



AST 103 Automotive Electrical Systems II

Course Information

Division	ASET
Contact Hours	75
Theory	45
Lab Hours	30
Total Credits	4

Prerequisites – AST 102, AST 101

Course Description

This course is a continuation from Electrical Systems I. Topics include, but are not limited to, the fundamentals, diagnostics, and service of the following areas: advanced battery design, starting systems, starter motors, charging systems, and lighting circuits, instrumentation and warning lamps, accessories, passive restraints, and alternative power sources as well as, the proper tools and equipment used to perform diagnostics and service

This course is a required core course for students pursuing a (n) Certificate or an AAS in Automotive Technologies

Program Outcomes Addressed by this Course:

Upon successful completion of this course, students should be able to meet the program outcomes listed below:

- A. Demonstrate the correct method of utilizing automotive service tools and equipment
- B. Identify all related system diagnostic/repair information within automotive service information
- C. Employ safe and professional work habits while conducting typical automotive service procedures.
- D. Explain how the various systems of an automobile work
- E. Demonstrate correct service procedures in the various automotive systems
- F. Test and diagnose the proper operation of the various automotive systems

Course Outcomes

In order to evidence success in this course, the students will be able to:

1. Understand and demonstrate starting system operation, diagnosis and repair

This outcome is relevant to program outcomes: (A) , (B),(C),(D), (E) and (F)

- a) Perform starter current draw tests; determine necessary action.
- b) Perform starter circuit voltage drop tests; determine necessary action.
- c) Inspect and test starter relays and solenoids; determine necessary action.
- d) Remove and install starter in a vehicle.
- e) Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action.
- f) Differentiate between electrical and engine mechanical problems that cause a slow-crank or a no-crank condition.



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2. Understand and demonstrate charging system operation, diagnosis and repair

This outcome is relevant to program outcomes: (A) , (B),(C),(D), (E) and (F)

- a) Perform charging system output test; determine necessary action.
- b) Diagnose (troubleshoot) charging system for causes of undercharge, no-charge, or overcharge conditions.
- c) Inspect, adjust, or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment.
- d) Remove, inspect, and re-install generator (alternator).
- e) Perform charging circuit voltage drop tests; determine necessary action.

3. Understand and demonstrate lighting system operation, diagnosis and repair

This outcome is relevant to program outcomes: (A) , (B),(C),(D), (E) and (F)

- a) Diagnose (troubleshoot) the causes of brighter-than-normal, intermittent, dim, or no light operation; determine necessary action.
- b) Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed.
- c) Aim headlights.
- d) Identify system voltage and safety precautions associated with high-intensity discharge headlights.

4. Understand and demonstrate gauge, warning device, and driver information systems operation, diagnosis and repair

This outcome is relevant to program outcomes: (A) , (B),(C),(D), (E) and (F)

- a) Inspect and test gauges and gauge sending units for causes of abnormal gauge readings; determine necessary action.
- b) Diagnose (troubleshoot) the causes of incorrect operation of warning devices and other driver information systems; determine necessary action.

5. Understand and demonstrate horn and wiper/washer operation, diagnosis, and repair

This outcome is relevant to program outcomes: (A) , (B),(C),(D), (E) and (F)

- a) Diagnose (troubleshoot) causes of incorrect horn operation; perform necessary action.
- b) Diagnose (troubleshoot) causes of incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action.
- c) Diagnose (troubleshoot) windshield washer problems; perform necessary action.



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6. Understand and demonstrate accessory operation diagnosis and repair

This outcome is relevant to program outcomes: (A) , (B),(C),(D), (E) and (F)

- a) Diagnose (troubleshoot) incorrect operation of motor-driven accessory circuits; determine necessary action.
- b) Diagnose (troubleshoot) incorrect electric lock operation (including remote keyless entry); determine necessary action.
- c) Diagnose (troubleshoot) incorrect operation of cruise control systems; determine necessary action.
- d) Diagnose (troubleshoot) supplemental restraint system (SRS) problems; determine necessary action.
- e) Disable and enable an airbag system for vehicle service; verify indicator lamp operation.
- f) Remove and reinstall door panel.
- g) Check for module communication errors (including CAN/BUS systems) using a scan tool.
- h) Describe the operation of keyless entry/remote-start systems.
- i) Verify operation of instrument panel gauges and warning/indicator lights; reset maintenance indicators.
- j) Verify windshield wiper and washer operation, replace wiper blades.
- k) Diagnose (troubleshoot) radio static and weak, intermittent, or no radio reception; determine necessary action.
- l) Diagnose (troubleshoot) body electronic system circuits using a scan tool; determine necessary action.
- m) Diagnose the cause(s) of false, intermittent, or no operation of anti-theft systems.
- n) Describe the process for software transfers, software updates, or flash reprogramming on electronic modules.

Date Updated:3/31/15,8/12/13

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