COURSE SYLLABUS

LAST REVIEW   Fall 2022

COURSE TITLE   Electrical 2

COURSE NUMBER   AUTT-0164

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-0163

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. Students will complete service work orders; describe the relationship between voltage, ohms and amperage; perform basic electrical circuit repairs; identify electrical system faults; identify basic wiring diagram symbols, components, and legend information; perform basic electrical circuit measurements using a DVOM; describe basic circuit characteristics of series, parallel and series parallel circuits through a variety of classroom and shop learning and assessment activities. 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 Automotive Electrical Theory, Diagnostics, and Service
    A. Use of DMM
        1. Voltage drop
        2. Source voltage
        3. Current flow
        4. Resistance
    B. Use of inductive ammeter
    C. Parasitic draw
II. Additional Battery Knowledge
    A. Re-initialization or code entry after reconnecting vehicle battery
        1. Electronic modules
        2. Radios
        3. Other accessories
    B. Hybrid vehicle service
        1. Unique 12v battery service procedures
        2. Testing 12v systems
    C. High voltage circuits of electric and hybrid vehicles
        1. Safety procedures
        2. Service procedures
        3. High voltage accessories
III. Starting System
    A. Starter current draw tests and diagnostics
    B. Starter circuit voltage drop testing and diagnostics
    C. Starter relays and solenoids
    D. Starter service procedures
    E. Start circuit testing and diagnostics
        1. Clutch switch
        2. Neutral start switch
        3. Key switch and security systems
IV. Charging System
    A. Charging system output tests
    B. Drive belt, pulley alignment
    C. Replacements and unusual mounting
    D. Charging system voltage drop tests
    E. Regulation methods and regulators
    F. Regulator testing and control

G. Charging system indicators
V.   Lighting Systems
    A. Light socket repair
    B. Identification of bulbs
    C. Flasher
    D. Turn signal switch
    E. Brake light switch
    F. Head light
        1. High intensity lights
        2. Beam selector switch
        3. Aim head lamps
        4. Relays
        5. Auto dimmers
        6. Fog or driving lamps
VI.   Vehicle Accessories
    A. Airbag service
        1. Arming and disarming
        2. Replacement
        3. Safe disposal
        4. Modules and sensors
        5. Squibs
        6. Seatbelt service
        7. Seat sensors
    B. Door panel service
        1. Special tools
        2. Precautions
        3. Riveting
    C. Keyless entry
    D. Alarm systems
    E. Interment panel service
        1. Speedometer service
        2. Interment cluster service
        3. Component removal and installation
        4. Glove box removal and replacement
    F. Maintenance light reset procedures
    G. Windshield wiper service
    H. Back up proximity detection
    I. Back up cameras

COURSE LEARNING OUTCOMES AND COMPETENCIES
Upon successful completion of this course, the student will:

A. Demonstrate knowledge of general automotive electrical theory, diagnostics, and
    service.

1. Demonstrate proper use of a Digital Multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow and resistance.
2. Diagnose the cause(s) of excessive key-off battery drain (measure parasitic draw); determine necessary action.

B. Demonstrate knowledge of battery operation, diagnostics, and service.
3. Identify high-voltage circuits of electric or hybrid electric vehicle and related safety precautions.
4. Identify electronic modules, security systems, radios, and other. accessories that require re-initialization or code entry after reconnecting vehicle battery.
5. Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures.

C. Demonstrate knowledge of starting system diagnosis and repair.
6. Perform starter current draw tests; determine necessary action.
7. Perform starter circuit voltage drop tests; determine necessary action.
8. Inspect and test starter relays and solenoids; determine necessary action.
9. Remove and install starter in a vehicle.
10. Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action.

D. Demonstrate knowledge of charging system diagnosis and repair.
11. Perform charging system output test; determine necessary action.
12. Inspect, adjust, or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment.
13. Remove, inspect, and re-install generator (alternator).
14. Remove, inspect, and re-install generator (alternator).
15. Perform charging circuit voltage drop tests; determine necessary action.

E. Demonstrate knowledge of lighting systems diagnosis and repair.
16. Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed.
17. Aim headlights.
18. Identify system voltage and safety precautions associated with high- intensity discharge headlights.

F. Demonstrate knowledge of vehicle accessories diagnosis and repair.
19. Disable and enable an airbag system for vehicle service; verify indicator lamp operation.
20. Remove and reinstall door panel.
21. Describe the operation of keyless entry/remote-start systems.
22. Verify operation of instrument panel gauges and warning/indicator lights; reset maintenance indicators.
23. Verify windshield wiper and washer operation, replace wiper blades.

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.