

COURSE OUTLINE **Auto Electrical III**

Course Description:

AT 202 Auto Electrical Systems III. 3 hours credit. Prerequisites: AT 105 with a C or better. This course will enable the student to diagnose and repair customer complaints related to lighting, gauge function, and driver information systems. The utilization of diagrams and schematics in the diagnosis and repair procedure is emphasized in this course.

Course Relevance:

The Skills acquired in this course allow the student to diagnose and repair lighting and information systems complaints. The utilization of diagrams and schematics as a diagnostic tool allows the transference of these skills from one vehicle to another.

Required Materials:

Halderman, J. D. (1999) Diagnosis and Troubleshooting of Automotive Electrical, Electronic and Computer System. New York: Prentice Hall

Learning Outcomes:

1. Diagnose and repair lighting and driver information systems.
2. Utilize diagrams and schematics within the diagnostic/repair process
3. Utilization of electrical/electronic principles within the repair process.
4. Practice all personal and equipment safety procedures in the performance Of repairs.
5. Discern between problems caused by component failure and those created by circuit problems.

Learning PACT

Through the student involvement in this course, the student will develop and document his/her achievement of the following PACT skills:

Primary skills (developed and documented):

1. Critical Thinking
 - The diagnosis and repair of lighting and driver information complaints require the student to employ “outside-in” thinking process; a logical sequential approach must be utilized in order to repair the “cause” and not the symptom.
2. Problem Solving
 - The application and techniques acquired in this course will allow the student to repair complaints related to lighting and information circuits. Knowledge and application of electrical laws and principles, sensor

function and operating parameters allow the student to discern between component and circuit problems.

3. Field Related Technology

- Through the completion of assigned tasks, the student will develop the ability to select and utilize tools and instruments that are appropriate to the task. The ability to research repair procedures and service bulletins related to the complaint are further enhanced. The ability to follow diagnostic flow charts will also be demonstrated.

Secondary skills (developed but not documented):

- Time Management
- Ethical work practices
- Reading/Research
- Sequential/Logical thinking

Assessment Tasks:

These learning outcomes and primary Learning PACT skills will be demonstrated by:

1. In a field related environment locate and identify lighting system components.
2. In a field related environment locate and identify those components related to driver information systems.
3. Comply with all manufacturers recommendations in the diagnosis and repair of lighting and driver information systems.
4. Diagnose and repair all related customer complaints.
5. Service, test, adjust or replace related components according to manufacturer's specifications.
6. Follow all recommended safety procedures required in the performance of lighting and driver information systems repair.

Course Content:

- I. Themes - Key recurring concepts that run throughout this course:
 - A. Ethical work practices
 - B. Cost effectiveness
 - C. Time management
 - D. Safe working practices
 - E. Communication
- II. Issues - Key issues that will be addressed in this course: areas of conflict that must be understood in order to achieve the intended outcome:
 - A. Safety when working with Electrical/Electronic systems
 - B. Communication as a tool in the diagnostic loop

- C. Technology as a research tool
- D. Ethical work practices
- E. Transference of learned procedures
- III. Concepts – Key concepts that must be understood to address the issues:
 - A. Diagnostic Theory
 - B. Flow charts
 - C. Electronic/Electrical principles
 - D. Multimeter principles
- IV. Skills / Competencies - Actions that are essential to achieve the course outcomes:
 - A. Diagnose the cause of brighter than normal, intermittent, dim, or no light operation; determine necessary action.
 - B. Inspect, replace, and aim headlights and bulbs.
 - C. Inspect and diagnose incorrect turn signal or hazard light operation; perform necessary action.
 - D. Inspect and test gauges and gauge sending units for cause of intermittent, high, low, or no gauge reading; determine necessary action.
 - E. Diagnose the cause of incorrect operation of warning devices and other driver information systems; determine necessary action.
 - F. Inspect and test sensors, connectors, and wires of electronic instrument circuits; determine necessary action.
 - G. Diagnose incorrect horn operation; perform necessary action
 - H. Diagnose incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action.
 - I. Diagnose incorrect windshield washer operation; perform necessary action.

Learning Units:

- I. System component identification and function
- II. Component testing procedures
- III. Electrical/ Electronic principle
- IV. Diagnostic procedure
- V. Safety
- VI. Information research and utilization
- VII. Flow Charting
- VIII. Selection of proper diagnostic tool(s)

Learning Activities:

Independent and collaborative learning activities will be assigned within the classroom and lab environment to assist the student in achieving the desired outcomes. Class discussion, lecture, reading assignments and supportive lab activities will also contribute to the learning experience.

Grade Determination:

Grade determination will be based on the student's performance of assigned tasks within the classroom/lab environment. Attendance, group participation and attitude toward fellow students and assigned tasks will be reflected in the final grade. Lab tasks (competencies) will be evaluated (rated) according to the competency profile.