Western Technical College

32412401 Diesel Truck Powertrains

Course Outcome Summary

Course Information

Description	This course is a practical study in performing diagnosis and repair of heavy truck transmissions, differentials, and drivelines.
Career Cluster	Transportation, Distribution and Logistics
Instructional Level	Technical Diploma Courses
Total Credits	3
Total Hours	108

Textbooks

Fundamentals of Medium/Heavy Duty Commercial Vehicle Systems. 2nd Edition. Copyright 2020. Wright, Gus and Owen C. Duffy. Publisher: Jones & Bartlett Publishers. **ISBN-13**: 978-1-284-15093-3. Required.

Learner Supplies

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

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

Uniform: Four black/grey shirts with embroidered name. **Vendor:** Campus Shop. 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

High Impact Practices

1. Learning Community: these courses are designed to enhance your learning experience in which a cohort of peers complete two or more courses that are linked through projects, themes, or program emphasis.

Program Outcomes

1. Diagnose, repair and service drive train systems

Course Competencies

1. Perform maintenance, diagnosis, and repair of clutch and related components.

Assessment Strategies

1.1. Written Product
1.2. Skill Demonstration
1.3. Written Objective Test

Criteria

You will know you are successful when:

1.1. you complete task sheets with average score of three.
1.2. you wear personal protective equipment.
1.3. you follow safety procedures.
1.4. you select the correct tools, equipment, instruments, materials, and supplies.
1.5. you perform critical steps in the right order from start to finish.
1.6. you are able to verbalize sound reasoning for the decisions made throughout the process.

Learning Objectives

1.a. Identify causes of clutch noise, binding, slippage, pulsation, vibration, grabbing, dragging, and chatter problems; determine needed action.
1.b. Inspect and adjust clutch linkage, cables, levers, brackets, bushings, pivots, springs, and clutch safety switch (includes push and pull-type assemblies); check pedal height and travel; perform needed action.
1.c. Inspect, adjust, repair, and replace hydraulic clutch slave and master cylinders, lines, and hoses; bleed system.
1.d. Inspect, adjust, lubricate, or replace release (throw-out) bearing, sleeve, bushings, springs, housing, levers, release fork, fork pads, rollers, shafts, and seals.
1.e. Inspect, adjust, and replace single-disc clutch pressure plate and clutch disc.
1.f. Inspect, adjust, and replace two-plate clutch pressure plate, clutch discs, intermediate plate, and drive pins/lugs.
1.g. Inspect and/or replace clutch brake assembly; inspect input shaft and bearing retainer; perform needed action.
1.h. Inspect, adjust, and replace self-adjusting/continuous-adjusting clutch mechanisms.
1.i. Inspect and replace pilot bearing.

1.j. Remove and reinstall flywheel; inspect mounting area on crankshaft, rear main oil seal, and measure crankshaft end play; determine needed action.
1.k. Inspect flywheel and starter ring gear; measure flywheel face and pilot bore runout; determine needed action.
1.l. Inspect flywheel housing(s) to transmission housing/engine mating surface(s) and measure flywheel housing face and bore runout; determine needed action.

2. Perform maintenance, diagnosis, and repair of manual and automated manual transmissions.

Assessment Strategies

2.1. Written Product
2.2. Skill Demonstration
2.3. Written Objective Test

Criteria

You will know you are successful when:

2.1. you complete task sheets with average score of three.
2.2. you wear personal protective equipment.
2.3. you follow safety procedures.
2.4. you select the correct tools, equipment, instruments, materials, and supplies.
2.5. you perform critical steps in the right order from start to finish.
2.6. you are able to verbalize sound reasoning for the decisions made throughout the process.

