Course Outline

2026-2027 Catalog

HVAC 23 - Intermediate HVACR Concepts

Catalog Description

Transfer Status: CSU
Prerequisite: ITEC 55, HVAC 11, HVAC 12, HVAC 13
Corequisite: HVAC 21, HVAC 22
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, commercial air distribution, factors to be controlled when dealing with indoor air quality, types of hot-water heating systems, and devices used in hydronic systems. 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. Describe various approaches used in commercial air distribution.
3. Explain the importance of indoor air quality and the factors to be controlled.
4. Describe the primary types of hot-water heating systems and their components.
5. Describe the methods and devices used to balance water flow in hydronic systems.

Course Content

Topic Titles / Suggested Time Topic

Lecture

Topics	Lec Hrs
Introduction and Safety	1.50
Ventilation and Commercial Air	4.50
Ducting Design	4.50
Ducting Materials	4.00
Ducting Techniques	4.50
Proper Installation	4.50
Airflow	5.50
Diagnostic Tools	5.00
Total Hours:	**34.00**

Lab

Topics	Lab Hrs
Introduction and Safety	1.50
Ventilation and Commercial Air	12.50
Ducting Design	20.50
Ducting Materials	15.00
Ducting Techniques	15.50
Proper Installation	15.00
Airflow	10.00
Diagnostic Tools	12.00
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
E. Multimedia Presentations

Methods of Evaluation

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

Examples of Assignments

Reading Assignments

1. Read assigned trade journal article and be prepared to discuss in class.
2. Read the module on the factors involved in indoor air quality and be prepared to discuss in class.

Writing Assignments

1. Write an order of operations for the proper installation of fiberglass ducting materials.
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 setting airflow using manufactures' publications and be prepared to discuss in class.
2. Research OSHA publications for the proper use and safety of power tools and write a one-page essay on your research.

Recommended Materials of Instruction

National Center for Construction Education and Research (NCCER). (2018). Heating, Ventilating, and Air Conditioning - Level 2. *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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Date: 02/25/2019