



Course Outline

2026-2027 Catalog

HVAC 12 - Basic HVACR Systems

Catalog Description

Transfer Status: CSU

Corequisite: ITEC 55, HVAC 11, HVAC 13

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 teach the functions of Heating, Ventilation, Air Conditioning and Refrigeration (HVACR) systems and where they are used in the industry. Emphasis will be placed on developing safety skills, heating and cooling system types, equipment categories, air distribution, components of a system, and the different types of tubing used in the industry. 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) Heating, Ventilation, and Air Conditioning 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. Explain the fundamental concepts of heating and combustion.
3. Identify common refrigerants and their unique characteristics.
4. Describe the mechanical equipment and materials used to create air distribution systems.
5. Recognize and identify different types of plastic, copper, and carbon tubing and their related fittings.
6. Describe and demonstrate the safe process of soldering copper tubing.
7. Describe and identify the various types of steel pipe and fittings.

Course Content

Topic Titles / Suggested Time Topic

Lecture

<u>Topics</u>	<u>Lec Hrs</u>
Introduction and Safety	2.00
Types of Heating	5.50
Types of Cooling	5.50
Basic Air Distribution	5.50
Types of Equipment	5.00
Introduction to System Components	5.00
Introduction to Types of Plastic, Copper, and Carbon Tubing	5.50
Total Hours: 34.00	

Lab

<u>Topics</u>	<u>Lab Hrs</u>
Introduction and Safety	2.00
Types of Heating	18.00
Types of Cooling	18.00
Basic Air Distribution	16.00
Types of Equipment	16.00
Introduction to System Components	16.00
Introduction to Types of Plastic, Copper, and Carbon Tubing	16.00
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

Methods of Evaluation

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

Examples of Assignments

Reading Assignments

1. Read the introduction to the various types of heating 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 the mechanical equipment that is required for a particular air distribution system.
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 fundamental concepts of heating and combustion using manufactures' publications and be prepared to discuss in class.
2. Research OSHA publications for the use and safety of power tools properly and write a one-page essay.

Recommended Materials of Instruction

National Center for Construction Education and Research (NCCER). (2018). Heating, Ventilating, and Air Conditioning - Level 1. *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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