



## Course Outline

2026-2027 Catalog

### HVAC 42 - Advanced HVACR Design

#### Catalog Description

**Transfer Status:** CSU

**Prerequisite:** HVAC 31, HVAC 32, HVAC 33

**Corequisite:** HVAC 41, HVAC 43

**Unit(s):** 5.00

**Lecture:** 51.00 Contact hours/102.00 Out of class hours/153.00 Total hours/3.00 Unit(s)

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

**Total:** 153.00 Contact hours/102.00 Out of class hours/255.00 Total hours/5.00 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, reading construction drawings, system design, commercial refrigeration, alternative HVAC systems, and leadership skills for supervisors. 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 uses of specifications and submittals in construction projects.
2. Explain how to complete a heating and cooling load estimate.
3. Explain how to design air distribution systems.
4. Identify and describe various commercial and industrial refrigeration system components.
5. Identify and describe various unique heating and cooling systems and equipment.
6. Describe current issues and organizational structures in industry today.

#### Course Content

##### Topic Titles / Suggested Time Topic

##### Lecture

| <u>Topics</u>                     | <u>Lec Hrs</u> |
|-----------------------------------|----------------|
| Introduction and Safety           | 1.00           |
| Construction Drawings             | 10.00          |
| Advanced System Design            | 12.00          |
| In-depth Commercial Refrigeration | 12.00          |
| Alternative Systems               | 6.00           |
| Fundamentals of Leadership        | 10.00          |
| <b>Total Hours:</b>               | <b>51.00</b>   |

##### Lab

| <u>Topics</u>                     | <u>Lab Hrs</u> |
|-----------------------------------|----------------|
| Introduction and Safety           | 2.00           |
| Construction Drawings             | 20.00          |
| Advanced System Design            | 24.00          |
| In-depth Commercial Refrigeration | 24.00          |
| Alternative Systems               | 12.00          |
| Fundamentals of Leadership        | 20.00          |
| <b>Total Hours:</b>               | <b>102.00</b>  |

#### 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

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

## Examples of Assignments

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### Reading Assignments

1. Read module 10 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 determining the load calculations on an assigned 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 correct use for a passive cooling system using manufactures publications and be prepared to discuss in class.
2. Read module 9 and then answer the review questions at the end of the module.

## Recommended Materials of Instruction

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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

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Air Cond,Refrig,Heating  
Industrial Technology

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**Created/Revised by:** Williams, Tom

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