DEM204 Advanced Machine Electrical

Course Information

Credits	4
Campus	Washburn Institute of Technology
Address	5724 SW Huntoon
City/State/Zip	Topeka, Kansas 66604
Office Fax	785-273-7080

Description

Knowledge and skills learned in DEM113 are the foundation for the study of CASE Construction equipment electrical systems such as monitoring systems, instrumentation, lighting and other specialized electronic and computer-controlled systems. Troubleshooting, diagnosis, and repair of these systems is performed utilizing electrical testers, meters, and scan tools such as the CASE EST (Electronic Service Tool). The use of wiring schematics and repair manuals in the diagnosis process is emphasized.

Prerequisite: DEM113 Electrical Electronics Systems

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 *CDX 9781284041163*
Text-Hard (paper) edition

Fundamentals of Medium/Heavy Duty Diesel Engines CDX 9781284067057
Text-Hard (paper) edition

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 Electrical/Electronic Systems, 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 Electrical/Electronic Systems is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.**	**NATEF**
XXX	**V. ELECTRICAL/ELECTRONIC SYSTEMS**	**NATEF**
XXX	**A. General Electrical Systems**	**NATEF**
	8. Inspect and test fusible links, circuit breakers, relays, solenoids, and fuses; replace as needed.	P-1
	9. Inspect and test spike suppression devices; replace as needed.	P-3
	10. Check frequency and pulse width signal in electrical/electronic circuits using appropriate test equipment.	P-3
XXX	**B. Battery**	**NATEF**
	9. Identify and test low voltage disconnect (LVD) systems; determine needed repair.	P-2
XXX	**E. Lighting Systems**	**NATEF**
	1. Interface with vehicle's on-board computer; perform diagnostic procedures using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.	P-1
	2. Identify causes of brighter than normal, intermittent, dim, or no headlight and daytime running light (DRL) operation.	P-1
	3. Test, aim, and replace headlights.	P-1
	4. Test headlight and dimmer circuit switches, relays, wires, terminals, connectors, sockets, and control components/modules; repair or replace as needed.	P-1
	5. Inspect and test switches, bulbs/LEDs, sockets, connectors, terminals, relays, wires, and control components/modules of parking, clearance, and taillight circuits; repair or replace as needed.	P-1
	6. Inspect and test instrument panel light circuit switches, relays, bulbs/LEDs, sockets, connectors, terminals, wires, and printed circuits/control modules; repair or replace as needed.	P-2

	7. Inspect and test interior cab light circuit switches, bulbs/LEDs, sockets, low voltage disconnect (LVD), connectors, terminals, wires, and control components/modules; repair or replace as needed.	P-2
	9. Inspect, test, and adjust stoplight circuit switches, bulbs/LEDs, sockets, connectors, terminals, wires and control components/modules; repair or replace as needed.	P-1
	10. Inspect and test turn signal and hazard circuit flasher(s), switches, relays, bulbs/LEDs, sockets, connectors, terminals, wires and control components/modules; repair or replace as needed.	P-1
	11. Inspect and test reverse lights and warning device circuit switches, bulbs/LEDs, sockets, horns, buzzers, connectors, terminals, wires and control components/modules; repair or replace as needed.	P-1
XXX	**F. Gauges and Warning Devices**	**NATEF**
	1. Interface with vehicle's on-board computer; perform diagnostic procedure, verify instrument cluster operations using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.	P-1
	2. Identify causes of intermittent, high, low, or no gauge readings; determine needed action.	P-2
	3. Identify causes of data bus-driven gauge malfunctions; determine needed action.	P-3
	4. Inspect and test gauge circuit sensor/sending units, gauges, connectors, terminals, and wires; repair or replace as needed.	P-2
	5. Inspect and test warning devices (lights and audible) circuit sensor/sending units, bulbs/LEDs, sockets, connectors, wires, and control components/modules; repair or replace as needed.	P-1
	6. Inspect, test, replace, and calibrate (if applicable) electronic speedometer, odometer, and tachometer systems.	P-2
XXX	**G. Related Electrical Systems**	**NATEF**
	1. Interface with vehicle's on-board computer; perform diagnostic procedures using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.	P-1
	2. Identify causes of constant, intermittent, or no horn operation; determine needed action.	P-2
	3. Inspect and test horn circuit relays, horns, switches, connectors, wires, clock springs, and control components/modules; repair or replace as needed.	P-2
	4. Identify causes of constant, intermittent, or no wiper operation; diagnose the cause of wiper speed control and/or park problems; determine needed action.	P-2

	5. Inspect and test wiper motor, resistors, park switch, relays, switches, connectors, wires and control components/modules; repair or replace as needed.	P-2
	6. Inspect wiper motor transmission linkage, arms, and blades; adjust or replace as needed.	P-2
	7. Inspect and test windshield washer motor or pump/relay assembly, switches, connectors, terminals, wires, and control components/modules; repair or replace as needed.	P-3
	8. Inspect and test side view mirror motors, heater circuit grids, relays, switches, connectors, terminals, wires and control components/modules; repair or replace as needed.	P-3
	9. Inspect and test heater and A/C electrical components including: A/C clutches, motors, resistors, relays, switches, connectors, terminals, wires, and control components/modules; repair or replace as needed.	P-3
	10. Inspect and test auxiliary power outlet, integral fuse, connectors, terminals, wires, and control components/modules; repair or replace as needed.	P-3
	13. Inspect and test block heaters; determine needed repairs.	P-2
	16. Check operation of keyless and remote lock/unlock devices; determine needed action.	P-3
	17. Inspect and test engine cooling fan electrical control components/modules, wiring; repair or replace as needed.	P-2
	18. Identify causes of data bus communication problems; determine needed action.	P-2
XXX	**A. Shop and Personal Safety (Supplemental Tasks)**	**NATEF**
	14. Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.).	
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	**1. Instruments and Controls**	**NATEF**
	6. Check operation of all accessories.	P-1
XXX	**2. Safety Equipment**	**NATEF**
	1. Check operation of electric/air horns and reverse warning devices.	P-1
	2. Check condition of spare fuses, safety triangles, fire extinguisher, and all required decals.	P-1
	3. Inspect seat belts and sleeper restraints.	P-1

	4. Inspect wiper blades and arms.	P-1
XXX	**3. Hardware**	**NATEF**
	1. Check operation of wiper and washer.	P-1
	2. Inspect windshield glass for cracks or discoloration; check sun visor.	P-1
	3. Check seat condition, operation, and mounting.	P-1
	4. Check door glass and window operation.	P-1
	5. Inspect steps and grab handles.	P-1
	6. Inspect mirrors, mountings, brackets, and glass.	P-1
	7. Record all observed physical damage.	P-2
	8. Lubricate all cab and hood grease fittings.	P-2
	9. Inspect and lubricate door and hood hinges, latches, strikers, lock cylinders, safety latches, linkages, and cables.	P-1
	10. Inspect cab mountings, hinges, latches, linkages and ride height; service as needed.	P-1
XXX	**3. Lighting System (PMI Tasks)**	**NATEF**
	1. Check operation of interior lights; determine needed action.	P-1
	2. Check all exterior lights, lenses, reflectors, and conspicuity tape; check headlight alignment; determine needed action.	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