



MASTER COURSE OUTLINE

Prepared By: John Martin

Date: September 2017

COURSE TITLE

Automotive Electrical and Electronic Systems

GENERAL COURSE INFORMATION

Dept.: AUT

Course Num: 121

(Formerly:)

CIP Code: 47.0604

Intent Code: 21

Program Code: 712

Credits: 15

Total Contact Hrs Per Qtr.: 220

Lecture Hrs: 110

Lab Hrs: 110

Other Hrs:

Distribution Designation:

COURSE DESCRIPTION (as it will appear in the catalog)

This comprehensive course covers both theory and operation of the electrical systems in today's high-tech vehicles. Topics covered include D.C. electrical theory, D.C. circuitry, Ohms Law, solid state components, batteries, starting circuits, charging circuits, lighting circuits, vehicle wiring and ignition systems. Emphasis will be placed on using modern electrical test equipment and procedures to diagnose and repair complex electrical systems. This course is designed to prepare the student for the ASE/NATEF Electrical Systems Certification test, while instilling interpersonal and employability skills. There will be a heavy focus on customer service and quality control.

PREREQUISITES

AUT 115 Automotive Shop Safety and Environmental Issues

AUT 190 Automotive Lab (Co-Requisite)

TEXTBOOK GUIDELINES

An automotive electricity text as chosen by Automotive Faculty (Example: *Automotive Electricity and Electronics 4th Edition - Halderman*)

COURSE LEARNING OUTCOMES

Upon successful completion of the course, students should be able to demonstrate the following knowledge or skills:

1. Demonstrate awareness of safety and environmental issues in the automotive lab area.
2. Explain the fundamentals and operation of electricity (AC and DC).
3. Identify the parts of an electrical circuit and explain their involvement in the current carrying process.
4. Demonstrate the ability to distinguish between normally operating and faulty electrical circuits.
5. Interpret and illustrate automotive wiring schematics (diagrams).
6. Interpret automotive service data and apply to diagnostic procedures.
7. Apply diagnostic thinking and procedures to locate the source of electrical malfunctions.
8. Demonstrate the ability to safely perform high quality electrical circuit repairs.
9. Participate in small-group discussions with people of different backgrounds and personalities.
10. Demonstrate punctuality, curtesy, and basic integrity in the work place.
11. Demonstrate effective customer service skills and problem resolution.

INSTITUTIONAL OUTCOMES

COURSE CONTENT OUTLINE

UNIT 1: AUTOMOTIVE ELECTRICAL BASICS

1. Electrical Fundamentals
2. Electrical Circuits and Ohm's Law
3. Series Circuits
4. Parallel Circuits
5. Series-Parallel Circuits

UNIT 2: AUTOMOTIVE ELECTRICAL TESTING AND EQUIPMENT

1. Circuit Testers and Digital Multi-meters
2. Oscilloscopes and Graphing Meters Automotive Wiring and Wire Repair
3. Wiring Schematics and Circuit Testing

UNIT 3: MAGNETISM, CAPACITORS, AND ELECTRONICS

1. Capacitance and Capacitors
2. Magnetism and Electromagnetism
3. Electronic Fundamentals
4. Computer Fundamentals
5. Can and Network Communications

UNIT 4: ELECTRICAL STORAGE, GENERATION, AND STARTING SYSTEMS

1. Batteries
2. Battery Testing and Service
3. Cranking System
4. Cranking System Diagnosis and Service
5. Charging System
6. Charging System Diagnosis and Service

UNIT 5: COMPLEX AUTOMOTIVE CIRCUITS

1. Lighting and Signaling Circuits
2. Driver Information and Navigation Systems
3. Horn, Wiper, and Blower Motor Circuits
4. Accessory Circuits
5. Airbag and Pre-tensioner Circuits
6. Audio System Operation and Diagnosis

UNIT 6: HIGH VOLTAGE AUTOMOTIVE CIRCUITS

1. Introduction to Hybrid Vehicle Technology
2. Introduction to Electric Vehicle Technology

DEPARTMENTAL GUIDELINES *(optional)*

DIVISION CHAIR APPROVAL

DATE