

Course Objectives/Course Outline
Spokane Community College

Course Title: Fundamentals of Electricity in HVAC/R

Prefix and Course Number: AIRC 103

Course Learning Outcomes:

By the end of this course, a student should be able to:

- Describe major concepts of basic electrical theory
- Describe Ohm's Law and its usage
- Solve problems using Ohm's Law in series, parallel, and series-parallel circuits
- Explain alternating current and direct current, and describe the differences between them
- Describe the operation and usage of capacitors, inductors, transformers, relays and contactors, and circuit protection devices
- Identify the electrical symbols used in schematic diagrams, and the components they represent
- Read and use basic wiring diagrams, including label diagrams and schematic diagrams
- Construct and analyze simple schematic diagrams
- Identify electrical safety procedures

Course Outline:

1. Fundamental Concepts of Electricity
 - a. Structure of an atom
 - b. Movement of electrons
 - c. Electric current
 - d. Conductors and insulators
 - e. Electromotive force
2. Fundamental Concepts of Magnetism
 - a. Basic laws of magnetism
 - b. Magnetic fields
 - c. Electromagnets
 - d. Magnetic shielding, lines of force, magnetic flux, self-inductance, mutual induction, and counter electromotive force
3. Fundamental Concepts of Alternating and Direct Current
 - a. Voltage, amperage, resistance, and wattage
 - b. Ohm's Law
 - c. Peak-to-peak, RMS, and average voltage values
 - d. Phase relationships
 - e. Inductive reactance, capacitive reactance, and impedance
 - f. Power factor
4. Series and Parallel Circuits
 - a. Application of Ohm's Law in series, parallel, and series-parallel circuits
 - b. Power
5. Electrical Symbols and Schematic Diagrams
 - a. Component symbols
 - b. Wiring diagrams
 - c. Schematic diagrams

Print Date: 9/26/19

- d. Reading and usage of schematic and wiring diagrams
- 6. Electrical Components
 - a. Capacitors and capacitance
 - b. Inductors and inductance
 - c. Transformers
 - d. Relays and contactors
- 7. Electrical Safety
 - a. Safety procedures and PPE
 - b. Grounding
 - c. GFCI
 - d. Lockout/tagout