



Western Technical College

32404357 Drive Systems 1

Course Outcome Summary

Course Information

Description	A study of the driveline component parts with an emphasis on diagnosis, maintenance and repair procedures, drive axles and shafts, bearings and seals and manual transmissions/transaxles.
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: Embrace Sustainability

6. Live Responsibly: Foster Accountability
7. Refine Professionalism: Act Ethically
8. Refine Professionalism: Improve Critical Thinking
9. Refine Professionalism: Participate Collaboratively
10. Refine Professionalism: Practice Effective Communication

Program Outcomes

1. Demonstrate professionalism appropriate for the auto service industry.
2. Perform diagnosis, service, and repair of automotive manual drive train and axle systems.
3. Perform diagnosis, service, and repair of automotive steering and suspension systems.
4. Perform diagnosis, service, and repair of automotive brake systems.

Course Competencies

1. Investigate general drive train concerns.

Assessment Strategies

- 1.1. Written Product
- 1.2. Skill Demonstration

Criteria

You will know you are successful when:

- 1.1. you identify and interpret drive train concerns.
- 1.2. you research vehicle service information.
- 1.3. you check for fluid leaks and condition.
- 1.4. you drain and refill manual transmission/transaxle.

Learning Objectives

- 1.a. Identify and interpret drive train 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 condition; check for leaks; determine needed action.
- 1.d. Drain and refill manual transmission/transaxle and final drive unit; use proper fluid type per manufacturer specification.

2. Diagnose clutch concerns.

Assessment Strategies

- 2.1. Written Product
- 2.2. Skill Demonstration

Criteria

You will know you are successful when:

- 2.1. you diagnose clutch concerns.
- 2.2. you inspect clutch control components.
- 2.3. you inspect clutch mechanical components.
- 2.4. you perform clutch component measurements.
- 2.5. you review the operational functions and service of dual mass flywheel.

Learning Objectives

- 2.a. Diagnose clutch noise, binding, slippage, pulsation, and chatter; determine needed action.
- 2.b. Inspect clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots, and springs; perform needed action.
- 2.c. Inspect flywheel and ring gear for wear, cracks, and discoloration; determine needed action.

- 2.d. Measure flywheel runout and crankshaft end play; determine needed action.
- 2.e. Describe the operation and service of a system that uses a dual mass flywheel.

3. Repair clutch systems.

Assessment Strategies

- 3.1. Written Product
- 3.2. Skill Demonstration

Criteria

You will know you are successful when:

- 3.1. you select the correct [TOOLS, EQUIPMENT, INSTRUMENTS, MATERIALS, SUPPLIES].
- 3.2. you inspect and service/replace clutch hydraulic components.
- 3.3. you inspect and replace clutch mechanical components.

Learning Objectives

- 3.a. Inspect and replace clutch pressure plate assembly, clutch disc, release (throw-out) bearing and linkage, and pilot bearing/bushing (as applicable).
- 3.b. Bleed clutch hydraulic system.
- 3.c. Check and adjust clutch master cylinder fluid level; check for leaks; use proper fluid type per manufacturer specification.

4. Examine drive axles.

Assessment Strategies

- 4.1. Written Product
- 4.2. Skill Demonstration

Criteria

You will know you are successful when:

- 4.1. you inspect, remove, and replace drive axle wheel studs, shafts, seals, bearings, and retainers.
- 4.2. you diagnose drive axle shafts, bearings, and seals for noise, vibration, and fluid leak concerns.
- 4.3. you measure drive axle flange runout, and shaft end play.

Learning Objectives

- 4.a. Inspect and replace drive axle wheel studs.
- 4.b. Remove and replace drive axle shafts.
- 4.c. Inspect and replace drive axle shaft seals, bearings, and retainers.
- 4.d. Measure drive axle flange runout and shaft end play; determine needed action.
- 4.e. Diagnose drive axle shafts, bearings, and seals for noise, vibration, and fluid leakage concerns; determine needed action.

5. Diagnose Drive Shaft and Half Shaft, Universal and Constant-Velocity (CV) Joint.

Assessment Strategies

- 5.1. Written Product
- 5.2. Skill Demonstration

Criteria

You will know you are successful when:

- 5.1. you diagnose constant-velocity (CV) and universal joints for noise and vibration concerns.
- 5.2. you evaluate shaft balance, phasing, runout, and drive line angles.

Learning Objectives

- 5.a. Diagnose constant-velocity (CV) joint noise and vibration concerns; determine needed action.
- 5.b. Diagnose universal joint noise and vibration concerns; perform needed action.
- 5.c. Check shaft balance and phasing; measure shaft runout; measure and adjust driveline angles.

6. Repair Drive Shaft and Half Shaft, Universal and Constant-Velocity (CV) Joint.

Assessment Strategies

- 6.1. Written Product
- 6.2. Skill Demonstration

Criteria

You will know you are successful when:

- 6.1. you inspect, remove, and replace front and rear wheel bearings, hubs, and seals.
- 6.2. you inspect, service, and replace shafts, yokes, boots, and universal/CV joints.
- 6.3. you remove, reinstall, and/or replace sealed wheel bearing assembly.

Learning Objectives

- 6.a. Inspect, remove, and/or replace bearings, hubs, and seals.
- 6.b. Inspect, service, and replace shafts, yokes, boots, and universal/CV joints.
- 6.c. Remove, inspect, service and/or replace front and rear wheel bearings.
- 6.d. Remove, reinstall, and/or replace sealed wheel bearing assembly.