



Broward Community College

Course Outline

LAST REVIEW: 2005-2006

NEXT REVIEW: 2010-2011

STATUS: A

COURSE TITLE: Automotive Electronics

COMMON COURSE NUMBER: AER1695C

CREDIT HOURS: 4

CONTACT HOUR BREAKDOWN

(per 16 week term)

CLOCK HOURS:

Lecture: 48 Lab: 48

(Voc. Course ONLY)

Clinic: Other: 29

PREREQUISITE(S):

COREQUISITE(S):

PRE/COREQUISITE(S):

<p>COURSE DESCRIPTION: A course designed to teach the fundamental principles of electronics and to introduce the application of electronics in the modern automobile.</p>

General Education Requirements - Associate of Arts Degree, meets Area(s):

General Education Requirements - Associate in Science Degree, meets Area(s):

UNIT TITLES:

1. Electronic Fundamentals
2. Automotive Electronic Systems
3. Electronic Trouble Shooting

I. Course Overview:

Upon successful completion of this course, the students should be able to use fundamental principles of electronics when describing an automotive electronic system and to diagnose electronic system problems.

II. Units:

Unit 1. Electronic Fundamentals

General Outcome:

- 1.0 The students should be able to demonstrate an understanding of electricity and electronics and a familiarity with common electrical devices including vacuum tubes, integrated circuits, printed circuits, semiconductors and microprocessors.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 1.1 Define the term "electronics."
- 1.2 Describe the purpose construction and operation of display screens including CRT's and LCD's.
- 1.3 Describe the purpose construction and operation of semiconductors including transistors.
- 1.4 Describe the purpose construction and operation of printed circuit boards.
- 1.5 Describe the purpose construction and operation of integrated circuits.
- 1.6 Describe the purpose construction and operation of microprocessors.
- 1.7 Define the terms electron beam, emitter, collector, rectifier, base, anode, plate, cathode, diode, triode, electron gun, amplifier, N-type, P-type, LED, tank circuit, solid state, LCD, analog, digital, thermistor, potentiometer, variable resistor.

Unit 2. Automotive Electronic Systems

General Outcome:

2.0 The students should be able to demonstrate an understanding of the extent and nature of electronic circuitry in automotive systems including monitoring and/or control circuits for engines, transmissions, brakes, steering, suspension, climate control, instrumentation and radios and accessories.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 2.1 Explain the difference between automotive electronic modules, sensors and processors.
- 2.2 Describe the purpose, construction and operation of electronic monitoring and control systems for the following:
 - A. Emission control systems.
 - B. Ignition systems.
 - C. Fuel systems including carbureted and fuel injected.
 - D. Integrated engine controls such as PCM, BCM and various Class II communication systems.
 - E. Instrument panels.
 - F. Message centers and driver computers.
 - G. Braking systems.
 - H. Transmissions.
 - I. Suspension systems and steering systems.
 - J. Climate control.
 - K. Radios and other accessories.
 - L. Supplemental Restraint Systems
 - M. Integrated navigation, theft deterrent and communication (phone) systems.
- 2.3 Describe the purpose, construction and operation of microprocessors as applied to the automobile.
- 2.4 Define the following terms:

Hall effect switch, digital binary signal, ROM, RAM, PROM, Computer clock, BCM, ECM, KAM, ECA, A/D conversion, input, output memory, adaptive learn, codes.

Unit 3. Electronic Trouble Shooting

General Outcome:

3.0 The students should be able to demonstrate an understanding of the tools, instruments and techniques used in electronic circuitry diagnosis and repair.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 3.1 Describe the precautions necessary to work safely with electrical and electronic systems.
- 3.2 Identify and describe the proper use of test equipment including digital volt/*ohm* meters, oscilloscopes, and engine control system testers, scanners and break out boxes.
- 3.3 Diagnose electronic system problems using appropriate test equipment and references.
- 3.4 Using factory service manuals and service bulletins for reference, remove, test, repair and replace components of all automotive electronic systems, according to manufacturer's specifications.
- 3.5 Diagnose, service and repair supplemental restraint systems, including air bags, side air bags, air bag curtains and seat belt pre-tensioners.