AUTO 1600

Division: Career and Technical Education
Department: Transportation Technology
Course: AUTO 1600
Title: Automotive Electrical and Electronics I
Catalog Description:

This course covers the principles and laws that govern electrical circuits, including Ohm's and Kirchhoff's Laws. Student will also gain understanding of the use of meters, wiring diagrams, wiring repair, c onductors, semiconductors, PN junctions, diodes, transistors, multiplexing, computers, and sensors.

General Education Requirements: N/A
Semesters Offered: TBA
Credit/Time Requirement: Credit: 5; Lecture: 5; Lab: 3
Clock/Hour Requirements: 120
Offered for Non-Credit: Yes
Prerequisites: N/A

Corequisites: N/A

Justification:

This course is required for Automotive Service Excellence (A.S.E.) certification. It is approved by the advisory committee for an AAS degree in Automotive Technology.

Student Learning Outcomes:

Upon successful completion of this course, students will be able to safely perform the tasks listed in the current edition of *A.S.E. Certification for Automotive Training Programs.* Students will be able to:

- understand and predict voltage, current, and resistance in series and parallel circuits
- use and make mathematical calculations using Ohm's and Kirchhoff's Law
- make electrical wiring harness repairs without effecting critical computerized circuitry
- use wiring diagrams to troubleshoot and identify problems in electrical components
- use a digital volt Ohm meter (D.V.O.M.) to properly test various electrical components.

Content:

Upon completion of this course, students will understand and be able to explain:

- the use of Ohm's and Kirchoff's Laws to analyze electrical circuits

- safe practices when working on or around electrical components
- principles of series circuits
- principles of parallel circuits
- principles of series-parallel circuits
- measuring electrical circuits with a digital multi-meter
- how to build electrical and electronic test equipment
- theory of magnetism
- theory and principles of relay, solenoids, various diodes, transistors, and integrated circuits
- proper usage of circuit protection devices; such as fuses, circuit breakers, and fusible links
- how to read and understand electrical wiring diagrams
- how to properly identify and repair wiring, wiring harnesses, connectors, terminals
- how to identify electrical symbols
- use of electronic service information database
- proper documentation on repair orders
- component locators
- semiconductor operation
- operation of digital and analog IC circuits
- pulse generators and voltage regulation
- use of a digital logic probe to measure DC voltage levels and digital signal pulses
- theory and operation of windshield wiper circuits
- theory and operation of optional accessories; such as power windows, power door locks, etc.

Instruction will also include:

- an introduction into the operation and diagnosis of computers and body control modules
- an introduction of input and output devices for computer controlled circuits
- relationship of sensor inputs to computer outputs
- principles of air bag systems.

General Education Outcomes:

Applied Education Outcomes:

2) Students will become aware of industry specific certification and develop skills sufficient to acquire the same.

The tests and homework for this class are designed to simulate and prepare the students to take A.S.E. certification tests.

3) Students will demonstrate safe practices and awareness of potential hazards in their field of expertise.

Students will study, test on, and practice a safe work environment in the lab area.

Key Performance Indicators:

Student Learning Outcomes will be assessed by two or more of the following Key Performance Indicators:

- complete shop tasks as outlined in the current edition of *A.S.E. Certification for Automobile Training Programs.*
- student feedback as per A.S.E. requirements
- students passing A.S.E. tests
- students transferring to other post secondary institutions
- student performance in subsequent courses.

Representative Text and/or Supplies:

- Barry Hollembeak, *Automotive Electricity and Electronics*, current edition, Thomson/Delmar Learning.
- Test light kit, available in bookstore.

Optimum Class Size: 20
Maximum Class Size: 35

Signatures:

I hereby submit this course syllabus:

Brent Reese, BS, Associate Professor

I hereby find this course consistent with the goals and resources of the Transportation Technology Department:

Brent Reese, BS, Associate Professor, Chair

I hereby find this course consistent with the goals and resources of the Career and Technical Education Division:

Michael P. Medley, MBA, Assistant Professor, Dean

I have discussed the need for library resources related to this class with the person submitting the syllabus:

Lynn Anderson, MLIS, Technical Services Librarian (Main Campus)

Michelle Olsen, MLS, Campus Librarian (Richfield Campus)