3240. Family Communication and Collaboration for Exceptional Learners. 3 hours. (2;1). Analysis of collaboration and communication models and strategies used in working with families, caregivers and professionals concerned about students with exceptionalities. Focus on the changing definition of family, community resources, advocacy groups, political forces, legal mandates and other factors are addressed that may impact students and their families. 15 hours per term/semester of field-work is arranged.

3300. Special Education Practicum I. 3 hours. (1;6) Practical experience in field sites (90 hours: 70 hours field experience and 20 hours classroom). Cognitive, affective and psychomotor objectives for observing behaviors, assisting in planning for instruction and participating in diagnostic processes. Professional development is emphasized. Prerequisite(s): 60 hours of undergraduate credit, overall GPA 2.75, all sections of THEA must be passed.

3410. Mental Retardation: Characteristics, Identification and Intervention. 3 hours. An examination is made of the typical characteristics associated with mental retardation and identification procedures utilized. Emphasis is on the development of appropriate intervention programs. Prerequisite(s): EDSP 3210 and 3300 or consent of department.

3420. Behavioral Disorders: Characteristics, Identification and Intervention. 3 hours. An examination is made of the typical characteristics associated with severe behavior problems and procedures for identification. Emphasis is on the development of appropriate intervention programs. Prerequisite(s): EDSP 3210 and 3300 or consent of department.

4110. Student Teaching in Special Education. 3 hours. Teaching under supervision. See "Student Teaching Program" under College of Education section in the *Undergraduate Catalog* for details. Prerequisite(s): EDSP 3210, 3220, 3300, 3410, 3420, 4320, 4330 and 4340; or consent of department. Pass/no pass only.

4320. Educational Assessment and Evaluation of Exceptional Learners. 3 hours. Examines a variety of assessment and evaluation strategies that are appropriate for special and general education settings. Knowledge of basic testing procedures and terminology as related to the exceptional learner. Interpretation and utilization of test data in developing individual education plans. Introduction to curriculum-based assessment. Field experiences include administration of academic and teacher-made assessments. Prerequisite(s): EDSP 3210 or equivalent and EDSP 3420.

4330. Advanced Educational Strategies for Exceptional Learners. 3 hours. Advanced educational strategies and interventions that promote academic performance of exceptional learners across a variety of settings and situations. Includes an emphasis on instructional use of computers and technology in the classroom. Prerequisite(s): EDSP 3210 or equivalent and EDSP 3240.

4340. Classroom and Behavioral Management Strategies for Exceptional Learners. 3 hours. Approaches to behavioral management of exceptional learners across a variety of educational settings. Implementation of individualized techniques including applied behavioral analysis, as well as larger-group strategies, to foster positive behavioral, social and emotional growth. Special attention to the development of behavioral intervention plans and positive behavioral supports for students with challenging behaviors. Prerequisite(s): EDSP 3210 or equivalent and EDSP 3240.

4350. Strategies to Support Diverse Learners in General Education. 3 hours. Examination of the roles of various professionals in the successful inclusion of students with disabilities in the general education classroom. Focus on consultation models, practices and principles with an emphasis on collaboration, cooperative learning and inclusion. Provides and overview of assessment techniques applicable for all learners in the general education classroom. Prerequisite(s): EDSP 3210, or equivalent.

4360. Transition Education and Services for Exceptional Learners. 3 hours. Transition education and services for individuals with disabilities across the life span with emphasis on the post-secondary years. Examines the theory and practice of transition planning from school to community living, post-secondary education and employment. Legislative history and practical applications of skills such as transition assessment, job development and job placement are emphasized. Prerequisite(s): EDSP 3210, 3240 and 4320.

4900-4910. Special Problems. 1–3 hours each.

4951. Honors College Capstone Thesis. 3 hours. Major research project prepared by the student under the supervision of a faculty member and presented in standard thesis format. An oral defense is required of each student for successful completion of the thesis. Prerequisite(s): completion of at least 6 hours in honors courses; completion of at least 12 hours in the major department in which the thesis is prepared; approval of the department chair and the dean of the school or college in which the thesis is prepared; approval of the dean of the Honors College. May be substituted for HNRS 4000.

