

# APSM 158C: INVERTER, VRF & HEAT RECOVERY TECHNOLOGY

## Foothill College Course Outline of Record

Heading	Value
<b>Units:</b>	2.5
<b>Hours:</b>	35 lecture, 5 laboratory per quarter (40 total per quarter)
<b>Prerequisite:</b>	Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.
<b>Degree &amp; Credit Status:</b>	Degree-Applicable Credit Course
<b>Foothill GE:</b>	Non-GE
<b>Transferable:</b>	None
<b>Grade Type:</b>	Letter Grade (Request for Pass/No Pass)
<b>Repeatability:</b>	Not Repeatable

## Student Learning Outcomes

- A successful student will be able to explain theory and operation of inverter technology.
- A successful student will be able to explain operation of heat recovery systems.

## 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:

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

## Course Content

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

D. Install, maintain and repair heat recovery systems.

- Install and charge an inverter and heat recovery system (Lec and Lab)
- Discuss troubleshooting of inverter and heat recovery systems (Lec and Lab)

## Lab Content

- Install and charge an inverter and heat recovery system.

## Special Facilities and/or Equipment

- Laboratory with sheet metal service tools
- Personal protective equipment

## Method(s) of Evaluation

- 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

- 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. Boston, MA: Cengage Learning, 2016.

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

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

## Discipline(s)

Sheet Metal, Air Conditioning, Refrigeration, Heating