BAKER COLLEGE
STUDENT LEARNING OUTCOMES

AST 2210A Automatic Transmission
4 Semester Hours

Student Learning Outcomes & Enabling Objectives

1. Apply transmission and transaxle diagnosis techniques.
    a. Identify and interpret transmission/transaxle concerns, differentiate between engine performance and transmission/transaxle concerns; determine needed action. (P-1)
    b. Research vehicle service information including fluid type, vehicle service history, service precautions, and technical service bulletins. (P-1)
    c. Diagnose fluid loss and condition concerns; determine needed action. (P-1)
    d. Check fluid level in a transmission or a transaxle equipped with a dip-stick. (P-1)
    e. Check fluid level in a transmission or a transaxle not equipped with a dip-stick. (P-1)
    f. Perform pressure tests (including transmissions/transaxles equipped with electronic pressure control); determine needed action. (P-1)
    g. Diagnose noise and vibration concerns; determine needed action. (P-2)
    h. Perform stall test; determine needed action. (P-2)
    i. Perform lock-up converter system tests; determine needed action. (P-3)
    j. Diagnose transmission/transaxle gear reduction/multiplication concerns using driving, driven, and held member (power flow) principles. (P-1)
    k. Diagnose electronic transmission/transaxle control systems using appropriate test equipment and service information. (P-1)
    l. Diagnose pressure concerns in a transmission using hydraulic principles (Pascal's Law). (P-2)

2. Apply in-vehicle transmission/transaxle maintenance and repair.
    a. Inspect, adjust, and/or replace external manual valve shift linkage, transmission range sensor/switch, and/or park/neutral position switch. (P-1)
    b. Inspect for leakage; replace external seals, gaskets, and bushings. (P-2)

c. Inspect, test, adjust, repair and/or replace electrical/electronic components and circuits including computers, solenoids, sensors, relays, terminals, connectors, switches, and harnesses; demonstrate understanding of the relearn procedures. (P-1)
d. Drain and replace fluid and filter(s); use proper fluid type per manufacturer specification. (P-1)
e. Inspect, replace and align powertrain mounts. (P-2)

3. Apply off-vehicle transmission and transaxle repair.
    a. Remove and reinstall transmission/transaxle and torque converter; inspect engine core plugs, rear crankshaft seal, dowel pins, dowel pin holes, and mounting surfaces. (P-2)
    b. Inspect, leak test, flush, and/or replace transmission/transaxle oil cooler, lines, and fittings. (P-1)
    c. Inspect converter flex (drive) plate, converter attaching bolts, converter pilot, converter pump drive surfaces, converter end play, and crankshaft pilot bore. (P-2)
    d. Describe the operational characteristics of a continuously variable transmission (CVT). (P-3)
    e. Describe the operational characteristics of a hybrid vehicle drive train. (P-3)
    f. Disassemble, clean, and inspect transmission/transaxle. (P-1)
    g. Inspect, measure, clean, and replace valve body (includes surfaces, bores, springs, valves, switches, solenoids, sleeves, retainers, brackets, check valves/balls, screens, spacers, and gaskets). (P-2)
    h. Inspect servo and accumulator bores, pistons, seals, pins, springs, and retainers; determine needed action. (P-2)
    i. Assemble transmission/transaxle. (P-1)
    j. Inspect, measure, and reseal oil pump assembly and components. (P-2)
    k. Measure transmission/transaxle end play and/or preload; determine needed action. (P-1)
    l. Inspect, measure, and/or replace thrust washers and bearings. (P-2)
    m. Inspect oil delivery circuits, including seal rings, ring grooves, and sealing surface areas, feed pipes, orifices, and check valves/balls. (P-2)
    n. Inspect bushings; determine needed action. (P-2)
    o. Inspect and measure planetary gear assembly components; determine needed action. (P-2)
    p. Inspect case bores, passages, bushings, vents, and mating surfaces; determine needed action. (P-2)
    q. Diagnose and inspect transaxle drive, link chains, sprockets, gears, bearings, and bushings; perform needed action. (P-2)
    r. Inspect measure, repair, adjust or replace transaxle final drive components. (P-2)

s. Inspect clutch drum, piston, check-balls, springs, retainers, seals, friction plates, pressure plates, and bands; determine needed action. (P-2)
t. Measure clutch pack clearance; determine needed action. (P-1)
u. Air test operation of clutch and servo assemblies. (P-1)
v. Inspect one-way clutches, races, rollers, sprags, springs, cages, retainers; determine needed action. (P-2)

4. Demonstrate four-wheel drive/all-wheel drive component diagnosis and repair techniques.

    a. Inspect, adjust, and repair shifting controls (mechanical, electrical, and vacuum), bushings, mounts, levers, and brackets. (P-3)
    b. Inspect locking hubs; determine needed action. (P-3)
    c. Check for leaks at drive assembly and transfer case seals; check vents; check fluid level; use proper fluid type per manufacturer specification. (P-3)
    d. Identify concerns related to variations in tire circumference and/or final drive ratios. (P-2)
    e. Diagnose noise, vibration, and unusual steering concerns; determine needed action. (P-3)
    f. Diagnose, test, adjust, and/or replace electrical/electronic components of four-wheel drive/all-wheel drive systems. (P-2)
    g. Disassemble, service, and reassemble transfer case and components. (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

Diagnosis transmissions and transaxles
Maintenance and repair of transmissions and transaxles
Transmission and transaxle repair, off the vehicle
Diagnosis and repair of 4-wheel and all-wheel drive systems

Essential Questions

1. How do you diagnose transmissions and transaxles?

2. How do you perform maintenance and repair of transmissions and transaxles?

3. How do you perform off-vehicle transmission and transaxle repair?

4. How do you diagnose and repair 4-wheel drive and all-wheel drive systems?

These SLOs are not approved for experiential credit.

Effective: Fall 2023