



DEM123 Hydraulics

Course Information

Credits	5
Campus	Washburn Institute of Technology
Address	5724 SW Huntoon
City/State/Zip	Topeka, Kansas 66604
Office Fax	785-273-7080

Description

This introductory hydraulics course teaches the theory, principles and servicing for hydraulic systems used on mobile equipment. It includes terminology, industry standards, symbols, and basic circuitry design related to fluid power. Maintenance, diagnosing and repair of typical systems 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

Mobile Equipment Hydraulics (Printed Text) 1 st	Cengage	978-1-4180-8043-3
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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	Priority
XXX	For every task in Hydraulics, 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	The first task in Hydraulics is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.	NATEF
XXX	VIII. HYDRAULICS	NATEF
XXX	A. General System Operation	NATEF
	1. Identify system type (closed and open) and verify proper operation.	P-1
	2. Read and interpret system diagrams and schematics.	P-1
	3. Perform system temperature, pressure, flow, and cycle time tests; determine needed action.	P-1
	4. Verify placement of equipment /component safety labels and placards; determine needed action.	P-1
XXX	B. Pumps	NATEF
	1. Identify system fluid type.	P-1
	2. Identify causes of pump failure, unusual pump noises, temperature, flow, and leakage problems; determine needed action.	P-1
	3. Determine pump type, rotation, and drive system.	P-1
	4. Remove and install pump; prime and/or bleed system.	P-2
	5. Inspect pump inlet for restrictions and leaks; determine needed action.	P-2
	6. Inspect pump outlet for restrictions and leaks; determine needed action.	P-2
XXX	C. Filtration/ Reservoirs (Tanks)	NATEF
	1. Identify type of filtration system; verify filter application and flow direction.	P-1
	2. Service filters and breathers.	P-1
	3. Identify causes of system contamination; determine needed action.	P-2
	4. Take a hydraulic oil sample for analysis.	P-1
	5. Check reservoir fluid level and condition; determine needed action.	P-1
	6. Inspect and repair or replace reservoir, sight glass, vents, caps, mounts, valves, screens, supply and return lines.	P-1
XXX	D. Hoses, Fittings, and Connections	NATEF

	1. Diagnose causes of component leakage, damage, and restriction; determine needed action.	P-2
	2. Inspect hoses and connections (length, size, routing, bend radii, and protection); repair or replace as needed.	P-1
	3. Assemble hoses, tubes, connectors, and fittings in accordance with manufacturers' specifications; use proper procedures to avoid contamination.	P-1
	4. Inspect and replace fitting seals and sealants.	P-1
XXX	E. Control Valves	
	1. Pressure test system safety relief valve; determine needed action.	P-1
	2. Perform control valve operating pressure and flow tests; determine needed action.	P-1
	3. Inspect, test, and adjust valve controls (electrical/electronic, mechanical, and pneumatic).	P-1
	4. Identify causes of control valve leakage problems (internal/external); determine needed action.	P-1
	5. Inspect pilot control valve linkages, cables, and PTO controls; adjust, repair, or replace as needed.	P-1
XXX	F. Actuators	NATEF
XXX	Comply with manufacturers' and industry accepted safety practices associated with equipment lock out/tag out; pressure line release; implement/support (blocked or resting on ground); and articulated cylinder devices/machinery safety locks.	NATEF
	1. Identify actuator type (single/double acting, multi-stage/telescopic, and motors).	P-1
	2. Identify the cause of seal failure; determine needed repairs.	P-1
	3. Identify the cause of incorrect actuator movement and leakage (internal and external); determine needed repairs.	P-1
	4. Inspect actuator mounting, frame components, and hardware for looseness, cracks, and damage; determine needed action.	P-1
	5. Remove, repair, and/or replace actuators in accordance with manufacturers' recommended procedures.	P-1
	6. Inspect actuators for dents, cracks, damage, and leakage; determine needed action.	P-1
	7. Purge and/or bleed system in accordance with manufacturers' recommended procedures.	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

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