

# EET - Electrical Engineering Technology

## **EET 110 Electrical Circuits I (3 Credit Hours)**

Fundamentals of electrical circuits including basic electrical parameters and variables, circuit laws and theorems, mesh analysis, node analysis, Thevenin's and Norton's Theorems, capacitance, inductance, magnetism, and elementary RC and RL transients.

**Prerequisites:** MATH 162M

## **EET 120 Fundamentals of Logic Circuits (3 Credit Hours)**

An introduction to logic circuits, Boolean algebra, digital interface devices, combinational and sequential logic design, and microprocessor fundamentals.

## **EET 125 Logic Circuits Laboratory (1 Credit Hour)**

Team-oriented experiments in basic combinational and sequential logic circuits and an introduction to fundamental microprocessors.

**Pre- or corequisite:** EET 120

## **EET 195 Topics (1-3 Credit Hours)**

Study of selected topics.

## **EET 200 Electrical Circuits II (3 Credit Hours)**

A continuation of EET 110 with emphasis on steady-state ac circuit analysis and applications. Topics include alternating current and voltage, phasors and complex numbers and their applications in circuit analysis, series and parallel resonance, complex power, and polyphase circuits.

**Prerequisites:** MATH 163 and a grade of C or better in EET 110

## **EET 205 Electrical Circuits Laboratory (1 Credit Hour)**

Electrical laboratory instruction including test equipment, measurements, data analysis, verification of circuit laws, formal report preparation, and circuit implementation.

**Pre- or corequisite:** EET 200

## **EET 210 Electronic Circuits (3 Credit Hours)**

Semiconductor properties and semiconductor devices including diodes, MOS field-effect transistors, junction field-effect transistors and bipolar junction transistors. The ideal operational amplifier and its applications. FET and BJT biasing, including constant current biasing, and amplifier circuits with emphasis on DC modeling and graphical analysis, including Multisim simulation of circuit biasing.

**Prerequisites:** EET 110

## **EET 225 Electronic Circuits Laboratory (1 Credit Hour)**

Practical design, construction, testing and troubleshooting of electronic circuits, including single state and multistage amplifiers, power amplifiers, linear integrated circuits, and control devices.

**Prerequisites:** EET 125

**Pre- or corequisite:** EET 210

## **EET 261 Introduction to Microprocessors and Microcontrollers (3 Credit Hours)**

Introduction of software and hardware that relates to PIC16FXXX 8 bit microprocessor and microcontroller architectures, interface circuitry, and system designs. Programming in controls of internal and external hardware/peripherals, communication protocols between the logic circuits, peripherals, and MCUs. The ASM programming and design is the focus and C coding will also be introduced.

**Prerequisites:** EET 120 and EET 125

## **EET 263 Introduction to Programmable Logic Controllers (PLCs) (3 Credit Hours)**

An introduction to the design and programming of automatic machine controls. Topics include controls diagrams, programmable logic controllers, ladder logic programming, interfacing, sensors, transducers, encoders, analog I/O, PID, motor controls, codes and standards, controls programming languages, controls safety, and pneumatics. Lab assignments include ladder logic program simulations.

**Prerequisites:** EET 120 or EET 350

**Pre- or corequisite:** EET 210

## **EET 295 Topics (1-3 Credit Hours)**

Study of selected topics.

## **EET 300 Advanced Circuit Analysis (3 Credit Hours)**

General analysis of linear networks using classical methods, Laplace transforms and computer-aided methods. Topics include single element transients, first- and second-order circuits, transfer function analysis, Bode plots and waveform analysis. Circuit analysis software is used to support the analytical methods.

**Prerequisites:** MATH 211 and a grade of C or better in EET 200

## **EET 310 Digital Electronics (3 Credit Hours)**

First course in an upper division sequence in digital electronics circuits and systems. Topics include a comprehensive treatment of Boolean algebra, computer arithmetic, and applications of digital integrated circuits.

**Prerequisites:** EET 120, EET 125, EET 205, and EET 210

## **EET 312 Principles of Communication Systems (4 Credit Hours)**

Overview of communications systems, including both time and frequency domain analysis. Topics include spectrum analysis, analog modulation methods, digital modulation methods, receiver design, and multiplexing methods. Virtual laboratory projects utilize simulation software.

