2613 and 9 additional hours of 2000-3000 level courses in Psychology.

PSYC 4523. Personality Dynamics. (3-0) Credit 3 semester hours. An advanced seminar focusing on special topics emphasizing the interaction of personality and situational determinants of behavior. Prerequisites: PSYC 2423 and PSYC 2513.


PSYC 4633. Sensation and Perception. (3-0) Credit 3 semester hours. Examines the sensory processes, the relationship between physical stimuli and sensory/perceptual experience, and perceptual phenomena. Prerequisite: PSYC 4613.

PSYC 4823. Readings and Research. (3-0) Credit 3 semester hours. Offered when demand warrants. Seminar or projects on various topics in psychology.

PSYC 4993. Independent Study. (3-0) Credit 3 semester hours. Readings, research, and/or fieldwork on selected topics. Prerequisite: consent of advisor.

** Transfer equivalent from Texas Community/Junior Colleges.
College of Nursing Courses

NURS 2553. Human Development: Life Span. (3-0) Credit 3 semester hours. The dynamic processes of co-development of the individual from conception to senescence in physical, sensory, intellectual, emotional, and social development. Pattern of self-development with focus on the interaction between and among individuals. Prerequisite: junior standing.

NURS 3001. Seminar I - Historical Perspective and Current Issues. (1-0) Credit 1 semester hour. This seminar will help the student develop as a professional by exploring the evolution of issues and trends using a historical perspective. Major issues and policies influencing health care will be included. Prerequisite or corequisite: NURS 3103.

NURS 3003. Introduction to Pharmacology. (3-0) Credit 3 semester hours. This course discusses basic concepts of pharmacology with emphasis on nursing implications. Prerequisite: NURS 3163, 3103, 3014.

NURS 3004. Concepts of Professional Nursing Practice. (4-0) Credit 4 semester hours. The philosophy and conceptual framework of the College of Nursing will serve as the foundation for exploring professional nursing, nursing roles, group dynamics, and the nursing process. Major issues and trends influencing health care delivery will be included. For Registered Nurses Only.

NURS 3014. Individual Health Assessment. (3-2) Credit 4 semester hours. This course introduces basic components and techniques of the health assessment within the framework of the nursing process. It focuses on data collection regarding the individual’s adaptation to internal and external factors within the environment. Emphasis is placed on the individual with high level wellness throughout the lifespan. Laboratory experiences include the application of health assessment skills. Prerequisite: admission to clinical studies.

NURS 3024. Basic Pathophysiology. (4-0) Credit 4 semester hours. This course explores the basic principles and concepts of human disease processes. Normal, compensatory, and pathological mechanisms related to physiological functioning of the individual in health and illness are discussed.

NURS 3102. Diagnostic Reasoning for the Health Professional. (2-0) Credit semester hours. This course will explore the diagnostic reasoning process. Emphasis will be placed on techniques for identifying and clustering cues, and formulating inferences in health care situations.

NURS 3103. Introduction to Professional Nursing. (3-0) Credit 3 semester hours. This theory course introduces the philosophy, objectives and curriculum framework using adaptation as the organizing concept. The nursing process is presented in depth. Additional curriculum concepts and theories that serve as a basis for planning and implementing nursing care are introduced. Prerequisite: Admission to Clinical Studies.

NURS 3163. Basic Concepts of Nursing. (3-0) Credit 3 semester hours. This theory course introduces basic concepts utilized in health promotion and minor health alterations. Emphasis is placed on identifying basic human needs and understanding principles guiding nursing practice. Prerequisite or corequisite: NURS 3103, NURS 3014. Corequisite: NURS 3263.

NURS 3173. Adult Health Nursing I. (3-0) Credit 3 semester hours. This theory course focuses on the nursing care of adult clients experiencing moderate to major alterations from health. Nursing care of clients with acute and chronic health alterations is explored. Prerequisite or corequisite: NURS 3003, 3024. Corequisite: NURS 3273. Prerequisite: NURS 3163, 3263, 3103, 3014.

NURS 3183. Nursing of the Childbearing Family. (3-0) Credit 3 semester hours. This theory course focuses on childbearing using a family-centered approach to nursing care. Nursing’s role in education, and promotion of positive family health goals in childbearing is explored. Prerequisite: NURS 3173, 3024, 3003. Corequisite: NURS 3282.
NURS 3193. Child Health Nursing. (3-0) Credit 3 semester hours. This theory course focuses on the provision of family centered child care. Emphasis is placed on the nursing management of children and families in health promotion and adaptation to illness. Prerequisite: NURS 3173, 3024, 3003. Corequisite: NURS 3292.

NURS 3263. Basic Concepts of Nursing Practicum. (0-12) Credit 3 semester hours. This clinical practicum provides an opportunity for the application of concepts and principles basic to nursing practice. Experiences are provided in a variety of agencies for the utilization of the nursing process in caring for individuals with health promotion needs and minor to moderate health alterations. Corequisite: NURS 3163.

NURS 3273. Adult Health Nursing I Practicum. (0-12) Credit 3 semester hours. This clinical practicum course provides an opportunity for students to use the nursing process to provide care for clients with acute and chronic health alterations. Clinical experiences are provided in a variety of acute care settings. Corequisite: NURS 3173.

NURS 3282. Nursing of the Childbearing Family Practicum. (0-8) Credit 2 semester hours. This clinical practicum provides an opportunity for the student to apply the nursing process in the education, assistance, and promotion of positive health goals with families during the childbearing process. Varied family structures are included in the clinical experience. Corequisite: NURS 3183.

NURS 3292. Child Health Nursing Practicum. (0-8) Credit 2 semester hours. This clinical practicum provides an opportunity for students to apply concepts and principles of child health nursing in a variety of health care settings. Implementation of care for children from infancy to adolescence occurs within the framework of this course. Corequisite: NURS 3193.

