

HVACR 104 Course Outline as of Fall 2024**CATALOG INFORMATION**

Dept and Nbr: HVACR 104 Title: AIR COND & 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:

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:

AS Degree:	Area	Effective:	Inactive:
CSU GE:	Transfer Area	Effective:	Inactive:

IGETC:	Transfer Area	Effective:	Inactive:
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CSU Transfer:	Effective:	Inactive:
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UC Transfer:	Effective:	Inactive:
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CID:

Certificate/Major Applicable:

Certificate Applicable Course

Approval and Dates

Version:	02	Course Created/Approved:	2/7/2022
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. 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.

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	Either online or hybrid, as determined by instructor
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