

COURSE SYLLABUS

LAST REVIEW	Fall 2022
COURSE TITLE	Advanced Electronics, Chassis, and HVAC Service
COURSE NUMBER	AUTT-0264
DIVISION	Career and Technical Education
DEPARTMENT	AUTT
CIP CODE	47.0604
CREDIT HOURS	2
CONTACT HOURS/WEEK	Class: 1 Lab: 2
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) Master Automobile Service Technician (MAST) Program. This course is a collection of the advanced service procedures for chassis, electronics, and HVAC courses. These studies include elements of electronics diagnostics using advanced techniques including dash service for HVAC, Electronics testing for ABS, traction controls and electronic steering. 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. Electronically Controlled Steering System Diagnosis and Repair
 - A. Components
 - B. Electric rack and pinion
 - C. Electric steering column
 - D. Scan diagnostics
 - E. Current testing
- II. Electronic Brakes, ABS Diagnosis
 - A. Components
 - B. Scan diagnostics
 - C. Depressurize brake hydraulics
 - D. Scope/graphically display speed sensors patterns
 - E. Bleed ABS modules
 - F. Tone wheels
 - G. Magnetic pickups/digital pickups
 - H. Effects of tire size
 - I. Effects of curb height
 - J. Effects of final drive ratio
- III. Traction Control
 - A. Components
 - B. Scan diagnostics
 - C. Service
- IV. Stability Control
 - A. Dynamics
 - B. Components
 - C. Scan diagnostics
- V. Electrical System Diagnosis
 - A. Waveforms for various sensors and actuators
 - B. Current ramping for various components
 - C. CAN/BUS operation
 - D. CAN/BUS diagnostics
 - E. Harnesses
 - F. Gateway modules
 - G. Communication
- VI. Electrical Accessories
 - A. Radio service
 - B. Anti-theft diagnosis and repair

- C. Software transfers, updates and re-flash reprogramming on electronic modules
- VII. Advanced HVAC Service
- A. Test, understand process to remove and replace evaporator
 - B. Test, understand process to remove and replace condenser
 - C. Test, understand process to remove and replace heater core

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>.