ELECTRICAL ENGINEERING (EE)

NOTE: All prerequisites for Electrical Engineering (EE) courses must be completed with a grade of "C-" or better.

Electrical Engineering (EE) Courses

EE 1322. Introduction to Electrical and Computer Engineering. (2-1) 2 Credit Hours. (TCCN = ENGR 1201)
Prerequisite: MAT 1073. An introduction to the electrical and computer engineering profession with emphasis on technical communication, team-based engineering design, professional and ethical responsibilities, contemporary issues, and software tools. One hour of recitation session per week. (Formerly EE 1323. Credit cannot be earned for both EE 1323 and EE 1322.) Course Fees: LRE1 $25; STSE $20; DL01 $50.

EE 2213. Electric Circuits and Electronics. (3-0) 3 Credit Hours. (TCCN = ENGR 2305)
Prerequisite: PHY 1963 and completion of or concurrent enrollment in EGR 3423. Principles of electrical circuits and systems. Basic circuit elements (resistance, inductance, mutual inductance, capacitance, independent and dependent controlled voltage, and current sources). Topology of electrical networks; Kirchhoff's laws; node and mesh analysis; DC circuit analysis; operational amplifiers; transient and sinusoidal steady-state analysis; AC circuit analysis; first- and second-order circuits; application of Laplace transforms to the analysis of RLC circuits. (Formerly EE 2214. Credit cannot be earned for both EE 2213 and EE 2214.) Generally offered: Fall, Spring. Course Fee: LRE1 $25; STSE $30; DL01 $75.

EE 2423. Electric Network Theory. (3-1) 3 Credit Hours.
Prerequisite: EE 1322 and completion of or concurrent enrollment in EGR 3423 and PHY 1963. Basic network principles; simple resistive circuits; steady state responses to DC and AC signals; node-voltage and mesh-current analysis; source transformations and superposition; Thevenin and Norton equivalents; natural and step transient responses of first- and second-order circuits; Laplace transform in circuit analysis; and use of circuit simulation software to solve network problems. One hour of problem solving recitation per week. Generally offered: Fall, Spring, Summer. Course Fee: LRE1 $25; STSE $30; DL01 $75.

EE 2511. Logic Design Laboratory. (1-2) 1 Credit Hour.
Prerequisite: Completion of or concurrent enrollment in EE 2513. Introduction to digital design techniques. Implementation of basic digital logic and hardware; combinational circuits, flip-flops, registers, sequential circuits and state machines. Generally offered: Fall, Spring, Summer. Course Fee: LRE1 $20; STSE $10.

EE 2513. Logic Design. (3-1) 3 Credit Hours.
Prerequisite: EE 1322 and completion of or concurrent enrollment in CS 2073 or CPE 2073. Number systems, Boolean algebra, combinational and sequential circuit design, and minimization and implementation. One hour of problem solving recitation per week. Generally offered: Fall, Spring. Course Fee: LRE1 $25; STSE $30; DL01 $75.

EE 2583. Microcomputer Systems I. (3-1) 3 Credit Hours.
Prerequisite: EE 2513, and CS 2073 or CPE 2073. Introduction to assembly and C language programming; architecture, peripherals, operating system interfacing principles, and development tools; and software documentation techniques. One hour of recitation per week. (Formerly EE 3463. Credit can be earned for only one of the following: EE 3463 or EE 2583.) Generally offered: Fall, Spring, Summer. Differential Tuition: $165. Course Fee: L001 $30.

EE 3113. Electrical and Computer Engineering Laboratory I. (1-6) 3 Credit Hours.
Prerequisites: EE 2423, EE 2513, and completion of or concurrent enrollment in EE 3313. Introduction to basic measurement equipment and techniques; use of circuit simulation tools; comparison to empirical performance of simple circuits using discrete devices and circuits; simple subsystem circuit design; introduction to automated data acquisition; and laboratory technical communication. Generally offered: Fall, Spring. Differential Tuition: $165. Course Fees: L001 $30; DL01 $75.

