



Course Outline

2026-2027 Catalog

HVAC 41 - Advanced HVACR Systems

Catalog Description

Transfer Status: CSU

Prerequisite: HVAC 31, HVAC 32, HVAC 33

Corequisite: HVAC 42, HVAC 43

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, water related concepts, indoor air quality, energy management systems, air balancing, and proper startup and shutdown procedures. 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. Describe the basic concepts related to water as a substance and its movement.
2. Identify sources of building air contaminants and describe how to detect such problems.
3. Identify and describe the operation of electric energy-demand reduction and ice storage systems.
4. Describe the architecture of a building management system.
5. Explain how to balance an air distribution system.

Course Content

Topic Titles / Suggested Time Topic

Lecture

<u>Topics</u>	<u>Lec Hrs</u>
Introduction and Safety	1.50
Hydronic Systems	6.00
Indoor Air Quality	4.00
Energy Efficiency	6.00
Energy Management Systems	6.00
Air Balancing	4.50
System Startups & Shut Down	6.00
Total Hours:	
34.00	

Lab

<u>Topics</u>	<u>Lab Hrs</u>
Introduction and Safety	1.50
Hydronic Systems	20.00
Indoor Air Quality	12.50
Energy Efficiency	18.50
Energy Management Systems	18.50
Air Balancing	12.50
System Startups & Shut Down	18.50
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 energy efficiency considerations 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 system startups and shut downs.
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 maintaining cooling towers 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 4. *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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