

Electrical Engineering (EE)

EE 202 - INTRO DIGITAL LOGIC DSGN

Semester Hours: 3

Engineering approaches to design and analysis of digital logic circuits. Boolean algebra, Karnaugh maps, design using Hardware Description Languages, digital computer building blocks, standard logic (SSI MSI) vs. programmable logic (PLD, PGA0, finite state machine design. Prerequisites: ENG 101.

EE 203 - DIGITAL LOGIC DESIGN LAB

Semester Hour: 1

Experiments in applying Boolean logic concepts to digital design. The course introduces students to small-scale prototyping and simulation techniques that are used to implement and evaluate digital combinational and sequential logic designs. Prerequisite: EE 202.

EE 213 - ELECTRICAL CIRCUIT ANALYSIS I

Semester Hours: 3

Basic concepts of DC and AC circuit theory and analysis. Includes both DC and AC power. Prerequisites: MA 201 and PH 112 both w/concurrency.

EE 223 - DES & MOD ELEC CIR & SYS

Semester Hours: 3

Electrical circuit and systems design and modeling. Includes using modern tools (i.e. Matlab and simulink) to design and model circuits. Introduces and reinforces engineering design principles. Prerequisites: EE 202 & EE 213.

EE 299 - EE MENTORING I

Semester Hours: 0

Yearly mentoring and advising from engineering faculty and staff. Prerequisite w/ concurrency: CPE 211.

EE 307 - ELECTRICITY & MAGNETISM

Semester Hours: 3

Basic concepts of electrostatics, electric potential theory, electric fields and currents, fields of moving charge, magnetic fields, time varying electromagnetic fields, Maxwell's equations. Prerequisites: EE 213, MA 238 and MA 244.

EE 308 - ELECTROMAGNETIC ENGR

Semester Hours: 3

Review of Maxwell's equations, uniform plane waves in different types of media, reflection, and transmission of uniform plane waves, transmission lines, waveguides, and antennas. Prerequisites: EE 307.

EE 310 - SOLID STATE FUNDAMENTALS

Semester Hours: 3

Introduction to semiconductors including crystalline structure, energy bands and charge carriers, excess carriers, and thermal properties. Introduction to semiconductor junctions, the bipolar junction transistor, the MOSFET. Prerequisites: PH 113 and MA 238.

EE 315 - INTRO ELECTRONIC ANAL & DESIGN

Semester Hours: 3

Properties of diode, bipolar transistors, FET and operational amplifiers, analysis of DC and AC small-signal operation and circuit models for the design and analysis of electronic circuits. Prerequisite: EE 213.

EE 316 - ELE CIRCUITS & ELTRNC DSGN LAB

Semester Hour: 1

Electric circuit experiments including first and second order DC circuits, maximum power transfer, impedance measurements, transformers, measurement of electronic device characteristics and design and testing of operational amplifier circuits and single-stage amplifiers using MOSFETs and BJTs. Prerequisite: EE 315.

EE 382 - ANALY METH CONTINUOUS TIME SYS

Semester Hours: 3

Fourier Series, Fourier and Laplace transforms with emphasis on their physical interpretation. System representation by transfer functions and impulse response functions. Convolution integral. Transient response. Modeling and simulation. Prerequisites: EE 213, MA 238 and MA 244.

EE 383 - ANALY METH MULTIVARIABLE

Semester Hours: 3

Discrete time signals and systems, sampling techniques, Z and discrete Fourier transforms, multivariable systems. Introduction to digital signal processing. Prerequisite: EE 382.

EE 384 - DIG SIGNAL PROCESS LAB

Semester Hour: 1

Design and programming of digital processing algorithms such as DFT, FFT, IIR, and FIR filtering. Prerequisites: EE 383 or CPE 381.

EE 385 - RANDOM SIGNALS & NOISE

Semester Hours: 3

Random variables and probabilities description of signals. Introduction to random processes; autocorrelations, cross correlation, power spectral density. Noise analysis, thermal, shot, white, and colored. Response of electrical systems to random inputs. Prerequisites: EE 382 or CPE 381.

EE 386 - INTRO CONTROL/ROBOTIC SYS

Semester Hours: 3

Theory and analytical techniques for modeling, analysis and control of dynamical systems. Transfer functions, block-diagrams, frequency response, stability criteria, series and feedback controller design, and digital control. Introduction to the dynamic analysis and control of robotic systems. Prerequisites: EE 382 or CPE 381.

EE 399 - EE MENTORING II

Semester Hours: 0

Yearly mentoring and advising from engineering faculty and staff. Prerequisites: EE 299 and EE 223.

EE 401 - REAL-TIME DIGITAL SIGNAL PROCE

Semester Hours: 3

Introduction to digital signal processor architectures, applications, assembly language programming, and development tools for designing and implementing DSP systems. Prerequisites: EE 383 or CPE 381.

EE 410 - SELECTED TOPICS/ECE

Semester Hours: 1-6

Special topics in Electrical Engineering.

EE 410L - SELECTED TOPIC LABORATORY

Semester Hours: 0

EE 411 - ELECTRIC POWER SYSTEM

Semester Hours: 3

Power generation, transmission and distribution. Three-phase circuits, conventional and renewable power systems, transformers and motors, protection and control. Prerequisite: EE 382.