Electrical Engineering

Electrical Engineering, EENG

1910. Project I: Learning to Learn. 2 hours. Learning to Learn (L2L) is based on sound cognitive and pedagogical techniques that improve learning outcomes and make lifelong learning habitual. Students develop an understanding of how engineering and computer science are learned and how we can facilitate and encourage the lifelong learning process. Topics covered include consciousness and self-awareness, metacognition, learning styles, memory, language, reading, writing, problem solving, creativity and biology of learning.

1920. Project II: Introduction to Electrical Engineering. 2 hours. Engineering is the place where science, business and society intersect, so engineering ethics provides an interesting way to study the relationships among these three. This project course focuses on the profession of engineering, its role in business and society, and the ethical issues that engineers face. Class involves case studies, discussions, group projects, reading, writing response papers and exams; topics include international concerns, risk safety, and environmental issues, employee loyalties and professional responsibility, professional organizations and codes of conduct.

2610. Circuit Analysis. 3 hours. Introduction to electrical elements, sources and interconnects. Ohm's law, Kirchoff's law, superposition and Thevenin's theorems are introduced. The resistive circuit, OP Amp, RL, RC circuits, Sinusoidal analysis. Prerequisite(s): MATH 1720 and PHYS 2220/2240.

2620. Signals and Systems. 3 hours. Elementary concepts of continuous-time and discrete-time signals and systems. Linear time-invariant (LTI) systems, impulse response, convolution, Fourier series, Fourier transforms and frequency-domain analysis of LTI systems. Laplace transforms, z-transforms and rational function descriptions of LTI systems. Prerequisite(s): EENG 2610; MATH 3310 or MATH 2730. (Same as CSCE 3010.)

2710. Digital Logic Design. 3 hours. Digital computers and digital information processing systems; Boolean algebra, principles and methodology of logic design; machine language programming; register transfer logic; microprocessor hardware, software and interfacing; fundamentals of circuits and systems; computer organization and control; memory systems, arithmetic unit design. Prerequisite(s): MATH 1720.

2900. Special Problems. 1–3 hours. Individualized instruction in theoretical or experimental problems in electrical engineering. For elective credit only. Prerequisite(s): approval of supervisory faculty member. May be repeated for credit.

2910. Project III: Digital System Design. 2 hours. Digital system design projects that provide students substantial experience in logic analysis, design, logic synthesis in VHDL, and testing. Project documentation including all the phases of project cycle from requirement analysis to testing as well as a project presentation providing the students an opportunity to enhance their communication and presentation skills, are essential components of this course. Instructor may choose to include a mini-project for breadboard implementation with discrete components as a part of this course. Prerequisite(s): EENG 2610. May be repeated for credit with consent of instructor.

2920. Project IV: Analog Circuit Design. 2 hours. Students learn to use basic electrical engineering lab equipment, to build and test simple circuits in the lab and to design and analyze circuits using CAD software tools. Includes simulation and design experiments and a final comprehensive design project to complement the circuit analysis course. Prerequisite(s): EENG 2710. May be repeated for credit with consent of instructor.

3410. Engineering Electromagnetics. 3 hours. Electromagnetic theory as applied to electrical engineering: vector calculus; electrostatics and magnetostatics; Maxwell's equations, including Poynting's theorem and boundary conditions; uniform plane-wave propagation; transmission lines – TEM modes, including treatment of general, lossless line, and pulse propagation; introduction to guided waves; introduction to radiation and scattering concepts. Prerequisite(s): EENG 2610, MATH 2700, MATH 3310 and PHYS 2220.

3510. Electronics I (Devices and Materials). 3 hours. Introduction to contemporary electronic devices, terminal characteristics of active semiconductor devices, and models of the BJT and MOSFET in cutoff and saturation region are introduced. Incremental and DC models of junction diodes, bipolar transistors (BJTs), and metal-oxide semiconductor field effect transistors (MOSFETs) are studied to design single and multistage amplifiers. Prerequisite(s): EENG 2910.

