

Virginia Western Community College

Advanced Troubleshooting and Service

AIR 238

Prerequisites

ELE 130 or ELE 133

Course Description

Presents advanced service techniques on wide variety of equipment used in refrigeration, air conditioning, and phases of heating and ventilation and controls.

Semester Credits: 3 Lecture Hours: 2 Lab/Clinical/Internship Hours: 1

Required Materials

Textbook:

Modern Refrigeration, 20th edition, ISBN#: 9781631263545

Electricity for Refrigeration, Heating and Air

Author: Smith

Edition: 10th

ISBN: 9781337399128

Other Required Materials:

- Safety Glasses are to be provided by the student and are required to be worn in the lab at all times
- USB storage device (1 G is adequate)

Course Outcomes

At the completion of this course, the student should be able to:

- To obtain a working knowledge of the HVAC troubleshooting, the properties and processes associated with it, as it relates to residential heating and cooling.
- Students will also learn to perform basic troubleshooting methods using tools and test equipment on actual HVAC equipment and components.
- The students will learn how to use the engineering data, electrical schematics, and technical manuals provided by the manufacturer of the equipment to determine the normal operation of the equipment.
- Based on these values students will be able to determine guidelines for the system to operate safely, dependably and efficiently.

- Ultimately by the end of the semester each student should have the ability to look at basic residential HVAC equipment and the accompanying components and apply the knowledge gained in the course to determine repair methods.

Topical Description

- Introduction, Course Orientation and Policies, Emergency and Safety Review, Electrical Fundamentals / Basic electrical symbols / schematics
- Electrical Test Equipment and Tools for HVAC
- Basic Electrical Motors and Controllers
- Current relays / Potential relays / Hard start relays
- Residential Electrical distribution panels / high voltage circuits / NEC wiring
- HVAC high and low voltage transformers and control circuits
- High voltage control circuits and controllers for condensers and air handlers
- Low voltage controls and equipment safety circuits
- Thermostats and T-stat wiring
- Basic wiring and components for AC condensers and air handlers
- Basic wiring and components for Heat Pumps
- Heat Pump defrost circuitry and safety features
- Auxiliary / Emergency Electrical Heating for Heat Pumps
- Gas furnace wiring and controls / sequence of operation
- Practical field testing and electrical troubleshooting
- Final test review / Final Exam

Notes to Instructors

None