

AUTO 1100 Automotive Electrical Systems I Syllabus

Instructor and Class Information

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Office Hours	7:10 a.m. – 3:45 p.m. Monday - Friday

Additional Instructor Information

Start Date	8/09/2023
End Date	10/13/2023

Course Information

Course Description

An introduction to automotive electrical to include theory of operation, component function, and minor repair.

Purpose/Goals

To develop an understanding of the basic theories and principles of direct current electricity; the student will have the ability to properly demonstrate battery, starting, and charging systems testing; also to test the use of test equipment in other accessory systems; and to develop an understanding of basic electricity.

Target Population

Any person who is willing to learn about the Electrical System of an automobile.

Pre/Corequisites

Prerequisite AUTO 1000 Basic Shop Practices

Textbooks

Textbook and workbook will be given to students at the beginning of the year. Students will be responsible for textbook and workbook care and return at the end of course.

Materials Needed

Pen

Notebook

Safety glasses (optional – no tinted safety glasses allowed)

School issued device

Grading Information

98-100 A+	85-89 B	74-76 D+
93-97 A	82-84 C+	70-73 D
90-92 B+	77-81 C	<70 F

Instructor Grading Information

The student will be graded on their attendance, ability to work with others on projects, participation in class, workbook assignments, tests, and quizzes.

Shop – 55%

Tests – 25%

Workbooks/Quizzes – 20%

All late work will be 50% off and 1 point off every day after due date.

Semester Final Grading

1st Quarter – 45% / 2nd Quarter – 45% / 1st Semester Final – 10%

3rd Quarter – 45% / 4th Quarter – 45% / 2nd Semester Final – 10%

Academic Honesty

Academic honesty is a core principle of learning and scholarship. When you violate this principle, you cheat yourself of the confidence that comes from knowing you have mastered the targeted skills and knowledge. You also hurt all members of the learning community by falsely presenting yourself as having command of competencies with which you are credited, thus degrading the credibility of the program and your fellow learners who hold the same credential.

All members of the learning community share an interest in protecting the value, integrity, and credibility of the outcomes of this learning experience. We also have the responsibility to censor behaviors that interfere with this effort. The following behaviors will be subject to disciplinary action:

Plagiarism = presenting someone else's words, ideas, or data as your own work.

Fabrication = using invented information or the falsifying research or other findings.

Cheating = misleading others to believe you have mastered competencies or other learning outcomes that you have not mastered.

Examples include, but are not limited to: 1. Copying from another learner's work 2. Allowing another learner to copy from your work 3. Using resource materials or information to complete an assessment without permission from your instructor 4. Collaborating on an assessment (graded assignment or test) without permission from the instructor 5. Taking a test for someone else or permitting someone else to take a test for you

Academic Misconduct - other academically dishonest acts such as tampering with grades, taking part in obtaining or distributing any part of an assessment, or selling or buying products such as papers, research, projects or other artifacts that document achievement of learning outcomes.

Course Competencies

1. Interpret basic electrical circuit problems.

Learning Objectives

- 1.a. Explains laws and theories of electricity.
- 1.b. Identifies insulators, conductors, and semiconductors.
- 1.c. Classify voltage, current, and resistance in a circuit.
- 1.d. Discuss Ohm's Law and how it is used in a circuit.
- 1.e. Explain the difference between AC and DC currents in a system.
- 1.f. Describe series, parallel, and series-parallel circuits and the electrical laws that govern them.
- 1.g. Explain the theory of electromagnetism.

Criteria

Performance will meet expectations when the student:

- 1.1. examines basic electrical theory and circuits on a written exam.
- 1.2. explains basic electrical faults.
- 1.3. solve series/parallel circuit equations using ohms law.

2. Use electrical service equipment properly.

Learning Objectives

- 2.a. Demonstrate electrical test equipment.
- 2.b. Apply Ohm's Law to electrical circuits with a DVOM or equivalent instrument.

Criteria

Performance will meet expectations when the student:

- 2.1. carries out all safety rules regarding electrical equipment
- 2.2. uses the correct function on a DVOM to test a circuit.
- 2.3. uses the proper tester to diagnose a circuit.
- 2.4. demonstrates proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow and resistance.

