



DEM268 Auxiliary Power Units/Refrigeration

Course Information

Credits	2
Campus	Washburn Institute of Technology
Address	5724 SW Huntoon
City/State/Zip	Topeka, Kansas 66604
Office Fax	785-273-7080

Description

The function and purpose of **Auxiliary Power Units** (APUs) that power system when the primary engine is not in use, such as refrigeration units on tractor-trailers, are covered. This course includes basic air conditioning service, diagnostic, and repair on applications used in the diesel field and Section 509 Refrigeration certification by the Mobile Air Condition Society (MACS).

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

Macs 609 Refrigerant & Recovery Training (supplied)

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 Heating, Ventilation, and Air Conditioning, 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 Heating, Ventilation, & Air Conditioning is to listen to and verify the operator's concern, review past maintenance and repair documents, and determine necessary action.	NATEF
XXX	B. A/C System and Components	NATEF
XXX	1. A/C System - General	NATEF
	1. Identify causes of temperature control problems in the A/C system; determine needed action.	P-1
	2. Identify refrigerant and lubricant types; check for contamination; determine needed action.	P-1
	3. Identify A/C system problems indicated by pressure gauge and temperature readings; determine needed action.	P-1
	4. Identify A/C system problems indicated by visual, audible, smell, and touch procedures; determine needed action.	P-1
	5. Perform A/C system leak test; determine needed action.	P-1
	6. Recover, evacuate, and recharge A/C system using appropriate equipment.	P-1
	7. Identify contamination in the A/C system components; determine needed action.	P-3
	8. 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-2
XXX	2. Compressor and Clutch	NATEF
	1. Identify A/C system problems that cause protection devices (pressure, thermal, and electronic) to interrupt system operation; determine needed action.	P-1
	2. Inspect, test, and replace A/C system pressure, thermal, and electronic protection devices.	P-2
	3. Inspect and replace A/C compressor drive belts, pulleys, and tensioners; adjust belt tension and check alignment.	P-1

	4. Inspect, test, adjust, service, or replace A/C compressor clutch components or assembly.	P-2
XXX	3. Evaporator, Condenser, and Related Components	NATEF
	1. Correct system lubricant level when replacing the evaporator, condenser, receiver/drier or accumulator/drier, and hoses.	P-1
	2. Inspect A/C system hoses, lines, filters, fittings, and seals; determine needed action.	P-1
	3. Inspect and test A/C system condenser. Check for proper airflow and mountings; determine needed action.	P-1
	9. Identify and inspect A/C system service ports (gauge connections); determine needed action.	P-1
XXX	D. Operating Systems and Related Controls	NATEF
XXX	1. Electrical	NATEF
	2. Inspect and test HVAC blower motors, resistors, switches, relays, modules, wiring, and protection devices; determine needed action.	P-2
	5. Inspect and test engine cooling/condenser fan motors, relays, modules, switches, sensors, wiring, and protection devices; determine needed action.	P-2
XXX	E. Refrigerant Recovery, Recycling, and Handling	NATEF
XXX	NOTE: Tasks 1 through 5 should be accomplished in accordance with appropriate EPA regulations and SAE "J" standards.	NATEF
	1. Maintain and verify correct operation of certified equipment.	P-1
	2. Identify and recover A/C system refrigerant.	P-1
	3. Recycle or properly dispose of refrigerant.	P-1
	4. Handle, label, and store refrigerant.	P-1
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 (PMI Tasks - NATEF)	NATEF
	5. Check HVAC controls.	P-1
	6. Check operation of all accessories.	P-1
XXX	4. Heating, Ventilation, & Air Conditioning (HVAC) (PMI Tasks - NATEF)	
	1. Inspect A/C condenser and lines for condition and visible leaks; check mountings.	P-2
	2. Inspect A/C compressor and lines for condition and visible leaks; check mountings.	P-2

	3. Check A/C system condition and operation; check A/C monitoring system, if applicable.	P-1
	4. Check HVAC air inlet filters and ducts; service as needed.	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