3520. Electronics II. 3 hours. Concepts, analysis and design of electronic circuits and systems are introduced. Topics include principle of DC biasing, small signal analysis, frequency response, feedback amplifiers, active filters, non-linear op-amp applications and oscillators. Prerequisite(s): EENG 3510.

3710. Computer Organization. 3 hours. Principles of computer system organization, instruction sets, computer arithmetic, data and control paths, memory hierarchies. Prerequisite(s): CSCE 1030 and EENG 2710. (Same as CSCE 2610.)

3810. Communications Systems. 3 hours. Introduction to the concepts of transmission of information via communication channels. Amplitude and angle modulation for the transmission of continuous-time signals. Analog-to-digital conversion and pulse code modulation. Transmission of digital data. Introduction to random signals and noise and their effects on communication. Optimum detection systems in the presence of noise. Prerequisite(s): EENG 2620 and MATH 1780 or equivalent. (Same as CSCE 3020.)

3910. Project V: DSP System Design. 2 hours. To study basic theory and applications of modern digital signal processing, to learn basic theory of real-time digital signal processing, and to develop ability to implement and simulate digital signal processing algorithms using MATLAB and on real-time DSP platform. Prerequisite(s): EENG 2620, 2910 and 2920.

3920. Project VI: Modern Communication System Design. 2 hours. Students are required to design electronic communication systems with electronic devices such as MOS transistors, capacitors and resistors. Topics include LC circuits and oscillators, AM modulation, SSB communications and FM modulation. Prerequisite(s): EENG 3510, simultaneously taking EENG 3520.

4010. Technical Elective I: Advanced Topics. 3 hours. Materials taught in the advanced topic I are decided by the instructor each term/semester, reflecting the state-of-the-art technology progress in electrical engineering. Prerequisite(s): to be decided by the instructor.

4020. Technical Elective II: Advanced Topics. 3 hours. Materials taught in the advanced topic II are decided by the instructor each term/semester, reflecting the state-of-the-art technology progress in electrical engineering. Prerequisite(s): to be decided by the instructor.

4710. VLSI Design. 3 hours. Basic knowledge of various aspects of modern VLSI design. They include MOS transistors, circuit design and analysis at transistor level, logic and digital sub-system and analysis, VLSI architecture, hardware description languages (VHDL, Verilog-HDL), VLSI testing and VLSI physical design (layout, floor planning, placement and routing), design examples using CAD tools and design projects. Prerequisite(s): EENG 2710 or equivalent. (Same as CSCE 4730.)

4810. Computer Networks. 3 hours. Introduction to data communication; asynchronous, synchronous, networks, TCP/IP and current technology. Prerequisite(s): EENG 3810 and MATH 1780.

4900. Special Problems in Electrical Engineering. 1–3 hours. Individualized instruction in theoretical or experimental problems in electrical engineering. For elective credit only. Prerequisite(s): approval of supervisory faculty member. May be repeated for credit.

4910. Project VII: Senior Design I. 3 hours. (0;0;3) Designing a wireless communication system or another electrical engineering system based on CADENCE or other software. This project aims to solve a practical engineering problem that meets ABET design criteria. Taken individually. Prerequisite(s): EENG 3810, 3910 and 3920; consent of instructor.

Courses of Instruction

4920. Cooperative Education in Electrical Engineering. 1–3 hours. Supervised field work in a job directly related to the student's major field of study or career objective. Prerequisite(s): junior- or senior-level standing in electrical engineering. May be repeated for credit.

4951. Honors College Capstone Thesis. 3 hours. Major research project prepared by the student under the supervision of a faculty member and presented in standard thesis format. An oral defense is required of each student for successful completion of the thesis. Prerequisite(s): completion of at least 6 hours in honors courses; completion of at least 12 hours in the major department in which the thesis is prepared; approval of the department chair and the dean of the school or college in which the thesis is prepared; approval of the dean of the Honors College. May be substituted for HNRS 4000.

