

Electrical and Computer Engineering

ECE 119LA. Senior Laboratory A (1)

Prerequisite: senior standing and permission of instructor. Hands-on experience in topics in electrical and computer engineering. (3 lab hours) (Formerly ECE 119L)

ECE 119LB. Senior Laboratory B (1)

Prerequisite: ECE 71 or CSCI 40, ECE 118, senior standing, and permission of instructor. Hands-on experience in topics in micro-controllers and automation processes. (3 lab hours)

ECE 120L. Microcontroller Laboratory (1)

Prerequisite: ECE 118 and ECE 85L. Lab is intended to solidify and build upon ECE 118 class. Experiments on microcontroller and its associated peripheral I/O subsystems. Hands-on program controlled I/O, timer, parallel and serial I/O communications, and A/D and subsystem interfacing. Design projects. (3 lab hours)

ECE 121. Electromechanical Systems and Energy Conversion (3)

Prerequisites: ECE 90 or ECE 91. Principles and applications of direct- and alternating-current machinery and other energy-conversion apparatus; introduction to power electronics and machine drives.

ECE 121L. Electromechanical Systems and Energy Conversion Laboratory (1)

Prerequisite: ECE 90 or 91 or 121; may be taken concurrently. Experiments and computations on direct- and alternating-current machinery and on other energy-conversion devices and associated apparatus. (3 lab hours)

ECE 124. Signal and Systems (4)

Prerequisites: ECE 90, MATH 81, ECE 71 or CSCI 40. Analysis of discrete and continuous linear circuits, systems, and signals. Fourier transforms, Fourier series. Difference and differential equations, frequency response, system analysis via Laplace- and Z-transforms. Idealized sampling and aliasing. Stability analysis. Engineering applications, modeling, and simulation using Matlab.

ECE 125. Probabilistic Engineering System Analysis (3)

Prerequisites: ECE 124. Probability theory, single and multiple discrete and continuous random variables and their characterization, transformations of random variables, principles of random variables, principles of random sampling, estimation theory, en-

gineering decision principles, data analysis, reliability theory, and applications to quality control in manufacturing process systems.

ECE 126. Electromagnetic Theory and Applications I (3)

Prerequisite: MATH 81 or concurrently, ECE 90. Electrostatics; boundary value problems; magnetostatics; time-varying fields; Maxwell's equations. Transmission of electromagnetic energy.

ECE 128. Electronics I (3)

Prerequisite: ECE 90. Characteristics and properties of solid state devices; theory and analysis of electronic circuits; power supply design; device and circuit models; single- and multi-stage amplifier analysis and design; analysis of digital circuits; circuit simulation using Spice or other contemporary software tools.

ECE 128L. Electronics I Laboratory (1)

Prerequisite: ECE 90L and 128 or concurrently. Experiments on static and dynamic characteristics of solid state devices in analog and digital electronic circuits; computer solutions as appropriate. (3 lab hours)

ECE 132. Design of Digital Systems (3)

Prerequisites: ECE 118. Design of Digital Systems utilizing microprocessors; application of assembly programming language to input/output programming, interrupts and traps, DMA and memory management.

ECE 134. Analog and Digital Communication Engineering (3)

Prerequisite: ECE 124. Mathematical modeling of signals and systems, linear and non-linear modulation theory, demodulators, link analysis and design, phase-lock loops, sampling theory and signal reconstruction, digitization techniques, basic digital transmission methodologies, computer simulations.

ECE 135. Wireless Communications Systems (3)

Prerequisite: ECE 125, 134. Principles of digital signal transmission and reception; binary, M-ary, and hybrid digital modulation techniques; channel and receiver front-end noise effects; statistical performance receiver analysis; source coding; block and convolutional channel coding; block decoding; VDA, channel fading, and multipath; equalization; cellular systems; Spread Spectrum and CDMA; computer simulations.

ECE 136. Electromagnetic Theory and Applications II (3)

Prerequisite: ECE 126. Plane wave propagation and reflection; waveguides; strip-lines and microstrip impedance matching; microwave circuits and S-parameters; amplifier power gain and stability, amplifier design, antenna analysis and design; methods for computer solution.

ECE 136L. Electromagnetic Theory and Applications Laboratory (1)

Prerequisite: ECE 136 or concurrently. Experiments on the transmission of electromagnetic energy through wires, waveguides, and space; filters and antennas; impedance matching; cross-over networks; location of faults on lines. (3 lab hours)

ECE 138. Electronics II (3)

Prerequisites: ECE 102, 124, 128. Analysis and design of high frequency amplifiers; high frequency models of transistors; operational amplifiers and applications; feedback amplifiers; oscillators, modulators, bandpass amplifiers, and demodulators for communications. Emphasis on modern design methods.

ECE 138L. Electronics II Laboratory (1)

Prerequisite: ECE 128L and 138 or concurrently. Design oriented experiments to study the characteristics, limitations, and design trade-offs of circuits from ECE 138. Emphasis on circuit and system design to meet preestablished specifications. Design project included; computer solutions as appropriate. (3 lab hours)

ECE 140. VLSI System Design (3)

Prerequisites: ECE 118, 128. Emphasis on the design of a full custom VLSI system using contemporary CAD tools. Digital circuit design, CMOS circuit and layout principles, fabrication principles, physical and electrical design rules, control and data path design techniques, system timing, design verification, simulation and testing.

ECE 146. Computer Networking and Distributed Processing (3)

Prerequisites: ECE 118 or CSCI 113; ECE 125 or CSCI 60 or concurrently. Analysis and design of modern computer networks: layered protocols, routing; flow and congestion control; packet, message, and circuit switching; error control and recovery; performance analysis. Local area networks, asynchronous transfer mode and ISDN.