

# Electronics (ELEC)

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## Courses

### **ELEC 120 Introduction to Electronics (3 Hours)**

This is a beginning course in electronics technology that is appropriate for both electronic majors and other interested students. An overview of basic electronic theory, principles and components is presented. In addition, the laboratory exercises will emphasize the operation and use of the primary pieces of electronic test equipment and the fabrication of selected circuits.

### **ELEC 125 Digital Electronics I (4 Hours)**

This is a beginning course in which students will study and practice the basic concepts of digital electronics. Topics will include digital number systems, logic gates, logic circuits, flip-flops, digital arithmetic, counters and registers.

### **ELEC 134 DC Circuits\* (4 Hours)**

**Prerequisites or corequisites:** ELEC 120 and MATH 130 (or higher) with a grade of "C" or higher.

This course covers resistive circuits having DC sources. Analysis topics include Ohm's law, Kirchoff's law, Watt's law, the superposition theorem, Thevenin's theorem and Norton's theorem. The current, voltage and resistance relationships in series, parallel and combination circuits will be studied.

### **ELEC 186 CompTIA A+ Core 1 (3 Hours)**

This course aligns with the CompTIA A+ Core 1 certification exam. Students learn about personal computer (PC) hardware and peripheral components, network components and connections, network services, virtualization, cloud computing, mobile and print devices. A best-practices approach to troubleshooting is introduced. 3 credit hours.

### **ELEC 212 Fundamentals of Light and Lasers\* (3 Hours)**

**Prerequisites :** MATH 131 (or higher).

This is the foundational course necessary for applying lasers and/or photonics to other technologies. It covers the basics of light and lasers that will allow a technician to continue his or her studies in any photonics-enabled technology. This course reviews the physics of light, geometrical and wave optics, light sources, basic optical material and lab equipment, laser principles, and laser safety.

### **ELEC 227 Digital Electronics II\* (4 Hours)**

**Prerequisites :** ELEC 125 with a grade of "C" or higher.

Students will continue their study of digital concepts and will learn how to build digital circuitry using digital integrated circuit chips and basic concepts of computer organization. In addition, emphasis will be placed on learning how to troubleshoot digital circuits and digital systems. Each student will build a digital computer through a series of laboratory projects.

### **ELEC 234 AC Circuits\* (4 Hours)**

**Prerequisites :** ELEC 134 with a grade of "C" or higher and MATH 130 (or higher) with a grade of "C" or higher.

The analysis techniques presented in Electronics I will be applied to complex circuits driven by Alternating Current (AC) and pulsed sources. The responses of the circuits having resistance, impedance, inductive and capacitive reactance will be analyzed. Other topics will include transformers and electronic filters.

### **ELEC 235 Digital Systems and Applications\* (4 Hours)**

**Prerequisites :** ELEC 225 or ELEC 227.

This course is designed to provide an introduction to advanced digital systems concepts and applications. This course is a continuation of topics introduced in the Digital Electronics I and II classes. Included are hardware and software topics in embedded systems, peripherals, displays, processors, storage media, diagnostics and troubleshooting. Analog and digital data acquisition and processing will also be covered.

### **ELEC 236 Semiconductor Devices\* (4 Hours)**

**Prerequisites :** ELEC 234 with a grade of "C" or higher.

Topics for this class include the analysis and understanding of diodes and transistors. Special purpose diodes, bipolar junction transistors (BJT) and field effect transistors (FET) will be examined. Additional topics include operational amplifiers (Op-Amps), four-layer semiconductor devices and voltage regulators. Op-Amp applications will cover comparators, summing amplifiers, integrators, differentiators and active filters.

### **ELEC 240 Electronic Communication Systems\* (4 Hours)**

**Prerequisites :** ELEC 236 with a grade of "C" or higher.

This course provides a study of electronic communication systems used in today's world. Topics will include the electromagnetic spectrum, decibels, signal-to-noise ratio, AM and FM super-heterodyne radios, antennas, transmission lines and the Global Positioning System.

### **ELEC 251 Laser Systems and Applications\* (3 Hours)**

**Prerequisites :** ELEC 212.

Laser Systems and Applications covers more advanced concepts in photonics and the operating principles, output characteristics, diagnostics and applications for fiber- and diode-based lasers. These lasers will be classified according to their active medium, output wavelength and applications.

### **ELEC 252 Specialized Lasers and System Integration\* (3 Hours)**

**Prerequisites or corequisites:** ELEC 251.

The advanced course will focus on the function on the Fiber Laser and the Diode (Semiconductor) Laser. Students will work with laser operation and safety procedures. Topics will also cover system integration and the subsystems required in today's industry that depend on Photonics.

**ELEC 271 Electronics Internship\* (1-3 Hour)**

**Prerequisites** : Department approval.

This course affords the student the opportunity to apply classroom knowledge to an actual work environment. It will provide selected advanced electronics technology students with appropriate on-the-job experience with area employers, under instructional oversight, that will promote the student's career goals. 18 hrs. approved and appropriate work activity/wk.

**ELEC 291 Independent Study\* (1-7 Hour)**

**Prerequisites** : 2.0 GPA minimum and department approval.

Independent study is a directed, structured learning experience offered as an extension of the regular curriculum. It is intended to allow individual students to broaden their comprehension of the principles of and competencies associated with the discipline or program. Its purpose is to supplement existing courses with individualized, in-depth learning experiences. Such learning experiences may be undertaken independent of the traditional classroom setting, but will be appropriately directed and supervised by regular instructional staff. Total contact hours vary based on the learning experience.