NURS 4001. Seminar II - Ethical/Legal Issues in Nursing. (1-0) Credit 1 semester hour. This seminar explores legal and ethical issues using a decision making framework to guide the practice of nursing. Prerequisite: NURS 3001.

NURS 4011. Seminar III - Professional Roles and Trends. (1-0) Credit 1 semester hour. This seminar examines trends and issues related to nursing practice. The transition of the nursing student to a practitioner of professional nursing will be the major focus of the course. Prerequisite: NURS 4001.

NURS 4013. Introduction to the Research Process. (3-0) Credit 3 semester hours. This course discusses basic research methodology and its application to the practice of nursing. Computer aids to research are considered. Prerequisite: Completion of Semester II.

NURS 4032. Seminar IV Trends and Issues in Professional Nursing. (2-0) Credit 2 semester hours. This seminar explores legal and ethical issues using a decision making framework to guide the practice of nursing. Major policies influencing health care and professional nursing will be included. For Registered Nurses Only.

NURS 4123. Special Topics in Nursing. (3-0) Credit 3 semester hours. The study of various areas in nursing and health care as they relate to contemporary social issues. Course may be repeated for credit when topics vary. Prerequisite: Consent of instructor.

NURS 4163. Mental Health Nursing. (3-0) Credit 3 semester hours. This clinical practicum course focuses on the application of the nursing process when providing health, promotion, protection, and restoration care for culturally diverse individuals, groups and families at varying levels of risk for psychological impairment in a variety of clinical settings. Prerequisite: NURS 3193, 3183. Corequisite: NURS 4262.

NURS 4173. Community Health Nursing. (3-0) Credit 3 semester hours. This theory course focuses on the synthesis of public health concepts within a preventive framework to promote and maintain the health

NURS 4183. Adult Health Nursing II. (3-0) Credit 3 semester hours. This theory course emphasizes the utilization of the nursing process in providing care for clients experiencing major physiological deviations from wellness. Nursing care of clients with multi-system complex health alterations is explored. Prerequisite: NURS 3183, 3193. Corequisite: NURS 4282.

NURS 4192. Nursing Leadership and Management. (2-0) Credit 2 semester hours. This theory course focuses on concepts and principles of leadership and management. Functions of beginning nurse management roles are explored. Prerequisite: NURS 4183, 4163, 4013. Prerequisite or corequisite: NURS 4173, 4272, 4292.

NURS 4262. Mental Health Nursing Practicum. (0-8) Credit 2 semester hours. This clinical practicum course focuses on the application of the nursing process when providing health, promotion, protection, and restoration care for culturally diverse individuals, groups and families at varying levels of risk for psychological impairment in a variety of clinical settings. Corequisite: NURS 4163.

NURS 4272. Community Health Nursing Practicum. (0-8) Credit 2 semester hours. This clinical practicum provides the student an opportunity to synthesize the nursing process with public health concepts in the nursing care of individuals, families, groups and communities with a focus on preventive nursing care. Corequisite: NURS 4173.

NURS 4282. Adult Health Nursing II Practicum. (0-8) Credit 2 semester hours. This clinical practicum course provides an opportunity for students to apply the nursing process when caring for client with multisystem complex health alterations. Clinical experiences in a variety of settings are used. Corequisite: NURS 4183.

NURS 4292. Nursing Leadership and Management Practicum. (0-8) Credit 2 semester hours. This clinical practicum provides an opportunity for the transition of nursing students into professional nursing practice. Students will apply leadership and management principles and concepts to patient care coordinator of care, and functions of healthcare organizations. Corequisite: NURS 4192.

NURS 4313. Nursing and Cultural Diversity. (3-0) Credit 3 semester hours. This course examines application of the nursing process as it relates to selected cultures. The primary concerns will be diverse communication systems and cultural norms within the health care delivery system. Prerequisite: Advisor Consent.

NURS 4343. Group Dynamics and the Nursing Process. (3-0) Credit 3 semester hours. This course focuses on the understanding of group dynamics and its impact on nursing practice. An exposure to small-group theory and research, a weekly sensitivity training group, and clinical utilization of theory in a nursing care setting are integral parts of the course. Prerequisite: Advisor Consent.

NURS 4353. Advanced Nursing Concepts. (3-0) Credit 3 semester hours. This course explores advanced clinical and theoretical issues relating to nursing practice. Prerequisite: Advisor Consent.

NURS 4363. Human Sexuality: Implications for Nursing. (3-0) Credit 3 semester hours. This course explores the sexual needs of patients as these needs relate to the provision of nursing care for individuals who are ill or disabled. Prerequisite: Advisor Consent.

NURS 4373. Nursing and the Aged. (3-0) Credit 3 semester hours. This course examines the utilization of the nursing process with aged clients. Major problems of aging are emphasized. Prerequisite: Advisor Consent.
NURS 4383. Patient Education and Nursing Practice. (3-0) Credit 3 semester hours. This course discusses patient education relative to the prevention of illness and to the maintenance and restoration of health. Prerequisite: Advisor Consent.

NURS 4403. Nursing Process Seminar. (3-0) Credit 3 semester hours. This course culminates professional socialization by focusing on the integration of behaviors essential in the transition from nursing student to professional nursing. Comprehensive review and evaluation of essential concepts and principles within the professional knowledge base including adult health, maternal/child, mental health, community health, and management. Prerequisite: Completion of Semester IV.

NURS 4991-4992-4993. Independent Study. (1, 2, or 3-0) Credit 1, 2, or 3 semester hours. Selected topics are explored through reading, research, and/or field work. Prerequisite: Advisor Consent.