



AUTOMOTIVE HVAC SYSTEMS — AUTM 2137

A. Course Description

- **Credits:** 3.00
- **Lecture Hours/Week:** 1.00
- **Lab Hours/Week:** 2.00
- **OJT Hours/Week:** 0
- **Prerequisites:** None
- **Corequisites:** None
- **MnTC Goals:** None

This course covers the principles of air conditioning and types, diagnosis, testing, and repair of air conditioning systems. The course includes practical work on air conditioning systems such as evacuating, replacement of components, charging, recycling, and performance testing. Reference materials available through Alldata, Mitchell, Identifix, AC Delco, Subaru of America and the student textbook will be utilized. Prerequisites: AUTM 1003, 1013, 2117, 2127

B. Course Effective Dates: 8/21/17 – Present

C. Outline of Major Content Areas

1. 1) Heating system components and operation
2. 2) Ventilation system components and operation
3. 3) Air Conditioning system components and operation
4. 4) HVAC controls operation and diagnosis
5. 5) HVAC system service and repair

D. Learning Outcomes

1. 1. Identify and demonstrate industry recognized professionalism and safety procedures
2. 10. Inspect and replace A/C compressor drive belts; determine necessary action
3. 11. Inspect evaporator housing water drain; perform necessary action
4. 12. Inspect the condition of discharged oil; determine necessary action
5. 13. Inspect, test, and/or replace A/C compressor clutch components and/or assembly
6. 14. Leak test A/C system; determine necessary action
7. 15. Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels)
8. 16. Performance test A/C system; diagnose A/C system malfunctions using principles

of refrigeration

9. 17. Remove and inspect AC system mufflers, hoses, lines, fittings, O-rings, seals, and service valves; perform necessary action
10. 18. Remove, inspect, and reinstall A/C compressor and mountings; determine required oil quantity
11. 19. Remove, inspect, and reinstall receiver/drier or accumulator/drier; determine required oil quantity
12. 2. Complete repair orders to include customer information vehicle identifying information, customer concern, related service history, cause, and correction
13. 20. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins
14. 21. Using scan tool, observe and record related HVAC data and trouble codes
15. 22. Diagnose temperature control problems in the heater/ventilation system; determine necessary action
16. 23. Evacuate and charge A/C system
17. 24. Identify (by label application or use of a refrigerant identifier) and recover A/C system refrigerant
18. 25. Inspect and test electrical cooling fan, fan control system, and circuits; determine necessary action
19. 26. Inspect and test heater control valve(s); perform necessary action
20. 27. Inspect engine cooling and heater system hoses and belts; perform necessary action
21. 28. Label and store refrigerant
22. 29. Perform correct use and maintenance of refrigerant handling equipment
23. 3. Determine need for an additional A/C system filter; perform necessary action
24. 30. Recycle refrigerant
25. 31. Remove, inspect, and reinstall condenser; determine required oil quantity
26. 32. Remove, inspect, and reinstall evaporator; determine required oil quantity
27. 33. Remove, inspect, and reinstall heater core
28. 34. Test recycled refrigerant for non-condensable gases
29. 4. Determine recommended oil for system application
30. 5. Diagnose abnormal operating noises in the A/C system; determine necessary action
31. 6. Identify and demonstrate proper use of various automotive tools and equipment
32. 7. Identify and interpret heating and air conditioning concerns; determine necessary action
33. 8. Identify refrigerant type; select and connect proper gauge set; record pressure readings
34. 9. Inspect A/C condenser for airflow restrictions; perform necessary action

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

F. Learner Outcomes Assessment

As noted on course syllabus

G. Special Information

None noted