3. Use diagnostic principles to troubleshoot automotive circuits.

Learning Objectives

- 3.a. Classify various circuit faults.
- 3.b. Identify characteristics of power-side switching.
- 3.c. Identify characteristics of ground-side switching.
- 3.d. Identify types of circuits such as series, parallel, and series-parallel circuits.
- 3.e. Calculate resistance, amperage, and voltage drop using Ohm's Law.

Criteria

Performance will meet expectations when the student:

- 3.1. utilizes basic electrical theory to solve circuits.
- 3.2. performs research, diagnosis, and repair to automotive circuits.
- 3.3. interprets electrical/electronic system concerns and determines necessary actions.

4. Utilize basic principles of batteries to trouble shoot automotive battery problems.

Learning Objectives

- 4.a. Locate the key components of a battery.
- 4.b. Demonstrate the key operating characteristics of a battery.
- 4.c. Test the chemical reaction that occurs to produce current in a battery.
- 4.d. Test the rating of batteries.
- 4.e. Identify the correct battery to be installed in a vehicle.
- 4.f. Test the effects of temperature on battery performance.
- 4.g. Inspect for the major reasons of battery failure.

Criteria

Performance will meet expectations when the student:

- 4.1. interpret battery theory and diagnosis techniques on a written exam.
- 4.2. performs a battery test.
- 4.3. uses battery test equipment.

5. Follow all safety practices while working on automotive battery systems.

Learning Objectives

- 5.a. Reinforce safety regulations while in the lab area.
- 5.b. Describe the safety procedure for acid spills on your skin.
- 5.c. Identify steps to neutralize an acid spill.
- 5.d. Demonstrate proper use of a battery charger / booster.

Criteria

Performance will meet expectations when the student:

- 5.1. identifies shop safety principles on a written exam.
- 5.2. utilizes personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

6. Use diagnostic equipment on circuits and electronic components.

Learning Objectives

- 6.a. Operate a diagnostic meter, circuit tester, and any other test devices for electrical use.
- 6.b. Test circuits and diagnose problems for components and circuit systems.

Criteria

Performance will meet expectations when the student:

- 6.1. uses a digital volt ohm meter to diagnose a circuit or component and completes the repair.
- 6.2. uses service information to diagnose a circuit or component and completes the repair.
- 6.3. uses a test light to diagnose a circuit or component and completes the repair.
- 6.4. diagnoses the causes of brighter-than-normal, intermittent, dim, or no light operation; determines necessary action.

7. Diagnose automotive electrical shorts, opens, and grounds.

Learning Objectives

- 7.a. Describe potential problems in a circuit (opens, short to ground, high resistance, and short to voltage).
- 7.b. Illustrate a failure with the use of circuit wiring diagrams.
- 7.c. Indicate testing procedures for shorts, opens, and grounds.

Criteria

Performance will meet expectations when the student:

- 7.1. analyzes automotive circuit faults including opens, shorts and grounds on a written exam.
- 7.2. uses a DVOM to test a circuit for shorts, opens and grounds.
- 7.3. uses a test light to test a circuit for shorts, opens and grounds.
- 7.4. identifies causes and effects of shorts, grounds, opens, and resistance problems in electrical / electronic circuits.

8. Interpret wiring schematic diagrams.

Learning Objectives

- 8.a. Illustrate electrical flow through a schematic diagram.
- 8.b. Identify electrical components in a wiring schematic.
- 8.c. Consult wiring diagrams while diagnosing an electrical fault.

Criteria

Performance will meet expectations when the student:

- 8.1. identifies components on schematic wiring diagrams.
- 8.2. uses wiring schematics to solve circuit faults.

8.3. uses service information to find the appropriate schematic.

9. Perform electrical wiring repair.

Learning Objectives

9.a. Demonstrate soldering repair of electrical wiring.

9.b. Fix electrical wiring using non-solder repairs.

Criteria

Performance will meet expectations when the student:

9.1. replaces electrical connectors and terminal ends.

9.2. performs solder repair of electrical wiring.

Please see the school calendar for scheduled student days: 2022-2023 LPS School Year Calendar
available at - lexschools.org/calendar