

APRT 140B: REFRIGERATION BASICS FOR RESIDENTIAL HVAC SERVICE

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2025
Units:	3
Hours:	30 lecture, 24 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 demonstrate practical skills in Sheet Metal heating and Air Conditioning service work, with appropriate safety precautions.
- A student will be able to identify and explain functions of the basic refrigeration cycle components.

Description

Development of the basics of refrigeration principles and residential systems for service technicians to service heating and air conditioning equipment.

Course Objectives

The student will be able to:

1. Apply practical skills handling refrigerants in HVAC service work, with appropriate safety precautions.
2. Explain the basic refrigeration cycle.
3. Identify and explain functions of basic refrigeration cycle components.
4. Describe and use refrigerant gauges and high vacuum evacuation equipment.
5. Assemble and braze refrigeration piping.

Course Content

1. Apply practical skills handling refrigerants in HVAC service work, with appropriate safety precautions
 - a. List techniques to keep refrigerant contained in transport, evacuation, and charge operations
 - b. Perform checks for ventilation, clean work area, and typical hazards on job sites

2. Explain the basic refrigeration cycle
 - a. The British Thermal Unit, BTU
 - b. Sensible and latent heat
 - c. The refrigeration cycle
3. Identify and explain functions of basic refrigeration cycle components
 - a. Components
 - b. Airflow in residential systems
4. Describe and use refrigerant gauges and high vacuum evacuation equipment
 - a. Use of refrigerant gauges
 - b. Evacuation procedures and techniques
 - c. Importance of removing moisture from refrigerant systems
 - d. Evaluation of vacuum service equipment
5. Assemble and braze refrigeration piping
 - a. Safe uses of oxy-acetylene brazing equipment
 - b. Charging a refrigeration system

Lab Content

1. Practice safety techniques for measuring and handling HVAC refrigerants
2. Practice safety techniques for use of oxy-acetylene brazing equipment
3. Assemble refrigerant piping

Special Facilities and/or Equipment

Laboratory equipped with air conditioning equipment.

Method(s) of Evaluation

Methods of Evaluation may include but are not limited to the following:

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

Methods of Instruction may include but are not limited to the following:

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. 2007.

This is the standard Sheet Metal textbook/workbook used for this course. Although it is older than 5 years, it is the most current book used when teaching this course.

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

1. Readings from textbook on instruments and gauges
2. Writing assignments given in the laboratory
 - a. Make a schematic drawing of a basic refrigeration system with components
 - b. Describe the refrigerant properties at each point in the system

Discipline(s)

Air Conditioning, Refrigeration, Heating