

CUYAMACA COLLEGE OFFICIAL COURSE OUTLINE

AUTOMOTIVE TECHNOLOGY 122 – AUTOMOTIVE ELECTRICAL SYSTEMS

3 hours lecture, 6 hours laboratory, 5 units

Catalog Description

Basic principles of electricity as applied to automobiles. Comprehensive investigation of automotive electrical systems including periodic maintenance, diagnosis, component servicing and adjustment. Students will be expected to complete associated tasks in the shop as specified by NATEF (National Automotive Training Educational Foundation). Preparation for ASE A-6 Certification.

Prerequisite

None

Course Objectives

Students will be able to:

- 1) Acquire safe working habits
- 2) Relate electrical system theory for practical application
- 3) Perform electrical system and component repair to prescribed industry standards

Special Materials Required of Student

- 1) Basic hand tool set
- 2) Approved safety glasses
- 3) Specialized electrical tools
- 4) Notebook, required textbook

Minimum Instructional Facilities

- 1) Auto tech lab
- 2) Complete electrical system service center
- 3) Classroom with projection screen
- 4) Various training models
- 5) Automotive transparencies, PowerPoint presentations, CD/DVD videos
- 6) SMART classroom

Course Content

- 1) Lecture
 - a. Electron theory
 - b. Conductors and insulators
 - c. Voltage, amperage, resistance
 - d. Direct and alternating current
 - e. Semi-conductors
 - f. Ohms law
 - g. Series, parallel circuits
 - h. Resistance in series and parallel circuits
 - i. Voltage drops
 - j. Magnetism
 - k. Electromagnets
 - l. Storage battery
 - m. Starting motors
 - n. Charging system
 - o. Supplemental Restraint Systems (air bags)
 - p. Body computer system and components
 - q. Wiring diagrams
 - r. Other electrical units of automobile

- 2) Lab
 - a. Introduction and safety
 - b. Laboratory procedures
 - c. Equipment operation
 - d. Battery service and diagnosis
 - e. Starting system diagnosis and repair
 - f. Charging system diagnosis and repair
 - g. Safe diagnosis and repair of Supplemental Restraint Systems (air bags)
 - h. Diagnosis and repair of body computer system and components
 - i. Electrical system troubleshooting
 - j. Servicing other electrical components

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 test

Texts and References

- 1) Required: Halderman, Diagnosing and Troubleshooting of Automotive Electrical, Electronic and Computer Systems. 3rd edition. Prentice Hall, 2001.
- 2) Supplemental: None

Exit Skills

Students having successfully completed this course exit with the following skills, competencies and/or knowledge:

- 1) Understand how to diagnose and repair automotive electrical systems following industry accepted safety practices
- 2) Understand how to read and use automotive wiring diagrams to diagnose electrical problems
- 3) Perform wiring and soldering repairs to industry acceptable standards
- 4) Understand theory of operation and basic diagnostic procedures of automotive starting and charging systems
- 5) Understand how to diagnose automotive batteries
- 6) Understand how to safely operate and use a Digital Volt Ohm Meter (DVOM) for electrical diagnosis
- 7) Understand how to safely operate and use a standard automotive test light