

APSM 158C: INVERTER, VRF & HEAT RECOVERY TECHNOLOGY

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2022
Units:	2.5
Hours:	35 lecture, 5 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 explain operation of heat recovery systems.
- A successful student will be able to explain theory and operation of inverter technology.

Description

Students explore the components and principals that comprise inverter, variable refrigerant flow (VRF), and heat recovery systems as used in the HVAC industry.

Course Objectives

The student will be able to:

1. Explain theory and operation of inverter technology.
2. Perform installation, repair and maintenance of variable refrigerant flow (VRF) systems.
3. Explain operation of heat recovery systems.
4. Install, maintain and repair heat recovery systems.

Course Content

1. Explain theory and operation of inverter technology
 - a. Explain the capabilities and advantages of modulated refrigerant flow for energy efficiency (Lec and Lab)
 - b. Explain how voltage is inverted to enable a compressor to modulate refrigerant flow (Lec and Lab)
2. Perform installation, repair and maintenance of variable refrigerant flow (VRF) systems
 - a. Demonstrate piping techniques required for installation of VRF and heat recovery systems (Lec and Lab)
 - b. Explain and demonstrate refrigerant charging procedures required for VRF and heat recovery systems (Lec and Lab)

3. Explain operation of heat recovery systems
 - a. Explain how heat is recovered and utilized in a heat recovery system (Lec and Lab)
4. Install, maintain and repair heat recovery systems
 - a. Install and charge an inverter and heat recovery system (Lec and Lab)
 - b. Discuss troubleshooting of inverter and heat recovery systems (Lec and Lab)

Lab Content

1. Install and charge an inverter and heat recovery system

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.

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

1. Assigned reading from the textbook
2. Sample writing assignment: Diagram a heat recovery system, labeling components and using notes to explain the function of each component

Discipline(s)

Sheet Metal or Air Conditioning, Refrigeration, Heating