SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

ACADEMIC AFFAIRS

Course Number: AUTO 212 Department: Automotive Technology

Course Title: Automotive Electronic System Semester: Spring Year: 1997

Objectives/Competencies

Course Objective	Competencies
1. The student should become aware of the variety of electronically controlled systems available for current vehicles.	1. The student must be able to identify the following electronic systems and explain the advantages of their use: a. Antilock brake system. b. Speed control systems. c. Electronic engine control systems. d. Climate control systems. e. Variable steering systems. f. Active suspension systems. g. Supplemental airbag systems. h. Electronically controlled transmissions. i. Electronic instrumentation.
2. The student should develop an understanding of electronic sensor applications, locations, and classifications.	1. Identify the general function of each sensor. 2. Recognize the sensor as an input device for the processor. 3. Describe the different principles of sensor input. 4. Demonstrate sensor operation.

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	5. Relate sensor input to system operation.
3. The student should develop an understanding of the oscilloscope and the various controls used by the students during activities.	1. Set the various knobs and switches of the oscilloscope in preparation of observing specific signals. 2. Determine what type of signal is being generated by the sensor or actuator observing. 3. Compare results of oscilloscope readings with specifications. 4. Recognize the detail available when viewing electrical and electronic signals on a "0" scope. 5. Recognize AC – DC – Frequency – Hertz – Duty Cycles – Digital Square Wave and Positive – Negative polarity when viewing signals.
4. The student should recognize and compare computer systems to the human body nervous system.	1. Explain how the human nervous system performs similar to sensor input. 2. Compare the brain to the microprocessor. 3. Recognize the human reflex action is similar to actuator output devices. 4. Sketch a block diagram for a computer network. 5. Explain what is meant by open loop and closed loop. 6. Describe how automotive computer systems contribute to safe vehicle operations.
5. The student should become aware of input, processing, and output sections of a basic computer system.	1. Identify the functions of analog to digital converters, AC to DC converters, and frequency – to –DC voltage converters.

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	2. Describe the function of memory latch circuits. 3. Define the difference between ROM and RAM memories. 4. Describe the ALU binary addition/subtraction process. 5. Describe how system sampling time effects system self testing. 6. Describe the role of digital to analog converters in the production of output signals. 7. Explain how transistors are used to perform switching and relay functions. 8. Describe the process of direct analog voltage output control. 9. Explain the basic principles of pulse width modulation. 10. Describe how multiplexed systems operate.
6. The student should become familiar with direct current motors and stepper motors used as output devices.	1. Describe the operation of a D/C motor. 2. Describe the commutator action. 3. Describe the operation of a stepper motor. 4. Explain why stepper motor electromagnets are energized one at a time. 5. Explain why after 180 degree rotation of the shaft polarity of the electromagnets is reversed. 6. Describe the similarities of D/C and stepper motors.
7. The student should gain the knowledge of various types of output devices which control different vehicle functions.	1. Explain how a simple transformer operates. 2. Describe how coils are used in a variety of different ignition systems. 3. Describe the purpose and operation of a relay.

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	4. Explain the operation of a solenoid. 5. Describe how solenoids are used to actuate values. 6. Construct an electronically controlled system using input and output devices and a microprocessor controller. 7. Compare expected circuit operation with actual circuit operation and explain why discrepancies.
8. The student should realize the advantages of using computers in modern vehicles.	1. Demonstrate how computer systems can compensate for wear on parts. 2. Recognize that computers are very fast and can alter outputs in milliseconds. 3. Explain how computers reduce fuel consumption. 4. Describe how computers can increase engine power. 5. Recognize how computers can reduce vehicle weight. 6. Demonstrate how computers can help find system problems. 7. Explain how computer increase driver convenience. 8. Recognize how computers can improve passenger safety.