**Prerequisites:** EET 300 and ENGT 305

## **EET 315 Digital Electronics Laboratory (2 Credit Hours)**

Application-oriented experiments and design problems in digital electronics. Multistage prototype construction requiring system design, module interface, and Engineering Design Journaling.

**Prerequisites:** junior standing

**Pre- or corequisite:** EET 310

## **EET 320 Microcontroller Applications (3 Credit Hours)**

This is the second course in the digital electronics course sequence. The course will focus on software/hardware design of microprocessors and microcontrollers in C under ARM M4 and PIC microcontrollers, interface circuitry, simulation, and system designs in CAD circuit layout. The focus will be on application of microprocessor-based systems design.

**Prerequisites:** EET 120 and EET 125

## **EET 325 Microcontroller Applications Laboratory (2 Credit Hours)**

Hands-on implementation of microprocessor and microcontroller systems and peripheral interfacing experiments. Emphasis is placed on the hardware and software design and firmware construction in embedded system applications.

**Prerequisites:** junior standing

**Pre- or corequisite:** EET 320

## **EET 330 Linear Electronics (3 Credit Hours)**

General treatment of linear electronic circuits with emphasis on the operational amplifier and integrated circuits derived from it. Topics include various amplifier circuits and converters, integrators and differentiators, comparators, waveform generators, active filters, A/D and D/A converters, and regulators. Design of circuits to meet specifications. Circuit analysis software is used to validate some of the designs.

**Prerequisites:** EET 210 and EET 300

## **EET 335 Linear Electronics Laboratory (2 Credit Hours)**

Design testing, and evaluation of 'linear' electronic circuits and subsystems with primary emphasis on circuit components and modules. Measurement techniques, instrumentation and error analysis. Simulation of circuit designs using Multisim including transient response and frequency response.

**Prerequisites:** junior standing

**Pre- or corequisite:** EET 330

## **EET 350 Fundamentals of Electrical Technology (3 Credit Hours)**

A comprehensive course in electrical engineering technology for nonmajors. Major topics are basic electricity (AC and DC), circuit analysis, linear electronics and digital electronics. Not open to electrical engineering technology majors except as a substitute for EET 110 in special cases.

**Prerequisites:** junior standing

**Pre- or corequisite:** MATH 211

**EET 355 Electrical Laboratory (1 Credit Hour)**

Selected electrical laboratory topics for nonmajors including basic measurements, instrumentation, operational amplifiers, digital circuits, and rotating machines. Not open to electrical engineering technology majors.

**Prerequisites:** junior standing

**Pre- or corequisite:** EET 350

**EET 360 Electrical Power and Machinery (3 Credit Hours)**

A study of synchronous and asynchronous AC machinery, DC machinery, power distribution systems, and instrumentation.

**Prerequisites:** EET 200 or EET 350

**EET 366 Electrical Power and Machinery Laboratory (2 Credit Hours)**

A laboratory course dealing with electrical power and machinery as covered in EET 360.

**Prerequisites:** EET 205 or EET 355

**Pre- or corequisite:** EET 360

**EET 367 Cooperative Education (1-3 Credit Hours)**

Available for pass/fail grading only. Student participation for credit based on the academic relevance of the work experience, criteria, and evaluative procedures as formally determined by the department and Career Development Services prior to the semester in which the work experience is to take place.

**Prerequisites:** approval by the department and Career Development Services in accordance with the policy for granting credit for Cooperative Education programs

**EET 368 Internship (1-3 Credit Hours)**

Available for pass/fail grading only. Academic requirements will be established by the department and will vary with the amount of credit desired. Allows students to gain short duration career-related experience.

**Prerequisites:** approval by department and Career Development Services

**EET 369 Practicum (1-3 Credit Hours)**

Available for pass/fail grading only.

**Prerequisites:** approval by department and Career Development Services

**EET 370 Energy and The Environment (3 Credit Hours)**

A study of existing and new energy production methods, energy as a purchased/traded commodity, physics of energy, positive and negative implications for the environment, economics of energy alternatives, and resulting human/social impacts.

