



DEM241 Advanced Diesel Engines

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

Advanced Diesel Engines builds on the knowledge, skills and abilities obtained from DEM231. The course provides a more in-depth approach to diesel engine mechanical diagnostic and repair procedures on common engines utilized in light, medium and heavy diesel trucks and CASE construction equipment. Detailed precision measurements and testing process utilizing OEM and aftermarket tools and processes are utilized.

Prerequisite: DEM231 Diesel Engines I

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 Diesel Engines, 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 Diesel Engines is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.	NATEF
XXX	I. DIESEL ENGINES	NATEF
XXX	A. General	NATEF
	2. Identify engine fuel, oil, coolant, air, and other leaks; determine needed action.	P-1
	3. Listen for engine noises; determine needed action.	P-3
	4. Observe engine exhaust smoke color and quantity; determine needed action.	P-2
	5. Check engine no cranking, cranks but fails to start, hard starting, and starts but does not continue to run problems; determine needed action.	P-1
	6. Identify engine surging, rough operation, misfiring, low power, slow deceleration, slow acceleration, and shutdown problems; determine needed action.	P-1
	7. Identify engine vibration problems.	P-2
XXX	D. Lubrication Systems	NATEF
	1. Test engine oil pressure and check operation of pressure sensor, gauge, and/or sending unit; test engine oil temperature and check operation of temperature sensor; determine needed action.	P-1
	2. Check engine oil level, condition, and consumption; determine needed action.	P-1
	6. Inspect turbocharger lubrication systems; determine needed action.	P-2
XXX	E. Cooling System	NATEF
	1. Check engine coolant type, level, condition, and consumption; test coolant for freeze protection and additive package concentration; determine needed action.	P-1
	2. Test coolant temperature and check operation of temperature and level sensors, gauge, and/or sending unit; determine needed action.	P-1

	3. Inspect and reinstall/replace pulleys, tensioners and drive belts; adjust drive belts and check alignment.	P-1
	4. Inspect thermostat(s), by-passes, housing(s), and seals; replace as needed.	P-2
	5. Recover coolant, flush, and refill with recommended coolant/additive package; bleed cooling system.	P-1
	6. Inspect coolant conditioner/filter assembly for leaks; inspect valves, lines, and fittings; replace as needed.	P-1
	7. Inspect water pump and hoses; replace as needed.	P-1
	8. Inspect, clean, and pressure test radiator. Pressure test cap, tank(s), and recovery systems; determine needed action.	P-1
	9. Inspect thermostatic cooling fan system (hydraulic, pneumatic, and electronic) and fan shroud; replace as needed.	P-1
	10. Inspect turbo charger cooling systems; determine needed action.	P-2
XXX	F. Air Induction and Exhaust Systems	
	9. Inspect, clean, and test charge air cooler assemblies; replace as needed.	P-2
	10. Inspect exhaust manifold, piping, mufflers, and mounting hardware; repair or replace as needed.	P-2
XXX	H. Engine Brakes	NATEF
	1. Inspect and adjust engine compression/exhaust brakes; determine needed action.	P-2
	2. Inspect, test, and adjust engine compression/exhaust brake control circuits, switches, and solenoids; determine needed action.	P-3
	3. Inspect engine compression/exhaust brake housing, valves, seals, lines, and fittings; determine necessary action.	P-3
XXX	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.	NATEF
XXX	A. Engine System (PMI Tasks – NATEF)	NATEF
XXX	1. Engine (PMI Tasks - NATEF)	NATEF
	6. Check engine for oil, coolant, air, fuel, and exhaust leaks (Engine Off and Running).	P-1
XXX	2. Fuel System (PMI Tasks - NATEF)	NATEF
XXX	3. Air Induction and Exhaust System (PMI Tasks - NATEF)	NATEF
	2. Check engine exhaust system for leaks, proper routing, and damaged or missing components to include exhaust gas recirculation (EGR) system and after treatment devices, if equipped.	P-1
	3. Check air induction system: piping, charge air cooler, hoses, clamps, and mountings; check for air restrictions and leaks.	P-1

	4. Inspect turbocharger for leaks; check mountings and connections.	P-1
	5. Check operation of engine compression/exhaust brake.	P-2
XXX	4. Cooling System (PMI Tasks - NATEF)	
	1. Check operation of fan clutch.	P-1
	4. Pressure test cooling system and radiator cap.	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