Electrical Engineering (EE)

Courses

**EE 1101 Electrical Engineering and Society: 1 semester hour.**
Survey and history of the electrical engineering profession. F

**EE 1199 Experimental Course: 1-6 semester hours.**
The content of this course is not described in the catalog. Title and number of credits are announced in the Class Schedule. Experimental courses may be offered no more than three times with the same title and content. May be repeated.

**EE 2240 Electrical Circuits I: 3 semester hours.**

**EE 2240L Electrical Circuits I Laboratory: 1 semester hour.**
Laboratory course emphasizing DC circuits with OP-AMP, simple RLC transient phenomena, basic electrical measurements and methods. PRE-or-COREQ: EE 2240. F

**EE 2245 Principles of Electrical Circuits: 3 semester hours.**
Ohm's and Kirchhoff's laws; analysis of DC and AC circuits; first-order transient circuits; introduction to OP-AMPs and DC motors. Non-EE majors only. PRE-or-COREQ: EE 2240. F

**EE 2274 Introduction to Digital Systems: 3 semester hours.**
Number systems; Boolean algebra fundamentals; system reduction, combinational and sequential logic. PREREQ: EE 1101. PRE-or-COREQ: EE 2274L. F

**EE 2274L Introduction to Digital Systems Laboratory: 1 semester hour.**
Laboratory experience in the construction of basic digital logic circuits and state machines. PRE-or-COREQ: EE 2274. F

**EE 3301 Software Methodology and Tools for Electrical Engineering: 3 semester hours.**
Introduction to electrical engineering problem solving methods. Typical numerical and analytical problems in electrical engineering are examined. Introduction to mid or low-level procedural compiled languages and their applications to interface with hardware. PREREQ: CS 1181. F

**EE 3325 Electromagnetics: 3 semester hours.**
Vectors and fields, electrostatics, magnetostatics, electrodynamics, Maxwell's equations, boundary value problems, plane and guided waves. PREREQ: EE 3340, MATH 2275, and PHYS 2212; MATH 3360 recommended. F

**EE 3329 Introduction to Electronics: 3 semester hours.**
Introduction to semiconductor theory, diodes, bipolar junction transistors and amplifiers, metal-oxide-semiconductor field effect transistors and amplifiers, and frequency response. PREREQ: CHEM 1111. PRE-or-COREQ: EE 3340. S

**EE 3340 Electrical Circuits II: 3 semester hours.**

**EE 3340L Electrical Circuits II Laboratory: 1 semester hour.**
Laboratory experience emphasizing AC circuits including: phasors, power, three-phase, transformers, and frequency response. PRE-or-COREQ: EE 3340. S

**EE 3345 Signals and Systems: 3 semester hours.**
Linear time-invariant systems, continuous and discrete; Fourier series, Fourier transforms; discrete Fourier transforms; Laplace transforms, z-transforms; state-space analysis. PREREQ: EE 3340. PREOR COREQ: MATH 3360. F

**EE 3399 Experimental Course: 1-6 semester hours.**
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**EE 4416 Applied Engineering Methods: 3 semester hours.**
Applied discrete and continuous probability, random variables, probability distributions, sampling, data description, parameter estimation, hypothesis testing, inference, correlation and linear and multiple regression. PREREQ: MATH 1175. S

**EE 4418 Communication Systems: 3 semester hours.**
Basic principles of analysis and design of modern analog and digital communication systems, including transmission and reception. PREREQ: EE 3329, EE 3345 and EE 4416. S

**EE 4426 Computer Architecture and Organization: 3 semester hours.**
Design, implementation, and performance evaluation of modern computer systems; instruction sets; datapath and control optimizations; single-cycle, multiple-cycle, and pipelined processors; hazard detection and resolution; memory hierarchies; peripheral devices. PREREQ: EE 2274, EE 2274L and EE 3301. F

**EE 4427 Embedded Systems Engineering: 2 semester hours.**
Integration of algorithms, software and hardware to design real-time and embedded systems for signal processing and control. PREREQ: EE 4426 or CS 1337. COREQ: EE 4427L. S

**EE 4427L Embedded Systems Engineering Laboratory: 1 semester hour.**
Design and implement embedded signal processing and control systems through the integration of algorithms, software, and hardware. PREREQ: EE 4426 or CS 1337. COREQ: EE 4427. S

