

# ELT - ELECTRONICS TECHNOLOGY

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## ELT 103. Math Study Skills for Electronics

### 1 Credit (1)

Covers specific math study skills and critical thinking processes to reinforce practical applications of math and its use with electronics. The student will be introduced to electronic mathematical formulas during the problem-solving steps required for circuit analysis. May be repeated up to 4 credits.

**Prerequisite(s)/Corequisite(s):** E T 183 OR E T 184. Restricted to Community Colleges only.

## ELT 105. Basic Electricity and Electronics

### 3 Credits (2+2P)

Fundamentals of electricity and electronics, basic circuit devices, meters, transistors, integrated circuits and other solid state devices, computers, fiber optics, and industrial application topics. Minimum math proficiency of CCDM 103 or CCDM 104 required or math placement into CCDM 114 or higher. Restricted to: Community Colleges only. Crosslisted with: AERT 111

## ELT 110. Electronics I

### 4 Credits (3+3P)

Fundamentals of electronics including: components, schematics, Ohm's law, Thevenin's and Norton's theorems, and series/parallel circuits incorporating passive, active and magnetic elements. Introduction to AC circuits. Crosslisted with: AERT123. Restricted to: Community Colleges only.

## ELT 120. Mathematics for Electronics

### 4 Credits (4)

Includes fundamental mathematics, algebra, sine, cosine, and other elementary functions as they specifically apply to the operation, manipulation, and evaluation of direct current (DC) and alternating current (AC) circuits. Minimum math proficiency of CCDM 114 required or math placement into MATH 1215 or higher. Restricted to: Community Colleges only. Crosslisted with: AERT 124

## ELT 135. Electronics II

### 4 Credits (3+3P)

Analysis of AC circuits, filters, and resonance. Introduction to solid state fundamentals including diodes and rectifier circuits, voltage regulators, various transistors and transistor characteristics, amplification and amplifiers, photoelectric effects, gates and timing circuits. Restricted to Community Colleges campuses only.

**Prerequisite(s):** ELT 110 and ELT 120.

## ELT 155. Electronics CAD and PCB Design

### 3 Credits (2+2P)

Introduction to and the use of commercially available CAD software covering schematic representation of electronic components and circuits. Printed circuit board layout techniques including proper schematic capture, netlist generation, design rule checking and manual routing covered.

## ELT 160. Digital Electronics I

### 4 Credits (3+3P)

Number systems, codes, Boolean algebra, logic gates, Karnaugh maps, combination circuits, flip-flops, and digital troubleshooting techniques. Restricted to: Community Colleges only.

**Prerequisite(s):** ELT 110 and (ELT 120 or MATH 1215).

## ELT 175. Soldering Practices

### 3 Credits (2+2P)

Methods and techniques of hand soldering in the production of high quality and reliable soldering connections. Restricted to: Community Colleges only.

## ELT 205. Semiconductor Devices

### 4 Credits (3+3P)

Analysis and trouble shooting of linear electronic circuits including amplifiers, op-amps, power supplies, and oscillators. Restricted to: Community Colleges only.

**Prerequisite(s):** ELT 110 and ELT 135.

## ELT 215. Microprocessor Applications I

### 4 Credits (3+2P)

Fundamentals of microprocessor architecture and assembly language with an emphasis on hardware interfacing applications.

**Prerequisite(s)/Corequisite(s):** ELT 235. Prerequisite(s): ELT 160.

Restricted to: Community Colleges only.

## ELT 220. Electronic Communication Systems

### 4 Credits (3+2P)

Principles and applications of circuits and devices used in the transmission, reception, and processing of RF, microwave, digital and telecommunications systems.

**Prerequisite(s)/Corequisite(s):** ELT 205. Prerequisite(s): ELT 135.

Restricted to: Community Colleges only.

## ELT 221. Cooperative Experience I

### 1-6 Credits

Supervised cooperative work program. Student is employed in an approved occupation and supervised and rated by the employer and instructor. Student will meet in a weekly class. Graded S/U.

**Prerequisite:** consent of instructor.

## ELT 222. Cooperative Experience II

### 1-6 Credits

Continuation of ELT 221. Maximum of 6 credits. Graded S/U.

**Prerequisite:** consent of instructor.

## ELT 225. Computer Applications for Technicians

### 3 Credits (2+2P)

An overview of computer hardware, software applications, operating systems, high level programming languages and networking systems.

## ELT 230. Microprocessor Applications II

### 4 Credits (3+2P)

Advanced microprocessor interfacing techniques. Topics in A/D and D/A conversion, I/O port address decoding, direct memory accessing, and peripheral device interfacing applications.

**Prerequisite:** ELT 215.

## ELT 235. Digital Electronics II

### 3 Credits (2+2P)

Sequential logic circuits, latches, counters, shift-registers, fault analysis and troubleshooting of digital IC s, multiplexers, timers, encoders/decoders, arithmetic circuits, pulse shaping, and memory devices.

Restricted to: Community Colleges only.

**Prerequisite(s):** ELT 160.

## ELT 240. Introduction to Photonics

### 4 Credits (3+2P)

Nature of light, light emitters, lasers, detectors, fiber optics communications systems, and other applications of light to electronics.

**Prerequisite:** ELT 135 or consent of instructor.

**ELT 245. Radar: Principles and Applications**

**3 Credits (3)**

Explores the principles of operation for microwave radar applications and supporting subsystems.

**Prerequisite:** E T 246.

**Learning Outcomes**

1. Students will analyze the various factors that comprise the Radar Equation and apply the equation in calculations for various scenarios. Students will explain the principles of Moving Target Indication, Pulse Doppler, Phased Array, and Synthetic Aperture Radars, and their advantages and disadvantages. Students will analyze and calculate the effects of clutter and environmental noise, earth surface scattering, and atmospheric attenuation, diffraction, and refraction on radar propagation. Students will analyze the performance of supporting radar subsystems, including transmitters, receivers, antennas, tracking servos, and signal processing. Students will explain the kinds of information that can be obtained from radar signals and perform calculations associated with range determination, target motion resolution, and error. Students will explain the use of telemetry, and correlate test radar and telemetry measurements. Students will explain and compare radar countermeasures and analyze their effect on radar return cross-sections.

**ELT 250. Electronics Systems Analysis**

**2 Credits (1+3P)**

Capstone course emphasizing a systems approach to troubleshooting and maintaining complex electronics systems. Includes program review in preparation for technician certification.

**Prerequisite:** consent of instructor.

**ELT 260. Instrumentation Control and Signal Conditioning**

**4 Credits (3+2P)**

Introduction to sensors and transducers, signal conditioning and transmission for measuring and process control systems. Includes AD, DA converter, small servos and actuators. Prerequisite:ELT 205.

**ELT 265. Special Topics**

**1-6 Credits**

Topic to be announced in the Schedule of Classes.

**ELT 270. Biomedical Equipment Instrumentation**

**4 Credits (3+2P)**

Principles and applications of electronic circuits and devices used in biomedical equipment. Skills taught to include evaluating, troubleshooting and repairing various types of medical equipment.

**Prerequisite(s)/Corequisite(s):** ELT 260. Prerequisite(s): ELT 205.

Restricted to: Community Colleges only.