

ELECTRICAL ENGINEERING (ELEG)

ELEG 3010. Discrete Time Signals and Sys (3)

This is an undergraduate course that teaches methods for analyzing discrete-time signals and systems. Important topics include Nyquist sampling theory, quantization, signal classification, solving difference equations, system impulse response and frequency response, the Discrete-Time Fourier Transform, Fast Fourier Transform, and the Z-Transform.

Prerequisites: ELEG 2301

ELEG 3020. Electronic Devices (3)

This course introduces electronic devices as components of electrical circuits that are responsible for regulating flow of current for information processing and system control. Topics include semiconductors, diodes and applications, light-emitting diodes, bipolar junction transistors, FETs, basic op-amp circuits, active filters and oscillators, voltage regulators. Students learn how to apply basic electronic theory to analytical problem solving, experimentation, and circuit design relevant to the usage of the various electronic devices.

Prerequisites: ELEG 2301

ELEG 3030. Microelectronics (3)

This course is an introduction to microelectronics. Topics covered are the differences between electronics and microelectronics, basic physics of semiconductors, physics of bipolar transistor and amplifiers, diode models and circuits, MOS capacitors, MOS field effect transistors, digital CMOS circuits and CMOS amplifiers, cascode stages, differential amplifiers, frequency response, feedback, oscillators, digital logic and MOS logic devices, complimentary MOS (or CMOS) logic gates, fundamental trade-offs in high speed analog and digital circuit design.

Prerequisites: ELEG 2301

ELEG 4010. Digital Signal Processing (3)

This course introduces the fundamental concepts and techniques of modern digital processing as well as the algorithms and applications. Topics covered include an overview of signals, systems, and signal processing, sampling and reconstruction of signals, and convolution.

Prerequisites: ELEG 3301 and MATH 2140

ELEG 4011. Intro to Control Systems (3)

This is an introductory control systems course providing an overview of feedback control systems, Laplace Transform, Root Locus Design, and Bode plotting Techniques with examples and applications. Students learn the process of analyzing and designing feedback control systems starting from a physical model of a system which will focus on everyday applications.

Prerequisites: ELEG 3010

ELEG 4020. Power Engineering (3)

This course introduces the basic concepts of electric power systems. Single-phase and 3-phase networks, electric power generation, transformers, transmission lines, and power flow analysis, are covered. Mathematical modeling of various power systems is covered.

Prerequisites: ELEG 3301

ELEG 4230. Renewable Energy Systems (3)

This course introduces students to the concepts and design of renewable and efficient electric power systems. The course presents the various sources of renewable energy including wind, solar, and biomass as potential sources of energy. Discussions of economics, environment, politics and social policy are integral components of the course.

Prerequisites: ELEG 3301

ELEG 4240. Pwr Generation & Distribution (3)

This course introduces the basic concepts of electric power systems. Single-phase and 3-phase networks, electric power generation, transformers, transmission lines, and power flow analysis, are covered. Mathematical modeling of various power systems is covered.

Prerequisites: ELEG 3301

ELEG 4250. Battery Technology (3)

This course is an introduction to rechargeable battery technology. Topics covered are battery terminology, thermodynamics of batteries, electrode of Lithium-ion cell and its working. Other topics include electrochemical modeling of batteries, aging mechanisms, thermal behavior and thermal management systems, battery safety, battery system design, integrated battery-based systems, supercapacitors, and electrical vehicle (EV) batteries. Advanced and future technologies for next generation batteries will be introduced. The standards and regulatory requirements are also discussed.

Prerequisites: ELEG 3301