BAKER COLLEGE
STUDENT LEARNING OUTCOMES

AST 1410A Electrical/Electronic Systems I
4 Semester Hours

Student Learning Outcomes & Enabling Objectives

1. Demonstrate general electrical system diagnosis techniques.
    a. Research vehicle service information including vehicle service history, service precautions, and technical service bulletins. P-1
    b. Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law). P-1
    c. Demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow and resistance. P-1
    d. Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits. P-1
    e. Demonstrate proper use of a test light on an electrical circuit. P-1
    f. Use fused jumper wires to check operation of electrical circuits. P-1
    g. Use wiring diagrams during the diagnosis (troubleshooting) of electrical/electronic circuit problems. P-1
    h. Inspect and test fusible links, circuit breakers, and fuses; determine needed action. P-1
    i. Inspect, test, repair, and/or replace components, connectors, terminals, harnesses, and wiring in electrical/electronic systems (including solder repairs); determine needed action. P-1

2. Demonstrate battery diagnosis and service techniques.
    a. Perform battery state-of-charge test; determine needed action. P-1
    b. Confirm proper battery capacity for vehicle application; perform battery capacity and load test; determine needed action. P-1
    c. Maintain or restore electronic memory functions. P-1
    d. Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs. P-1

e. Perform slow/fast battery charge according to manufacturer's recommendations. P-1
f. Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply. P-1
g. Identify safety precautions for high voltage systems on electric, hybrid, hybrid-electric, and diesel vehicles. P-2
h. Identify electrical/electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery. P-1
i. Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures. P-2

3. Demonstrate starting system diagnosis and repair techniques.
    a. Perform starter current draw tests; determine needed action. P-1
    b. Perform starter circuit voltage drop tests; determine needed action. P-1
    c. Inspect and test starter relays and solenoids; determine needed action. P-2
    d. Remove and install starter in a vehicle. P-1
    e. Inspect and test switches, connectors, and wires of starter control circuits; determine needed action. P-2
    f. Differentiate between electrical and engine mechanical problems that cause a slow-crank or a no-crank condition. P-2

4. Demonstrate lighting systems diagnosis and repair techniques.
    a. Diagnose (troubleshoot) the causes of brighter-than-normal, intermittent, dim or no light operation; determine needed action. P-1
    b. Inspect interior exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed. P-1
    c. Aim headlights properly. P-2
    d. Identify system voltage and safety precautions associated with high-intensity discharge lights. P-2

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

Big Ideas

Electrical systems diagnostics techniques
Battery diagnosis and service techniques
Starting system diagnosis and repair techniques
Lighting systems diagnosis and repair

Essential Questions

1. How do I perform diagnostics on general electrical systems?
2. How do I perform battery diagnosis and service techniques?
3. How do I perform starting system diagnosis and repair techniques?
4. How do you perform lighting systems diagnosis and repair?

These SLOs are not approved for experiential credit.

Effective: Fall 2023