

AUTO 146: AUTOMOTIVE ELECTRICAL SYSTEMS

Citrus College Course Outline of Record

Heading	Value
Effective Term:	Fall 2023
Credits:	4
Total Contact Hours:	108
Lecture Hours :	54
Lab Hours:	54
Hours Arranged:	0
Outside of Class Hours:	108
Total Student Learning Hours:	216
Strongly Recommended:	ENGL 101; MATH 144; AUTO 140A or one year of employment as automotive technician.
Transferable to CSU:	Yes
Transferable to UC:	No
Grading Method:	Standard Letter, Pass/No Pass

Catalog Course Description

Intended for the incumbent worker, re-entry person or person seeking a career change into the automotive service industry. This course is part of the Maintenance and Light Repair (MLR) curriculum. This course covers essential electrical and electronic systems theory, along with inspection, diagnosis, service & repair of specific electrical systems including the battery, starting systems, charging systems, lighting systems, gauges, instrument-panel warning lights and power accessories. Prepares students for ASE Electrical & Electronic Systems (A6) certification. 54 lecture hours, 54 lab hours.

Course Objectives

- Inspect battery state of charge and determine corrective action.
- Use wiring diagrams to diagnose starting and charging system operation and determine corrective action.
- Inspect for parasitic draw and determine corrective action.
- Remove and replace batteries, starters and alternators following manufacturer's repair procedures.
- Use wiring diagrams to diagnose lighting system operation and determine corrective action.

Major Course Content

1. Electrical and electronic systems theory
 - a. Electrical principles
 - i. Ohm's law
 - ii. Watt's law
 - iii. Series, parallel, and series-parallel circuits
 - iv. Switches & relays
 - v. Electrical diagnostic tools (DMMs, test lights, fused jumper wires)
 - vi. Wiring diagrams
 - b. Electronic principles
 - i. Semi-conductors & doping
 - ii. Diodes & zener diodes
 - iii. Transistors
 - iv. Solid-state voltage regulators
 - v. Solid-state AC-to-DC rectification

- c. Automotive electrical systems theory & diagnosis
 - i. Battery
 - ii. Starting systems
 - iii. Charging systems
 - iv. Lighting systems (headlights, brake & tail lights, turn signals)
 - v. Gauges
 - vi. Instrument panel warning lights
 - vii. Power accessories
- d. Electrical systems service & repair
 - i. Service precautions
 - ii. Hybrid vehicle safety & general service
 - iii. Wiring repair, soldering
 - iv. Starter motor R&R
 - v. Alternator R&R
 - vi. Instrument panel disassembly and inspection
2. Service Literature
 - a. Repair manuals & wiring diagrams
 - b. Technical Service Bulletins

Lab Content

1. Electrical and electronic systems theory
 - a. Electrical principles
 - i. Perform resistance, voltage and amperage measurements
 - ii. Test switches & relays
 - b. Automotive electrical systems theory & diagnosis
 - i. Test & evaluate batteries
 - ii. Test & evaluate starting systems
 - iii. Test & evaluate charging systems
 - iv. Test & evaluate lighting systems (headlights, brake & tail lights, turn signals)
 - v. Test & evaluate gauges
 - vi. Test & evaluate instrument panel warning lights
 - vii. Test & evaluate power accessories
 - c. Electrical systems service & repair
 - i. Perform soldering and build fused jumper wire
2. Service literature
 - a. Use repair manuals & wiring diagrams to support diagnosis & repair
 - b. Use Technical Service Bulletins to supplement repair manuals & wiring diagrams

Suggested Reading Other Than Required Textbook

Student will complete instructor selected MyAutomotiveLab e-learning modules that are related to the subject matter.

Examples of Required Writing Assignments

Student will use electronic service information to complete guided

Examples of Outside Assignments

Students will be assigned industry based technical article evaluation from trade journals.

Instruction Type(s)

Lab, Lecture, Online Education Lecture