EE 412 - SR DSGN PROJ ELECT ENGR

Semester Hours: 1-6

Individual design project under the direction of an ECE faculty member. Senior standing and permission of instructor.

EE 414 - ANALOG & DIGITAL FILTER DESIGN

Semester Hours: 3

Analog filter design via Butterworth, Chebyshev, and elliptical approximation. Active filter design using operational amplifiers. Digital filter design methods. Prerequisites: EE 315 and EE 383.

EE 416 - ELECTRONICS II

Semester Hours: 3

Integrated circuits and micro-devices related to multistage amplifiers, oscillators, design specifications, operational amplifiers, and microunits. Computer simulation. Prerequisites: EE 313 and EE 315.

EE 417 - PHOTOVOLTAIC FUNDAMENTALS

Semester Hours: 3

The course will cover fundamental device physics for solar cell operation, reliability issues in panel and module design, partial shading problems on PV module, cost and efficiency analysis. Prerequisite: EE 310.

EE 421 - ANTENNA DESIGN & ANALYSIS

Semester Hours: 3

Covers analytical methods and mathematical foundations for solving antenna radiation problems, based on Maxwell's equations. Different types of antennas will be studied, including wire, phased array, aperture, microstrip, and reflector antennas. Prerequisite: EE 308.

EE 423 - COMM SYS & SIMULATION W/ LAB

Semester Hours: 3

Modern test equipment and computer-based simulation methods are used to conduct experiments in the area of communication systems. Includes experiments to investigate signal modulation and demodulation, and filters. (Same as EE 523) Prerequisite: EE 426.

EE 424 - INTRO DATA COMMUN NETWORKS

Semester Hours: 3

Overview of historic development of modern telephone and data communication system, system architecture, standards, broadband switching systems, modems, protocols, personal and mobile communications, digital modulation techniques. (Same as EE 504) Prerequisites: EE 383 and EE 385.

EE 426 - COMMUNICATION THEORY

Semester Hours: 3

Signals and systems including the Hilbert transform, cross and auto correlation, power density spectrum, and the Wiener-Khinchine theorem. Filter design. Linear and nonlinear modulation and demodulation methods and circuits. Phase lock and frequency feedback techniques. (Same as EE 506). Prerequisites: EE 382 or CPE 381.

EE 436 - DIGITAL ELECTRONICS

Semester Hours: 3

Introduction to digital electronics. The Metal-Oxide-Semiconductor (MOS) transistor. MOS inverters and gate circuits. Bipolar junction transistors, ECL inverters, and bipolar digital gates. Semiconductor Memories. (Same as EE 516) Prerequisites: EE 202 and EE 315.

EE 437 - ELECTRONICS MANUF PROCESSES

Semester Hours: 3

Concepts, facilities, and technology utilized in the manufacture of electronic components and products. Includes printed wiring board fabrication and component mounting methods, automation, quality and reliability, product testing, and economic issues. Senior standing. (Same as ISE 437 and EE 537).

EE 451 - OPTOELECTRONICS

Semester Hours: 3

Basic concepts for understanding electro-optic devices and systems. Blackbody radiation; light sources; quantum and thermal detectors, noise in detectors; optical heterodyning; acousto-optic, magneto-optic, and electro-optic modulation. (Same as OPE 451) Prerequisites: EE 307 and EE 315.

EE 453 - LASER SYSTEMS

Semester Hours: 3

Spontaneous and stimulated emission, population inversion, optical resonators, three- and four-level systems, Q-switching and mode-locking, semiconductor lasers, integrated optic waveguides and couplers, scanning systems, high-power industrial application. Prerequisite: EE 307.

EE 454 - OPTICAL FIBER COMMUNICA

Semester Hours: 3

Introduction to optical fibers and their transmission characteristics, optical fiber measurements, sources and detectors, noise considerations for digital and analog communication, optical fiber systems. (Same as OPE 454) Prerequisites: (EE 307 or PH 432) and (EE 382 or CPE 381).

EE 486 - INTRO MODERN CONTROL SYSTEMS

Semester Hours: 3

Modern control theory including techniques for modeling, analysis and control of MIMO dynamic systems, state-variable feedback control design and state observers. Kalman-filtering. Fundamentals of nonlinear systems analysis and discrete-time system modeling, analysis and control. Prerequisites: EE 386.

EE 494 - EE DESIGN PROJECTS

Semester Hours: 3

Senior Capstone Course. Design, simulation, and construction of technical projects. Review of legal, economic, and ethical issues. Students work as individuals or teams to design, implement, test, and evaluate their projects. Oral presentation and written reports are required. Senior Standing. Prerequisites: ISE 321, EE 308, EE 310, EE 313, EE 315, CPE 323, EE 383, EE 386 and EE 399.

EE 497 - ELEC ENGR INTERNSHIP

Semester Hours: 1-3

Active involvement in an engineering project in an engineering enterprise, professional organization, or government agency that has particular interest and relevance in the student. Junior/senior standing and Approval of Engineering Faculty Advisor.