



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

**AST 2110A Engine Repair II**  
**4 Semester Hours**

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**Student Learning Outcomes & Enabling Objectives**

1. Apply engine diagnosis, removal and reinstallation (R & R) techniques
  - a. Remove engine on a newer vehicle equipped with OBD; reconnect all attaching components and restore the vehicle to running condition. P-3
  - b. Reinstall engine on a newer vehicle equipped with OBD; reconnect all attaching components and restore the vehicle to running condition. P-3
  
2. Demonstrate cylinder head and valve train diagnosis and repair techniques.
  - a. Inspect and replace camshaft and drive belt/chain; includes checking drive gear wear and backlash, end play, sprocket and chain wear, overhead cam drive sprocket(s), drive belt(s), belt tension, tensioners, camshaft reluctor ring/tone-wheel, and valve timing components; verify correct camshaft timing. P-1
  - b. Establish camshaft position sensor indexing. P-1
  
3. Demonstrate engine block assembly diagnosis and repair techniques.
  - a. Remove, inspect, and/or replace crankshaft vibration damper (harmonic balancer). P-1
  - b. Disassemble engine block; clean and prepare components for inspection and reassembly. P1
  - c. Inspect engine block for visible cracks, passage condition, core and gallery plug condition, and surface warpage; determine needed action. P-2
  - d. Inspect and measure cylinder walls/sleeves for damage, wear, and ridges; determine needed action. P-2
  - e. Deglaze and clean cylinder walls. P-2
  - f. Inspect and measure camshaft bearings for wear, damage, out-of-round, and alignment; determine needed action. P-3

- g. Inspect crankshaft for straightness, journal damage, keyway damage, thrust flange and sealing surface condition, and visual surface cracks; check oil passage condition; measure end play and journal wear; check crankshaft position sensor reluctor ring (where applicable); determine needed action. P-1
  - h. Inspect main and connecting rod bearings for damage and wear; determine needed action. P-2
  - i. Identify piston and bearing wear patterns that indicate connecting rod alignment and main bearing bore problems; determine needed action. P-3
  - j. Inspect and measure piston skirts and ring lands; determine needed action. P-2
  - k. Determine piston-to-bore clearance. P-2
  - l. Inspect, measure, and install piston rings. P-2
  - m. Inspect auxiliary shaft(s) (balance, intermediate, idler, counterbalance and/or silencer); inspect shaft(s) and support bearings for damage and wear; determine needed action; reinstall and time. P-2
  - n. Assemble engine block. P-1
4. Demonstrate lubrication and cooling systems diagnosis and repair techniques.
- a. Perform cooling system pressure and dye tests to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, heater core, and galley plugs; determine needed action. P-1
  - b. Identify causes of engine overheating. P-1
  - c. Inspect, replace, and/or adjust drive belts, tensioners, and pulleys; check pulley and belt alignment. P-1
  - d. Inspect and/or test coolant; drain and recover coolant; flush and refill cooling system; use proper fluid type per manufacturer specification; bleed air as required. P-1
  - e. Inspect, remove, and replace water pump. P-2
  - f. Remove and replace radiator. P-2
  - g. Remove, inspect, and replace thermostat and gasket/seal. P-1
  - h. Inspect and test fan(s), fan clutch (electrical or mechanical), fan shroud, and air dams; determine needed action. P-1
  - i. Perform oil pressure tests; determine needed action. P-1
  - j. Perform engine oil and filter change; use proper fluid type per manufacturer specification. P-1
  - k. Inspect auxiliary coolers; determine needed action. P-3
  - l. Inspect, test, and replace oil temperature and pressure switches and sensors. P-2
  - m. Inspect oil pump gears or rotors, housing, pressure relief devices, and pump drive; perform needed action. 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.

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These SLOs are not approved for experiential credit.

**Effective: Fall 2017**