

APRT 140A: ELECTRICAL BASICS FOR RESIDENTIAL HVAC SERVICE I

Foothill College Course Outline of Record

Heading	Value
Units:	2.5
Hours:	24 lecture, 30 laboratory per quarter (54 total per quarter)
Prerequisite:	Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Residential Service Apprenticeship Program.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Non-GE
Transferable:	None
Grade Type:	Letter Grade (Request for Pass/No Pass)
Repeatability:	Not Repeatable

Student Learning Outcomes

- A student will be able to identify basic residential gas furnace components and their functions.
- A student will be able to identify heat-cool, heat only, and cool only thermostats.

Description

Development of basic skills necessary for service technicians to service heating and air conditioning equipment with special emphasis on the basics of electricity and air filtration.

Course Objectives

The student will be able to:

- Describe alternating and direct electrical current.
- Take voltage, amperage and ohm readings on simplified electrical circuits.
- Identify heat-cool, heat only and cool only thermostats.
- Identify basic residential gas furnace components and their functions.
- Demonstrate practical skills in sheet metal and air conditioning service work.
- Explain replacement and cleaning decisions for common residential air filters.

Course Content

- Describe alternating and direct electrical current
 - Definition of electricity and its relationship to the atom
 - Definitions of A.C. and D.C. current
- Take voltage, amperage and ohm readings on simplified electrical circuits
 - Explanation of voltage, amperage and ohms
 - Working safely with electricity
 - Select and set up a multi-meter to take desired measurements
- Identify heat-cool, heat only and cool only thermostats

- Identify common thermostats and their functions
- Identify basic residential gas furnace components and their functions
 - Identify basic furnace components, functions and relationship to other components
 - Explain flow of electricity, combustion air, gas, exhaust, and conditioned air through basic furnace system components
- Demonstrate practical skills in sheet metal and air conditioning service work
 - Disconnect and/or lockout, tagout electrical source
 - Safely open access to circuits as needed
 - Visual check for electrical hazards, evidence of circuit overloads, disconnections, shorts or other problems
 - Practice safe techniques and troubleshooting sequence in using meters and other devices to verify circuit conditions
- Explain replacement and cleaning decisions for common residential air filters
 - Air filtration fundamentals
 - Document and report to supervisor or customer

Lab Content

- Identify components of heating and air conditioning equipment
- Practice safety techniques with electrical systems
- Perform electrical measurements for servicing

Special Facilities and/or Equipment

Laboratory equipped with air conditioning equipment.

Method(s) of Evaluation

- Results of written quizzes and tests
- Satisfactory completion of shop projects
- Comprehensive written final examination
- Maintenance of a workbook of student's daily work activities

Method(s) of Instruction

- Lecture
- Discussion
- Laboratory
- Demonstration

Representative Text(s) and Other Materials

International Training Institute for the Sheet Metal and Air Conditioning Industry. Residential HVAC Service Technician. International Training Institute, 2007.

NOTE: This is the standard Sheet Metal textbook/workbook used for this course. Although it may not be within 5 years of the required published date, it is the most current book used when teaching this course.

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

- Readings from textbook
 - Ohms and Power Law
- Writing assignments given in the laboratory

1. Complete the review item questions referring to Electrical Meters

Discipline(s)

Air Conditioning, Refrigeration, Heating