Course Information Form (CIF)

Course Code: AFD 217

Course Title: Basic Refrigeration

Department: Applied Sciences and Technologies
PCS Code: 1.2 - Occupational/Technical Instruction
CIP Code: 47.0604
Repeatability: 0

Effective Date: Summer 2026

Credit Hours

Catalog Notation: 2-2-3
Credit Hour Distribution:

Lecture: 2	Lab: 2	Clinical: 0	**Total: 3**

General Course Information

Catalog Description

Construction and operation of mobile refrigeration units with emphasis on maintenance, service, diagnosis, and repair of automotive and light truck air conditioners.

General Course Objectives

Students will identify operational components of mobile air conditioning (A/C) units, perform prescribed service procedures on mobile A/C units, and develop diagnostic procedures and skills for mobile A/C units.

Minimum Placement Levels

English	Reading	Math
Placement into ENG 098	Placement into CCS 098	Placement into MAT 060

Prerequisites

Credit or concurrent enrollment in AFD 115

Methods of Evaluation

The minimum number of evaluation methods will include: 2 exams, 7 quizzes, and 2 practicals.

Instructional Materials and Additional Supplies

Today's Technician - Auto Heating and Air Conditioning, Schnable, 2007

Course Content

General Learning Outcomes (GLOs)

- Critical Thinking and Information Literacy: Students will demonstrate the ability to evaluate perspectives, evidence, and implications, and to locate, assess, and use information effectively.
- Reasoning and Inquiry: Students will demonstrate the ability to solve problems using deductive reasoning and logic, quantitative reasoning, or the scientific method.
- Technology: Students will demonstrate the ability to evaluate, select, and appropriately use current and emerging tools.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Scientific Principles	1. Define heat. 2. Describe heat transfer. 3. Describe basic gas laws regarding temperature and pressure. 4. Define temperature-pressure (T-P) relationships in R12 and R134a refrigerants. 5. Define and describe LATENT heat.	3	0	0
Refrigeration Components	1. Describe five main refrigeration components: 1) compressor, 2) condenser, 3) drier or accumulator, 4) thermal expansion valve (TXV) or expansion tube, and 5) evaporator.	2	0	0
Refrigeration Cycle	1. Describe pressure, temperature, and state of R12 and R134a in each zone of a system.	1	0	0
Refrigerants	1. Describe characteristics of R12 and R134a. 2. Develop safety procedures for working with refrigerants. 3. Transfer and handle refrigerants. 4. Demonstrate recycling of and measure for contamination in refrigerants.	2	2	0
System Operation and Performance	1. Use body senses to determine correct system operation. 2. Use thermometer to check evaporator ambient and refrigerant temperatures. 3. Operate controls for system stabilization and performance testing. 4. Analyze and test the different systems.	3	2	0
Evaporator Controls	1. Describe operation and function of modern automotive climate control systems.	2	2	0
Compressor Controls	1. Define components and operation of: a) evaporator pressure switch, b) evaporator temperature switch, c) ambient switch, d) low pressure switch, e) thermal limiter switch, and f) power steering cutout switch.	2	0	0
Specific Systems	1. Describe components and operation of automotive heating/ventilation/air conditioning (HVAC) systems.	2	2	0
System Service	1. Discharge system. 2. Evacuate system. 3. Recharge system: a) Vapor charge and b) liquid charge. 4. Develop skill in using A/C recycling and charging equipment.	3	6	0
Locating Leaks	1. Locate leaks using a leak detector. 2. Use dyes in refrigerants to visually spot leaks.	2	4	0
System Diagnosis	1. Develop systematic procedure for diagnosis of mobile A/C units. 2. Describe diagnostic conditions with related temperatures, gauge readings, and visual signs. 3. Identify tests for correct operation of all HVAC system components.	3	6	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Component Repair	1. Describe how to change automotive HVAC components. 2. Describe how to solder components. 3. Describe how to epoxy components.	2	4	0
Compressor Service	1. Examine modern automotive compressors. 2. Perform reseal operation on serviceable A/C compressors.	3	2	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
30	30	0