

# ELECTRICAL AND COMPUTER ENGR. (ECE)

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## ECE 110 Introduction to Engineering (1 Credits)

This course provides an integrated introduction to electrical engineering and computer engineering. It covers the principles of electrical and computer engineering including sinusoidal wave forms, electrical measurements, digital circuits, and applications of electrical and computer engineering. 1 credit hours.

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

## ECE 111 Engineering Analysis Lab I (1 Credits)

Laboratory activities on electronic circuits, Ohm's law, voltage, current, resistance, and basic test instruments are emphasized. 1 credit hour.

**Prerequisite(s):** (ECE 131 (may be taken concurrently))

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

## ECE 130 Programming Engineering Applications (3 Credits)

Use of the C++ language as a problem-solving tool is emphasized, including algorithmic approaches to problem and computer program design for engineers. 3 credit hours.

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**Department:** Department of Engineering

## ECE 131 Circuit Analysis I (3 Credits)

Direct current topics covered: current, voltage, resistance, power, energy, series and parallel circuits, combination circuits, Ohm's law, Kirchhoff's rules, inductance, capacitance, and magnetism. 3 credit hours.

**Prerequisite(s):** (MATH 241 and ECE 111 (may be taken concurrently))

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

## ECE 211 Circuit Analysis Lab II (1 Credits)

Practical experiences in the measurement and analysis of alternating current with voltage, impedance, and phasor experiments are studied. 1 credit hour.

**Prerequisite(s):** (ECE 231 (may be taken concurrently))

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

## ECE 215 Digital System Lab (1 Credits)

Laboratory experiments on implementation of basic digital logic and hardware, combinational circuits, flip-flops, registers, and sequential circuits. 1 credit hour.

**Prerequisite(s):** (ECE 235 (may be taken concurrently))

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

## ECE 231 Circuit Analysis II (3 Credits)

Continuation of ECE 131 with studies of alternating current circuits, impedance concepts, network theorems, transformers, passive filters, and response curves are emphasized. 3 credit hours.

**Prerequisite(s):** (ECE 131 and MATH 242) and (ECE 211 (may be taken concurrently))

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

## ECE 235 Digital System (3 Credits)

Overview of digital computer systems. Boolean algebra, number systems, codes, combinational and sequential logic device, programmable logic devices, and study of digital hardware with emphasis on digital circuits such as A/D and D/A converter, memory circuits. 3 credit hours.

**Prerequisite(s):** (ECE 231 and ECE 215 (may be taken concurrently))

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

## ECE 236 Java Programming (3 Credits)

High-level, object-oriented language programming using JAVA is emphasized. The course includes inheritance and polymorphism, implementing, hiding and the creation of JAVA applet for internet usage. 3 credit hours.

**Prerequisite(s):** ECE 130

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

## ECE 239 Electromechanical Energy Conversions (3 Credits)

Study of energy storage and conversion, force and emf production, coupled circuit analysis of systems with both electrical and mechanical inputs, applications to electric motors and generators and other electromechanical transducers are emphasized. 3 credit hours.

**Prerequisite(s):** (ECE 231 and PHYS 251 and PHYS 252 (may be taken concurrently))

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

## ECE 311 Electronics Circuits Lab (1 Credits)

Laboratory experiments on the application, analysis, and measurement of semiconductor devices in amplifier circuits. 1 credit hour.

**Prerequisite(s):** ECE 331 (may be taken concurrently)

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

## ECE 312 Microprocessor Arch Laboratory (1 Credits)

Laboratory experiments to explore the relationship between hardware and software in microprocessors, input/output operations, and assembly language techniques. 1 credit hour.

**Prerequisite(s):** (ECE 332 (may be taken concurrently))

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

## ECE 315 Control System Laboratory (1 Credits)

A series of control system experiments including process control using PID controller experiments, closed loop control systems, and transient response design topics. 1 credit hour.

**Prerequisite(s):** (ECE 335 (may be taken concurrently))

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

## ECE 319 Real-Time Embedded System Lab (1 Credits)

Laboratory Experiments utilizing hardware and software in the design of a real-time embedded system. 1 credit hour.

**Prerequisite(s):** (ECE 339 (may be taken concurrently))

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 330 Engineering Mathematics Analysis (3 Credits)**

Learn how to use mathematics to formulate, solve and analyze physical problems which includes systems and series of ordinary differential equations, Fourier analysis, partial differential equations, linear algebra, vector calculus, special functions, unconstrained and combinational optimization, and etc. 3 Credit hours.

**Prerequisite(s):** MATH 251

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 331 Electronic Circuits (3 Credits)**

Study of the operation and characteristics of semiconductor devices such as introduction to electronic systems. linear circuits, diodes, field effect transistors, amplifiers and nonlinear circuits, and operational amplifiers, and applications are emphasized. 3 credit hours.

**Prerequisite(s):** (MATH 242 and ECE 231 and ECE 311 (may be taken concurrently))

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 332 Microprocessor Architecture (3 Credits)**

Introduction to microprocessor hardware and software, including: microprocessor principles, organization machine language programming, and input/output functions. 3 Credit hours.

**Prerequisite(s):** (ECE 235 and ECE 312 (may be taken concurrently))

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 333 Software Engineering (3 Credits)**

Software engineering is the study and an application of engineering to the design, development, and maintenance of software. 3 Credit hours.

