



## MASTER COURSE OUTLINE

Prepared By: Dick Wynder

Date: April 2019

### COURSE TITLE

Automotive Heating and Air Conditioning

### GENERAL COURSE INFORMATION

Dept.: AUT

Course Num: 231

(Formerly: )

CIP Code: 47.0604

Intent Code: 21

Program Code: 712

Credits: 6

Total Contact Hrs Per Qtr.: 99

Lecture Hrs: 33

Lab Hrs: 66

Other Hrs:

Distribution Designation:

### COURSE DESCRIPTION (as it will appear in the catalog)

This course covers the diagnosis, servicing, and repair of modern vehicle heating and air conditioning systems. Classroom and laboratory lessons provide training and experience using modern refrigeration servicing and recycling equipment necessary to meet environmental regulations. CFC-12 and HFC-134A systems and equipment are utilized and retrofitting following Environmental Protection Agency guidelines is discussed. This course is designed to prepare the student for the ASE/NATEF Heating and Air Conditioning test.

### PREREQUISITES

All first-year certificate Auto courses OR instructor permission

### TEXTBOOK GUIDELINES

Appropriate heating and air conditioning textbook as chosen by Automotive Faculty (Example: Automotive Heating and Air Conditioning and NATEF Correlated Task Sheets for Heating and Air Conditioning by James D. Haldeman and Tom Birch)

### COURSE LEARNING OUTCOMES

*Upon successful completion of the course, students should be able to demonstrate the following knowledge or skills:*

1. Describe the operation of an automotive heating and air conditioning system.
2. Use and interpret automotive service manuals
3. Accurately diagnose heating and air conditioning malfunctions using accepted and environmentally sound service procedures.
4. Perform necessary service and repair of mobile and automobile heating and air conditioning systems.
5. Receive training and certification in HFC-134A refrigerant recycling and service procedures.
6. Pass the Automotive Service Excellence (ASE) Test for Automotive Heating and Air Conditioning (A7)

### INSTITUTIONAL OUTCOMES

### COURSE CONTENT OUTLINE

Unit 1: Safety, Environmental, and Hazardous Materials

- Chapter 1. Service Information Tools and Safety
- Chapter 2. Environmental and Hazardous Materials

Unit 2: Introduction to Automotive HVAC

- Chapter 3. Heating and Air Conditioning Principles
- Chapter 4. The Refrigeration Cycle
- Chapter 5. Air Conditioning Compressors and Service
- Chapter 6. Refrigerants and Refrigerant Oils
- Chapter 7. Air Conditioning System Components, Operation, and Service

Unit 3: HVAC Controls

- Chapter 8. Air Management Systems
- Chapter 9. HVAC Electricity and Electronics
- Chapter 12. Automatic Temperature Controls

Unit 4: Operation and Diagnosis

- Chapter 10. Cooling System Operation and Diagnosis
- Chapter 11. Heating System Operation and Diagnosis
- Chapter 15. Air Conditioning System Diagnosis and Repair
- Chapter 12. Automatic Temperature Control
- Chapter 13. Hybrid and Electric Vehicle HVAC Systems
- Chapter 14. Refrigerant Recovery, Recycling, and Recharging

**DEPARTMENTAL GUIDELINES** *(optional)*

---

**DIVISION CHAIR APPROVAL**

---

**DATE**