



**BAKER COLLEGE**  
**STUDENT LEARNING OUTCOMES**

**AST 1510A Engine Performance I**  
**4 Semester Hours**

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**Student Learning Outcomes & Enabling Objectives**

1. Complete general engine diagnostics
  - a. Identify and interpret engine performance concerns; determine needed action. P-1
  - b. Research vehicle service information including vehicle service history, service precautions, and technical service bulletins. P-1
  - c. Diagnose abnormal engine noises or vibration concerns; determine needed action. P-3
  - d. Diagnose the cause of excessive oil consumption, coolant consumption, unusual exhaust color, odor, and sound; determine needed action. P-2
  - e. Perform engine absolute manifold pressure tests (vacuum/boost); determine needed action. P1
  - f. Perform cylinder power balance test; determine needed action. P-2
  - g. Perform cylinder cranking and running compression tests; determine needed action. P-1
  - h. Perform cylinder leakage test; determine needed action. P-1
  - i. Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine needed action. P-2
  - j. Verify engine operating temperature; determine needed action. P-1
  - k. Verify correct camshaft timing including engines equipped with variable valve timing systems (VVT). P-1
  
2. Complete computerized controls diagnosis and repair
  - a. Retrieve and record diagnostic trouble codes (DTC), OBD monitor status, and freeze frame data; clear codes when applicable. P-1
  - b. Access and use service information to perform step-by-step (troubleshooting) diagnosis. P-1
  - c. Perform active tests of actuators using a scan tool; determine needed action. P-1

- d. Describe the use of OBD monitors for repair verification. P-1
  - e. Diagnose the causes of emissions or driveability concerns with stored or active diagnostic trouble codes (DTC); obtain, graph, and interpret scan tool data. P-1
  - f. Diagnose emissions or driveability concerns without stored or active diagnostic trouble codes; determine needed action. P-1
  - g. Inspect and test computerized engine control system sensors, powertrain/engine control module (PCM/ECM), actuators, and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO); perform needed action. P-2
  - h. Diagnose driveability and emissions problems resulting from malfunctions of interrelated systems (cruise control, security alarms, suspension controls, traction controls, HVAC, automatic transmissions, non-OEM installed accessories, or similar systems); determine needed action. P-2
3. Demonstrate ignition system diagnosis and repair techniques.
- a. Diagnose (troubleshoot) ignition system related problems such as no-starting, hard starting, engine misfire, poor driveability, spark knock, power loss, poor mileage, and emissions concerns; determine needed action. P-2
  - b. Inspect and test crankshaft and camshaft position sensor(s); determine needed action. P-1
  - c. Inspect, test, and/or replace ignition control module, powertrain/engine control module; reprogram/initialize as needed. P-3
  - d. Remove and replace spark plugs; inspect secondary ignition components for wear and damage. P-1

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.

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These SLOs are not approved for experiential credit.

**Effective: Fall 2018**