SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

## ACADEMIC AFFAIRS

**Course Number:** AUTO 114
**Course Title:** CLIMATE CONTROL
**Department:** AUTOMOTIVE TECHNOLOGY
**Semester:** FALL **Year** 2008

### Objectives/Competencies

| Course Objective (The student should develop and understanding of:) | Competencies (The student must be able to:) |
|---|---|
| 1. The basics of heating and air conditioning, including heat movement theory. | A. Explain the basic understanding of temperature and humidity comfort zones.<br>B. Recognize that heat is measured in both temperature and quantity.<br>C. Explain how heat can be transferred from one location to another.<br>D. List the three states of matter and the effect heat has on them.<br>E. Explain what latent heat is and why it is important to A/C.<br>F. Demonstrate how pressure is measured.<br>G. Show the effect that pressure has on boiling points. |
| 2. The low and high-pressure sides of the system and variety of components used in each side. | A. Interpret the relationship between the A/C cycle and and the components on the low side and high side of the system.<br>B. Explain the duties of the low side and high side of a system.<br>C Describe the role of each A/C component.<br>D. Know how the components operate.<br>E. Recognize the variety of components used in today's A/C systems.<br>F. Differentiate among the variety of controls that are used in an automotive A/C system. |

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|---|---|
| 3. Recovering, evacuating and recharging a partially or fully charged system according to Environmental Protection Agency procedures. | A. Operate recovery, evacuation and recharging equipment correctly.<br>B. Recover all refrigerant from a system.<br>C. Understand why refrigerants cannot be discharged to the atmosphere.<br>D. Recognize the penalties the technician and shop owner will be liable for in the event of refrigerant discharge. |
| 4. Heating system operation. | A. Understand how the common automotive heating system works.<br>B. List what components make up the heating system.<br>C. Understand how heater temperature is controlled.<br>D. Recognize why it is one of the most efficient parts of an automobile. |
| 5. Air flow controls, including ducts and air doors operation. | A. Understand the function of the air control doors in the A/C and heating duct system.<br>B. Recognize how the temperature of the air entering the car is controlled.<br>C. Explain the variety of methods used to control blower operation among manufacturers.<br>D. Describe the sensors and controls used with A.T.C. systems, and the way that they control air temp and flow.<br>E. Read the electrical and vacuum trouble-shooting manual schematics when diagnosing a concern.<br>F. Check the operation of vacuum controls and motors and determine any faults. |
| 6. Heating – A/C system inspection and diagnosis, | A. Describe the effects that overcooling and overheating have on an engine including engine cooling system theory.<br>B. Explain the cooling system's role in maintaining proper engine temperature.<br>C. Interpret what parts of a cooling system do and how they operate. |

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|---|---|
| | D. Connect a manifold gauge set to a system and check system pressure.<br>E. Determine if system pressure is normal and if abnormal determine the cause of the fault.<br>F. Locate the source of a refrigerant leak. |
| 7. Be aware of the variety and complexity of heating electronic controls used in today's systems. | A. Understand the relationship between volts, and A/C amperes and Ohms.<br>B. Explain the circuits required to operate in electronic controls.<br>C. Recognize the types of circuit problems that may be encountered.<br>D. Recognize the procedures used to locate and repair heat and A/C electrical problems. |
| 8. Heating and A/C system preventive maintenance | A. Explain preventive maintenance operations and repair. and adjustments necessary to keep a heating and A/C system operating properly.<br>B. Perform basic A/C service operation, given the operating manual for the equipment.<br>C. Remove and reinstall an A/C compressor and perform the standard bench repairs on that compressor.<br>D. Back flush major components of an a/c system to remove unwanted debris. |
| 9. Develop a routine and engine cooling system inspection, diagnosis, and service. | A. Perform preventive maintenance operations and adjustments necessary to keep a cooling system operating properly.<br>B. Inspect a cooling system to see if it is operating properly.<br>C. Perform the standard cooling system tests to locate the cause of the problem.<br>D. Remove and replace a faulty cooling system component.<br>E. Back flush a partially restricted system. |