

**HVAC 102 Course Outline as of Summer 2025****CATALOG INFORMATION**

Dept and Nbr: HVAC 102 Title: HVACR SYSTEM COMPONENTS

Full Title: Residential HVACR System Components

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 102

**Catalog Description:**

In this course, students will study the electrical and mechanical components of residential heating and air-conditioning systems, including system controls, motors, compressors, refrigerants, and sensors. This course prepares students for the Environmental Protection Agency's EPA 608 examination for safe refrigerant handling.

Students with previous experience in the HVACR industry may be prepared for the more advanced HVACR courses. Contact the instructor or Department Chair for more information.

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

Course Completion or Concurrent Enrollment in HVAC 101 ( or HVACR 101)

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

Description: In this course, students will study the electrical and mechanical components of residential heating and air-conditioning systems, including system controls, motors,

compressors, refrigerants, and sensors. This course prepares students for the Environmental Protection Agency's EPA 608 examination for safe refrigerant handling.

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

Prerequisites/Corequisites:

Recommended: Course Completion or Concurrent Enrollment in HVAC 101 ( or HVACR 101)

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>	Effective:	Inactive:
<b>CSU GE:</b>	<b>Transfer Area</b>	Effective:	Inactive:
<b>IGETC:</b>	<b>Transfer Area</b>	Effective:	Inactive:
<b>CSU Transfer:</b>		Effective:	Inactive:
<b>UC Transfer:</b>		Effective:	Inactive:

**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 key system components in air-conditioning and heating systems.
2. Identify and describe refrigerant systems and how temperature, pressure, and heat affect refrigerants.
3. Explain common joining methods with copper, steel, and PVC.

**Objectives:**

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

1. Describe the various components of residential Heating, Ventilation, Air Conditioning, and Refrigeration (HVACR) systems.
2. Explain the how refrigerants and refrigerant systems work.
3. Demonstrate knowledge of safe and proper handling of refrigerants.

**Topics and Scope:**

- I. Residential HVACR System Components
  - A. Heating and cooling components
    1. HVAC cooling components
    2. Compressors
    3. Diagnosing compressor problems

4. Evaporators and condensers
  5. Metering devices
  6. Refrigeration system accessories
  7. HVAC heating components
- B. Motors
1. HVAC motors
  2. AC motor lab
  3. Aftermarket motors
  4. Aftermarket parts
  5. Contactors and motor starters
  6. Compressor starting relays and capacitors
  7. Troubleshooting motors
- C. Controls and electronics
1. Residential HVAC controls
  2. Thermostats and heating controls
  3. Solid state electronics
- D. Piping and ductwork
1. Basic construction for trades
  2. Ductwork fabrication and installation overview
  3. Hot work
  4. Copper joining methods
  5. Steel joining methods lab
  6. PVC/CPVC joining methods lab
- E. Basic maintenance
- II. Refrigerants and Refrigerant Systems
- A. Refrigerant systems
  - B. Charging
  - C. Leak checks
  - D. Evaluation
- III. EPA 608 Certification Test Preparation

The 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. Skills demonstrations (5-10)
2. Lab activities (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 - 30%

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

Participation; lab activities

Other Category  
20 - 30%

**Representative Textbooks and Materials:**

This course will utilize HVACR industry instructional training materials.