

**HVACR 103 Course Outline as of Fall 2024****CATALOG INFORMATION**

Dept and Nbr: HVACR 103 Title: HEAT, AIR, VENTILATION

Full Title: Residential Heating, Airflow and Ventilation

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:

**Catalog Description:**

In this course, students will learn about common residential heating systems, including heat pumps, furnaces, and boilers. Students also learn about airflow, Heating, Ventilation, Air Conditioning, and Refrigeration (HVACR) system load calculations and combustion analysis.

Students with previous experience in the HVACR industry may be prepared to enroll directly in HVACR 103. 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 common residential heating systems, including heat pumps, furnaces, and boilers. Students also learn about airflow, Heating, Ventilation, Air Conditioning, and Refrigeration (HVACR) system load calculations and

combustion analysis.

Students with previous experience in the HVACR industry may be prepared to enroll directly in HVACR 103. 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:**

**AS Degree:**      **Area**      Effective:      Inactive:

**CSU GE:**      **Transfer Area**      Effective:      Inactive:

**IGETC:**      **Transfer Area**      Effective:      Inactive:

**CSU Transfer:**      Effective:      Inactive:

**UC Transfer:**      Effective:      Inactive:

**CID:**

**Certificate/Major Applicable:**

Certificate Applicable Course

## **Approval and Dates**

Version:	02	Course Created/Approved:	1/24/2022
Version Created:	8/24/2023	Course Last Modified:	6/25/2024
Submitter:	Benjamin Goldstein	Course last full review:	11/27/2023
Version Status:	Approved (Changed Course)	Prereq Created/Approved:	11/27/2023
Version Status Date:	11/27/2023	Semester Last Taught:	
Version Term Effective:	Fall 2024	Term Inactive:	Summer 2025

## **COURSE CONTENT**

**Student Learning Outcomes:**

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

1. Explain how residential heating systems operate.
2. Measure airflow and calculate heating and cooling loads for systems.
3. Document the steps involved in combustion analysis.

**Objectives:**

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

1. Explain how the main types of residential heating systems operate.
2. Perform calculations to determine proper heating and cooling loads.
3. Troubleshoot electrical and fuel-related operating issues for heating systems.
4. Describe the proper procedures for a combustion analysis.

**Topics and Scope:**

## I. Residential Heating Systems

- A. Furnaces
- B. Boilers
- C. Heat pumps
- D. Maintenance procedures

## II. Airflow

- A. Airflow and comfort
- B. Humidity
- C. Air balancing and testing procedures

## III. Ventilation and Indoor Air Quality

## IV. Load Calculations

- A. Manual D calculations
- B. Manual J calculations

## V. Combustion Analysis

- A. Diagnostic procedures and tools
- B. Worst-case Combustion Appliance Zone (CAZ) depressurization

## VI. Safety Procedures

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

### Assignment:

#### Lecture-Related Assignments:

1. Weekly reading (10-30 pages) and 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 demonstrations (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.

## **OTHER REQUIRED ELEMENTS**

### **STUDENT PREPARATION**

Matric Assessment Required:	X	Exempt From Assessment
Prerequisites-generate description:	NP	No Prerequisite
Advisories-generate description:	U	User-Generated Text
Prereq-provisional:	N	NO
Prereq/coreq-registration check:	N	No Prerequisite Rules Exist
Requires instructor signature:	N	Instructor's Signature Not Required

### **BASIC INFORMATION, HOURS/UNITS & REPEATABILITY**

Method of instruction:	02	Lecture
	04	Laboratory
	71	Internet-Based, Simultaneous Interaction
	72	Internet-Based, Delayed Interaction
Area department:	INDTRA	Industrial & Trade Technology
Division:	73	Science, Technology, Engineering & Mathematics
Special topic course:	N	Not a Special Topic Course
Program status:	1	Certificate Applicable Course
Repeatability:	00	Two Repeats if Grade was D, F, NC, or NP
Repeat group id:		

### **SCHEDULING**

Audit allowed:	N	Not Auditable
Open entry/exit:	N	Not Open Entry/Open Exit
Credit by exam:	N	Credit by examination not allowed
Budget code: Program:	0000	Unrestricted
Budget code: Activity:	0936	Environmental Control Tech

### **OTHER CODES**

Discipline:	Air Conditioning, Refrigeration, Heating OR Construction Technology	
Basic skills:	N	Not a Basic Skills Course
Level below transfer:	Y	Not Applicable
CVU/CVC status:	Y	Distance Ed, Not CVU/CVC Developed
Distance Ed Approved:	Y	<a href="#">Either online or hybrid, as determined by instructor</a>
Emergency Distance Ed Approved:	N	None
Credit for Prior Learning:	N	Agency Exam
	N	CBE
	N	Industry Credentials
	N	Portfolio
Non-credit category:	Y	Not Applicable, Credit Course
Classification:	Y	Career-Technical Education
SAM classification:	C	Clearly Occupational
TOP code:	0946.10	Energy Systems Technology
Work-based learning:	N	Does Not Include Work-Based Learning
DSPS course:	N	Not a DSPS Course

In-service:

N

Not an in-Service Course

Lab Tier:

21

Credit Lab - Tier 1