

**HVAC 104 Course Outline as of Summer 2025****CATALOG INFORMATION**

Dept and Nbr: HVAC 104 Title: AIR COND &amp; REFRIGERATION

Full Title: Air-Conditioning and Refrigeration Systems

Last Reviewed: 11/27/2023

| Units   |      | Course Hours per Week |      | Nbr of Weeks | Course Hours Total |       |
|---------|------|-----------------------|------|--------------|--------------------|-------|
| Maximum | 3.00 | Lecture Scheduled     | 2.00 | 17.5         | Lecture Scheduled  | 35.00 |
| Minimum | 3.00 | Lab Scheduled         | 3.00 | 6            | Lab Scheduled      | 52.50 |
|         |      | Contact DHR           | 0    |              | Contact DHR        | 0     |
|         |      | Contact Total         | 5.00 |              | Contact Total      | 87.50 |
|         |      | Non-contact DHR       | 0    |              | Non-contact DHR    | 0     |

Total Out of Class Hours: 70.00

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable

Grading: Grade or P/NP

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly: HVACR 104

**Catalog Description:**

In this course, students will learn about installation, commissioning, maintenance of residential air-conditioning systems, and maintenance and repair of foodservice refrigeration. Students will also be introduced to commercial air-conditioning equipment as a means of reinforcing topics related to refrigeration and to preview more advanced careers in the Heating, Ventilation, Air Conditioning, and Refrigeration (HVACR) industry.

Students with previous experience in the HVACR industry may be prepared to enroll directly in HVACR 104. Contact the instructor or Department Chair for more information.

**Prerequisites/Corequisites:****Recommended Preparation:**

Completion or concurrent enrollment in HVACR 101 and HVACR 102

**Limits on Enrollment:****Schedule of Classes Information:**

Description: In this course, students will learn about installation, commissioning, maintenance of

residential air-conditioning systems, and maintenance and repair of foodservice refrigeration. Students will also be introduced to commercial air-conditioning equipment as a means of reinforcing topics related to refrigeration and to preview more advanced careers in the Heating, Ventilation, Air Conditioning, and Refrigeration (HVACR) industry.

Students with previous experience in the HVACR industry may be prepared to enroll directly in HVACR 104. Contact the instructor or Department Chair for more information. (Grade or P/NP)

Prerequisites/Corequisites:

Recommended: Completion or concurrent enrollment in HVACR 101 and HVACR 102

Limits on Enrollment:

Transfer Credit:

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

|                      |                      |                   |                  |
|----------------------|----------------------|-------------------|------------------|
| <b>AS Degree:</b>    | <b>Area</b>          | <b>Effective:</b> | <b>Inactive:</b> |
| <b>CSU GE:</b>       | <b>Transfer Area</b> | <b>Effective:</b> | <b>Inactive:</b> |
| <b>IGETC:</b>        | <b>Transfer Area</b> | <b>Effective:</b> | <b>Inactive:</b> |
| <b>CSU Transfer:</b> |                      | <b>Effective:</b> | <b>Inactive:</b> |
| <b>UC Transfer:</b>  |                      | <b>Effective:</b> | <b>Inactive:</b> |

**CID:**

**Certificate/Major Applicable:**

Certificate Applicable Course

## **COURSE CONTENT**

### **Student Learning Outcomes:**

At the conclusion of this course, the student should be able to:

1. Identify and describe residential air-conditioning and foodservice refrigeration systems and their operations.
2. Diagnose and troubleshoot operational faults within residential air-conditioning systems.
3. Diagnose and troubleshoot operational faults in foodservice refrigeration systems.

### **Objectives:**

At the conclusion of this course, the student should be able to:

1. Use manufacturer specifications and manuals to identify residential air-conditioning systems and their components.
2. Use diagnostic tools to troubleshoot faults in residential air-conditioning and foodservice refrigeration equipment.
3. Describe how different commercial air-conditioning systems operate, as a means of reinforcing topics related to refrigeration and a window into more advanced careers in the HVACR industry.

### **Topics and Scope:**

- I. Residential Air-Conditioning Systems

- A. Residential ducted air-conditioning systems
  - B. Residential split air-conditioning systems
  - C. Commissioning residential air-conditioning systems
  - D. Diagnosing and troubleshooting residential air-conditioning systems
- II. Foodservice Refrigeration
- A. Overview of foodservice refrigeration (coolers and freezers)
  - B. Systems and components
  - C. Diagnosing and troubleshooting foodservice refrigeration
- III. Commercial Air-Conditioning Systems
- A. Types of commercial air-conditioning systems
  - B. Refrigeration
  - C. Mechanical and electrical components
  - D. Additional training and employment opportunities

Topics and Scope above will be covered in an integrated lecture and lab environment.

### Assignment:

#### Lecture-Related Assignments:

1. Weekly reading (10-30 pages) or instructional videos
2. Problem sets (10-20)
3. Quizzes (5-10)
4. Midterm
5. Final exam

#### Lab-Related Assignments:

1. Lab activities (5-10)
2. Skill demonstration (5-10)

### Methods of Evaluation/Basis of Grade:

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments and skill demonstrations are more appropriate for this course.

Writing  
0 - 0%

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Problem sets; lab activities

Problem solving  
10 - 40%

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Skill demonstrations

Skill Demonstrations  
20 - 40%

**Exams:** All forms of formal testing, other than skill performance exams.

Quizzes; midterm; final exam

Exams  
20 - 40%

**Other:** Includes any assessment tools that do not logically fit into the above categories.

Participation; lab activities

Other Category  
20 - 40%

**Representative Textbooks and Materials:**

This course will utilize HVACR industry instructional training materials.