



BAKER COLLEGE STUDENT LEARNING OUTCOMES

AST 1210A Suspension and Steering 4 Semester Hours

Student Learning Outcomes & Enabling Objectives

1. Apply general suspension and steering system diagnostic techniques.
 - a. Research vehicle service information including fluid type, vehicle service history, service precautions, and technical service bulletins. (P-1)
 - b. Identify and interpret suspension and steering system concerns; determine needed action. (P-1)

2. Apply steering systems diagnosis and repair techniques.
 - a. Disable and enable supplemental restraint system (SRS); verify indicator lamp operation. (P-1)
 - b. Remove and replace steering wheel; center/time supplemental restraint system (SRS) coil (clock spring). (P-1)
 - c. Diagnose steering column noises, looseness, and binding concerns (including tilt/telescoping mechanisms); determine needed action. (P-2)
 - d. Diagnose steering column noises, looseness, and binding concerns (including tilt/telescoping mechanisms); determine needed action. (P-2)
 - e. Diagnose power steering gear (non-rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns; determine needed action. (P-2)
 - f. Diagnose power steering gear (rack and pinion) binding, uneven turning effort, looseness, hard steering, and noise concerns; determine needed action. (P-2)
 - g. Inspect steering shaft universal-joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel; determine needed action. (P-2)
 - h. Remove and replace rack and pinion steering gear; inspect mounting bushings and brackets. (P-2)
 - i. Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots; replace as needed. (P-1)
 - j. Inspect power steering fluid level and condition. (P-1)

- k. Flush, fill, and bleed power steering system; use proper fluid type per manufacturer specification. (P-2)
 - l. Inspect for power steering fluid leakage; determine needed action. (P-1)
 - m. Remove, inspect, replace, and/or adjust power steering pump drive belt. (P-1)
 - n. Remove and reinstall power steering pump. (P-2)
 - o. Remove and reinstall press fit power steering pump pulley; check pulley and belt alignment. (P-2)
 - p. Inspect, remove and/or replace power steering hoses and fittings. (P-2)
 - q. Inspect, remove and/or replace pitman arm, relay (centerlink/intermediate) rod, idler arm, mountings, and steering linkage damper. (P-2)
 - r. Inspect, replace, and/or adjust tie rod ends (sockets), tie rod sleeves, and clamps. (P-1)
 - s. Inspect, test and diagnose electrically- assisted power steering systems (including using a scan tool); determine needed action. (P-2)
 - t. Identify hybrid vehicle power steering system electrical circuits and safety precautions. (P2)
 - u. Test power steering system pressure; determine needed action. (P-2)
3. Apply suspension systems diagnosis and repair techniques.
- a. Diagnose short and long arm suspension system noises, body sway, and uneven ride height concerns; determine needed action. (P-1)
 - b. Diagnose strut suspension system noises, body sway, and uneven ride height concerns; determine needed action. (P-1) c
 - c. Inspect, remove, and/or replace upper and lower control arms, bushings, shafts, and rebound bumpers. (P-3)
 - d. Inspect, remove, and/or replace strut rods and bushings. (P-3)
 - e. Inspect, remove, and/or replace upper and/or lower ball joints (with or without wear indicators). (P-2)
 - f. Inspect, remove, and/or replace steering knuckle assemblies. (P-3)
 - g. Inspect, remove and/or replace short and long arm suspension system coil springs and spring insulators. (P-3)
 - h. Inspect, remove, and/or replace torsion bars and mounts. (P-3)
 - i. Inspect, remove, and/or replace front/rear stabilizer bar (sway bar) bushings, brackets, and links. (P-3)
 - j. Inspect, remove, and/or replace strut cartridge or assembly, strut coil spring, insulators (silencers), and upper strut bearing mount. (P-3)
 - k. Inspect, remove, and/or replace track bar, strut rods/radius arms, and related mounts and bushings. (P-3)
 - l. Inspect rear suspension system leaf spring(s), spring insulators (silencers), shackles, brackets, bushings, center pins/bolts, and mounts. (P-1)

4. Apply related suspension and steering service techniques.
 - a. Inspect, remove, and/or replace shock absorbers; inspect mounts and bushings. (P-1)
 - b. Remove, inspect, service and/or replace front and rear wheel bearings. (P-1)
 - c. Describe the function of suspension and steering control systems and components, (i.e. active suspension and stability control). (P-3)

5. Apply wheel alignment diagnosis, adjustment, and repair.
 - a. Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns; determine needed action. (P-1)
 - b. Perform prealignment inspection; measure vehicle ride height; determine needed action. (P-1)
 - c. Prepare vehicle for wheel alignment on alignment machine; perform four-wheel alignment by checking and adjusting front and rear wheel caster, camber and toe as required; center steering wheel. (P-1)
 - d. Check toe-out-on-turns (turning radius); determine needed action. (P-2)
 - e. Check steering axis inclination (SAI) and included angle; determine needed action. (P-2)
 - f. Check rear wheel thrust angle; determine needed action. (P-1)
 - g. Check for front wheel setback; determine needed action. (P-2)
 - h. Check front and/or rear cradle (subframe) alignment; determine needed action. (P-3)
 - i. Reset steering angle sensor. (P-2)

6. Apply wheels and tires diagnosis and repair.
 - a. Inspect tire condition; identify tire wear patterns; check for correct tire size, application (load and speed ratings), and air pressure as listed on the tire information placard/label. (P1)
 - b. Diagnose wheel/tire vibration, shimmy, and noise; determine needed action. (P-2)
 - c. Rotate tires according to manufacturer's recommendation including vehicles equipped with tire pressure monitoring systems (TPMS). (P-1)
 - d. Measure wheel, tire, axle flange, and hub runout; determine needed action. (P-2)
 - e. Diagnose tire pull problems; determine needed action. (P-1)
 - f. Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly. (P-1)
 - g. Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor. (P-1)
 - h. Inspect tire and wheel assembly for air loss; perform needed action. (P-1)
 - i. Repair tire following vehicle manufacturer approved procedure. (P-1)

- j. Identify indirect and direct tire pressure monitoring system (TPMS); calibrate system; verify operation of instrument panel lamps. (P-1)
- k. Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system (TPMS) including relearn procedure. (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.

These SLOs are not approved for experiential credit.

Effective: Summer 2018