EE 3213. Electromagnetic Engineering. (3-1) 3 Credit Hours.
Prerequisite: EGR 2313 and PHY 1963. Review of vector calculus, electrostatics, magnetostatics, electrodynamics, electromagnetic waves, dielectrics, boundary conditions, and RLC circuits. Selected other topics include wave guides, anisotropic crystal optics, transmission lines, fiber optics, reflection and refraction, and special relativity. One hour of problem solving recitation per week. Generally offered: Fall, Spring. Differential Tuition: $165. Course Fee: DL01 $75.

EE 3223. C++ and Data Structures. (3-1) 3 Credit Hours.
Prerequisite: EE 2583 (or EE 3463 in previous catalogs). Review of C++ non-OOP concepts, object-oriented programming, inheritance, virtual functions and polymorphism, and operator overloading. In-depth study of data structures including stacks, queues, linked lists, trees, binary trees, and their application to binary search trees and sorting. One hour of problem solving recitation per week. Generally offered: Fall. Differential Tuition: $165. Course Fee: DL01 $75.

EE 3233. Systems Programming for Engineers. (2-3) 3 Credit Hours.
Prerequisite: EE 3223. Programming low-level interfaces of Linux using Python; learning basics of Linux utilities and Python; interfacing to services in the underlying Linux kernel using Python's system programming tools; support for running programs covering threads, process forks, processing files and directories, and networking with pipes, socket, and queues in Python. Two hours of lecture, one hour of recitation, and one hour of programming lab per week. Differential Tuition: $165. Course Fee: DL01 $75.

EE 3313. Electronic Circuits I. (3-1) 3 Credit Hours.
Prerequisite: EE 2423. P-N junctions, diode circuits, BJTs and FETs, application to digital and analog circuits, and use of circuit simulation software to solve simple circuits. One hour of problem solving recitation per week. Generally offered: Fall, Spring, Summer. Differential Tuition: $165.

EE 3323. Electronic Devices. (3-0) 3 Credit Hours.
Prerequisites: CHE 1103 and EE 2423. Introduction to semiconductor materials, fundamentals of quantum mechanics and carrier phenomena, operating principles of P-N junction diodes, metal-semiconductor contacts (Schottky diodes), bipolar-junction transistors, field-effect transistors, photodetectors and optoelectronic devices. Generally offered: Fall, Spring. Differential Tuition: $165.

EE 3413. Analysis and Design of Control Systems. (3-1) 3 Credit Hours.
Prerequisite: EE 3423 for electrical engineering majors; EGR 2513 and EE 2213 for mechanical engineering majors. Modeling, analysis, and design of linear automatic control systems; time and frequency domain techniques; stability analysis, state variable techniques, and other topics. Control systems analysis and design software will be used. One hour of problem solving recitation per week. Generally offered: Fall, Spring, Summer. Differential Tuition: $165. Course Fee: DL01 $75.

EE 3423. Mathematics in Signals and Systems. (3-1) 3 Credit Hours.
Prerequisite: EE 2423. Topics include: introduction and basic concepts, mathematical representation of signals and systems, graphs of functions, elements of complex numbers, partial fraction expansion, properties of basic functions (including sinusoidal and complex exponential signals), phasors, time and amplitude transformations of signals, properties of signals and classification of systems, Dirac delta function, step function, convolution integral, impulse response, frequency response function for linear time invariant systems, differential-equation models, response to real sinusoidal signals, ideal filters, periodic functions and Fourier series, continuous-time Fourier transform, energy and power spectral density functions, Laplace transforms in linear system analysis, differential equations with constant coefficients, transfer functions. (Formerly EE 3424. Credit cannot be earned for both EE 3424 and EE 3423.) Differential Tuition: $165. Course Fee: DL01 $75.

