



South Central College

# AST 1233 Starting and Charging Systems

## Common Course Outline

### Course Information

<b>Description</b>	This course covers the operation and diagnosis of the starting and charging systems. Instruction in component identification and operation, circuit diagnosis, and component testing will be included. (Prerequisite: Admission to the Automotive Service program)
<b>Total Credits</b>	3
<b>Total Hours</b>	72

### Types of Instruction

Instruction Type	Credits/Hours
Lecture	1.5/24
Lab	1.5/48

### Pre/Corequisites

Prerequisite Admission to the Automotive Service program

### Institutional Core Competencies

Communication - Students will be able to demonstrate appropriate and effective interactions with others to achieve their personal, academic, and professional objectives.

Critical and Creative Thinking - Students will be able to demonstrate purposeful thinking with the goal of using a creative process for developing and building upon ideas and/or the goal of using a critical process for the analyzing and evaluating of ideas.

### Course Competencies

#### 1. Exhibit professionalism and demonstrate proper shop safety procedures

##### Learning Objectives

Exhibit professional conduct, act responsibly, and accept responsibility for the successful and timely completion of assignments

Identify and follow all shop operating and safety procedures including electrical safety procedures

#### 2. Describe the operation of the battery, starting system, and charging system

##### Learning Objectives

Describe battery types, BCI number, operation, charging, and service including hybrid vehicle auxiliary 12 volt battery

Identify starting system components and explain starting system operation

Describe the operation of an automatic idle stop/start system  
Identify charging system components including AC generator output rating  
Explain charging system principles of operation including computer controlled charging systems  
Explain voltage regulator operation including temperature compensation  
Identify electronic modules, security systems, entertainment systems, and other accessories that require initialization or code entry following a battery disconnect  
Identify safety precautions for high voltage systems on electric and hybrid-electric vehicles

**3. Inspect, test, and diagnose the battery - determine necessary action**

**Learning Objectives**

Inspect the battery, connections, hold down, and identify the proper battery for the vehicle  
Perform a battery open circuit voltage, specific gravity, conductance, and load test

**4. Inspect, test, and diagnose the starting system - determine necessary action**

**Learning Objectives**

Perform starter current draw test, voltage drop test, and diagnose starting system concerns  
Trace, inspect, and test starter control circuits, inspect and test switches, connectors, wires, relays, and solenoid  
Differentiate between electrical and engine mechanical problems causing a slow or no crank condition  
Remove starter and bench test the starter motor for proper operation

**5. Inspect, test, and diagnose the charging system - determine necessary action**

**Learning Objectives**

Inspect, adjust, or replace the generator drive belt, pulleys, tensioner, and check belt alignment  
Perform charging system output test  
Inspect and test the field circuit operation, voltage regulator operation, and perform a charging system voltage drop test  
Diagnose the charging system for a no charge, undercharge, and overcharge condition

**6. Inspect, test, repair, or replace starting system components**

**Learning Objectives**

Demonstrate jump starting a vehicle using jumper cables or booster pack  
Inspect, clean, or replace the battery, battery cables, connectors, and hold-downs  
Maintain electronic module memory function  
Inspect, test, and replace starter motor or components

**7. Inspect, test, repair, or replace charging system components**

**Learning Objectives**

Demonstrate charging a battery using a battery charger  
Inspect, test, and replace AC generator or components