Wayne County Community College District

COURSE SYLLABUS

AUT 114 Electrical/Electronic Systems I

CREDIT HOURS: 3.00

CONTACT HOURS: 60.00

COURSE DESCRIPTION:
This fundamental course provides students with the necessary skills and understanding to identify, describe, and locate basic parts of major electrical/electronic automotive systems. Electrical theory, operating principles, construction, and maintenance of various components will be applied in this class. Introduction to on-vehicle testing procedures and inspection of electrical components will be performed by students. There will be discussion and testing of on-board computers included. ASE certification requirements will be introduced in this course.

PREREQUISITES: PROGRAM APPROVAL

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

Industry Information

- **Identify various career types in the automotive field**
  Objective
  - Identify the eight Automotive Service Excellence (ASE) service areas for technicians and the components included in each.
  - Identify career opportunities directly related to the automotive technology field.
  - Identify various methods used to pay automotive technicians.
  - Identify the difference between a union and a non-union shop.

Shop Safety

For every task in Electrical/Electronic Systems, the following safety requirements must be strictly enforced: Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

- **Identify protective clothing and equipment and their proper use; proper shop behavior; principles of fire safety; and federal regulations concerning hazardous material and shop safety.**
  Objective
  - Describe how to select individual personal protective clothing and equipment.
  - Identify the dangers of improper behavior in the shop.
  - Identify the importance of proper grooming and hygiene.
  - Identify the classes of fires and the types of fire extinguishers.
  - Identify the use of a fire blanket.
  - Identify general fire emergency procedures.
  - Identify the Occupational Safety and Health Administration (OSHA) regulations.
  - Identify the Environmental Protection Agency (EPA) regulations.
  - Identify the safe use of fire protection equipment
  - Identify the safe use of shop equipment following Environmental Protection Agency (EPA) and Occupational Safety and Health Act (OSHA) regulations

- **Identify and explain the safe and proper use of chemicals**
  Objective
  - Identify the types and uses of solvents.
  - Identify the types and uses of soaps and cleaning solutions.
  - Identify the types and uses of oils.
  - Identify the types and uses of greases.
  - Identify the types and uses of specialty additives.
  - Identify the types and uses of specialty chemicals.
  - Describe the five general rules for using automotive chemicals.
  - Complete the assignment sheet on lubricants.
  - Complete the assignment sheet on lubricants.
  - Identify gasses and the hazards they present.
  - Identify the hazards of asbestos dust.
- **Identify and explain the safe and proper use of basic hand tools**
  Objective
  - Identify the types and uses of common end wrenches.
  - Identify the types and uses of socket set components.
  - Identify the types and uses of wrenches.
  - Identify the types and uses of screwdrivers.
  - Identify the types and uses of pliers.
  - Identify the types and uses of hammers.
  - Identify the types and uses of punches and chisels.
- **Identify and explain the safe and proper use of specialty tools, fasteners, and measuring tools**
  - Identify the types and uses of specialty tools.
  - Describe the procedures for cutting threads onto a rod or into a hole, repairing damaged threads, and removing broken bolts.
  - Identify common nuts and bolts in the English system.
  - Identify common nuts and bolts in the metric system.
  - Identify other types of common fasteners.
  - Identify the types and uses of measuring tools.
  - Identify the procedures for the care and use of measuring tools.
- **Identify and explain the safe and proper use of power tools and shop equipment**
  - Identify the types and uses of pneumatic, hydraulic, and electric power tools.
  - Identify the hazards of power tools.
  - Identify the types, purposes, and safety considerations of common shop equipment.
  - Demonstrate the ability to:
    A. Lift a vehicle

General Electrical System Diagnosis

- **Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.**
  Objective
  - Identify the procedures for verifying the customer's concerns.
  - Identify terms and definitions associated with the evaluation and diagnosis of electrical/electronic problems
  - Identify printed and electronic resources for automotive manuals, manufacturer and supplier updates.
  - Identify locations where vehicle identification numbers are found
  - Identify important diagnostic information included in driver complaints

- **Identify and interpret electrical/electronic system concern; determine necessary action.**
  Objective
  - Identify the procedures for verifying the customer's concerns.

