

## Common Course Numbering System

Your current Institution is CCCS

### Searching Current Courses For Spring 2015

**Course:** ELT 106

**Title:** Fundamentals of DC/AC

**Long Title:** Fundamentals of DC/AC

**Course Description:** Introduces the basic skills needed for many careers in electronics and related fields. Covers the operations and applications of basic DC and AC circuits consisting of resistors, capacitors, inductors, transformers and diodes. Emphasizes the use of common test instruments in troubleshooting.

**Min Credit:** 4

**Max Credit:**

**Origin Notes:** ACC

**Notes:** vised credits, competencies, & outline on 6-18-14: AW

#### STANDARD COMPETENCIES:

1. Identify and practice safe work habits.
2. Describe first aid for electrical shock.
3. Convert between metric prefixes.
4. Measure voltage, current and resistance with an analog and digital multimeter.
5. Identify electronic components by their shape, symbols and reference designators.
6. Determine the value and tolerance of a color-coded resistor.
7. Describe the construction and applications of potentiometers.
8. Apply Ohm's law.
9. Calculate power and energy.
10. Apply Kirchhoff's voltage and current laws.
11. Calculate voltage, current and resistance in a series resistive circuit, parallel resistive circuit and series-parallel resistive circuit.
12. Troubleshoot series-parallel circuits for opens and shorts.
13. Explain the operation of electromagnetic devices
14. Explain the operation of reactive devices (inductors and capacitors)
15. Test/troubleshoot reactive devices (inductors and capacitors)
16. Describe various types of inductors and capacitors.
17. Describe alternating current.
18. Convert between RMS and peak voltage.

19. Convert between frequency and period, and measure frequency, period and voltage with an oscilloscope.

20. Construct and test circuits with resistors, inductors and capacitors.

TOPICAL OUTLINE:

I. Introduction, Safety, Electrical Concepts

A. PPE

B. harmless, injurious, and lethal electrocution levels

II. Resistance

A. measurement

B. calculate equivalent resistance for series, parallel, and series-parallel configurations

III. Ohm's Law

A. Calculate voltage, current, and resistance values in series, parallel, series-parallel circuits

IV. Power

A. Calculate power given voltage, current, and/or resistance values in series, parallel, series-parallel circuits

V. Series DC Circuits

A. apply Kirchhoff's Voltage Law

B. Calculate current, resistance, and power

C. Troubleshoot opens and shorts

VI. Parallel DC Circuits

A. apply Kirchhoff's Current Law

B. Calculate current, resistance, and power

C. Troubleshoot opens and shorts

VII. Series-Parallel DC Circuits

A. simplify using series and parallel rules

B. apply Kirchhoff's Voltage and Current Laws

C. Calculate current, resistance, and power

D. Troubleshoot opens and shorts

VIII. Troubleshooting Series and Parallel Circuits

A. Apply Ohm's and Kirchhoff's Laws to malfunctioning circuits

B. Locate circuit faults (open or short) using a digital Multimeter

IX. Magnetism

A. Theory (domains)

- B. Electromagnetism (mmf, flux, field strength and density)
- X. Alternating Current and the Power Distribution System
  - A. Theory (phasor analysis)
  - B. Calculate apparent, true, and reactive power
  - C. Calculate power factor and phase shift
  - D. wye and delta power distribution systems
- XI. Inductors
  - A. DC characteristics
  - B. AC characteristics
- XII. Capacitors
  - A. DC characteristics
  - B. AC characteristics
- XIII. Pulse Waveforms, Oscilloscope and Function Generator
  - A. Use function generator to create sinewave, squarewave, and triangular waveforms (voltage vs. time)
  - B. Observe voltage vs. time waveforms on oscilloscope
  - C. Calculate and/or measure amplitude, period, frequency, and phase shift of sine, step, and triangle functions

**Course Offered At:**

Arapahoe Community College ACC  
Front Range Community College FRCC  
Lamar Community College LCC  
Pueblo Community College PCC  
Pikes Peak Community College PPCC

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