EE 3513. Electromechanical Systems. (3-0) 3 Credit Hours.
Prerequisite: PHY 1963. Principles of electromechanical energy conversion, polyphase circuits, dynamic analysis and simulation of energy-transfer devices, and power devices. Generally offered: Fall, Spring. Differential Tuition: $165. Course Fee: DL01 $75.

EE 3523. Discrete Signals and Systems. (3-0) 3 Credit Hours.
Prerequisite: EE 3423. Topics include: time and frequency characteristics of signals and systems, sampling, discrete-time convolution, applications of discrete-time Fourier and Z-transforms to systems, MATLAB exercises. (Formerly titled "Signals and Systems II.") Generally offered: Fall, Spring. Differential Tuition: $165.

EE 3533. Probability and Random Signals. (3-0) 3 Credit Hours.
Prerequisite: EE 3423. Probability axioms, conditional probability, Bayes' theorem, and independence. Probability models for a single discrete or continuous random variable: cumulative distribution function (CDF), probability mass function (PMF), probability density function (PDF), expected value, variance, and standard deviation. Specific families of random variables, such as Bernoulli, geometric, binomial, uniform, exponential, and Gaussian random variables. Models for multiple random variables: joint CDF, joint PMF, and joint PDF; marginal PMF and marginal PDF; random variable independence, covariance, and correlation. Theorems pertaining to sequences of random variables, such as the Central Limit Theorem and the Law of Large Numbers. Conditional probability models. Introduction to random signals. Applications in Electrical and Computer Engineering provided throughout the semester. (Formerly titled: "Probability and Stochastic Processes.") Generally offered: Fall, Spring. Differential Tuition: $165. Course Fee: DL01 $75.

EE 3563. Digital Systems Design. (2-3) 3 Credit Hours.
Prerequisite: EE 2513. Introduction to switching theory; design of complex combinational and sequential circuits; analysis of hazards and fault detection, location, and tolerance; and design and verification of complex circuitry using schematic entry, functional modeling, and mixed-mode simulation. Generally offered: Fall. Differential Tuition: $165. Course Fee: DL01 $75; L001 $30.

EE 4113. Electrical and Computer Engineering Laboratory II. (1-6) 3 Credit Hours.
Prerequisites: EE 3113, and completion of or concurrent enrollment in either EE 3563 for computer engineering majors or EE 4313 for electrical engineering majors. Complex electronic circuit subsystem design, improving measurement system performance, impact of circuit parasitics, signal integrity, electromagnetic interference, thermal analysis, printed circuit board layout, and technical communication. Generally offered: Fall, Spring. Differential Tuition: $165. Course Fees: L001 $30; DL01 $75.

EE 4123. Power Engineering Laboratory. (1-6) 3 Credit Hours.
Prerequisite: EE 3113 and completion of or concurrent enrollment in EE 4753 and EE 4763. Power Electronics Laboratory to analyze and test DC-DC converters, voltage mode and current mode control. Power Systems Simulation Laboratory to analyze and design power systems that include power flow, transmission line, transient and fault analysis. Differential Tuition: $165.

EE 4243. Computer Organization and Architecture. (2-3) 3 Credit Hours.
Prerequisite: EE 2583 (or EE 3463 in previous catalogs). Design of advanced state machines and computer systems, and processor design using computer-assisted design and analysis tools. Generally offered: Spring. Differential Tuition: $165. Course Fee: DL01 $75.

EE 4313. Electronic Circuits II. (3-0) 3 Credit Hours.
Prerequisite: EE 3313 and concurrent enrollment in or completion of EE 3323. Multiple transistor circuits, feedback and frequency response analysis, operational amplifier analysis and design, and introduction to integrated circuit design and analysis. Design of analog and digital circuits, and use of circuit simulation software to analyze complex circuits. Generally offered: Fall, Spring, Summer. Differential Tuition: $165.

