

Lassen Community College Course Outline

AT-80 Basic Electrical

3.0 Units

I. Catalog Description

This course is designed to provide the student with theory, diagnosis and repair of chassis electrical systems. Extensive use of voltmeters, ohmmeters, and short circuit testers, and common testing tools will be emphasized. Isolate a malfunction to a specific system in which a fault exists. This course meets ASE Education Foundation standards. This course has been approved for hybrid delivery.

Recommended Preparation: Successful completion of ENGL105 or equivalent multiple measures placement.

34 Hours Lecture, 51 Hours Lab, 68 outside of class hours, 153 total student learning hours
Scheduled: Spring

II. Coding Information

Repeatability: Not Repeatable. Take 1 Time

Grading Option: Graded or Pass/No Pass

Credit Type: Credit - Degree Applicable

TOP Code: 094800

III. Course Objectives

A. Course Student Learning Outcomes

Upon completion of this course the student will be able to:

1. Diagnose, analyze, and repair common electrical system malfunctions at a semi-skilled level.
2. Demonstrate proper use of specialized tools and equipment in performing electrical repairs.

B. Course Objectives

Upon completion of this course the student will be able to demonstrate performance of the following tasks at a semi-skilled level.

1. Test electrical system and components using various meters and tools
2. Use wiring diagrams to identify system components
3. Repair common wiring defects such as opens and shorts
4. Test batteries
5. Diagnose and repair starter circuit components
6. Diagnose and repair charging system components
7. Diagnose and repair lighting and accessory circuit components

IV. Course Content

A. Safety and shop routine

1. Shop safety and routines
2. Vehicle identifying information, customer concern, related service history, cause, and correction.
3. Identify and interpret electrical system concern; determine necessary action.

B. Electrical theory

1. Volts

2. Amperes
3. Resistance/ohms
4. Ohms law
- C. Wiring systems and symbols
 1. Series circuit
 2. Parallel circuit
 3. Series parallel circuit
 4. Wiring diagrams and symbols
- D. Circuit requirements
 1. Battery
 2. conductor/insulator
 3. Fuse/fusible link/circuit breaker
 4. Load
 5. Ground
- E. Test equipment
 1. Volt, amp, ohm meter
 2. Test light
 3. Self-powered test light
 4. High and low amp current probe
 5. Logic probe
 6. Lab scope
- F. Circuit testing and repair
 1. Voltage drop; diagnosing shorts, grounds, and opens.
 2. Wiring repair
 3. Insulator repair
- G. Batteries
 1. Theory and construction
 2. Testing using load and non-load testers
 3. Charging, maintenance and jump starting
- H. Starting systems
 1. Theory of operation
 2. Starter control systems
 3. Starting system diagnostics and current draw testing
 4. Starter overhaul
 5. Bench testing
- I. Charging systems
 1. Theory of operation Voltage regulation
 2. Diagnosis
 3. Alternator overhaul
 4. Inspect, adjust, and replace drive belt, pulley's and tensioners
- J. Testing, repairing, and replacing light and accessory components
 1. Headlight circuit
 2. Park light circuit
 3. Tail light circuit
 4. Brake light circuit
 5. Turn signal circuit
 6. Back-up light circuit
 7. Dash light circuit
 8. Interior light/dome light circuit
 9. Dash, gauge, and driver information system circuits
 10. Horn circuit

11. Wiper circuit
12. Blower motor circuit
13. Cruise control circuit
14. Rear window defogger circuit
15. Power seat circuit
16. Power window circuit
17. Keyless entry circuit
18. Anti-theft circuit

V. Assignments

A. Appropriate Readings

1. Assigned Textbooks
2. Manufacturer's bulletins
3. Various manuals

B. Writing Assignments

Typical assignments will include:

1. Providing written answers to assigned questions
2. Performing mathematical calculations as assigned
3. Maintaining a notebook of class assignments/activities
4. Maintain a record of completed assignments/activities

C. Expected Outside Assignments

Appropriate outside assignments may include:

1. Researching appropriate readings
2. Preparing written assignments
3. Studying as needed for successful classroom performance

D. Specific Assignments that Demonstrate Critical Thinking

Student will perform analysis and evaluation of readings and/or classroom materials and utilize this analysis in classroom discussion, writing assignments and in performing laboratory activities. Students must select and use appropriate methods and materials needed to complete laboratory assignments.

VI. Methods of Evaluation

Term paper (topic choice, thesis statement, outline, bibliography, rough draft, final draft), homework, classroom discussion, essay, journals, lab demonstrations and activities, multiple choice quizzes, and participation.

Hybrid Evaluation

All quizzes and exams will be administered during the in person class time. Students will be expected to complete online assignments and activities equivalent to in class assignments and activities for the online portion of the course. Electronic communication, both synchronous and asynchronous (chat/forum) will be evaluated for participation and to maintain effective communication between instructor and students.

VII. Methods of Delivery

Check those delivery methods for which, this course has been separately approved by the Curriculum/Academic Standards Committee.

Traditional Classroom Delivery Correspondence Delivery

Hybrid Delivery

Online Delivery

Traditional Classroom Delivery:

The appropriate method of instruction will be determined by the instructor and may include:

1. Lecture with or without various audio/visual aids.
2. Group problem solving, discussion, debate, and/or critique.
3. Demonstration
4. Computer-assisted/other self-paced instruction.
5. Field trips or field assignments.
6. Laboratory assignments utilizing planned activities or 'live' work.

Hybrid Delivery:

Hybrid modality may involve face to face instruction mixed with online instruction. A minimum of 1/3 of instruction, including 100% labs, will be provided face to face. The remaining hours will be taught online through a technology platform as adopted by the district.

VIII. Representative Texts and Supplies

Service manuals as determined by the instructor. Appropriate shop clothing, proper footwear, and safety glasses

Jones and VanGelder *Master Automotive Technician Series Automotive Electricity and Electronics*, 2017, ISBN 9781284101461

IX. Discipline/s Assignment

Automotive Technology

X. Course Status

Current Status: Active

Original Approval Date: 6/1/1990

Board Approval: 03/12/2013

Chancellors' Approval: 05/01/2013

Revised By: Chad Lewis

Curriculum/Academic Standards Committee Revision Date: 11/7/2023