

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

Automotive Technology 161L – Electrical Diagnosis and Repair Laboratory

3 hours laboratory, 1 unit

Catalog Description

This laboratory course describes and demonstrates proper operation, repair, and diagnostic techniques for automotive electrical systems. The course also includes the theory of electricity as related to lighting, power seats, power door locks, cruise controls, electric windows, electronic dashboards, radios, windshield wipers and other automotive systems. This course is the lab for students taking AUTO 161 Electrical Diagnosis and Repair lecture, or for students taking work experience who need additional instruction and practice completing required ASE competencies and tasks.

Prerequisite

None

Course Content

- 1) Safety policies and procedures
- 2) Laboratory exercises using distance education technologies
- 3) Laboratory practice using virtual reality or mobile technologies
- 4) Assistance of repair techniques using web conferencing and remote access computer sharing
- 5) Circuit testing using a digital multi-meter
- 6) Loaded circuit testing
- 7) Voltage drop testing
- 8) Workshop manual navigation
- 9) Scan tool operation
- 10) Battery tests
- 11) Charging system tests
- 12) Starting system tests
- 13) Electrical component activation
- 14) Electrical circuit diagnosis
- 15) Parasitic draw tests
- 16) Proper wire repair

Course Objectives

Students will be able to:

- 1) Demonstrate navigation of manufacturer specific repair information for electrical repairs
- 2) Demonstrate knowledge of electrical theory and operation through actual repairs
- 3) Demonstrate knowledge of various electrical components and repair methods
- 4) Show the use of critical voltage, amperage and resistance measurements using a digital multi-meter.
- 5) Use actual tools for electrical system performance tests of accurate failure analysis
- 6) Perform electrical tests using scan tool technology as prescribed by the manufacturer
- 7) Document failure analysis on automotive electrical systems for warranty and customer pay services
- 8) Display a competent knowledge of automotive electrical system theory and repair
- 9) Competently perform electrical wire repairs
- 10) Show correct electrical tests of battery, charging and starting systems

Method of Evaluation

A grading system will be established. Grades determined by summative test proficiency in the subject matter using multiple measurements, one of which is a demonstration of the components related to the cause of failure using the diagnostic processes and skills demonstrations of corrections.

- 1) Skills-based summative assessment that measures students' ability to complete the required ASE tasks related foundational knowledge of diagnosis, replacement, repair, and testing of automotive electrical systems.
- 2) Practical exercises that measure students' progress toward mastering tasks related to identification, description, communication, memorization of components for testing of electrical automotive systems.
- 3) A Student portfolio is required to showcase student comprehension.
- 4) Web based training modules.
- 5) Performance projects used to evaluate student ability to accurately perform repair procedures using web conferencing and simulations.

Special Materials Required of Student

- 1) Approved safety glasses.
- 2) High-speed internet connection and access to large screen computer, laptop, or tablet.
- 3) Students will have access to testing tools and equipment while on campus and by simulations.
- 4) Uniform dress code is required.

Minimum Instructional Facilities

- 1) Auto tech lab (20 service bays)
- 2) Various training vehicles
- 3) Smart classroom
- 4) Diagnostic tools and equipment

Method of Instruction

- 1) Demonstration
- 2) Individual assistance
- 3) Feedback of repair processes regardless of successful or unsuccessful

Out-of-Class Assignments

- 1) **Reading:** assigned course materials, manuals, content on websites, and more.
- 2) **Writing:** assignments where students describe the required tasks related to diagnosis, replacement, repair, and testing of electrical systems and components, and more.
- 3) **Other:** web-based training modules, portfolio performance projects related to electrical systems and components, and more.

Texts and References

- 1) Required (representative examples):
 - a. Student workbooks – will be provided electronically.
 - b. Required: VanGelder, Kirk. Fundamentals of Automotive Technology. Jones and Bartlett Learning, 2023.
 - c. Web Based Training Modules will be provided electronically.
 - d. Workshop Manuals will be provided electronically.
- 2) Supplemental: None

Exit Skills:

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

- 1) Demonstrate the ability to test electrical circuits by location and function
- 2) Demonstrate voltage drop tests of a circuit
- 3) Demonstrate resistance tests of components and circuits

- 4) Demonstrate current flow using a wiring diagram
- 5) Perform various battery tests
- 6) Perform various charging and starting system tests
- 7) Perform electrical circuit functions
- 8) Perform scan tool function tests
- 9) Attain and describe parameter identification data (PID) using scan tools
- 10) Use the workshop manual to perform electrical tests

Student Learning Outcomes

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

- 1) Accurately describe various electrical system conditions.
- 2) Correct electrical system problems by performing necessary actions.
- 3) Communicate effectively and professionally in a diverse setting that includes prospective colleagues, clients, and supervisors.
- 4) Comply with environmental health and safety regulations at the state and federal levels.