**Prerequisite(s):** ECE 236

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 334 Signal and System (3 Credits)**

Signals and Systems is an introduction to analog and signal processing. It presents and integrates the basic concepts for both continuous-time and discrete-time signals and systems. 3 credit hours

**Prerequisite(s):** MATH 242

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 335 Control Systems (3 Credits)**

Study of feedback control systems with the emphasis on the Linear Servomechanism theory and design principles, Pole-zero analysis, stability of feedback systems by root locus and real-frequency response methods, design methods of Bode and Nichols, introduction to advanced topics in automatic control theory. 3 Credit hours.

**Prerequisite(s):** (ECE 330 and ECE 331 and ECE 315 (may be taken concurrently))

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 336 Introductory VLSI Design (3 Credits)**

This course aims to convey knowledge of circuit design for digital VLSI components to state of the art MOS and BICMOS technologies.

Emphasis is on the circuit design, optimization, and layout for use in applications such as micro-processors, signal and multimedia processors, memory and periphery. 3 credit hours.

**Prerequisite(s):** (ECE 331) and ECE 332

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 337 Operating System (3 Credits)**

The fundamental principles of artificial intelligence and expert systems are introduced and their application in various areas of science and engineering. 3 credit hours.

**Prerequisite(s):** ECE 332

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 338 Computer and Wireless Networks (3 Credits)**

This course introduces the fundamental problems of computer networking, from sending bits over wires to running distributed applications. Some advanced wireless networks will be included such as wireless sensor networks and internet of things. 3 credit hours.

**Prerequisite(s):** ECE 332

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 339 Real-Time Embedded System (3 Credits)**

**Prerequisite(s):** (ECE 332 and ECE 319 (may be taken concurrently))

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 401 ECE Comprehensive Exam (0 Credits)**

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 412 Communication System Lab (1 Credits)**

**Prerequisite(s):** (ECE 432 (may be taken concurrently))

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 414 Data Communications Lab (1 Credits)**

Laboratory experiments in data communication devices is emphasized including modems, multiplexers, concentrators, front-end processor, error-checking, simple/duplex transmission, and telecommunications. 1 credit hour.

**Prerequisite(s):** (ECE 434 (may be taken concurrently))

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 430 Applied Electromagnetic (3 Credits)**

It is an introductory subject on electromagnetism, emphasizing fundamental concepts and applications of Maxwell equations. Topics covered include: polarization, dipole antennas, wireless communications, forces and energy, phase matching, dielectric waveguides and optical fibers, transmission line theory and circuit. 3 credit hours.

**Prerequisite(s):** ECE 330

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 431 Special Topics (3 Credits)**

In this course, students who received "unsatisfactory" grade in ECE 401 will use the method of the Face-to-face study and independent study to fulfill the requirement for the graduation. These requirements give the student an opportunity to master a particular aspect of the discipline in depth.

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 432 Communication Systems (3 Credits)**

Study of communication systems with emphasis on the application of frequency domain and time domain response of linear systems, analog modulation methods including amplitude modulation, frequency modulation and phase modulation, signal and noise modeling using probabilistic descriptions, narrowband. 3 credit hours.

**Prerequisite(s):** (ECE 330 and ECE 331 and ECE 412 (may be taken concurrently))

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 433 Microwave Engineering (3 Credits)**

Analysis and design of transmission lines and matching circuits, Loss in transmission lines, Mode structures in metallic and dielectric waveguides, Microwave resonators and magnetic devices, Smith chart and matching techniques. 3 credit hours.

**Prerequisite(s):** ECE 430

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 434 Data Communications (3 Credits)**

Study of data communication devices and software, their functional and operational aspects; including modems, control units, multiplexers, concentrators, front-end processors, and etc. 3 credit hours.

**Prerequisite(s):** (ECE 338 and ECE 414 (may be taken concurrently))

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 435 Network Programming (3 Credits)**

The design and implementation of software applications in a networked environment are emphasized. Topics include a broad overview of network technology, the OSI model, socket programming, multithreading, and web programming. 3 credit hours.

**Prerequisite(s):** ECE 338

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 436 Artificial Intelligence (3 Credits)**

The fundamental principles of artificial intelligence and expert systems are introduced and their application in various areas of science and engineering. 3 credit hours.

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 437 Digital Signal Processing (3 Credits)**

Application of learned theories/algorithms and available computer technologies to modern image and speech processing problems and emphasized. Characteristics of speech signals, linear predictive coding (LPC) of speech, pitch detection, and LPC speech synthesis, speech recognition, hardware designs for signal process. 3 credit hours.

**Prerequisite(s):** (ECE 235 and MATH 243)

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 438 Power System Analysis (3 Credits)**

This course is an introduction to power systems engineering. Topics include complex power, phases, balanced three phases, transformers and per-unit system, transmission line, power flow problem, symmetrical faults and power system controls. 3 credit hours.

**Prerequisite(s):** (ECE 331 and MATH 243 and PHYS 252)

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 439 Applied Cyber Security (3 Credits)**

This course addresses information security, ethical and legal practices, and mitigating cyber vulnerabilities. Students will also learn about the cryptography, hardware security, and software security. The content is targeted at ensuring the privacy, reliability, and integrity of information systems. 3 credit hours.

**Prerequisite(s):** ECE 338

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering

**ECE 441 Senior Project (4 Credits)**

Opportunity for seniors to engage in a team project in applied electrical and computer engineering field where integration of knowledge obtained throughout the program is possible. Students are formed into small design groups (typically three students) and assigned a project. In addition to carrying out the design. 4 credit hours.

**College/School:** Col of Science, Engr & Tech

**Department:** Department of Engineering