



## AUTO 1600

**Division:** Career and Technical Education

**Department:** Automotive 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, conductors, 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:** No

**Prerequisites:** None

**Corequisites:** None

**Justification:**

This course is required for Automotive Service Excellence (ASE) 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 ASE 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 Watt's Law
- make electrical wiring harness repairs without effecting critical computerized circuitry
- use wiring diagrams to troubleshoot and identify problem in electrical components
- use a digital volt ohm meter (DVOM) 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 Kirchhoff'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 a digital multi-meter
- 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, 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.

Students will perform basic electrical and electronic system identification and testing procedures which will help them prepare for future ASE certification in A6 Electrical/Electronic Systems. A student's ability to perform the above will be evaluated through instructor observation of their ability to complete a ASE specific list of hands on tasks in simulations and on-car diagnosis.

### **Key Performance Indicators:**

In Class: Students shall be required to complete chapter assignments (60%) and pass a final final test (40%).

In addition, students are required to perform shop tasks (P1 tasks 100%, P2 tasks 80%, P3 tasks 80% to pass the

course) as outlined in the current edition of ASE Certification For Automobile Training Programs.

(all percentages are approximate)

Following class: Course evaluation will be demonstrated by the following methods:

- Student feedback per ASE requirements
- Students passing ASE tests
- Students transferring to other post secondary institutions
- Students performance in subsequent courses

**Representative Text and/or Supplies:**

Automotive Electricity and Electronics, current edition, Thomson/Delmar Learning Author, Barry Hollembeak

**Optimum Class Size:** 10

**Maximum Class Size:** 14

**Signatures:**

I hereby submit this course syllabus:

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Brent Reese, BS, Associate Professor

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

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Brent Reese, BS, Associate Professor, Chair

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

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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:

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

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Michelle Olsen, MLS, Campus Librarian (Richfield Campus)