EE 4323. Dielectric and Optoelectronic Engineering Laboratory. (2-4) 3 Credit Hours.
Prerequisite: EE 3213 and EE 3323. Principles of dielectric devices and optical components and systems. May be repeated for credit when topics vary. Topic 1 (generally offered in Spring): Capacitance, resistance, and inductance device evaluations, impedance frequency and temperature spectrum analysis, characterization microwave materials, electromechanical coupling and piezoelectric devices, diffraction optics, optical spectrometry and ellipsometry. Topic 2 (generally offered in Fall): Lasers, photodetectors, laser interferometer and high speed vibrometer, evaluation of electrooptic and nonlinear optical devices, characterization of sensors, actuators, and energy conversion materials, X-ray diffraction, atomic force microscopy, additive manufacturing of micro- and nano-electronics. Differential Tuition: $165. Course Fee: DL01 $75.

EE 4443. Discrete-Time and Computer-Controlled Systems. (3-0) 3 Credit Hours.
Prerequisite: EE 3413 and completion of or concurrent enrollment in EE 3523. Sampled-data techniques applied to the analysis and design of digital control systems, stability criteria, compensation, and other topics. Generally offered: Fall. Differential Tuition: $165.

EE 4463. Introduction to Machine Learning. (3-0) 3 Credit Hours.
Prerequisite: EE 3533. Introduction to concepts of inference and learning. Introduction to concepts of regression and classification: linear and nonlinear regression; linear discriminant analysis, logistic regression, and support vector machines. Introduction to dimensionality reduction and clustering. Introduction to artificial neural networks. Differential Tuition: $165.

EE 4493. Electric Distribution System Modeling and Analysis. (3-0) 3 Credit Hours.
Prerequisite: EE 2423. Introduction to distribution systems. Nature of loads, series impedance and shunt admittance of overhead and underground lines, voltage regulation, three-phase transformer models, load models, power flow analysis, center-tapped transformers and secondaries, and short-circuit studies. Differential Tuition: $165.

EE 4513. Introduction to VLSI Design. (2-3) 3 Credit Hours.
Prerequisite: EE 3323 and EE 3563. Design of integrated digital systems; logic simulation, standard cell libraries, circuit simulation, and other computer-aided design tools; and integrated circuit processing and device modeling. Generally offered: Fall. Differential Tuition: $165. Course Fee: DL01 $75.

EE 4523. Introduction to Nanoelectronics. (2-3) 3 Credit Hours.
Prerequisite: Completion of or concurrent enrollment in EE 3323. Fundamentals of semiconductor device physics. State-of-the-art CMOS and beyond-CMOS device technologies. Quantum transport theories of electron, phonon, and spin in nanoscale solids. Nanofabrication techniques. Low-dimensional nanomaterials for future electronics. Practical application of nanotechnology in mechanical, optical, and biological heterogeneous systems. Students will study a quantum phenomenon using a device simulation software. (Formerly titled "Introduction to Micro and Nanotechnology.") (Same as EE 5503. Credit cannot be earned for both EE 4523 and EE 5503.) Generally offered: Spring. Differential Tuition: $165. Course Fee: DL01 $75.

EE 4533. Principles of Microfabrication. (2-3) 3 Credit Hours.
Prerequisite: Completion of or concurrent enrollment in EE 3323. Fundamentals of microfabrication techniques, including photolithography, thin film deposition (physical vapor deposition and chemical vapor deposition), etching, thermal oxidation, diffusion, ion implantation, chemical and mechanical polishing, and epitaxy. Nanofabrication techniques that enable sub-micron feature sizes will also be discussed (electron beam or x-ray lithography, focused ion beam, and other bottom-up approaches). Students will visit nearby research institutes and foundry companies as part of this course. (Credit cannot be earned for both EE 4533 and EE 5413.) Generally offered: Fall. Differential Tuition: $165. Course fee: DL01 $75.