4990. Project VIII: Senior Design II. 3 hours. (0;0;3) The capstone senior design course is a comprehensive electrical engineering design course. Students may choose a design topic in VLSI, communications, Signal Processing or any other relevant electrical engineering area. Substantial design work is required for passing this course. Taken individually. Prerequisite(s): consent of instructor.

Electronics Engineering Technology
see Engineering Technology

Elementary Education
see Teacher Education and Administration

Emergency Administration and Planning
see Public Administration

Engineering Technology

Construction Engineering Technology, CNET

1160. Construction Methods and Materials. 3 hours. (2;3) Introduction to the materials, systems, methods and procedures of building construction.

2180. Construction Methods and Surveying. 4 hours. (3;3) Contemporary methods and materials used in the construction industry; nature, use and characteristics of materials; construction methodology, application and sequencing in the building process. Surveying principles, instruments, measurements and calculations fundamentals of surveying for building construction; survey drawings and mapping. Prerequisite(s): CNET 1160.

2300. Architectural Drawing. 2 hours. (1;3) Emphasizes architectural details; home planning. Prerequisite(s): CNET 1160.

2900. Special Problems. 1–4 hours. Individualized instruction in theoretical or experimental problems. Prerequisite(s): consent of instructor.

3150. Construction Contract Documents. 2 hours. Interpretation of construction drawings; architectural, structural, mechanical, electrical and landscaping documents; development, interpretation and implementation of specifications and other construction documents. Prerequisite(s): CNET 2180.

3160. Construction Cost Estimating. 3 hours. (2;3) Procedures, techniques and systems of construction cost estimating. Includes work classification, quantity detailing, specification interpretation and bid preparation. Prerequisite(s): CNET 1160 and 2300.

3190. Construction Scheduling. 3 hours. (2;3) Study of construction scheduling utilizing current techniques including Critical Path Method (CPM), the Precedence Method (PM), the Program Evaluation and Review Technique (PERT) and a probabilistic method. Prerequisite(s): CNET 3160.

3410. Occupational Safety and Liability. 3 hours. Study of basic concepts of accident prevention, safety education, economic impact and environmental hazard control. Includes OSHA regulations and other regulations as they relate to the employer, the employee and the public.

3430. Structural Analysis. 3 hours. Analysis of continuous structures using slope-deflection, conjugate-beam, and virtual work methods. Force and stiffness methods of analysis are applied to truss and frame structures. Relevant computer applications are applied. Prerequisite(s): ENGR 2332.

3440. Steel Structures. 3 hours. Principles, analysis and methodologies for conceptual and detailed design of steel structures. Emphasis on the role of mechanics in modern structural engineering design specifications with a focus on load and resistance factor design. Topics include behavior and design of hot-rolled and cold-formed steel, connections, members frames and advanced analysis techniques. Prerequisite(s): CNET 3430.

3460. Soils and Foundations. 3 hours. (2;3) Study of the properties of subsurface materials and the principles of subsurface construction. Topics include soil classification and testing, soil mechanics, and foundation systems. Prerequisite(s): CNET 2180 and ENGR 2332.

3480. Structural Design with Concrete, Timber and other Materials. 3 hours. (2;3) Review of current requirements and techniques for design of modern structures using materials such as reinforced concrete, timber, engineered brick and concrete masonry. Relevant design specifications and criteria are included. Prerequisite(s): CNET 2180 and 3430.

4170. Construction Management. 3 hours. Planning, organizing, scheduling and managing construction projects. Includes preconstruction planning, cost and quality control, materials procurement, subcontractor management, start-up and close-out. Prerequisite(s): CNET 3160.

4180. Problems in Project Management. 3 hours. Construction project management simulation involving bid preparation, cost control, scheduling, contract preparation, construction documents interpretation, punchlist management and project evaluation. Prerequisite(s): CNET 4170.

4620. Advanced Design in Cold-Formed Steel Structures. 3 hours. (2;3) Study of the theories of design and behavior of cold-formed/light gauge steel structural members, connections and systems. Relevant design specifications and computer applications are included. Prerequisite(s): CNET 3420 and 3440.