



Western Technical College

32404355 Automatic Transmissions

Course Outcome Summary

Course Information

Description	A practical approach to automatic transmission theory and service. Provides functional skills on individual transmission and transaxle units. Diagnosis, repair, programming and adjustments are emphasized.
Career Cluster	Transportation, Distribution and Logistics
Instructional Level	Technical Diploma Courses
Total Credits	3
Total Hours	108

Textbooks

Fundamentals of Automotive Technology. 2nd Edition. Copyright 2018. CDX Automotive. Publisher: Jones & Bartlett Publishers. **ISBN-13**: 978-1-2842-0995-5. Required.

Learner Supplies

Safety glasses with side eye protection that meet Z87 OSHA guidelines. **Vendor**: To be discussed in class. Required.

Six inch ankle high, quality leather work shoes - \$75.00-100.00. **Vendor**: To be discussed in class. Required.

Pocket knife, six inch metal pocket ruler (English/metric measurement), small pocket flashlight, and pocket flat head screwdriver - \$20.00. **Vendor**: To be discussed in class. Required.

Success Abilities

1. Cultivate Passion: Enhance Personal Connections
2. Cultivate Passion: Expand a Growth-Mindset
3. Cultivate Passion: Increase Self-Awareness
4. Live Responsibly: Develop Resilience
5. Live Responsibly: Foster Accountability
6. Refine Professionalism: Act Ethically

7. Refine Professionalism: Improve Critical Thinking
8. Refine Professionalism: Participate Collaboratively
9. Refine Professionalism: Practice Effective Communication

Program Outcomes

1. Demonstrate professionalism appropriate for the auto service industry.
2. Perform diagnosis, service, and repair of automotive automatic transmission/transaxle systems.
3. Perform diagnosis, service, and repair of automotive electrical and electronic systems.
4. Perform diagnosis, service, and repair of automotive engine performance systems.

Course Competencies

1. Evaluate transmission and transaxle concerns.

Assessment Strategies

- 1.1. Written Product
- 1.2. Skill Demonstration

Criteria

You will know you are successful when

- 1.1. you differentiate between engine performance/concern and transmission performance/ concern.
- 1.2. you research vehicle service information.
- 1.3. you check fluid levels with or without dip-stick.
- 1.4. you perform pressure tests.
- 1.5. you perform stall test.
- 1.6. you perform lock-up converter system tests.

Learning Objectives

- 1.a. Identify and interpret transmission/transaxle concern, differentiate between engine performance and transmission/transaxle concerns; determine needed action.
- 1.b. Research applicable vehicle and service information fluid type, vehicle service history, service precautions, and technical service bulletins.
- 1.c. Check fluid level in a transmission or a transaxle equipped with a dip-stick.
- 1.d. Check fluid level in a transmission or a transaxle not equipped with a dip-stick.
- 1.e. Perform pressure tests (including transmissions/transaxles equipped with electronic pressure control); determine needed action.
- 1.f. Perform stall test; determine needed action.
- 1.g. Perform lock-up converter system tests; determine needed action.

2. Diagnose transmission and transaxle concern.

Assessment Strategies

- 2.1. Skill Demonstration
- 2.2. Written Product

Criteria

You will know you are successful when:

- 2.1. you select the correct [TOOLS, EQUIPMENT, INSTRUMENTS, MATERIALS, SUPPLIES]
- 2.2. you diagnose fluid loss concerns and repair/ replace oil cooler, lines and fittings as needed.
- 2.3. you diagnose transmission/ transaxle gear concerns.
- 2.4. you diagnose electronic transmission/transaxle control systems.
- 2.5. you diagnose pressure concerns.

Learning Objectives

- 2.a. Diagnose fluid loss and condition concerns; determine needed action.
- 2.b. Inspect, leak test, flush, and/or replace transmission/transaxle oil cooler, lines, and fittings.

- 2.c. Diagnose transmission/transaxle gear reduction/multiplication concerns using driving, driven, and held member (power flow) principles.
- 2.d. Diagnose electronic transmission/transaxle control systems using appropriate test equipment and service information.
- 2.e. Diagnose pressure concerns in a transmission using hydraulic principles (Pascal's Law).

