South Central College

AST 1233 Starting and Charging Systems

Course Outcome Summary

Course Information

Description
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)

Total Credits
3

Total Hours
72

Types of Instruction

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

Pre/Corequisites
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

SCC Accessibility Statement
South Central College strives to make all learning experiences as accessible as possible. If you have a disability and need accommodations for access to this class, contact the Academic Support Center to request and discuss accommodations. North Mankato: Room B-132, (507) 389-7222; Faribault: Room A-116, (507) 332-5847.

Additional information and forms can be found at: www.southcentral.edu/disability

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