EE 4543. Advanced Topics in Micro and Nanotechnology. (3-0) 3 Credit Hours.
Prerequisite: Completion of or concurrent enrollment in EE 3323. Topics to be selected from advanced sensors, actuators, engineered materials, device physics, microwave applications of MEMS structures, photonics, microelectronic devices, analog IC design, mixed-signal circuits and systems. May be repeated for credit when topics vary. Differential Tuition: $165.

EE 4553. VLSI Testing. (2-3) 3 Credit Hours.
Prerequisite: EE 2583 (or EE 3463 in previous catalogs). Faults modeling and simulation; stuck at faults, bridging faults, and functional testing; self-testing concepts; standard and test patterns; device and system testing; and design for testability. Differential Tuition: $165.

EE 4563. FPGA-Based System Design. (3-0) 3 Credit Hours.
Prerequisite: EE 2583 (or EE 3463 in previous catalogs) and EE 3563. FPGAs replace digital circuits in most applications. This course addresses underlying theory and applications: Introduction to Field Programmable Gate Arrays; General-Purpose FPGA Architecture; Reconfigurable Computing Devices and Systems; Hardware Description Language for FPGAs; synthesizing FPGA interconnections; Global Timing Constraints; evaluating and optimizing problems for FPGA implementations; Arithmetic, Precision Analysis & Floating Point; FPGA vs. CPU partitioning. Differential Tuition: $165.

EE 4583. Microcomputer Systems II. (2-3) 3 Credit Hours.
Prerequisite: EE 2583 (or EE 3463 in previous catalogs). Advanced microprocessor-based system design; high-speed bus interfacing, coprocessors, and other specialized input/output devices; and high-level languages and software performance analysis. Generally offered: Spring. Differential Tuition: $165. Course Fee: L001 $20.

EE 4593. Embedded System Design. (3-0) 3 Credit Hours.
Prerequisite: EE 2583 (or EE 3463 in previous catalogs) and EE 3563. The goal of this course is to develop a comprehensive understanding of the technologies behind embedded systems, particularly, those using computing elements: Embedded processor selection, hardware/firmware partitioning, circuit layout, circuit debugging, development tools, firmware architecture, firmware design, and firmware debugging. C programming of embedded microcontrollers, the function and use of common peripherals, and the programming and simulation (using VHDL/Verilog) of custom single-purpose processors. Differential Tuition: $165.

EE 4613. Communication Systems. (3-0) 3 Credit Hours.
Prerequisite: EE 3533. Basic theory and principles of modern analog and digital communication systems; signal, noise, and interference analysis, signal-to-noise and signal-to-noise-plus-interference ratio, and circuit implementations. Differential Tuition: $165.

EE 4623. Digital Filtering. (3-0) 3 Credit Hours.
Prerequisite: EE 3423 and completion of or concurrent enrollment in EE 2583 (or EE 3463 in previous catalogs). Design and implementation of FIR and IIR filters, hardware, and software; and topics from adaptive filtering, neural networks. MATLAB exercises. Differential Tuition: $165.

EE 4643. Digital Signal Processing. (3-0) 3 Credit Hours.
Prerequisite: Completion of or concurrent enrollment in EE 3523 and EE 3533. Topics include: transform techniques for discrete signal processing; discrete representation and analysis of digital filters and other topics; A/D and D/A conversion and associated filtering techniques. Generally offered: Spring. Differential Tuition: $165. Course Fee: DL01 $75.

EE 4653. Digital Communications. (3-0) 3 Credit Hours.
Prerequisite: EE 3533. Basic digital modulation schemes: ASK, BPSK, QPSK, FSK, QAM, OFDM, binary signal detection, matched filtering, bit error rate, intersymbol interference, equalization, signal-space methods, optimum receiver, fundamentals of information theory and block coding, convolutional coding and spread spectrum. Differential Tuition: $165.

