

COURSE SYLLABUS

LAST REVIEW	Fall 2022
COURSE TITLE	Engine Performance 3
COURSE NUMBER	AUTT 0285
DIVISION	Career and Technical Education
DEPARTMENT	AUTT
CIP CODE	47.0604
CREDIT HOURS	2
CONTACT HOURS/WEEK	Class: 1 Lab: 2
PREREQUISITES	AUTT-0103; AUTT-0182; AUTT-0284
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) Master Automobile Service Technician (MAST) Program. Engine Performance 3 is a collection of advanced principles and diagnostic strategies to understand and resolve driveability and emission control issues. The subjects covered will include analyzing computerized data, fuel, air, exhaust and other strategies. 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 advanced 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. Powertrain Control Diagnostics
 - A. O.E., Enhanced, Global, Generic
 - B. Diagnostic codes
 1. P,B,T,U codes
 2. Freeze frame data
 3. Pending
 4. History
 5. Trip
 6. Clearing
 - C. Monitors
 - D. Enabling criteria
 - E. Data streams
 - F. Fuel trim diagnostics
 - G. Limp in modes
 - H. Signal substitution
 - I. Graphing PIDs
 - J. Bi-directional controls
- II. Body Controls
 - A. Cruise control
 - B. ABS
 - C. Security
 - D. Suspension controls
 - E. Traction control
 - F. HVAC
 - G. Transmission controls
 - H. Aftermarket
- III. Oscilloscope
 - A. Operations
 - B. Waveform comparisons
 - C. Sensors
 - D. Actuators
 - E. Current ramping of various components
- IV. Driveability
 - A. Hot or cold no start
 - B. Hard start
 - C. Driveability
 - D. Hesitation types
 - E. Surging
 - F. Engine misfire

- G. Power problems
- H. Stalling
- I. Mileage issues
- J. Dieseling
- K. Emissions
- L. Turbochargers/superchargers
- V. Emissions
 - A. Secondary air injection
 - B. Catalytic converter
 - C. Evaporative emissions
 - D. Exhaust testing
 - E. Exhaust service
 - F. EGR strategies
 - G. Fuel strategies
 - H. O2 sensor strategies

COURSE LEARNING OUTCOMES AND COMPETENCIES

Upon successful completion of this course, the student will:

- A. Describe steering systems diagnosis and repair.
 1. Test and diagnose components of electronically-controlled steering systems using a scan tool; determine necessary action.
- B. Describe electronic brake, traction and stability control systems diagnosis and repair.
 2. Diagnose electronic brake control system electronic control(s) and components by retrieving diagnostic trouble codes, and/or using recommended test equipment; determine necessary action.
 3. Depressurize high-pressure components of an electronic brake control system.
 4. Bleed the electronic brake control system hydraulic circuits.
 5. Test, diagnose, and service electronic brake control system speed sensors (digital and analog), toothed ring (tone wheel), and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO) (includes output signal, resistance, shorts to voltage/ground, and frequency data).
 6. Diagnose electronic brake control system braking concerns caused by vehicle modifications (tire size, curb height, final drive ratio, etc.).
- C. Describe electrical system diagnosis.
 7. Check electrical/electronic circuit waveforms; interpret readings and determine needed repairs.
 8. Repair CAN/BUS wiring harness.
- D. Describe electrical accessories diagnosis and repair.
 9. Diagnose (troubleshoot) radio static and weak, intermittent, or no radio reception; determine necessary action.

10. Diagnose (troubleshoot) body electronic system circuits using a scan tool; determine necessary action.
 11. Diagnose the cause(s) of false, intermittent, or no operation of anti-theft systems.
 12. Describe the process for software transfers, software updates, or flash reprogramming on electronic modules.
- E. Describe refrigeration system component diagnosis and repair.
13. Determine procedure to remove and reinstall evaporator; determine required oil quantity.
 14. Remove, inspect, and reinstall condenser; determine required oil quantity.
 15. Determine procedure to remove, inspect, and reinstall heater core.

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>.