

**JEFFERSON COLLEGE**

**COURSE SYLLABUS**

**AUT202**

**BASIC ELECTRICAL/ELECTRONICS SYSTEMS LAB**

5 Credit Hours

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## AUT202 Basic Electrical/Electronics Systems Lab

### I. CATALOGUE DESCRIPTION

- A. Pre-requisite: AUT161 Introduction to Engine Performance with a Grade of “C” or Better  
 AUT162 Introduction to Engine Performance Lab with a Grade of “C” or Better  
 Reading Proficiency  
 Co-requisite: AUT 201 Basic Electrical/Electronics Systems

A. 5 Credit Hours

B. This course is an automotive shop experience that will include testing, diagnosis, and repair of electrical systems in a professional shop environment. The systems include battery, starting, and charging system. This course will include the hands on diagnosis and repair of these systems as is required to be successful in today’s shop environment. Wiring repair and replacement will also be covered. Completion of this course will prepare the student for employment in the automotive field and take the National Institute for Automotive Service Excellence (ASE) Electrical/Electronic Systems Test (A6), Engine Performance Test (A8), and Advanced Engine Performance Specialist Certification Test (L1). (F)

### II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

<b>A. General Electrical System Diagnosis</b>		
Student will demonstrate knowledge of how to complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of identifying and interpreting electrical/electronic system concern; determine necessary action	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of researching applicable vehicle and service information, such as electrical/electronic system operation, vehicle service history, service precautions, and technical service bulletins	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback

Student will demonstrate knowledge of locating and interpreting vehicle and major component identification numbers	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of diagnosing electrical/electronic integrity of series, parallel and series-parallel circuits using principles of electricity (Ohm's Law)	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of proper use of wiring diagrams during diagnosis of electrical circuit problems	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of the proper use of a digital multimeter (DMM) during diagnosis of electrical circuit problems, including: source voltage, voltage drop, current flow, and resistance	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of checking electrical circuits with a test light; determine necessary action	P-2	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of checking electrical/electronic circuit waveforms; interpret readings and determine needed repairs	P-2	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of checking electrical circuits using fused jumper wires; determine necessary action	P-2	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of locating shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine necessary action	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of measuring and diagnosing the cause(s) of excessive parasitic draw; determine necessary action	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of inspecting and testing fusible links, circuit breakers, and fuses; determine necessary action	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback

Student will demonstrate knowledge of inspecting and testing switches, connectors, relays, solenoid, solid state devices, and wires of electrical/electronic circuits; perform necessary action	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of removal and replacement of terminal ends from connectors; replace connectors and terminal ends	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of performing solder repair of electrical wiring	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback

<b>B. Battery Diagnosis and Service</b>		
Student will demonstrate knowledge of performing battery state-of-charge test; determine necessary action	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Students will demonstrate understanding of performing battery capacity test; confirm proper battery capacity for vehicle application; determine necessary action	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate understanding of maintaining or restoring electronic memory functions	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of inspecting, cleaning, filling, and/or replacing battery, battery cables, connectors, clamps, and hold-downs	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of performing a battery charge	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of starting a vehicle using jumper cables or an auxiliary power supply	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback

Students will demonstrate knowledge of identifying high voltage circuits of electric or hybrid electric vehicle and related safety precautions	P-3	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of identifying electronic modules, security systems, radios, and other accessories that require reinitialization or code entry following battery disconnect	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures.	P-3	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback

<b>C. Starting System Diagnosis and Repair</b>		
Student will demonstrate knowledge or performing starter current draw tests; determine necessary action	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of performing starter circuit voltage drop tests; determine necessary action	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of inspecting and testing starter relays and solenoids; determine necessary action	P-2	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of removal and installation of a starter in a vehicle	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of inspection and testing of switches, connectors, and wires of starter control circuits; perform necessary action	P-2	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of how to differentiate between electrical and engine mechanical problems that cause a slow-crank or no-crank condition	P-2	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback

<b>D. Charging System Diagnosis and Repair</b>		
Student will demonstrate knowledge of performing charging system output test; determine necessary action	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of diagnosis of charging system for the cause of undercharge, no-charge, and overcharge conditions	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of inspection, adjustment, or replacement of generator (alternator) drive belts, pulleys, and tensioners; check pulley and belt alignment	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of removal, inspection, and installation of generator (alternator)	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback
Student will demonstrate knowledge of performing charging circuit voltage drop tests; determine necessary action	P-1	Performance of Task During Lab/Shop Class with 100% Accuracy Lab Exercises Instructor Observation/Feedback

### III. OUTLINE OF TOPICS

- A. Properly Fill Out a Work order
- B. Diagnose Electrical Circuits
  - 1. Locate electrical faults using industry accepted procedures
  - 2. Apply Ohm's law to vehicle circuits
  - 3. Locate and utilize vehicle information
  - 4. Perform wiring repair using industry accepted procedures
- C. Test Battery, Starting, Charging Systems
- D. Miscellaneous Diagnosis and Repair
  - 1. Locate high voltage devices on a hybrid
  - 2. Identify electronic modules, security systems, and radios; reinitialize each one

IV. METHOD(S) OF INSTRUCTION

- A. A-Tech Trainers
- B. Lab Exercises
- C. Live Vehicle Repair
- D. Electude/Argo Online Curriculum

V. REQUIRED TEXTBOOK(S)

Al Santini, *Automotive Electricity & Electronics* (Current Edition), Delmar

VI. REQUIRED MATERIALS

- A. Jefferson College Automotive Technology or Approved Sponsoring Shop WorkShirt.
- B. Safety Glasses
- C. Work Boots

VII. SUPPLEMENTAL REFERENCES

None

VIII. METHODS OF EVALUATION

- A. Student Participation 40%
- B. Shop Grade 60%

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Technology Center 101; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College Website <http://www.jeffco.edu>).

## XI. ATTENDANCE STATEMENT

Regular and punctual attendance is expected of all students. Any one of these four options may result in the student being removed from the class and an administrative withdrawal being processed: (1) Student fails to begin class; (2) Student ceases participation for at least two consecutive weeks; (3) Student misses 15 percent or more of the coursework; and/or (4) Student misses 15 percent or more of the course as defined by the instructor. Students earn their financial aid by regularly attending and actively participating in their coursework. If a student does not actively participate, he/she may have to return financial aid funds. Consult the College Catalog or a Student Financial Services representative for more details.

## XII. OUTSIDE OF CLASS ACADEMICALLY RELATED ACTIVITIES

The U.S. Department of Education mandates that students be made aware of expectations regarding coursework to be completed outside the classroom. Students are expected to spend substantial time outside of class meetings engaging in academically related activities such as reading, studying, and completing assignments. Specifically, time spent on academically related activities outside of class combined with time spent in class meetings is expected to be a minimum of 37.5 hours over the duration of the term for each credit hour.