EE 4663. Digital Image Processing. (3-0) 3 Credit Hours.
Prerequisite: EE 3523. Topics include: fundamentals and some practical applications of digital image processing; image formation; sampling; quantization; image motion and detector noise; future extraction; image enhancement and restoration by spatial filtering and maximum entropy; image coding for bandwidth compression by DPCM; transform coding, sub-band coding; use of MATLAB for image processing. Generally offered: Fall. Differential Tuition: $165.

EE 4673. Data Communication and Networks. (2-3) 3 Credit Hours.
Prerequisite: EE 3223. Introduction to computer networks and their underlying concepts and principles. Learn layered organization of the internet in a top-down fashion: Application, Transport, Network, Data Link, and Physical layers. The course will also cover advance topics including wireless networking, wireless communication, and network cybersecurity. Differential Tuition: $165.

EE 4683. Wireless Communications. (3-0) 3 Credit Hours.
Prerequisite: EE 3533. Common wireless systems and standards. Cellular radio concepts: frequency reuse and handoff strategies. Large-scale path loss models. Small-scale fading and multipath. Modulation techniques for mobile radio: performances in fading and multipath channels. Introduction to in multi-input multi-output (MIMO) systems. Multiple access techniques. RF hardware realization issues. Differential Tuition: $165. Course Fee: DL01 $75.

EE 4693. Fiber Optic Communications. (3-0) 3 Credit Hours.
Prerequisites: EE 3313, EE 3423, and completion of or concurrent enrollment in EE 3213. Light propagation using ray and electromagnetic mode theories, dielectric slab waveguides, optical fibers, attenuation and dispersion in optical fibers, optical fiber transmitters and receivers, electro-optical devices, and optical fiber measurement techniques. Differential Tuition: $165.

EE 4723. Intelligent Robotics. (3-1) 3 Credit Hours.
Prerequisite: EE 3413 or ME 3543. Coordinate transformations, forward and inverse kinematics, Jacobian and static forces, path planning techniques, dynamics, design, analysis and control of robots, sensing and intelligence. (Formerly EGR 4723 and ME 4713. Credit cannot be earned for both EE 4723 and either EGR 4723 or ME 4713.) Generally offered: Spring. Differential Tuition: $165.

EE 4733. Intelligent Control. (3-0) 3 Credit Hours.
Prerequisite: EE 3423. Neural networks and fuzzy logic basics, approximation properties, conventional adaptive controller design and analysis, intelligent controller design and analysis techniques for nonlinear systems, and closed-loop stability. Generally offered: Spring. Differential Tuition: $165. Course Fee: DL01 $75.

EE 4743. Embedded Control Systems. (2-3) 3 Credit Hours.
Prerequisite: EE 3413 and EE 2583 (or EE 3463 in previous catalogs). Embedded system principles and control system concepts, programming, tools and their applications, embedded controls design, and analysis of industrial processes. Differential Tuition: $165.

EE 4753. Analysis of Power Systems. (3-0) 3 Credit Hours.
Prerequisite: EE 3413. Electric energy and principles of power generation. Power transformers and transmission lines. Power flow and fault analysis. Introduction to transient stability analysis and power systems controls. Generally offered: Fall. Differential Tuition: $165. Course Fee: DL01 $75.

EE 4763. Power Electronics. (3-0) 3 Credit Hours.
Prerequisites: EE 3113 and EE 3413. Switch-mode power conversion, analysis and control of DC-DC converters, DC-AC inverters for motor drives and to interface renewable energy sources with utility, AC-DC rectifiers, applications in sustainable energy systems, introduction to power semiconductor devices and magnetic components. Generally offered: Spring. Differential Tuition: $165.

EE 4773. Electric Drives. (3-0) 3 Credit Hours.
Prerequisite: Completion of or concurrent enrollment in EE 3513. Analysis of electric machines in combination with power electronics; torque, speed and position control; space vectors, motor drive inverter; vector control; wind energy conversion. Generally offered: Fall. Differential Tuition: $165. Course fee: DL01 $75.

