

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

Automotive Technology 161 – Electrical Diagnosis and Repair

2 hours lecture, 2 units

Catalog Description

This lecture course includes electrical systems theory, diagnosis and repair procedures utilizing state of the art equipment. Systems covered include storage, generating and starting. Accessory systems covered include lighting, power seats, power door locks, cruise controls, electric windows, electronic dashboards, radios, windshield wipers, and introduction to electronic systems such as transistors and electronic computer controls.

Prerequisite

None

Course Content

- 1) Lecture:
 - a. Introduction and safety
 - b. Laboratory procedures
 - c. Equipment operation
 - d. Basic electrical principles
 - e. Automotive wiring systems
 - f. Electro-magnetism
 - g. Storage and service of batteries
 - h. Starting motors
 - i. Charging systems
 - j. Electrical controls diagnosis
 - k. System diagnosis

Course Objectives

Students will be able to:

- 1) Demonstrate navigation of manufacturer specific repair information for repair.
- 2) Demonstrate knowledge of electrical theory and operation.
- 3) Demonstrate knowledge of various automotive electrical systems including charging and starting systems.
- 4) Demonstrate the use of a digital multi meter, flex probe kit, power probe, test light and related electrical tools.
- 5) Demonstrate impedance, voltage and state of charge battery tests.
- 6) Demonstrate voltage drop tests on starting and charging systems.
- 7) Demonstrate battery parasitic draw procedures.

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.

- 1) Quizzes, written exams, and hands-on performance exam that measure students' ability to proficiently describe the required ASE tasks related to electrical systems.
- 2) Practical exercises that measure students' progress toward communication related to diagnosis, replacement, repair, testing, of electrical circuits and components.

- 3) A Student portfolio will be used to show student skills.
- 4) Web based training modules.
- 5) Performance projects used to evaluate student ability to navigate repair procedures.

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 diagnostic testing tools and equipment while on campus and by simulations.
- 4) Uniform dress code is required.

Minimum Instructional Facilities

- 1) Auto tech lab (6 bays)
- 2) Various training vehicles
- 3) Smart classroom
- 4) Distance education technologies
- 5) 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

Student Learning Outcomes

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

- 1) Accurately diagnose electrical system problems.
- 2) Correctly repair electrical engine system problems.
- 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.