Course Information Form (CIF)

Course Code: AFM 217

Course Title: Climate Control Systems

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: 3-2-4
Credit Hour Distribution:

Lecture: 3	Lab: 2	Clinical: 0	**Total: 4**

General Course Information

Catalog Description

Construction and operation of climate control systems. Emphasis on maintenance, service, diagnosis, and repair of automotive and light truck air conditioners. Students who successfully complete this course may receive credit for Advanced Climate Control Diagnosis from Ford Motor Company.

General Course Objectives

Students will learn about the operation and components of mobile air conditioning (A/C) units, prescribed service procedures on mobile A/C units, and diagnostic procedures/skills for analyzing and repairing mobile A/C units.

Minimum Placement Levels

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

Prerequisites

Credit in AFM 257

Methods of Evaluation

The minimum number of evaluation methods include: 3 quizzes, 17 lab exercises, 3 web courses, 1 lab practical exam, 1 ASE exam, and 1 Ford Certification exam.

Instructional Materials and Additional Supplies

- Global Fundamentals, Climate Control, Ford Motor Company
- Automotive Technology, Erjavec, Thompson Delmar Learning

Course Content

General Learning Outcomes (GLOs)

- 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. Demonstrate knowledge of scientific principles. 2. Define heat. 3. Describe heat transfer. 4. Describe basic gas laws regarding temperature and pressure. 5. Define temperature-pressure relationships in R-12, R134A, and R1234yf. 6. Define and describe LATENT heat.	6	2	0
Refrigeration Components	1. Describe the five main components of a mobile A/C unit: 1) compressor, 2) condenser, 3) drier or accumulator, 4) thermostatic expansion valve (TXV) or fixed orifice tube, and 5) evaporator.	2	0	0
Refrigeration Cycle	1. Describe pressure, temperature, and state of R-12, R134A, and R1234yf in each zone of system.	1	1	0
Refrigerants	1. Demonstrate knowledge of refrigerants. 2. Describe characteristics of R-12, R134A, and R1234yf. 3. Describe nomenclature and chemical makeup of R-12, R134A, and R1234yr. 4. Describe safety procedures for working with refrigerants. 5. Demonstrate how to correctly transfer and handle refrigerants.	2	2	0
System Operation and Performance Test	1. Demonstrate proper system operation. 2. Use body senses to determine correct system operation. 3. Use a thermometer to check evaporator ambient and refrigerant temperatures. 4. Operate controls for system stabilization and performance testing. 5. Performance test the different systems.	4	2	0
Evaporator Controls	1. Describe operation and function of the various common means of evaporator temperature control.	1	1	0
Compressor Controls	1. Define components and operation of: a) evaporator pressure switch, b) evaporator temperature switch, c) ambient switch, and d) low pressure switch.	1	0	0
System Service	1. Demonstrate proper system service. 2. Discharge a system. 3. Evacuate a system. 4. Recharge a system via two different methods: a) vapor charge and b) liquid charge. 5. Use separate manifold gauge sets and Robinair and Sun Air-Kare charging stations.	4	6	0
Locate Leaks	1. Demonstrate proper leak detection procedures. 2. Use a halide leak detector. 3. Use a Robinair electronic leak detector. 4. Spot leaks visually via the dyes in refrigerants.	2	2	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
System Diagnosis	1. Demonstrate proper system diagnosis. 2. Develop systematic procedure for diagnosis of mobile A/C units. 3. Describe sixteen diagnostic conditions with related temperatures, gauge readings, and visual signs. 4. Develop tests for correct operation of: a) TXV, b) pilot operated absolute (POA), c) evaporator pressure regulator valve (EPR), d) evaporator switches, e) condenser, f) fan clutch, g) compressors, and h) blower relays.	6	6	0
Component Repair	1. Describe how to change: a) drier, b) TXV, c) POA, d) evaporator, and e) muffler and lines.	2	2	0
Compressor Service	1. Examine the following compressors: a) Sanyo, b) Nippendenso, and c) rotary style. 2. Perform reseal operation on compressors.	8	2	0
Electronic Climate Control Systems	1. Diagnose electronic climate control systems and related sub-systems including Electronic Automatic Temperature Control (EATC) and Automatic Temperature Control (ATC) systems.	6	4	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
45	30	0