Course Outline

2026-2027 Catalog

HVAC 33 - Internship with Local Trade Company

Catalog Description

Transfer Status: CSU

Prerequisite: HVAC 21, HVAC 22, HVAC 23

Corequisite: HVAC 31, HVAC 32

Unit(s): 7.00

Lecture: 51.00 Contact hours/102.00 Out of class hours/153.00 Total hours/3.00 Unit(s)
Lab: 204.00 Contact hours/0.00 Out of class hours/204.00 Total hours/4.00 Unit(s)
Total: 255.00 Contact hours/102.00 Out of class hours/357.00 Total hours/7.00 Unit(s)

Course Description: This course is designed to teach students skills by simulations and field internship experiences required to meet industry standards in Heating, Ventilation, Air Conditioning and Refrigeration (HVACR) systems and North American Technician Excellence (NATE) certification. Emphasis will be placed on developing safety skills, troubleshooting skills, application of electrical diagnostics and customer relation practices. These areas of instruction will be applied in several hands on performance lecture and 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. Demonstrate the use and care of appropriate personal protective equipment (PPE).
3. Identify, service and diagnose Direct Drive, Permanent Split Capacitor (PSC) and Electronically Commutated Motors (ECM).
4. Identify, service, and diagnose hermetic, semi-hermetic, reciprocating and scroll compressors.
5. Identify infrared gas heaters and describe proper application and how they operate.
6. Describe how to perform periodic servicing of typical heating systems.
7. Introduction of outside air requirements and application.
8. Introduction to ductless and variable refrigerant flow systems and describe the basic approach to trouble shooting.

Course Content

Topic Titles / Suggested Time Topic

Lecture

Topics	Lec Hrs
Introduction and Safety	1.50
Application of Trade Math	4.50
Application of Electrical Diagnostics	5.00
Troubleshooting of Heat Pump Systems	5.00
Troubleshooting of Gas Heating Systems	5.00
Troubleshooting of Oil Heating Systems	5.00
Troubleshooting of Cooling Systems	5.00
Troubleshooting of Accessories	4.00
Troubleshooting of Control Circuits and PSC Motors	4.00
Application of Zoning Practices	4.00
Application of Ducting Practices Design and Installation	4.00
Application of Customer Relation Practices	4.00
Total Hours:	**51.00**

Lab

Topics	Lab Hrs
Introduction and Safety	1.50
Application of Trade Math	18.50
Application of Electrical Diagnostics	20.00
Troubleshooting of Heat Pump Systems	22.00
Troubleshooting of Gas Heating Systems	20.00
Troubleshooting of Oil Heating Systems	20.00
Troubleshooting of Cooling Systems	20.00

Topics	Lab Hrs
Troubleshooting of Accessories	18.00
Troubleshooting of Control Circuits and Motors	16.00
Application of Zoning Practices	16.00
Application of Ducting Practices	16.00
Application of Customer Relation Practices	16.00
Total Hours:	**204.00**

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 module 8 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 step required for troubleshooting the assigned heat pump 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. Write an order of operations for troubleshooting the assigned heat pump system.

Out-of-Class Assignments

1. Research online the proper process for setting up an electrical circuit using manufactures publications and be prepared to discuss in class.
2. Read module 3 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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