

## COURSE SYLLABUS

<b>LAST REVIEW</b>	Fall 2022
<b>COURSE TITLE</b>	Engine Performance I
<b>COURSE NUMBER</b>	AUTT 0182
<b>DIVISION</b>	Career and Technical Education
<b>DEPARTMENT</b>	AUTT
<b>CIP CODE</b>	47.0604
<b>CREDIT HOURS</b>	3
<b>CONTACT HOURS/WEEK</b>	Class: 1                      Lab: 4
<b>PREREQUISITES</b>	AUTT-0103
<b>COREQUISITES</b>	None
<b>COURSE PLACEMENT</b>	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) Students will: complete work order and check history; identify engine mechanical integrity; explore the fundamentals of fuel system theory; identify fuel system concerns; explore the fundamentals of ignition theory; identify ignition system concerns; identify induction system concerns; identify exhaust system concerns; identify engine mechanical integrity through a variety of learning and assessment activities.

### 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](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. Identification and Interpretation of Engine Performance Concerns
  - A. Engine absolute (vacuum/boost) manifold pressure tests
  - B. Cylinder power balance tests
  - C. Cylinder cranking and running compression tests
  - D. Cylinder leakage test
- II. Engine Computer Diagnostics
  - A. OBD monitor status
  - B. Freeze frame data
  - C. Clear codes
  - D. Using service information to perform step-by-step diagnosis
- III. Fuel System
  - A. Fuel contamination and quality
  - B. Fuel pump tests
  - C. Pump control systems
  - D. Regulation
  - E. Fuel filters
- IV. Ignition System
  - A. Primary and secondary circuit wiring and solid state components
  - B. Ignition coil testing
  - C. Crankshaft and camshaft position sensors
  - D. Ignition control modules
  - E. Tune up procedures
- V. Air Induction
  - F. Throttle body
  - G. Intake manifold
  - H. Gaskets
  - I. Vacuum leaks and/or unmetered air
  - N. Idle controls
- VI. Identify Exhaust System Concerns
  - A. Manifolds
  - B. Catalytic converters
  - C. Muffler
  - D. Hangers
  - E. Tailpipes
  - F. Gaskets
  - G. Heat shields

- H. Repair methods
- I. Diesel Exhaust Fluid (DEF)

## **COURSE LEARNING OUTCOMES AND COMPETENCIES**

Upon successful completion of this course, the student will:

- A. Describe and demonstrate general engine performance tests and their purpose.
  - 1. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
  - 2. Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action.
  - 3. Perform cylinder power balance test; determine necessary action.
  - 4. Perform cylinder cranking and running compression tests; determine necessary action.
  - 5. Perform cylinder leakage test; determine necessary action.
  - 6. Verify engine operating temperature.
  - 7. Remove and replace spark plugs; inspect secondary ignition components for wear and damage.
- B. Describe the elements of computerized controls.
  - 8. Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.
  - 9. Describe the importance of operating all OBDII monitors for repair verification.
- C. Describe and demonstrate service to fuel, air induction, and exhaust systems.
  - 10. Replace fuel filter(s).
  - 11. Inspect, service, or replace air filters, filter housings, and intake duct work.
  - 12. Inspect integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; determine necessary action.
  - 13. Inspect condition of exhaust system hangers, brackets, clamps, and heat shields; repair or replace as needed.
  - 14. Check and refill diesel exhaust fluid (DEF).
- D. Describe and demonstrate service to emissions control systems.
  - 15. Inspect, test, and service positive crankcase ventilation (PVC) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action.

## **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>.