SOUTHEAST COMMUNITY COLLEGE
ADVANCED TECHNOLOGIES & SKILLED TRADES DIVISION
DIESEL TECHNOLOGY - TRUCK
COURSE SYLLABUS
November 14, 2025

I. CATALOG DESCRIPTION

Course Number: DESL1116
Course Title: Electrical Fundamentals
Prerequisite(s): None

Catalog Description: This course covers vehicle electrical systems and their components. Exercises are performed with basic math skills to understand Ohm's Law for series, parallel, and series parallel circuits. The design, diagnosis and repair methods are discussed for servicing storage batteries, starting and charging systems that are used in various vehicle types. Common vehicle circuits their design, diagnosis and repairs are covered.

Credit Hour: 6.0
Classroom Hours: 53
Lab Hours: 113
Total Contact Hours: 166

II. COURSE OBJECTIVES: *Course will:*

A. Cover electrical theories and principle function
B. Cover electrical laws
C. Cover circuit types and design
D. Cover control devices (switches, relays, modules)
E. Cover magnetism and electromagnetism
F. Cover basic electrical components
G. Cover use of a DVOM Meter
H. Teach how to calculate and measure voltage, resistance, and current
I. Teach conductor service and repair
J. Cover understanding and diagnosis of circuit faults
K. Cover theory of operation, service, and testing of batteries
L. Cover theory, design, and operation of the starting system
M. Cover theory, design, and operation of the charging system
N. Diagnosis and repair the starting system
O. Diagnosis and repair of the charging system
P. Cover wiring diagram components
Q. Cover testing and repair of wiring systems
R. Cover testing, diagnosis, and repair of electrical systems and components
S. Introduce Oscilloscopes

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES:

A. STUDENT LEARNING OUTCOMES: *Student will be able to:*

1. Explain basic electrical/electronic theory as it applies to a vehicle's operating systems.
2. Describe voltage, current, and resistance and their relationship to Ohm's and Kirchhoff's Laws.
3. Identify series, parallel and series-parallel circuits and explain their operation.
4. Demonstrate the ability to calculate values for voltage, current and resistance.
5. Identify the types of control devices used in electrical systems.
6. Identify the types of circuit protection devices used in electrical systems.
7. Identify the use of permanent magnets, electromagnets and the relationships of electricity and electromagnetic induction.
8. Demonstrate the use of a DVOM to measure voltage, current and resistance.
9. Identify opens, shorts and ground connections and demonstrate how faults are diagnosed.
10. Identify electrical components and explain their operation.
11. Solder and repair conductors used in the electrical circuit.
12. Make repairs to terminals and connectors.
13. Test, diagnose and replace automotive storage batteries.
14. Describe the theory of starting system operation, identify and test the major components, and demonstrate correct no-load testing procedures using all designated test equipment.
15. Demonstrate correct testing procedures on complete charging systems and components.
16. Utilize wiring diagrams to troubleshoot electrical circuits.
17. Diagnose the electrical system and its individual components.
18. Explain the function and operation of various automotive sensors and/or outputs.
19. Test and repair the electrical system and its individual components and accessories using industry service equipment.
20. Demonstrate the use of an oscilloscope.

B. GENERAL EDUCATION LEARNING OUTCOMES

GELO #3: Critical Thinking & Problem Solving

Outcomes:

1. Collect, identify, interpret and analyze data.

IV. CONTENT/UNIT OF INSTRUCTION

A. The basic electrical and electronic principles
B. Ohm's Law theory
C. Circuit types
D. Kirchhoff's Laws
E. Switches
F. Calculate and measuring voltage, resistance and current
G. Use of a DVOM Meter and circuit testers
H. Shorts, opens and grounds
I. Magnetism and electromagnetism
J. Conductor service and repair
K. Servicing and testing of batteries
L. Circuit components
M. Charging systems
N. Starting systems
O. Load testing
P. Wiring diagrams

V. INSTRUCTIONAL MATERIALS

Required Text(s): See Course Identification Document for current textbook.

Tools: See current required tool list.

VI. METHODS OF PRESENTATION / INSTRUCTION

A. Methods of presentation typically include a combination of the following:

1. Lecture
2. Small and large group discussion
3. Video presentation
4. Demonstrations
5. Project boards
6. Handouts
7. Observations
8. Assigned lab projects
9. Field trips

VII. METHODS OF EVALUATION

A. Methods of evaluation typically include a combination of the following:

1. Quizzes
2. Tests
3. Lab grades
4. Class conduct

Letter grades will be based on the SCC Standard Grade Scale Policy. **Note:** See course information document for specific details on how the course grades will be calculated.

VIII. SPECIFIC COURSE REQUIREMENTS

A. Student must:

1. Complete all tests, projects, assignments, and notebook (if required).
2. Earn a final grade of 70% (2.0) or higher.

B. Attendance:

1. **Attendance is required for successful completion of this course.**
2. This is an Engaged Learning course and students are expected to complete pre-class preparation assignments/homework and attend sessions for class, lab, including assignments missed due to absence.
3. Each instructor will inform students by means of a Syllabus and Course Information Document of attendance requirements at the first-class meeting.
4. It is expected that students will be on time and present for all scheduled class / lab times unless PRIOR arrangements have been made with the instructor.
5. Missed class or lab sessions, regardless of cause, reduces the opportunity for learning and may affect student achievement of course learning outcomes and the student's grades.
6. Students are responsible for all content missed, regardless of the reason for the absence.
7. Students must, whenever possible, notify the instructor if unable to attend any class/lab session.
8. Emergency absences will be considered on an individual basis to determine if learning activities can reasonably be rescheduled during the current session.

C. Participation:

1. For every hour of classroom learning students are expected to perform two hours of related studies as homework or hands-on / simulated/on-line activities outside the classroom.
2. Students are expected to be responsible for meeting scheduled class/lab/ homework & assigned due dates unless prior arrangements have been made with the instructor 24 hours before the due date.
3. Students are expected to complete all exams, quizzes, lab activities and assignments / homework at the scheduled times unless PRIOR arrangements have been made with the instructor before the due date and time.
4. When reasonably possible, and only when prior arrangements have been made, students may ask the instructor to have a test or exam rescheduled prior to 24 hours before the activities scheduled date and time.
5. Unscheduled Quizzes may be given at any time and may not be repeated or taken at a later time, unless approved by the instructor.
6. Exceptions due to emergency absences will be considered on an individual basis.

D. Program shop safety rules will be followed. Please see the course outline for any additional safety rules established by the instructor.