

APSM 155C: MAINTAINING EFFICIENT OPERATION OF ELECTRIC COOLING & HEATING EQUIPMENT

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2022
Units:	2
Hours:	25 lecture, 15 laboratory per quarter (40 total per quarter)
Prerequisite:	Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal 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 successful student will be able to demonstrate start up procedures for a gas heating unit, using a start up sheet.
- A successful student will be able to demonstrate common preventive maintenance procedures and diagnostic tests.

Description

Students learn to perform maintenance procedures required for efficient operation of HVAC systems.

Course Objectives

The student will be able to:

1. Explain and perform start-up, diagnosis, repair
2. Provide maintenance of gas heating/electric cooling package units and split systems

Course Content

1. Explain and perform start-up, diagnosis, repair and maintenance of gas heating/electric cooling package units and split systems
 - a. Start-up sheets (Lec and Lab)
 - i. Reasons for start-up sheets, both mechanical and legal (Lec and Lab)
 - ii. Examples of different start-up sheets; discussion of differences (Lec and Lab)
 - iii. How a start-up sheet can be used for troubleshooting (Lec and Lab)
 - b. Maintenance (Lec and Lab)
 - i. Perform procedures and diagnostics typically performed at the various levels of preventative maintenance (Lec and Lab)

- ii. Describe importance of maintenance to companies (Lec and Lab)
- c. Importance of customer relationships (Lec and Lab)
 - i. Soft skills—generate revenue for the company and provide the customer with good service (Lec and Lab)
- d. Demonstrate the ability, both verbally and in writing proposals, for additional work over and above maintenance contracts (Lec and Lab)
- e. Perform preventative maintenance on various types of systems in the lab (Lec and Lab)

Lab Content

1. Perform preventative maintenance on various assigned HVAC systems in the lab

Special Facilities and/or Equipment

1. Laboratory with sheet metal service tools
2. Personal protective equipment
3. When taught via Foothill Global Access, on-going access to computer with email software and hardware; email address

Method(s) of Evaluation

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

Results of written quizzes and tests
 Responses in class discussions
 Comprehensive written final examination
 Comprehensive final project
 Demonstration of assigned skills to acceptable level per instructor

Method(s) of Instruction

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

Lecture
 Discussion
 Demonstration
 Lab assignments followed by discussion

Representative Text(s) and Other Materials

Whitman, B., B. Johnson, J. Tomczyk, and E. Silberstein. *Refrigeration and Air Conditioning Technology*, 8th ed.. 2016.

Auvil, Ronnie J.. *HVAC Controls Systems*, 4th ed.. 2017.

These are the standard sheet metal textbooks/workbooks used for this course. Although one or more may not be within five years of the required published date, they are the most current books used when teaching this course.

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

1. Sample reading assignment: From the Refrigeration and Air Conditioning Technology textbook, Unit 40, "Typical Operating Conditions"
2. Sample writing assignment: Answer review questions related to assigned reading

Discipline(s)

Sheet Metal or Air Conditioning, Refrigeration, Heating