EE 4783. Power System Operation and Planning. (3-0) 3 Credit Hours.
Prerequisite: EE 3413. Unit commitment, spinning reserve, contingency, economic dispatch, production cost model, optimization, state estimation, measurement and monitoring, reactive power-voltage control, active power-frequency control, automatic generation control, generation planning, transmission planning, stability, reliability, and distribution planning. Differential Tuition: $165.

EE 4793. Nuclear Energy and Engineering. (3-0) 3 Credit Hours.
Prerequisite: EGR 2413 and EGR 2313. This is an introductory course for undergraduate and graduate students in electrical engineering desiring a nuclear energy sequence and elective course of students in science and other engineering disciplines. The course aspires to cover the basic knowledge and principles in nuclear energy and engineering and is structured in six parts. (i) Nuclear physics and radiation interactions, (ii) Basics of radiation detection, (iii) Nuclear reactors and nuclear power, (iv) Electric Utility and Nuclear Power Economics, (v) Nuclear Energy, Renewables and Environment, and (vi) nuclear instruments and sensors with artificial intelligence applied to nuclear safety, industry, and medicine. Differential Tuition: $165.

EE 4812. Electrical Engineering Design I. (2-1) 2 Credit Hours.
Prerequisites: Completion of EE 4313, and concurrent enrollment in, or completion of, EE 4113. Business planning and project management in engineering design; discussion of ethical and social issues in design; and selection of a design project, development of a detailed design proposal, and approval of a design project. One hour of problem solving recitation per week. (Formerly EE 4811. Credit cannot be earned for both EE 4812 and EE 4811.) Generally offered: Fall, Spring. Differential Tuition: $110. Course fee: DL01 $50.

EE 4813. Electrical Engineering Design II. (2-3) 3 Credit Hours.
Prerequisite: EE 4812. Complex system design; advanced ATE; project management, detailed design package, status reporting, formal oral and written technical reports, design reviews, and test plan development and execution; open-ended design project considering safety, reliability, environmental, economic, and other constraints; and ethical and social impacts. Generally offered: Fall, Spring, Differential Tuition: $165. Course Fee: DL01 $75.

EE 4911. Independent Study. (0-0) 1 Credit Hour.
Prerequisites: Permission in writing (form available) from the instructor, the Department Chair, and Dean of the College. Independent reading, research, discussion, and/or writing under the direction of a faculty member. May be repeated for credit, but not more than 6 semester credit hours of independent study, regardless of discipline, will apply to a bachelor's degree. Differential Tuition: $55.

EE 4912. Independent Study. (0-0) 2 Credit Hours.
Prerequisites: Permission in writing (form available) from the instructor, the student's advisor, the Department Chair, and Dean of the College. Independent reading, research, discussion, and/or writing under the direction of a faculty member. May be repeated for credit, but not more than 6 semester credit hours of independent study, regardless of discipline, will apply to a bachelor's degree. Differential Tuition: $110.

EE 4913. Independent Study. (0-0) 3 Credit Hours.
Prerequisites: Permission in writing (form available) from the instructor, the Department Chair, and Dean of the College. Independent reading, research, discussion, and/or writing under the direction of a faculty member. May be repeated for credit, but not more than 6 semester credit hours of independent study, regardless of discipline, will apply to a bachelor's degree. Differential Tuition: $165.

EE 4953. Special Studies in Electrical and Computer Engineering. (3-0) 3 Credit Hours.
Prerequisite: May vary with the topic (refer to the course syllabus on Bluebook or contact the instructor). An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Studies may be repeated for credit when topics vary. Generally offered: Fall, Spring. (Same as CPE 4953. Credit cannot be earned for both EE 4953 and CPE 4953.) Differential Tuition: $165. Course Fee: DL01 $75.