



## **DEM248 Drive Trains II**

### **Course Information**

Credits	3
Campus	Washburn Institute of Technology
Address	5724 SW Huntoon
City/State/Zip	Topeka, Kansas 66604
Office Fax	785-273-7080

### **Description**

Drive Trains II builds on the knowledge, skills and abilities obtained in DEM221. Systems utilized in light, medium and heavy truck drive trains including: clutches, drive axles, special drives; procedures in disassembly/assembly, wear analysis, and failure analysis in drive trains, pressure and flow testing of drive train systems, timing of drive train systems, and theory and operation of final drives and shuttles are included.

### **Prerequisite: DEM221 Drive Trains**

### **Textbooks**

**MHT - Shrink-wrapped Package: Tasksheet Manual Includes Systems & Engines / TWO Year Online Access Pack** Publisher: CDX 9781284099874

### **OPTIONAL** (in addition to above):

Fundamentals of Medium/Heavy Duty Commercial Vehicle Systems <i>Text-Hard (paper) edition</i>	CDX 9781284041163
Fundamentals of Medium/Heavy Duty Diesel Engines <i>Text-Hard (paper) edition</i>	CDX 9781284067057

### **Student Learning Outcomes:**

- A. Communicate effectively
- B. Integrate technology
- C. Learn effectively
- D. Demonstrate cooperative teamwork skills
- E. Apply safety in the workplace
- F. Think critically and creatively
- G. Demonstrate responsible work ethics

## Competencies

Rating	Tasks Covered in this Course	Source
XXX	For every task in Drive Trains, the following safety task must be strictly enforced: Comply with personal and environmental safety practices associated with clothing; eye protection; hand protection; proper lifting practices; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of fuels/chemicals/materials in accordance with federal, state, and local regulations.	NATEF
XXX	<b>The first task in Drive Train is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.</b>	NATEF
XXX	<b>II. DRIVE TRAIN</b>	NATEF
XXX	<b>C. Driveshaft and Universal Joint</b>	NATEF
	1. Identify causes of driveshaft and universal joint noise and vibration problems; determine needed action.	P-1
	2. 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.	P-1
	3. Inspect driveshaft center support bearings and mounts; determine needed action.	P-1
	4. Measure driveline angles; determine needed action.	P-1
XXX	<b>D. Drive Axle</b>	NATEF
	1. Identify causes of drive axle(s) drive unit noise and overheating problems; determine needed action.	P-2
	2. Check and repair fluid leaks; inspect and replace drive axle housing cover plates, gaskets, sealants, vents, magnetic plugs, and seals.	P-1
	3. Check drive axle fluid level and condition; determine needed service; add proper type of lubricant.	P-1
	4. Remove and replace differential carrier assembly.	P-2
	5. Inspect and replace differential case assembly including spider gears, cross shaft, side gears, thrust washers, case halves, and bearings.	P-3
	6. Inspect and replace components of locking differential case assembly.	P-3
	7. Inspect differential carrier housing and caps, side bearing bores, and pilot (spigot, pocket) bearing bore; determine needed action.	P-3
	8. Measure ring gear runout; determine needed action.	P-2
	9. Inspect and replace ring and drive pinion gears, spacers, sleeves, bearing cages, and bearings.	P-3
	10. Measure and adjust drive pinion bearing preload.	P-3

	11. Measure and adjust drive pinion depth.	P-3
	12. Measure and adjust side bearing preload and ring gear backlash.	P-2
	13. Check and interpret ring gear and pinion tooth contact pattern; determine needed action.	P-2
	14. Inspect, adjust, or replace ring gear thrust block/screw.	P-3
	15. Inspect power divider (inter-axle differential) assembly; determine needed action.	P-3
	16. 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.	P-2
	17. Inspect, repair, or replace drive axle lubrication system: pump, troughs, collectors, slingers, tubes, and filters.	P-3
	18. Inspect and replace drive axle shafts.	P-1
	19. Remove and replace wheel assembly; check rear wheel seal and axle flange gasket for leaks; perform needed action.	P-1
	20. Identify causes of drive axle wheel bearing noise and check for damage; perform needed action.	P-1
	21. Inspect and test drive axle temperature gauge, wiring harnesses, and sending unit/sensor; determine needed action.	P-2
	22. 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.	P-1
<b>XXX</b>	<b>The first task in Preventive Maintenance is to listen to and verify operator's concern, review past maintenance documents, and record condition on appropriate document.</b>	<b>NATEF</b>
<b>XXX</b>	<b>1. Instruments and Controls (PMI Tasks - NATEF)</b>	<b>NATEF</b>
	4. Check operation of electronic power take off (PTO) and engine idle speed controls (if applicable).	P-2
	6. Check operation of all accessories.	P-1
<b>XXX</b>	<b>3. Drive Train (PMI Tasks - NATEF)</b>	
	15. Check transmission wiring, connectors, seals, and harnesses for damage and proper routing.	P-1
	16. Change transmission oil and filter, if applicable; check and clean magnetic plugs.	P-2
	17. Check interaxle differential lock operation.	P-1
	18. Check transmission range shift operation.	P-1

## Guidelines for Success *(See Program Syllabus for additional information.)*

### Assessment Plan

Assessment is an integral part of the educational process at Washburn Tech and accurate feedback is an important tool in continuously improving the institution's technical programs. Students can expect to participate in assessment activities prior to entry into programs, within specific courses and following program completion for specific fields of study.

### Grading Rationale

Student progress is evaluated by means that include, but not limited to:

- Lab Work (40%)
- Professional Behavior (30%)
- Classroom Activities/Homework (10%)
- Quizzes & Tests (10%)
- Final Exams (10%)

### Grading Scale

90-100% A  
80-89% B  
70-79% C  
60-69% D  
59% or less F

### Attendance

Attendance is a key part of success in the program and in the workplace. Students are to arrive for class on time and be prepared to learn. Absences or tardiness will negatively impact grades. Missed time cannot be made up. Many assignments and labs cannot be "made-up" if missed. The options to make-up missed work or to accept late work is at the discretion of the instructor.

### Disability

The Americans with Disabilities Act (ADA) Office is responsible for assisting in arranging accommodations and for identifying resources at Washburn Institute of Technology for persons with disabilities. Qualified students with disabilities MUST self-identify by completing an application. In addition students must provide appropriate medical documentation to the ADA coordinator to be eligible for accommodations. New requests for accommodations should be submitted at least two months or more prior to the date the accommodations are needed. However, please contact the ADA office as soon as a need may arise. Depending on the accommodation request, four to eight weeks lead time may be needed for timely and effective provision of accommodations.

The ADA Office coordinates and assists in arranging accommodations it deems appropriate for eligible students on a case-by-case basis. If you are a student with a disability that may substantially limit your ability to participate in any of our classes and you believe that you will need accommodations, it is your responsibility to contact:

### ADA Coordinator

**Phone: 785-670-3365** Email: [gloria.christian@washburn.edu](mailto:gloria.christian@washburn.edu)

It is the policy of Washburn Institute of Technology to assure equal employment and educational opportunity to qualified individuals without regard to race, color, sex, age, ancestry, marital or parental status, disability, religion, national origin, or sexual orientation/gender identity. Contact Pam Foster, Morgan Hall, Room Washburn University (785-670-1509), and [pam.fosterel@washburn.edu](mailto:pam.fosterel@washburn.edu)