- **Research applicable vehicle and service information, such as electrical/electronic system operation, vehicle service history, service precautions, and technical service bulletins.**
  Objective
  - Identify printed and electronic resources for automotive manuals, manufacturer and supplier updates.
- **Locate and interpret vehicle and major component identification numbers.**
  Objective
  - Identify locations where vehicle identification numbers are found
    - **Diagnose electrical/electronic integrity of series, parallel and series-parallel circuits using principles of electricity (Ohm's Law).**
      Objective
  - Identify the equipment used to test electrical circuits.
- **Use wiring diagrams during diagnosis of electrical circuit problems.**
  Objective
  - Identify the procedures for testing electrical circuits.
  - Identify the procedures for tracking electrical circuits
    - **Demonstrate the proper use of a digital multi-meter (DMM) during diagnosis of electrical circuit problems, including: source voltage, voltage drop, current flow, and resistance**
      Objective
  - Identify the equipment used to test electrical circuits.
  - Identify the procedures for testing electrical circuits.
  - Identify the types of electrical faults.
  - Identify voltage drop testing.
- **Check Electrical/Electronic circuit waveforms; interpret readings and determine needed repairs.**
  Objective
- **Check electrical circuits with a test light; determine necessary action.**
  Objective
  - Identify and explain connector repairs.
  - Identify the types of electrical faults.
- **Check electrical circuits using fused jumper wires; determine necessary action.**
  Objective
  - Identify types of jumper wires
  - Identify situations in which a jumper wire is to be used

- **Locate shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine necessary action.**
  Objective
  - Identify the equipment used to test electrical circuits.
  - Identify the procedures for testing electrical circuits.
  - Identify the types of electrical faults.
  - Demonstrate the ability to:
    A. Measure voltage in a circuit.
    B. Measure resistance in a circuit.
    C. Measure current in a circuit.
    D. Determine circuit voltage and continuity using a test light.
    E. Perform a fault test.
    F. Check continuity in automotive electrical circuits.
    G. Check for opens, shorts, and grounds in an automotive electrical circuit
    H. Measure resistance in an automotive electrical circuit.
    I. Measure volts in an automotive electrical circuit.
    J. Measure current in an automotive electrical circuit.
    K. Inspect and service fusible links, circuit breakers, and fuses in an automotive electrical circuit.
    L. Identify and interpret electrical/electronic system concern
- **Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.**
  Objective
  - Demonstrate the ability to:
    A. Measure voltage in a circuit.
    B. Measure resistance in a circuit.
    C. Measure current in a circuit.
    D. Determine circuit voltage and continuity using a test light.
    E. Perform a fault test.
    F. Check continuity in automotive electrical circuits.
    G. Check for opens, shorts, and grounds in an automotive electrical circuit
    H. Measure resistance in an automotive electrical circuit.
    I. Measure volts in an automotive electrical circuit.
    J. Measure current in an automotive electrical circuit.
    K. Inspect and service fusible links, circuit breakers, and fuses in an automotive electrical circuit.
    L. Identify and interpret electrical/electronic system concern

- **Remove and replace terminal end from connector, replace connectors and terminal ends...**
  Objective
  - Identify and explain connector repairs.
  - Identify and explain wire repairs.
  - Demonstrate the ability to:
    A. Tin the iron.
    B. Solder wire splices.
    C. Replace terminals.
- **Repair wiring harness (including CAN/BUS systems).**
  Objective
  - Identify and explain connector repairs.
  - Identify and explain wire repairs.
  - Demonstrate the ability to:
    A. Tin the iron.
    B. Solder wire splices.
    C. Replace terminals.
- **Perform solder repair of electrical wiring.**
  Objective
  - Demonstrate the ability to:
    A. Tin the iron.
    B. Solder wire splices.
    C. Replace terminals.

ASSESSMENT METHODS:
Student performance may be assessed by examination, quizzes, case studies, oral reports, group discussion, written reports or presentations. The instructor reserves the option to employ one or more of these assessment methods during the course.

GRADING SCALE:
90%-100% = A
80%- 89.9%= B
70%- 79.9%= C
60%- 69.9%= D
<60% = E