

COURSE SYLLABUS

LAST REVIEW	Fall 2022
COURSE TITLE	Underhood Maintenance
COURSE NUMBER	AUTT-0132
DIVISION	Career and Technical Education
DEPARTMENT	AUTT
CIP CODE	47.0604
CREDIT HOURS	3
CONTACT HOURS/WEEK	Class: 1 Lab: 4
PREREQUISITES	AUTT-0103
COREQUISITES	None
COURSE PLACEMENT	None

COURSE DESCRIPTION

In this course students will study and perform tasks from the National Automotive Technicians Education Foundation's (NATEF) Maintenance and Light Repair (MLR) Program. These studies include elements from general engine repair service, cylinder head and valve train diagnosis and repair, lubrication and cooling system service, and heating and A/C system service. All students will successfully complete each element of personal safety training before working in the Automotive Laboratory.

PROGRAM ALIGNMENT

This course is part of a program aligned through the Kansas Board of Regents and Technical Education Authority. For more information, please visit:

https://kansasregents.org/workforce_development/program-alignment

PROGRAM LEARNING OUTCOMES

1. Demonstrate proper safety practices in an automotive shop environment.
2. Demonstrate workplace skills associated with a professional automotive shop.
3. Describe the fundamental elements of automotive technology including service information, tools, equipment, and maintenance procedures.

TEXTBOOKS

<http://kckccbookstore.com/>

METHODS OF INSTRUCTION

A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, panels,

conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.

COURSE OUTLINE

- I. General Engine Repair and Service
 - A. Research vehicle service information
 - 1. Engine operation
 - 2. Vehicle service history
 - 3. Service precautions
 - 4. Technical service bulletins
 - B. Instrument panel indicators
 - C. Engine leaks
 - 1. Cooling system
 - 2. Fuel system
 - 3. Oil
 - D. Engine seals
 - 1. Gaskets
 - 2. Seals
 - 3. Sealers
 - E. Timing belt service
 - F. Fastener repair
 - 1. Broken bolt
 - 2. Restore internal and external tread
 - 3. Repair threads with insert
 - G. Hybrid and electric vehicle precautions
- II. Cylinder Head Service
 - A. Adjust valves
 - 1. Hydraulic
 - 2. Mechanical
- III. Coolant and Lubrication Service
 - A. Cooling system pressure
 - 1. Dye testing
 - 2. Radiator service
 - 3. Pressure cap testing
 - 4. Coolant recovery tank
 - 5. Heater core
 - 6. Gallery plugs
 - B. Belts
 - 1. Replace
 - 2. Adjust
 - 3. Tensioners
 - 4. Pulleys
 - 5. Alignment
- IV. Heating and A/C

- A. Vehicle information
- B. A/C compressor clutch
 - 1. Pulley
 - 2. Belts
 - 3. Tension
- C. Hybrid and electric vehicle safety precautions
- D. Condenser airflow restrictions

COURSE LEARNING OUTCOMES AND COMPETENCIES

Upon successful completion of this course, the student will:

- A. Perform general engine repair service.
 - 1. Research applicable vehicle and service information, such as internal engine operation, vehicle service history, service precautions, and technical service bulletins.
 - 2. Verify operation of the instrument panel engine warning indicators.
 - 3. Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.
 - 4. Install engine covers using gaskets, seals, and sealers as required.
 - 5. Remove and replace timing belt; verify correct camshaft timing.
 - 6. Perform common fastener and thread repair, to include: remove broken bolt, restore internal and external threads, and repair internal threads with thread insert.
 - 7. Identify hybrid vehicle internal combustion engine service precautions.
- B. Perform basic cylinder head and valve train diagnosis and repair.
 - 8. Adjust valves (mechanical or hydraulic lifters).
- C. Perform basic lubrication and cooling system service.
 - 9. Perform cooling system pressure and dye tests to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, heater core and galley plugs; determine necessary action.
 - 10. Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment.
 - 11. Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required.
 - 12. Remove, inspect, and replace thermostat and gasket/seal.
- D. Perform general A/C system diagnosis and repair.
 - 13. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
 - 14. Inspect and replace A/C compressor drive belts, pulleys, and tensioners; determine necessary action.
 - 15. Identify hybrid vehicle A/C system electrical circuits and service/safety precautions.

16. Inspect A/C condenser for airflow restrictions; perform necessary action.
- E. Perform general heating, ventilation, and engine cooling system diagnosis and repair.
 17. Inspect engine cooling and heater systems hoses; perform necessary action.
 18. Inspect A/C-heater ducts, doors, hoses, cabin filters, and outlets; perform necessary action.
 19. Identify the source of A/C system odors.

ASSESSMENT OF COURSE LEARNING OUTCOMES AND COMPETENCIES

Student progress is evaluated through both formative and summative assessment methods. Specific details may be found in the instructor's course information document.

COLLEGE POLICIES AND PROCEDURES

Student Handbook

<https://www.kckcc.edu/files/docs/student-resources/student-handbook-and-code-of-conduct.pdf>

College Catalog

<https://www.kckcc.edu/academics/catalog/index.html>

College Policies and Statements

<https://www.kckcc.edu/about/policies-statements/index.html>

Accessibility and Accommodations

<https://www.kckcc.edu/academics/resources/student-accessibility-support-services/index.html>.