

CUYAMACA COLLEGE OFFICIAL COURSE OUTLINE

AUTOMOTIVE TECHNOLOGY 165 – ADVANCED AIR CONDITIONING AND HEATING SYSTEMS

2 hours lecture, 3 hours laboratory, 3 units

Catalog Description

Advanced course in automotive environmental control systems emphasizing advanced diagnosis and repair. Designed to develop greater student performance under simulated industry conditions. Students will be required to complete associated tasks in the shop as specified by NATEF (National Automotive Training Educational Foundation). Preparation for ASE A-7 Certification.

Prerequisite

AUTO 160

Entrance Skills

Without the following skills, competencies and/or knowledge, and student entering this course will be highly unlikely to succeed:

- 1) Understand nomenclature and operational theory of automotive air conditioning systems
- 2) Ability to diagnose automotive air conditioning and heating system components (HVAC)
- 3) Ability to diagnose HVAC systems using standard pressure charts and standard gauge set
- 4) Ability to remove and replace HVAC system components
- 5) Ability to recover refrigerant, evacuate and recharge HVAC system
- 6) Ability to find refrigerant leaks using dye and electronic detector methods
- 7) Ability to diagnose and repair HVAC controls and ducting

Course Objectives

Students will be able to:

- 1) Acquire safe working habits
- 2) Relate air conditioning and heating theory to practical application
- 3) Learn air conditioning and heating principles
- 4) Perform air conditioning and heating repairs to prescribed industry standards

Special Materials Required of Student

- 1) Basic hand tool set
- 2) Approved safety goggles (must have shielded vents)
- 3) Specialized air conditioning tools
- 4) Notebook, required textbook

Minimum Instructional Facilities

- 1) Auto tech lab (6 bays)
- 2) Complete air conditioning and heating service equipment center
- 3) Various training aides
- 4) Automotive transparencies, PowerPoint presentations, CD/DVD videos
- 5) VCR/monitor
- 6) SMART classroom

Course Content

- 1) Lecture:
 - a. Introduction and safety
 - b. Principles of refrigeration
 - c. Refrigerants
 - d. Electrical controls
 - e. Electronic/automatic temperature control systems
 - f. Moisture removal

- g. Service valves
 - h. Manifold gauge set
 - i. Leak detectors
 - j. Receiver driers
 - k. Thermostatic expansion valves and related refrigerant control techniques
 - l. Temperature pressure relationships
 - m. System diagnosis
- 2) Lab:
- a. Introduction and safety
 - b. Laboratory procedures
 - c. System diagnosis
 - d. Diagnose and repair electronic/automatic temperature control system
 - e. Leak testing
 - f. Pressure checks
 - g. Evacuating system
 - h. Compressor repair
 - i. Clutch repair
 - j. Checking and adding oil
 - k. Testing various regulator valves
 - l. Component replacement
 - m. Vacuum controls

Method of Instruction

- 1) Lecture and demonstration
- 2) Individual assistance

Method of Evaluation

A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in subject matter determined by multiple measurements for evaluation, one of which must be essay exams, skills demonstration or, where appropriate, the symbol system.

- 1) Quizzes and written exams
- 2) Observation of student work
- 3) Inspection of work completed
- 4) Hands-on performance exam

Texts and References

- 1) Required: Dwiggin, Automotive Air Conditioning. 8th edition. Delmar, 2002.
- 2) Supplemental: None