



Course Outline

2026-2027 Catalog

HVAC 31 - Advanced HVACR Components

Catalog Description

Transfer Status: CSU

Prerequisite: HVAC 21, HVAC 22, HVAC 23

Corequisite: HVAC 32, HVAC 33

Unit(s): 4.00

Lecture: 34.00 Contact hours/68.00 Out of class hours/102.00 Total hours/2.00 Unit(s)

Lab: 102.00 Contact hours/0.00 Out of class hours/102.00 Total hours/2.00 Unit(s)

Total: 136.00 Contact hours/68.00 Out of class hours/204.00 Total hours/4.00 Unit(s)

Course Description: This course is designed to provide pre-employment training in Heating, Ventilation, Air Conditioning and Refrigeration (HVACR) systems for industrial trades. Emphasis will be placed on developing safety skills, identifying fasteners, understanding of common control devices, troubleshooting oil-fired heating systems and various system accessories. These areas of instruction will be applied in several hands on performance lab exercises. This course is part of the National Center For Construction Education and Research (NCCER) core curriculum qualification.

Objectives

Upon successful completion of this course, the student should be able to:

1. Practice safety skills that are required on job-sites.
2. Identify the types, uses, and installation methods of fasteners.
3. Identify and describe the operation of common HVACR control circuit devices.
4. Describe how to troubleshoot the components related to gas heating.
5. Describe how to troubleshoot a typical oil-fired heating system.
6. Describe how to troubleshoot various HVAC system accessories.

Course Content

Topic Titles / Suggested Time Topic

Lecture

<u>Topics</u>	<u>Lec Hrs</u>
Introduction and Safety	1.50
Hardware, Fasteners, Electrical Connectors, and Applications	2.50
Terminology	3.00
Basic Design of Electrical Circuitry and Motors	12.00
Servicing Gas Furnaces and Boilers	4.00
Construction and Servicing Oil Furnace	4.00
Accessories for Home Automation	4.00
Efficiency for Home Automation Options	3.00
Total Hours: 34.00	

Lab

<u>Topics</u>	<u>Lab Hrs</u>
Introduction and Safety	1.50
Hardware, Fasteners, Electrical Connectors, and Applications	8.00
Terminology	6.00
Basic Design of Electrical Circuitry and Motors	24.00
Servicing Gas Furnaces and Boilers	18.00
Construction and Servicing Oil Furnace	18.00
Accessories for Home Automation	13.25
Efficiency for Home Automation Options	13.25
Total Hours: 102.00	

Methods of Instruction

- A. Demonstrations
- B. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture

- C. Laboratory Experiments
- D. Lecture
- E. Multimedia Presentations

Methods of Evaluation

- A. Exams/Tests
- B. Quizzes
- C. Homework
- D. Lab Projects

Examples of Assignments

Reading Assignments

- 1. Read the module introducing troubleshooting an oil-fired heating system and be prepared to discuss in class.
- 2. Read assigned trade journal article and be prepared to discuss in class.

Writing Assignments

- 1. Write an order of operations for servicing a gas furnace.
- 2. Write a two-page essay, explaining how the trade journal article can be implemented in workplace safety and how it relates to the class.

Out-of-Class Assignments

- 1. Research online the proper process for servicing a boiler using manufactures' publications and be prepared to discuss in class.
- 2. Read module 5 and then answer the review questions at the end of the module.

Recommended Materials of Instruction

National Center for Construction Education and Research (NCCER). (2018). Heating, Ventilating, and Air Conditioning - Level 3. *Pearson Education INC.*

Other Learning Materials

All tools listed in the HVACR Program Guide.

Minimum Qualifications

Air Cond,Refrig,Heating
Industrial Technology

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