

CATALOG INFORMATION

Dept and Nbr: AUTO 56 Title: AUTO ELECTRIC SYSTEM
Full Title: Automotive Electrical System
Last Reviewed: 5/12/2008

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	4.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	4.00	Lab Scheduled	3.00	17.5	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	6.00		Contact Total	105.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00

Total Student Learning Hours: 210.00

Title 5 Category: AA Degree Applicable
Grading: Grade Only
Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:
Formerly:

Catalog Description:
Theories of design and operation of automotive electrical and electronic systems; techniques of troubleshooting, service, and repair of starting, charging, and other chassis electrical systems. Introduction to computer controlled systems. Prepare students to take the A.S.E. (Automotive Service Excellent) Engine Repair Certification.

Prerequisites/Corequisites:

Recommended Preparation:
Course Eligibility for ENGL 100 OR Course Eligibility for ENGL 100A OR Course Eligibility for EMLS 100 (or ESL 100)

Limits on Enrollment:

Schedule of Classes Information:
Description: Theories of design and operation of automotive electrical and electronic systems; techniques of troubleshooting, service, and repair of starting, charging, and other chassis electrical systems. Introduction to computer controlled systems. Prepare students to take the A.S.E. (Automotive Service Excellence) Engine Repair Certification. (Grade Only)

Prerequisites/Corequisites:

Recommended: Course Eligibility for ENGL 100 OR Course Eligibility for ENGL 100A OR Course Eligibility for EMLS 100 (or ESL 100)

Limits on Enrollment:

Transfer Credit: CSU;

Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	Area			Effective:	Inactive:
CSU GE:	Transfer Area			Effective:	Inactive:
IGETC:	Transfer Area			Effective:	Inactive:
CSU Transfer:	Transferable	Effective:	Spring 1989	Inactive:	Spring 2016
UC Transfer:		Effective:		Inactive:	

CID:

Certificate/Major Applicable:

Both Certificate and Major Applicable

COURSE CONTENT

Outcomes and Objectives:

Upon completion of this course, students will be able to:

1. Explain theories of automotive electrical and electronic systems design and operation.
2. Apply the principles of electricity to evaluation and repair of common automotive electrical systems.
3. Differentiate among types of electrical circuits.
4. Utilize a variety of types of electrical test equipment to diagnose electrical system problems.
5. Troubleshoot electrical circuits.
6. Diagnose electrical system problems using electrical system schematics.
7. Test, evaluate and repair common electrical systems.
8. Explain the requirements and processes for obtaining A.S.E. (Automotive Service Excellence) Auto Electrical System Certification and B.A.R. (Bureau of Automotive Repair) Lamp Adjuster Certification.
9. Demonstrate eligibility to enter the automotive trade as an apprentice level technician specializing in automotive electrical systems.

Topics and Scope:

1. Theories of Automotive Electrical and Electronic Systems
 - a. Design
 - b. Operation
2. Principles of electricity
 - a. Conductors
 - b. Semiconductors

- c. Magnetism
- d. Reluctance
- 3. Electrical and Circuit Theory
 - a. Ohm's Law
 - b. Kirchoff's Law
 - c. Types of circuits
- 4. Safety
 - a. Safety equipment/apparel
 - b. Automobile environment
 - c. Use of equipment
 - d. First aid
- 5. Electronic fundamentals
 - a. Types of components
 - b. Operation
 - c. Damage prevention
- 6. Types of test equipment
 - a. Test lights
 - b. Meters
 - c. Oscilloscopes
- 7. Troubleshooting electrical circuits
 - a. Wires
 - b. Switches
 - c. Fuses
 - d. Diagnosis using electrical schematics
 - e. Repair Techniques
- 8. Batteries
 - a. Safety considerations
 - b. Construction and operation
 - c. Testing
- 9. Starters
 - a. Types
 - b. Operating circuits
 - c. Diagnosis
 - d. Overhaul procedures
- 10. Charging systems
 - a. Principles
 - b. Generators
 - c. Alternators
 - d. Regulators
 - e. Testing
- 11. Lighting systems
- 12. Instrument cluster and gauges
- 13. Accessory systems
 - a. HVAC
 - b. Windshield wipers and washers
 - c. Horn
 - d. Cruise control
 - e. Power windows
 - f. Power seats
 - g. Audio systems
- 14. Ignition systems
 - a. Points/condenser

- b. Ignition coil operation
- c. Electronic ignition
- d. Computer controlled
- e. Testing
- 15. Computer fundamentals
 - a. Operation
 - b. Sensors
 - c. Actuators
 - d. Carburetor controls
 - e. Fuel injection
 - f. Emission control devices
- 16. Preparing for certification exams
 - a. A.S.E. (Automotive Service Excellence) Electrical System Certification Exam
 - b. B.A.R. (Bureau of Automotive Repair) Lamp Adjuster Exam

Assignment:

1. Students will be required to keep a notebook of all class assignments and class notes that will be graded for completeness and organization.
2. Class performances and performance exams: In the lab, students will be evaluated on their ability to follow industry approved diagnostic and repair procedures in a reasonable amount of time.
3. Electrical circuit and component identification.
4. Lab reports: Complete work orders, diagnostic sheets, parts orders, and time sheets correctly and in a neat and readable manner.
5. Reading: 50 pages per week.
6. Three unit exams, midterm, final exam.

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments and skill demonstrations are more appropriate for this course.

Writing
0 - 0%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Lab reports

Problem solving
5 - 20%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Class performances, Performance exams, Component identification

Skill Demonstrations
30 - 50%

Exams: All forms of formal testing, other than skill performance exams.

Multiple choice, True/false

Exams
30 - 50%

Other: Includes any assessment tools that do not logically fit into the above categories.

Notebook, Attendance and Participation.

Other Category
10 - 15%

Representative Textbooks and Materials:

Diagnosis and Troubleshooting of Automotive Electrical, Electronic, and Computer Systems, James D. Halderman, Prentice Hall, 3rd Ed 2001.