

ELC-112 DC/AC Electricity

COURSE DESCRIPTION:

Prerequisites: None

Corequisites: None

This course introduces the fundamental concepts of and computations related to DC/AC electricity. Emphasis is placed on DC/AC circuits, components, operation of test equipment; and other related topics. Upon completion, students should be able to construct, verify, troubleshoot, and repair DC/AC circuits. Course Hours Per Week: Class, 3. Lab, 6. Semester Hours Credit, 5.

LEARNING OUTCOMES:

Upon completing requirements for this course, the student will be able to:

1. Demonstrate safe practices and procedures with tools, materials, and industry accepted test equipment covered in the course.
2. Demonstrate appropriate use of test equipment, evaluate circuit performance and apply appropriate troubleshooting techniques to electrical circuits.
3. Construct and analyze series, parallel and combinations circuits using appropriate components.
4. Use appropriate laws and formulas to perform circuit calculations.
5. Interpret electrical schematics.
6. Describe the characteristics of various power sources.
7. Understand how to use multimeters to make measurements.

OUTLINE OF INSTRUCTION:

- I. Introduction to electricity
 - A. Scientific notation
 - B. Engineering (metric) notation
- II. Voltage, current, and power
 - A. Atomic theory
 - B. Electric charge
 - C. Electron theory
 - D. Voltage and current
 - E. Ohm's law
 - F. Power
 - G. Voltage and current measurements
- III. Voltage sources
 - A. Cells
 - B. Batteries
 1. Primary
 2. Secondary
 3. Wet
 4. Dry
 - C. Other sources of voltage
- IV. Resistance

- A. Resistivity of materials
- B. Temperature relation
- C. Types
- D. Color code
- V. Series circuits
 - A. Voltage drops
 - B. Circuit current
 - C. Circuit power
 - D. Voltage divider
 - E. Ground reference
- VI. Parallel and series-parallel circuits
 - A. Voltage drops
 - B. Circuit current
 - C. Circuit power
 - D. Current divider
- VII. Capacitance
 - A. Properties of capacitors
 - B. Types
 - C. Time constants
 - D. Capacitors in series
 - E. Capacitors in parallel
- VIII. Magnetism
 - A. Magnetic field
 - B. Types of magnetic sources
 - C. Electromagnetism
- IX. Inductance
 - A. Properties of inductors
 - B. Types
 - C. Time constants
 - D. Inductors in series
 - E. Inductors in parallel
- X. Alternating current and voltage
 - A. Electromagnetic induction
 - B. The sine wave
 - C. Frequency
 - D. Amplitude
 - E. Transformers
- XI. Alternating current circuits
 - A. Reactive components
 - 1. Inductive reactance
 - 2. Capacitive reactance
 - B. Impedance
 - C. Resonance
 - D. Power
 - 1. Apparent

2. Real
3. Reactive

REQUIRED TEXTBOOK AND MATERIAL:

The textbook and other instructional material will be determined by the instructor.