COURSE INFORMATION FORM

DISCIPLINE: Automotive Technology
COURSE TITLE: Automotive Electrical Systems

CR. HR. 6  LECT HR. 3  LAB HR. 6  CLIN/INTERN HR.  

CATALOG DESCRIPTION

This course incorporates a study of the theory, construction, and repair of modern automotive electrical systems. Operational theory, testing and repair of batteries, charging systems, starting systems, lighting systems, wiring and accessories will be stressed. Practice in the use of test equipment to diagnose vehicle electrical systems will be covered in detail.

PREREQUISITES

Concurrent enrollment in or completion of AUTO 100.

EXPECTED STUDENT OUTCOMES IN THE COURSE (ESO)

Upon completion of this course, the student will be able to:

1. Demonstrate the cognitive and manipulative skills necessary to complete assigned tasks.
2. Describe and employ safe work habits, observing both personal safety and a concern for the safety of others.
3. Analyze, diagnose, and determine necessary actions to solve electrical concerns.
4. Apply procedures needed to successfully perform service operations.
5. Employ effective behaviors necessary to successfully work with others.

GENERAL EDUCATION OUTCOMES (ESO)

Specify which general education outcomes, if any, are substantially addressed by the course. Numbers in parentheses identify the Expected Student Outcomes linked to the specific General Education Outcome.

Outcomes  ESO
PROGRAM-LEVEL OUTCOMES

CAREER AND TECHNICAL EDUCATION PROGRAM OUTCOMES
Specify which Career and Technical program outcomes, if any, are substantially addressed by the course by completing the “Career and Technical Education template” to show the relationship between course and program outcomes to assessment measures.

1. Students will demonstrate the knowledge necessary to obtain industry recognized certifications.
2. Students will demonstrate or apply knowledge of basic sciences to the practices of automotive technology.
3. Students will demonstrate the knowledge and application of safety rules and regulations.
4. Students will exhibit professional behaviors.
5. Students will be able to use mathematics as it pertains to automotive technicians.

CLASS-LEVEL ASSESSMENT MEASURES
Student accomplishment of expected student outcomes may be assessed using the following measures. (Identify which measures are used to assess which outcomes.)

1. Written evaluation (1-4)
2. Oral evaluation (1-5)
3. Performance exams (1-4)
4. Written laboratory assignments (1-5)
I. Basic electrical theory
   A. Define and describe Atomic theory
   B. Define and describe theories of electricity
   C. Identify and describe sources of electricity
   D. Magnetic and electromagnetic theories

II. Measuring electricity
   A. Electrical pressure – Volts
   B. Electron flow – Amps
   C. Electrical resistance - Ohms
   D. Electrical power – Watts
   E. Ohm’s Law
   F. Watt’s Law
   G. Units of measure

III. Electrical components
   A. Conductors
   B. Resistors
   C. Switches
   D. Coils
   E. Transformers
   F. Relays
   G. Fuses
   H. Motors
   I. Input sensors
   J. Outputs

IV. Electrical circuits
   A. Basic circuit components
   B. Series circuits
   C. Parallel circuits
   D. Series-parallel circuits
   E. Circuit laws
   F. Open circuit voltage rules and effects
V. Batteries
   A. Battery types and construction
   B. Theory of operation
   C. Battery ratings
   D. Battery testing
      1. Load testing
      2. Capacitive testing
   E. Battery service

VI. Electrical measuring tools
   A. DMM operation and maintenance
   B. Display interpretation
   C. Measuring voltage
   D. Measuring amperage
   E. Measuring resistance
   F. Test lamp application and usage
   G. Jumper wire testing applications

VII. Wiring diagrams
   A. Typical symbols
   B. Types of diagrams
   C. Diagrams as a diagnostic tool

VIII. Charging systems
   A. Basic principles
   B. Alternator (AC generator) components
   C. Charging system components
   D. Charging system testing

IX. Starting systems
   A. Basic principles
   B. Starting system components
   C. Starting system testing

X. Accessory systems
   A. Wipers
   B. Lighting
   C. Power windows
   D. Power door locks
   E. Other popular accessories

XI. Ignition coil theory and operation
   A. Primary secondary
   B. Self and mutual induction
   C. Voltage, current, and power theories related to mutual induction

XII. Computer systems
   A. Scan tool usage
1. Code retrieval
2. Scan tool navigation
3. Data retrieval, plotting, and recording
4. Clearing codes
5. *Re-programming on-board computers