



Wayne County Community College District

COURSE SYLLABUS

AUT 115 Electrical/Electronic Systems II

CREDIT HOURS: 3.00

CONTACT HOURS: 60.00

COURSE DESCRIPTION:

Lab fee

This course is a required course in the Automotive Technology certificate and associate degree programs. This course provides students with the necessary skills and understanding to system construction and operations. Electrical theory, operating principles, construction, maintenance and repair of various components are included in the class. On-vehicle testing, inspection, and diagnoses will be performed by students. There will be discussion and testing of on-board diagnostic computers stressed in this course. In addition, ASE certification disciplines will be stressed and applied in this course.

PREREQUISITES: AUT 114

EXPECTED COMPETENCIES:

Upon completion of this course, the student will be familiar with:

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



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- **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.

General Electrical System Diagnosis

- **Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1**

- 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

- **Locate shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine necessary action. P-1**

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



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- **Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; perform necessary action. P-1**

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

- **Measure and diagnose the cause(s) of excessive parasitic draw; determine necessary action. P-1**

Objective

- Identify terms and definitions associated with the basics of the battery.
- Identify the construction of the battery.
- Identify the types of battery construction.
- Identify the characteristics of battery operation.
- Identify the procedures for inspecting and maintaining the battery components and current delivery systems.

Gauges, Warning Devices, and Driver Information Systems Diagnosis and Repair

- **Inspect and test connectors, wires, and printed circuit boards of gauge circuits; determine necessary action. P-3**

Objective

- Identify the driver information and warning systems.
- Identify the procedures for testing and servicing the driver information and warning systems.

- **Diagnose the cause of incorrect operation of warning devices and other driver information systems; determine necessary action. P-1**

Objective

- Identify terms and definitions associated with gauges, warning devices, and driver information systems.
- Identify gauge components and circuits.
- Identify the procedures for testing and servicing gauge system components.
- Identify the driver information and warning systems.
- Identify the procedures for testing and servicing the driver information and warning systems.



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COURSE SYLLABUS

Battery Diagnosis and Service

- **Perform battery state-of-charge test; determine necessary action. P-1**
Objective
 - Identify the procedures for performing battery condition tests.

- **Perform battery capacity test; confirm proper battery capacity for vehicle application; determine necessary action. P-1**
Objective
 - Identify the characteristics of battery operation.

- **Maintain or restore electronic memory functions. P-1**
Objective
 - Identify the procedures for inspecting and maintaining the battery components and current delivery systems.
 - Identify the procedures for removing and installing a battery.
 - Identify the procedures for performing battery condition tests.

- **Inspect, clean, fill, and/or replace battery, battery cables, connectors, clamps and hold-downs. P-1**
Objective
 - Identify the procedures for inspecting and maintaining the battery components and current delivery systems.
 - Identify the procedures for performing battery condition tests.

- **Perform battery charge. P-1**
Objective
 - Identify the procedures for jump starting a vehicle.

- **Start a vehicle using jumper cables or an auxiliary power supply. P-1**
Objective
 - Identify the procedures for jump starting a vehicle.
 - Demonstrate the ability to:
 - A. Remove and install a battery.
 - B. Charge a battery.
 - C. Jump start a vehicle.



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COURSE SYLLABUS

- **Identify high voltage circuits of electric or hybrid vehicle and related safety precautions. P-3**

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

- **Identify electronic modules, security systems, radios, and other accessories that require re-initialization or code entry following battery disconnect. P-1**

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



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COURSE SYLLABUS

- **Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures. P-3**

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

ASSESSMENT METHODS:

Student performance may be assessed by examination, quizzes, case studies, oral conversation, group discussion, oral 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