



## DEM138 Suspension and Steering

### 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

Suspension and Steering addresses the theory, operations and troubleshooting of various steering and suspension system components. (KBOR Aligned)

Common light, medium and heavy truck suspension/steering systems and components are highlighted. Operation, maintenance, inspection, diagnosis, wear pattern interpretation, failure analysis, disassembly, re-assembly and basic vehicle alignment are covered.

### 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	<b>Suspension and Steering (KBOR Aligned Tasks)</b>	KBOR
	1. Identify steering systems	KBOR
	2. Diagnose steering systems	KBOR
	3. Repair steering systems	KBOR
	4. Identify suspension systems	KBOR
	5. Diagnose suspension systems	KBOR
	6. Repair suspension systems	KBOR
	7. Diagnose total vehicle alignment	KBOR
	8. Adjust total vehicle alignment	KBOR
	9. Interpret wear patterns	KBOR
	10. Diagnose problems of frame & coupling devices	KBOR
	11. Repair frame & coupling devices	KBOR
	12. Adjust frame & coupling devices	KBOR
XXX	<b>For every task in Suspension and Steering, 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.</b>	NATEF
XXX	<b>The first task in Suspension and Steering is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.</b>	NATEF
XXX	<b>IV. SUSPENSION AND STEERING</b>	NATEF
XXX	<b>A. Steering Systems</b>	NATEF
XXX	<b>1. Steering Column</b>	NATEF
	1. Identify causes of fixed and driver adjustable steering column and shaft noise, looseness, and binding problems; determine needed action.	P-1
	2. Inspect and service steering shaft U-joint(s), slip joints, bearings, bushings, and seals; phase shaft.	P-1
XXX	<b>2. Steering Units</b>	NATEF
	1. Identify causes of power steering system noise, steering binding, darting/oversteer, reduced wheel cut, steering wheel kick, pulling, non-recovery, turning effort, looseness, hard steering, overheating, fluid leakage, and fluid aeration problems; determine needed action.	P-1

	4. Perform power steering system pressure, temperature, and flow tests; determine needed action.	P-3
	5. Inspect, service, or replace power steering reservoir including filter, seals, and gaskets.	P-2
	6. Inspect power steering pump drive gear and coupling; replace as needed.	P-3
	9. Inspect, adjust, repair, or replace integral type power steering gear(s) (single and/or dual) and mountings.	P-2
<b>XXX</b>	<b>B. Suspension Systems</b>	<b>NATEF</b>
	6. Inspect tandem suspension equalizer components; determine needed action.	P-3
	7. Inspect and test air suspension pressure regulator and height control valves, lines, hoses, dump valves, and fittings; adjust, repair or replace as needed.	P-1
	10. Identify rough ride problems; determine needed action.	P-3
<b>XXX</b>	<b>D. Wheels and Tires</b>	<b>NATEF</b>
	1. Identify tire wear patterns; check tread depth and pressure determine needed action.	P-1
	2. Identify wheel/tire vibration, shimmy, pounding, hop (tramp) problems; determine needed action.	P-2
	3. Remove and install steering and drive axle wheel/tire assemblies; torque mounting hardware to specifications with torque wrench.	P-1
	4. Inspect tire for proper application, (size, load range, position, and tread design); determine needed action.	P-2
	5. Inspect wheel/rims for proper application, load range, size, and design; determine needed action.	P-2
	6. Check operation of tire pressure monitoring system (TPMS); determine needed action if applicable.	P-3
<b>XXX</b>	<b>E. Frame and Coupling Devices</b>	
	1. Inspect, service, and/or adjust fifth wheel, pivot pins, bushings, locking mechanisms, and mounting hardware.	P-1
	2. Inspect and service sliding fifth wheel, tracks, stops, locking systems, air cylinders, springs, lines, hoses, and controls.	P-2
	3. Inspect frame and frame members for cracks, breaks, corrosion, distortion, elongated holes, looseness, and damage; determine needed repairs.	P-1
	4. Inspect, install, or repair frame hangers, brackets, and cross members in accordance with manufacturers' recommended procedures.	P-3
	5. Inspect, repair, or replace pintle hooks and draw bars, if applicable.	P-2
<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>4. Suspension and Steering Systems (PMI Tasks - NATEF)</b>	<b>NATEF</b>
	1. Check steering wheel operation for free play and binding.	P-1
	2. Check power steering pump, mounting, and hoses for leaks, condition, and routing; check fluid level.	P-1
	3. Change power steering fluid and filter.	P-1
	4. Inspect steering gear for leaks and secure mounting.	P-1
	5. Inspect steering shaft U-joints, pinch bolts, splines, pitman arm-to-steering sector shaft, tie rod ends, and linkages.	P-1
	6. Check kingpins for wear.	P-1
	7. Check wheel bearings for looseness and noise.	P-1
	8. Check oil level and condition in all non-drive hubs; check for leaks.	P-1
	9. Inspect springs, pins, hangers, shackles, spring U-bolts, and insulators.	P-1
	10. Inspect shock absorbers for leaks and secure mounting.	P-1
	11. Inspect air suspension springs, mounts, hoses, valves, linkage, and fittings for leaks and damage.	P-1
	12. Check and record suspension ride height.	P-1
	13. Lubricate all suspension and steering grease fittings.	P-1
	14. Check axle locating components (radius, torque, and/or track rods).	P-1
<b>XXX</b>	<b>5. Tires and Wheels (PMI Tasks - NATEF)</b>	<b>NATEF</b>
	1. Inspect tires for wear patterns and proper mounting.	P-1
	2. Inspect tires for cuts, cracks, bulges, and sidewall damage.	P-1
	3. Inspect valve caps and stems; determine needed action.	P-1
	4. Measure and record tread depth; probe for imbedded debris.	P-1
	5. Check and record air pressure; adjust air pressure in accordance with manufacturers' specifications.	P-1
	6. Check wheel mounting hardware; determine needed action.	P-1
	7. Inspect wheels for cracks, damage and proper hand hold alignment.	P-1
	8. Check tire matching (diameter and tread) on single and dual tire applications.	P-1
<b>XXX</b>	<b>6. Frame and Fifth Wheel (PMI Tasks - NATEF)</b>	<b>NATEF</b>
	1. Inspect fifth wheel mounting, bolts, air lines, and locks.	P-1
	2. Test operation of fifth wheel locking device; adjust if necessary.	P-1
	3. Check quarter fenders, mud flaps, and brackets.	P-1
	4. Check pintle hook assembly and mounting, if applicable.	P-2
	5. Lubricate all fifth wheel grease fittings and plate, of applicable.	P-1
	6. Inspect frame and frame members for cracks and damage.	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)