

## CUYAMACA COLLEGE OFFICIAL COURSE OUTLINE

### **AUTOMOTIVE TECHNOLOGY 127 – ADVANCED AUTOMOTIVE ELECTRICAL SYSTEMS**

3 hours lecture, 6 hours laboratory, 5 units

#### **Catalog Description**

Advanced course in electrical systems designed to develop greater student performance under simulated industry conditions. 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**

AUTO 122

#### **Entrance Skills**

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

- 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

#### **Course Objectives**

Students will be able to:

- 1) Acquire safe working habits
- 2) Perform electrical repairs with minimum guidance
- 3) Develop electrical sub-system training aides

#### **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, videos and computer-based training programs
- 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. Wiring diagrams
  - p. Digital Storage Oscilloscope (DSO)
  - q. Advanced diagnostic strategies
- 2) Lab
- a. Introduction and safety
  - b. Laboratory procedures
  - c. Advanced battery service and diagnosis
  - d. Advanced starting system diagnosis and repair
  - e. Advanced charging system diagnosis and repair
  - f. Advanced electrical system troubleshooting
  - g. Advanced diagnosis utilizing Digital Storage Oscilloscope (DSO)

**Method of Instruction**

- 1) Lecture and demonstration
- 2) Individual assistance
- 3) Student directed projects

**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) Project evaluation

**Texts and References**

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