



BAKER COLLEGE

STUDENT LEARNING OUTCOMES

AST1110A Engine Repair I (A1)

4 Semester Hours

Student Learning Outcomes & Enabling Objectives

1. Demonstrate Shop and Personal Safety.
 - a. Identify general shop safety rules and procedures.
 - b. Utilize safe procedures for handling of tools and equipment.
 - c. Identify and use proper placement of floor jacks and jack stands.
 - d. Identify and use proper procedures for safe lift operation.
 - e. Utilize proper ventilation procedures for working within the lab/shop area.
 - f. Identify marked safety areas.
 - g. Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment.
 - h. Identify the location and use of eye-wash stations.
 - i. Identify the location of the posted evacuation routes.
 - j. Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.
 - k. Identify and wear appropriate clothing for lab/shop activities.
 - l. Secure hair and jewelry for lab/shop activities.
 - m. Locate and demonstrate knowledge of material safety data sheets (MSDS).

2. Demonstrate Tools and Equipment usage.
 - a. Identify tools and their usage in automotive applications.
 - b. Identify standard and metric designation.
 - c. Demonstrate safe handling and use of appropriate tools.
 - d. Demonstrate proper cleaning, storage, and maintenance of tools and equipment.

3. Identify Fasteners and their uses.
 - a. Identify threaded fasteners and their use
 - b. Identify standard and metric fasteners
 - c. Identify bolt grades and how they are sized
 - d. Identify pitch
 - e. Identify nuts and their applications
 - f. Identify washers and their applications
 - g. Identify the purpose and application of thread locking compounds

4. Demonstrate Preparing Vehicle for Service
 - a. Identify information needed and the service requested on a repair order
 - b. Identify purpose and demonstrate proper use of fender covers, mats.
 - c. Demonstrate use of the three Cs (concern, cause and correction).
 - d. Review vehicle service history
 - e. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause and correction.

5. Demonstrate Preparing a Vehicle for Customer
 - a. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.)

6. Demonstrate general; engine diagnosis; removal and reinstallation techniques.
 - a. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1
 - b. Research vehicle service information including fluid type, internal engine operation, vehicle service history, service precautions, and technical service bulletins. P-1
 - c. Verify operation of the instrument panel engine warning indicators. P-1
 - d. Inspect engine assembly for fuel, oil, coolant, and other leaks; determine needed action. P-1
 - e. Install engine covers using gaskets, seals, and sealers as required. P-1
 - f. Verify engine mechanical timing. P-1
 - g. Perform common fastener and thread repair, to include: remove broken bolt, restore internal and external threads, and repair internal threads with thread insert. P-1
 - h. Inspect, remove and/or replace engine mounts. P-2

- i. Identify service precautions related to service of the internal combustion engine of a hybrid vehicle. P-2
7. Demonstrate cylinder head and valve train diagnosis and repair techniques.
 - a. Remove cylinder head; inspect gasket condition; install cylinder head and gasket; tighten according to manufacturer's specification and procedure. P-1
 - b. Clean and visually inspect a cylinder head for cracks; check gasket surface areas for warpage and surface finish; check passage condition. P-1
 - c. Inspect pushrods, rocker arms rocker arm pivots and shafts for wear, bending, cracks, looseness, and blocked oil passages (orifices); determine needed action. P-2
 - d. Adjust valves (mechanical or hydraulic lifters). P-1
 - e. Inspect valve springs for squareness and free height comparison; determine needed action. P-3
 - f. Replace valve stem seals on an assembled engine; inspect valve spring retainers, locks/keepers, and valve lock/keeper grooves; determine needed action. P-3
 - g. Inspect valve guides for wear; check valve stem-to-guide clearance; determine needed action. P-3
 - h. Inspect valves and valve seats; determine needed action. P-3
 - i. Check valve spring assembled height and valve stem height; determine needed action. P-3
 - j. Inspect valve lifters; determine needed action. P-2
 - k. Inspect and/or measure camshaft for runout, journal wear and lobe wear. P-3
 - l. Inspect camshaft bearing surface for wear, damage, out-of-round, and alignment; determine needed action. P-3

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

Shop and personal safety

Tools and equipment

Fasteners

Prepping vehicle

Engine diagnosis, removal, and reinstall

Cylinder head and valve train

Essential Questions

How do you use shop and personal safety techniques and equipment?

How do you properly use tools and equipment in auto services situations?

How do you use fasteners in auto services situations?

How do you prepare a vehicle to be returned to the customer?

How do you diagnose, remove and reinstall an engine?

How do you diagnose and repair the cylinder head and valve train?

These SLOs are not approved for experiential credit.

Effective: Fall 2023