3. Perform in vehicle transmission/transaxle maintenance and repair..

Assessment Strategies

- 3.1. Skill Demonstration
- 3.2. Written Objective Test

Criteria

You will know you are successful when:

- 3.1. you select the correct tools, equipment, instruments, materials, and supplies.
- 3.2. you inspect, adjust and repair transmission/ transaxle linkage, sensors, and switches.
- 3.3. you inspect and repair seals, gaskets, and bushings.
- 3.4. you inspect and repair electrical/ electronic components and circuits.
- 3.5. you drain and replace fluids and filters.
- 3.6. you inspect and replace powertrain mounts.

Learning Objectives

- 3.a. Inspect, adjust, and replace external manual valve shift linkage, transmission range sensor/switch, and park/neutral position switch.
- 3.b. Inspect for leakage; replace external seals, gaskets, and bushings.
- 3.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 procedure.
- 3.d. Drain and replace fluid and filter(s).
- 3.e. Inspect, replace and align powertrain mounts.

4. Investigate operational characteristics of various vehicle transmission.

Assessment Strategies

- 4.1. Skill Demonstration
- 4.2. Written Objective Test

Criteria

You will know you are successful when:

- 4.1. you describe the operational characteristics of a continuously variable transmission (CVT).
- 4.2. you describe the operational characteristics of a hybrid vehicle drive train.

Learning Objectives

- 4.a. Describe the operational characteristics of a continuously variable transmission (CVT).
- 4.b. Describe the operational characteristics of a hybrid vehicle drive train.

5. Inspect off-vehicle transmission and transaxle components.

Assessment Strategies

- 5.1. Skill Demonstration
- 5.2. Written Objective Test

Criteria

You will know you are successful when:

- 5.1. you select the correct tools, equipment, instruments, and supplies.
- 5.2. you examine transmission/ transaxle.
- 5.3. you inspect and replace, as needed, valve body.
- 5.4. you inspect and reseal oil pump assembly.
- 5.5. you examine thrust washers and bearings.
- 5.6. you inspect oil delivery circuits.
- 5.7. you examine and repair, as needed, transaxle final drive components.
- 5.8. you air test operation of clutch and servo assemblies.

Learning Objectives

- 5.a. Disassemble, clean, and inspect transmission/transaxle.
- 5.b. Inspect, measure, clean, and replace valve body (includes surfaces, bores, springs, valves, switches, solenoids, sleeves, retainers, brackets, check valves/balls, screens, spacers, and gaskets).
- 5.c. Inspect, measure, and reseal oil pump assembly and components.
- 5.d. Inspect, measure, and/or replace thrust washers and bearings.
- 5.e. Inspect oil delivery circuits, including seal rings, ring grooves, and sealing surface areas, feed pipes, orifices, and check valves/balls.
- 5.f. Inspect, measure, repair, adjust or replace transaxle final drive components.
- 5.g. Air test operation of clutch and servo assemblies.

6. Diagnose off-vehicle transmission and transaxle concern.

Assessment Strategies

- 6.1. Skill Demonstration
- 6.2. Written Objective Test

Criteria

You will know you are successful when:

- 6.1. you select the correct tools, equipment, instruments, materials and supplies.
- 6.2. you inspect servo and accumulator assemblies.
- 6.3. you measure transmission/ transaxle end play and/ or preload.
- 6.4. you inspect bushings and planetary gear assembly components.
- 6.5. you inspect physical components of transmission case.
- 6.6. you diagnose and inspect final drive assemblies.
- 6.7. you inspect clutch drum components and clutch drum clearances.
- 6.8. you inspect one way clutch assemblies.
- 6.9. you re-assemble transmission/ transaxle.

Learning Objectives

- 6.a. Inspect servo and accumulator bores, pistons, seals, pins, springs, and retainers; determine needed action.
- 6.b. Measure transmission/transaxle end play and/or preload; determine needed action.
- 6.c. Assemble transmission/transaxle.
- 6.d. Inspect bushings; determine needed action.
- 6.e. Inspect and measure planetary gear assembly components; determine needed action.
- 6.f. Inspect case bores, passages, bushings, vents, and mating surfaces; determine needed action.
- 6.g. Diagnose and inspect transaxle drive, link chains, sprockets, gears, bearings, and bushings; perform needed action.
- 6.h. Inspect clutch drum, piston, check-balls, springs, retainers, seals, friction plates, pressure plates, and bands; determine needed action.
- 6.i. Measure clutch pack clearance; determine needed action.
- 6.j. Inspect one-way clutches, races, rollers, sprags, springs, cages, retainers; determine needed action.