AUTOMOTIVE HEATING AND AIR-CONDITIONING FUNDAMENTALS (II)

Course Syllabus

Course Number: AC102
Instructor: Ron Rader

OCAS Code: Phone Number: 580-327-0344
Course Length: 30 hours
Email: rrader@nwtech.edu
Career Cluster: Transportation
Campus: Alva, OK

Career Pathway: Automotive Service
Program: Automotive Service Technology

Career Major: Automotive Service Technician, Automotive Maintenance Light Repair Technician, Air Conditioning Technician,
Pre-requisite: Automotive Introduction, Automotive Heating and Air-Conditioning Introduction

Course Description: In this course the student will learn servicing procedures and how to operate testing and servicing equipment. Students will learn to evacuate and recharge air-conditioning systems using the proper refrigerant. Students will learn to evaluate and determine necessary action for compressor and clutch assemblies, and how to perform the replacement of these parts. Students will learn to perform component replacement, such as the receiver drier, expansion valve, orifice tube, hose assemblies and o-rings. Students will learn to troubleshoot heating and air-conditioning systems operation and how to evaluate climate control systems. This course covers both the electrical and vacuum controls.

Instructional Philosophy: To provide a training program that is of merit both educationally and ethically while effectively providing the individual learner the opportunities, knowledge and skills necessary to succeed in the workplace as well as life.

Course Goals: Upon successful completion of this course, the student will be able to:

Competencies:
A/C System Diagnosis and Repair
Select oil type; measure, and add oil to the A/C system as needed.

Refrigeration System Component Diagnosis and Repair
Compressor and Clutch
Inspect, test, and replace A/C compressor clutch components or assembly.
Remove and replace A/C compressor and mountings

Evaporator, Condenser, and Related Components
Determine need for A/C system filter; perform necessary action
Remove and inspect A/C system mufflers, hoses, lines, fittings, o-rings, seals, and service valves; perform necessary action
Remove and install receiver/drier or accumulator/drier
Remove and install expansion valve or orifice (expansion) tube

Heating, Ventilation, and Engine Cooling Systems Diagnosis and Repair
Inspect, test, and replace thermostat and housing
Inspect and test fan, fan clutch (electrical and mechanical), fan shroud, and air dams; perform necessary action
Inspect and test electrical fan control system and circuits
Inspect and test heater control valve(s); perform necessary action

Operating Systems and Related Controls Diagnosis and Repair
Inspect and test A/C-heater blower, motors, resistors, switches, relays, wiring, and
protection devices; perform necessary action
Refrigerant Recovery, Recycling, and Handling
Verify correct operation and maintenance of refrigerant handling equipment
Identify (by label application or use of a refrigerant identifier) and recover A/C system refrigerant
Recycle refrigerant
Label and store refrigerant
Test recycled refrigerant for non-condensable gases
Evacuate and charge A/C system

Major Course Projects:
Students will perform tasks relating to the Automotive Service Industry as per standards identified by the National Automotive Technicians Education Foundation (NATEF). Students will complete repair orders each day and will document completion of competencies on competency profiles tracking individual progress and accomplishment.

Project Outline:
Projects will include performing tasks on mock ups, shop vehicles, and live work as student skills progress. These projects will reinforce classroom theory instruction and will require the student to consult industry service information during the course of task performance.

Instructional Delivery Plan:
The instruction for this course will be comprised of multiple methods designed to promote and accommodate different learning styles including classroom lecture, classroom demonstrations, shop demonstrations, hands on learning activities, classroom discussion, interactive media, textbook, computer based learning activities, research projects, guest speakers, student presentations, and interactive learning with CPS (Classroom Performance System). Students will be required to practice the skills associated with the instructional content and will be required to work independently and also in teams. Assignments will require students to use academic skills in math, science, and language arts.

Assessment Plan:
Students will be assessed according to three basic kinds of learning. Knowledge: Does the student possess the required knowledge to perform a specific competency? Skills: Does the student possess the necessary coordination to perform the task/competency? Attitude: Will the student perform the task/competency on the job after learning to do it? Students will also be assessed according to the basic work skills of attendance and promptness. Soft skills will be assessed in the Academic Career Center.

50% Daily work- Performance of technical skills on job, work habits, safety, clean-up, participation
50% Written assignment- Repair orders, textbook assignments, etc.

Grading Scale:
A 90-100 Exceeds expectations
B 80-89 Meets industry standards and expectations
C 70-79 Passing grade, but does not meet some standards
D 60-69 Passing, but only meets the minimum standards
F Below 60 Failing, does not meet minimum standards

Alliance Credit Offered:
OSU Okmulgee

Industry Alignments:
ASE Certification, ODCTE Certification,

End of Instruction
ASE Certification, ODCTE Certification,
Industry Assessment:

Resources:
Automotive Excellence Vol. 1 and Vol. 2
Modern Automotive Technology
Introduction to Automotive Service: Fundamental Concepts
CDX Global Interactive Training
Snap On Shop Key
Alldata

Attachments:
See Automotive Service Technology Task List Competency Handbook