**EE 4429 Advanced Electronics: 3 semester hours.**
Introduction to operational amplifiers and their applications, current mirrors, active loads, differential amplifiers, feedback and stability, filters, oscillators, Schmitt triggers, power amplifiers and voltage regulators. PREREQ: EE 3329. PRE-or-COREQ: EE 4429L. F

**EE 4429L Advanced Electronics Lab: 1 semester hour.**
Transistor biasing, amplifiers and other basic analog circuit designs. PREREQ or COREQ: EE 4429. F

**EE 4432 Introduction to VLSI Systems: 3 semester hours.**
Photolithography, CMOS Fabrication, MOSFET Operation, CMOS passive elements, design rules and layout, CAD tools for IC design, inverters, static logic and transmission gates, dynamic logic. PREREQ: EE 2274, EE 2274L, and EE 3329. D

**EE 4433 Mixed Signal Design and Synthesis: 3 semester hours.**
Analog IC design. Passive components, parasitic elements, component matching, IC layout techniques, amplifiers, current sources, comparators, op amps, noise, switched capacitor circuits. Includes lab work using design automation tools. PREREQ: EE 4432. D

**EE 4472 Electrical Machines and Power: 3 semester hours.**
Theory and application of electrical machinery and transformers. Power and energy relationships in power systems. PREREQ: EE 3340, EE 3340L and EE 3325. COREQ: EE 4472L. F

**EE 4472L Electrical Machines and Power Laboratory: 1 semester hour.**
Experimental study of the fundamental physical phenomena and characteristics of transformers, induction motors, synchronous and direct current machines. COREQ: EE 4472. F
EE 4473 Automatic Control Systems: 3 semester hours.
Continuous-time control systems using both frequency-domain and state-space techniques. Topics include design methodology, performance specifications, analysis and design techniques. PREREQ: MATH 3360; and EE 3345 or ME 4405.

EE 4474 Advanced Circuit Theory: 3 semester hours.
Methods of analog electrical circuit analysis and synthesis. Topics include signal flow graphs, multi-port networks, simulation techniques, and topological methods for formulation of network equations. PREREQ: EE 3340.

EE 4475 Digital Signal Processing: 3 semester hours.
Discrete, fast Fourier and Z-transforms, correlation, convolution, finite and infinite impulse response digital filter design, spectral analysis and adaptive digital filters. Includes projects. PREREQ: MATH 3360 and EE 3345.

EE 4476 Semiconductor Processing and Fabrication: 3 semester hours.
Silicon semiconductor processing and basic integrated circuit fabrication. Physics, chemistry and technology in basic processing steps in production of integrated circuits. PREREQ: EE 4432 and PHYS 2212.

EE 4478 Semiconductor Devices: 3 semester hours.
Operating principles of basic building blocks of modern silicon-based semiconductor devices to include p-n junctions, field effect transistors and bipolar junction transistors. PREREQ: EE 4432 and PHYS 2212.

EE 4479 Advanced Semiconductor Devices: 3 semester hours.
Review of semiconductor band theory. Opto-electronics, quantum mechanics, heterojunctions, power and microwave semiconductor devices. PREREQ: EE 4478 or equivalent.

EE 4481 Independent Problems: 1-3 semester hours.
Students are assigned to, or request assignment to, independent problems on the basis of interest and preparation. May be repeated for a maximum of 6 credits. Equivalent to CE 4481. PREREQ: Permission of instructor.

EE 4482 Principles of Power Electronics: 3 semester hours.
Introduction to steady state converter modeling and analysis. Principles of converter dynamics and control including controller design. PREREQ: EE 3329. PREREQ or COREQ: EE 4473.

EE 4491 Digital Control Systems: 3 semester hours.
Analysis and design of digital control systems, Z-transforms, transient response, stability, root locus, frequency response, design, state-space and state feedback. PREREQ: EE 4473.

EE 4495 Senior Seminar: 3 semester hours.
Current topics in Electrical Engineering. Initial selection of Senior Design projects. PREREQ: Permission of instructor and successful completion of all required EE courses numbered less than 4000 and ENGL 3307.

EE 4496 Project Design: 3 semester hours.
Conceptual design of multidisciplinary projects. Design, analysis, and implementation of senior projects proposed and defined in EE 4495. PREREQ: EE 4495.

EE 4499 Experimental Course: 1-6 semester hours.
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