

COURSE SYLLABUS

LAST REVIEW	Fall 2022
COURSE TITLE	Electrical and Electronics 3
COURSE NUMBER	AUTT-0263
DIVISION	Career and Technical Education
DEPARTMENT	AUTT
CIP CODE	47.0604
CREDIT HOURS	3
CONTACT HOURS/WEEK	Class: 1 Lab: 4
PREREQUISITES	AUTT-0103; AUTT-0163; AUTT-0164
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) Automobile Service Technology (AST) Program. This course is part three of electrical and electronics for automobiles. These elements include studies in battery, charging, starting, lighting, gauges, warning devices, wiper, air bag service and electronic modules such as the Body Control Module (BCM). 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 adherence to safety and pollution prevention standards according to OSHA and EPA regulations.
2. Demonstrate the ability to communicate effectively in workplace scenarios with an appropriate level of preparedness for daily tasks and assignments.
3. Demonstrate the ability to diagnose and repair mechanical and electrical damage according to Original Equipment Manufacturer (OEM) specifications and recommendations.

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 Electrical System Diagnosis
 - A. Switches
 - B. Connectors
 - C. Relays
 - D. Solenoid
 - E. Solid state devices
 - F. Electrical/electronic circuits
 - G. Repair wiring harness
- II. Starting and Charging Systems
 - A. Slow cranking diagnosis
 1. Mechanical causes
 2. Electrical causes
 - B. No crank diagnosis
 1. Amperage draw
 2. Starter circuit voltage drop
 3. Low current starting circuits
 - C. Undercharging
 1. Presence of A/C
 2. Charging wire voltage drop
 3. Rotor field testing
 4. Brush to commutator connectivity
 - D. Overcharging
 1. Voltage regulator operation
 2. Charging component grounds
- III. Driver Information Systems
 - A. Gauges
 1. Resistance testing
 2. Sending units
 3. Gauge testing
 - B. Information systems
 - C. Navigation systems
 - D. Proximity alerts
 - E. Warning devices
- IV. Accessories
 - A. lighting
 1. Types

- 2. Brighter than normal
- 3. Dimmer than normal
- 4. Aiming
- 5. Switches
- B. Wiper/washer systems
 - 1. Wiper park
 - 2. Wiper speed
 - 3. Auto operation
 - 4. Washer problems
- C. Horn
 - 1. Relay
 - 2. BCM
- D. Power seats
- E. Power windows
- F. Power mirrors
- G. Power locks
- H. Remote entry
- I. Alarm systems
- J. Proximity key
- K. Cruise control
- V. Safety Systems
 - A. Airbag service
 - B. Seatbelt operation
- VI. CAN/BUS
 - A. Diagnosis
 - B. Scan tool usage
 - C. Communication errors
 - D. Bi-directional controls
 - E. BCM
 - F. Module types
 - G. Module diagnosis strategies

COURSE LEARNING OUTCOMES AND COMPETENCIES

Upon successful completion of this course, the student will:

- A. Describe general electrical system diagnosis.
 - 1. Diagnose the cause(s) of excessive key-off battery drain (measure parasitic draw); determine necessary action.
 - 2. Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; determine necessary action.
 - 3. Repair wiring harness.
- B. Describe starting and charging system diagnosis and repair.
 - 4. Differentiate between electrical and engine mechanical problems that cause a slow-crank and a no-crank condition.

5. Diagnose (troubleshoot) charging system for causes of undercharge, no-charge, or overcharge conditions.
- C. Describe lighting, gauges, warning devices, and driver information systems diagnosis and repair.
6. Diagnose (troubleshoot) the causes of brighter-than-normal, intermittent, dim, or no light operation; determine necessary action.
 7. Inspect and test gauges and gauge sending units for causes of abnormal gauge readings; determine necessary action.
 8. Diagnose (troubleshoot) the causes of incorrect operation of warning devices and other driver information systems; determine necessary action.
- D. Describe horn and wiper/washer diagnosis and repair.
9. Diagnose (troubleshoot) causes of incorrect horn operation; perform necessary action.
 10. Diagnose (troubleshoot) causes of incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action.
 11. Diagnose (troubleshoot) windshield washer problems; perform necessary action.
- E. Describe accessories diagnosis and repair.
12. Diagnose (troubleshoot) incorrect operation of motor-driven accessory circuits; determine necessary action.
 13. Diagnose (troubleshoot) incorrect electric lock operation (including remote keyless entry); determine necessary action.
 14. Diagnose (troubleshoot) incorrect operation of cruise control systems; determine necessary action.
 15. Diagnose (troubleshoot) supplemental restraint system (SRS) problems; determine necessary action.
 16. Check for module communication errors (including CAN/BUS systems) using a scan tool.

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>.