**Prerequisites:** PHYS 101N or PHYS 111N or PHYS 226N or PHYS 231N

**EET 373 Instrumentation (3 Credit Hours)**

Fundamental concepts of electromechanical devices used in mechatronics and automation control systems. The working principles, calibration, interfacing methods and control loops of analog and digital instrumentation devices in a process control system. The instrumentation devices, including sensors, actuators, signal conditioning circuits and data acquisition boards, will be used in class projects as basic feedback control blocks in practical simulation and PLC-based mechatronics systems. The simulation projects will use PLC hardware, MATLAB and/or LabView software.

**Prerequisites:** EET 210 and EET 263; or ENGT 270

**EET 395 Topics (1-3 Credit Hours)**

Study of selected topics.

**Prerequisites:** junior standing

**EET 396 Topics (1-3 Credit Hours)**

Study of selected topics.

**Prerequisites:** junior standing

**EET 405 Data Communications and Computer Networks (3 Credit Hours)**

The course provides an overview of the local area networks (LANs), wide-area networks (WANs), and backbone technologies. It combines the fundamental concepts of data communications and networking with practical applications and emphasizes the OSI reference model and its relationship to traditional and next-generation LAN/WAN technologies, as well as general topics such as network topology, network interface, client/server hardware, bridges and routers. Hands-on activities using Wireshark are included.

**Prerequisites:** ENGT 305

**EET 412 Wireless Communication Systems (3 Credit Hours)**

Topics include digital encoding techniques, signal-to-noise comparisons of different analog and digital modulation methods, link analysis, basic data transmission, cellular networks, wireless standards, basic computer networks framing and protocols, and satellite communication. System level simulations for determining subsystem design requirements and overall performance.

**Prerequisites:** ENGT 305

**EET 420 Advanced Logic Design (3 Credit Hours)**

Advanced digital logic design and circuit reduction. Topics include lattice structure, symmetry recognition and simplification, threshold logic, design-for-testing techniques, shortest path test planning, adaptive testing, and fuzzy logic. Computer assignments include design simulation and testing.

**Prerequisites:** ENGT 305 and EET 310

**EET 430 Advanced Motion Control Systems (3 Credit Hours)**

A study of modern control devices and applications including electrical, mechanical and pneumatic types. This course is a study of modern electro-mechanical devices and advanced PLCs as applied to modern automation process control systems. The course covers motion control mathematical modeling, design using advanced PLCs and motion control PLC module cards, closed loop control theory and simulations. The emphasis is on understanding the underlying principles that support the building blocks of industrial process control systems.

**Prerequisites:** ENGT 305 and EET 360

**EET 470 Microcontrollers/Embedded-Based Designs (3 Credit Hours)**

Advanced embedded system designs. Topics focus in ADC, DAC, EEPROM External Memories, temperature sensor, digital RF wireless communications, communications in synchronous and asynchronous serial forms of SCI, SPI, & I2C, and parallel communication in system integration and design. The 32 bit ARM M4 in C code designs will be used in the course.

**Prerequisites:** EET 310, EET 320, and EET 325

**EET 483 Introduction to Smart Grids (3 Credit Hours)**

The course introduces the fundamental principles and techniques in smart grids, with focus on information and communication technologies (ICT) deployed to modernize the electric energy infrastructure. It provides an overview on: the smart grid and its main components; smart devices at transmission, distribution and customer level; distributed energy resources (DER) and emerging technologies; customer systems, including demand response, home energy management and smart appliances; communications technologies and standards/protocols for the smart grid; and smart distribution and customer system projects from real-world smart grid projects.

**Prerequisites:** EET 360 and ENGT 305

**EET 485 Electrical Power Systems (3 Credit Hours)**

Fundamentals of electrical power transmission and distribution systems. Transformer operation/application, balanced/unbalanced loads, power factor correction, per-unit system system applications, fault calculations, power quality, over-current protection, relay construction/application, lighting system design, grounding, and introduction to the National Electric Code.

**Prerequisites:** EET 360 and ENGT 305

**EET 495 Topics in Electrical Engineering Technology (1-3 Credit Hours)**

Study of selected topics.

**Prerequisites:** junior standing

**EET 496 Topics in Electrical Engineering Technology (1-3 Credit Hours)**

Study of selected topics.

**Prerequisites:** junior standing