

**COURSE PREFIX /NO: AUT 133**  
**COURSE TITLE: ELECTRICAL FUNDAMENTALS**  
**LEC HRS/WEEK: 2.0**  
**LAB HRS/WEEK: 3.0**  
**CREDIT HRS/SEMESTER: 3.0**

**DL ATTENDANCE/VA STATEMENT**  
**TEXTBOOK INFORMATION**

**COURSE DESCRIPTION**

This course is a study of the theories of electricity including magnetism, series and parallel circuits, Ohm's Law and the instruction to the use of various electrical test equipment.

**COURSE COMPETENCIES**

Upon successful completion of this course, the student should be competent to perform the following tasks:

**Module 1. General Electrical System Diagnosis**

1. Identify and interpret electrical/electronic system concerns; determine necessary action.
2. Research applicable vehicle and service information, such as electrical/electronic system operation, vehicle service history, service precautions, and technical service bulletins.
3. Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, and calibration decals).
4. Diagnose electrical/electronic integrity of series, parallel, and series parallel circuits using the principals of electricity (Ohm's Law).
5. Demonstrate the proper use of a digital multimeter (DMM) during the diagnosis of electrical circuit problems.
6. Check electrical circuits with a test light; determine necessary action.
7. Check current flow in electrical/electronic circuits and components using an ammeter; determine necessary action.

8. Check continuity and resistance in electrical/electronic circuits and components with an ohmmeter; determine necessary action.
9. Check electrical circuits using jumper wires; determine necessary action.
10. Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.
11. Repair wiring harnesses and connectors.
12. Discuss atomic structure and magnetism; voltage, amperage, and resistance; and Ohm's Law.
13. Discuss series and parallel circuits.

## **Module 2. Automotive Batteries**

1. Perform battery state-of-charge test; determine needed service.
2. Perform battery capacity test; determine needed service.
3. Perform slow/fast battery charge.
4. Inspect and clean battery cables, connectors, clamps, and hold-downs; repair or replace as needed.
5. Safety.
6. Maintain or restore electronic memory functions
7. Inspect, clean, fill, and replace battery.
8. Start a vehicle using jumper cables and a battery or auxiliary power supply according to manufactures recommended specifications.

## **Module 3. Starting System Diagnosis and Repair**

1. Perform starter current draw tests; determine necessary action.
2. Perform starter circuit voltage drop tests; determine necessary action.
3. Inspect and test starter relays and solenoids; replace as needed.
4. Remove and install starter.

5. Perform starter bench test; determine necessary action.
6. Inspect and test switches, connectors, and wires of starter control circuits; perform necessary action.
7. Disassemble, clean, inspect, and test starter components; replace as needed.
8. Differentiate between electrical and engine mechanical problems that cause a slow-crank or no-crank condition.

#### **Module 4. Lighting Systems Diagnosis and Repair**

1. Discuss lighting circuit operation.
2. Inspect, replace, and aim headlight bulbs.
3. Diagnose the cause of brighter than normal, intermittent, dim or no light operation; determine necessary action.
4. Diagnose and inspect incorrect turn signal or hazard light operation; perform necessary action.

#### **COURSE REQUIREMENTS**

Students are responsible for attaining competencies through completion of the following course requirements:

##### **ATTENDANCE:**

Students will be bound by the policies stated in the York Technical College Student Handbook. Students must attend 80% of the hours assigned the class for a semester to receive credit for the course. In case a student does miss a class, the student is responsible for obtaining the material that was covered during the absence. If a student is aware that a class will be missed, then the student should notify the instructor at the earliest possible date. Students with unexcused absences during tests will be allowed to make up tests at the discretion of the instructor. The student has the burden to be sure that some arrangement has been made with the instructor for taking a make-up test.

##### **ACADEMIC HONESTY**

York Technical College adheres to the South Carolina Tech Student code, approved by the State Board for Technical and Comprehensive Education on March 13, 1974( revised last April, 25 1984). Copies of this code are available in the Library and from Student Services. Any student involved in cheating or any other academic dishonesty will be given a grade of zero and will be subject to further disciplinary action. See the student handbook section “Student Life” subheading “Student Conduct” for further details.

### **PARTICIPATION IN CLASS**

Students will be expected to participate in class discussions, to demonstrate problem-solving techniques, to complete tests, homework, lab experiments, lab reports and other assigned work.

### **EVALUATION STRATEGIES / GRADING**

The grading scale will be as follows:

Grade Points	
A	90-100
B	80-89
C	70-79
D	60-69
F	00-59

#### Evaluation Method

Tests may be written or oral and may contain questions that are true or false, short answer, multiple choice, fill in the blank and/or problems. Students should refer to the instructor for the number of tests to be given and the material to be covered on each test. Each test will be of equal weight unless otherwise indicated by the instructor. Lab grades will be based on the completion of the Course Competencies, team work, safety, class participation, and housekeeping.

Final grades will be determined as follows:

Module 1.	Tests	8.35%
Module 1.	Lab	16.65%
Module 2.	Test	8.35%
Module 2.	Lab	16.65%
Module 3.	Test	8.35%
Module 3.	Lab	16.65%

Module 4.	Test	8.35%
Module 4.	Lab	16.65%
Total Grade		100%

### **ENTRY-LEVEL SKILLS**

Students should demonstrate hand eye coordination, manual dexterity, and be able to work in an industrial environment.

### **PREREQUISITES**

None

### **CO-REQUISITES**

None