Learning Objectives

2.a. Identify causes of transmission noise, shifting concerns, lockup, jumping-out-of-gear, overheating, and vibration problems; determine needed action.
2.b. Inspect, test, repair, or replace air shift controls, lines, hoses, valves, regulators, filters, and cylinder assemblies.
2.c. Inspect and replace transmission mounts, insulators, and mounting bolts.
2.d. Inspect for leakage and replace transmission cover plates, gaskets, seals, and cap bolts; inspect seal surfaces and vents; repair as needed.
2.e. Check transmission fluid level and condition; determine needed service; add proper type of lubricant.
2.f. Inspect, adjust, and replace transmission shift lever, cover, rails, forks, levers, bushings, sleeves, detents, interlocks, springs, and lock bolts/safety wires.
2.g. Remove and reinstall transmission.
2.h. Inspect input shaft, gear, spacers, bearings, retainers, and slingers; determine needed action.
2.i. Inspect transmission oil filters, coolers and related components; replace as needed.
2.j. Inspect speedometer components; determine needed action.
2.k. Inspect and adjust power take-off (P.T.O.) assemblies, controls, and shafts; determine needed action.
2.l. Inspect and test function of reverse light, neutral start, and warning device circuits; determine needed action.
2.m. Inspect and test transmission temperature gauge, wiring harnesses and sensor/sending unit; determine needed action.

3. Perform maintenance, diagnosis, and repair of drive axles.

Assessment Strategies

3.1. Written Product
3.2. Skill Demonstration
3.3. Written Objective Test

Criteria

You will know you are successful when:

3.1. you complete task sheets with average score of three.
3.2. you wear personal protective equipment.
3.3. you follow safety procedures.
3.4. you select the correct tools, equipment, instruments, materials, and supplies.
3.5. you perform critical steps in the right order from start to finish.
3.6. you are able to verbalize sound reasoning for the decisions made throughout the process.

Learning Objectives

3.a. Identify causes of drive axle(s) and drive unit noise and overheating problems; determine needed

action.
3.b. Check and repair fluid leaks; inspect and replace drive axle housing cover plates, gaskets, sealants, vents, magnetic plugs, and seals.
3.c. Check drive axle fluid level and condition; determine needed service; add proper type of lubricant.
3.d. Remove and replace differential carrier assembly.
3.e. Inspect and replace components of locking differential case assembly.
3.f. Measure ring gear runout; determine needed action.
3.g. Inspect, adjust, or replace ring gear thrust block/screw.
3.h. Inspect power divider (inter-axle differential) assembly; determine needed action.
3.i. Inspect, adjust, repair, or replace air operated power divider (inter-axle differential) lockout assembly including diaphragms, seals, springs, yokes, pins, lines, hoses, fittings, and controls.
3.j. Inspect and replace drive axle shafts.
3.k. Remove and replace wheel assembly; check rear wheel seal and axle flange gasket for leaks; perform needed action.
3.l. Identify causes of drive axle wheel bearing noise and check for damage; perform needed action.
3.m. Clean, inspect, lubricate, and replace wheel bearings; replace seals and wear rings; inspect and replace retaining hardware; adjust drive axle wheel bearings. Verify end play with dial indicator method.

4. Perform maintenance, diagnosis, and repair of drive shafts and universal joints.

Assessment Strategies

4.1. Written Product
4.2. Skill Demonstration
4.3. Written Objective Test

Criteria

You will know you are successful when:

4.1. you complete task sheets with average score of three.
4.2. you wear personal protective equipment.
4.3. you follow safety procedures.
4.4. you select the correct tools, equipment, instruments, materials, and supplies.
4.5. you perform critical steps in the right order from start to finish.
4.6. you are able to verbalize sound reasoning for the decisions made throughout the process.

Learning Objectives

4.a. Identify causes of driveshaft and universal joint noise and vibration problems; determine needed action.
4.b. Inspect, service, or replace driveshaft, slip joints, yokes, drive flanges, and universal joints, driveshaft boots and seals, and retaining hardware; check phasing of all shafts.
4.c. Inspect driveshaft center support bearings and mounts; determine needed action.
4.d. Measure driveline angles; determine needed action.