Course Description
The first in a sequence of courses that prepares individuals to apply technical knowledge and
skills to assemble and operate electrical/electronic equipment used in business, industry, and
manufacturing. Instruction includes training in safety, electrical theory, parallel & series circuits,
Kirchoff’s Laws, schematic diagrams, electrical components, and soldering.

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<tr>
<th>Core Code</th>
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<tr>
<td>Concurrent Enrollment Core Code</td>
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<td>Units of Credit</td>
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<td>Intended Grade Level</td>
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<td>Prerequisite</td>
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<td>Skill Certification Test Number</td>
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<td>Test Weight</td>
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<td>Required Endorsement(s)</td>
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STANDARD 1
Students will follow safety practices.

Standard 1
Identify potential safety hazards and follow general laboratory safety practices.
- Assess workplace conditions regarding safety and health.
- Identify potential safety issues and align with relevant safety standards to ensure a safe workplace/jobsite.
- Describe typical electric shock hazards in industry.
- Describe the effects of electricity on the human body.
- Locate and understand the use of shop safety equipment.
- Select appropriate personal protective equipment.

Standard 2
Use safe work practices.
- Use personal protective equipment according to manufacturer rules and regulations.
- Follow correct procedures when using any hand or power tools.

Standard 3
Complete a basic safety test without errors (100%) before using any tools or shop equipment.

STANDARD 2
Students will understand the proper use of test equipment.

Standard 1
Understand the proper configuration, handling, and storage of the following:
- Volt meter
- Ammeter
- Ohm meter
- Bench power supply

STANDARD 3
Students will be able to understand and demonstrate how to use, test, and select electronic components.

Standard 1
Identify the following components and draw their schematic symbols:
- Resistor
- Potentiometer
- Capacitor
- Variable capacitor
- Relay switch
ELECTRONICS 1

- Transformer
- Diode
- Antennae
- Transistor
- Microphone
- Speaker
- Batter
- AC power supply
- Terminal post
- Normally-open switch
- Normally-closed switch
- Incandescent light bulb
- Induction coil
- Light emitting diode
- Earth ground
- Chassis ground
- Single-pole single-throw switch
- Single-pole double-throw switch
- Ammeter
- Volt meter
- Ohm meter

Standard 2
Determine the values for electronic components from their markings and physical characteristics.

Standard 3
Describe the operation of and procedures for testing resistors and capacitors in both a series and in a parallel circuit.

STRAND 4
Students will be able to understand and demonstrate basic electrical theory.

Standard 1
Describe basic principles of electrical theory.
- Describe the atomic structure of matter.
- Describe the units of electrical charge, voltage, current, resistance, capacitance, and power.
- Describe the factors that affect the movement of electrical charges.
- Clearly distinguish between direct current (DC) and alternating current (AC).

Standard 2
Verify Ohm’s Law.
• State Ohm’s Law and graph the relationships between current, resistance, and voltage in circuits.
• Describe the effect on current when changing voltage or resistance.
• Use formulas and basic mathematics to solve problems involving Ohm’s Law.

Standard 3
Verify Watts Law.
• State Watts Law and graph the relationships between voltage, current, and power in circuits.
• Describe the effect on power if voltage, current or resistance is changed.
• Use formulas and basic mathematics to solve problems involving Watt’s Law.

Standard 4
Construct, measure and analyze simple series resistive circuits.
• Describe the principles of a series circuit.
• State and use Kirchoff’s voltage law and the voltage divider formula to solve a series circuit problem.
• Calculate the theoretical values of voltage, current, resistance and power in all parts of a series circuit.
• Use a VIRP table to predict the voltage, current, resistance, and power in all parts of a series circuit from a schematic diagram.

Standard 5
Construct measure and analyze simple parallel resistive circuits.
• Describe the principles of a parallel circuit.
• State and use Kirchoff’s current law and the current divider formula to solve parallel circuit problems.
• Calculate the theoretical values of voltage, current, resistance, and power in all parts of a parallel circuit.
• Use a VIRP table to predict the voltage, current, resistance, and power in all parts of a parallel circuit from a schematic diagram.

STRAND 5
Students will demonstrate the ability to successfully solder components to and desolder components from a printed circuit board.

Standard 1
Describe aspects of soldering techniques such as tinning, physical connections, temperature selection, and cleaning.

Standard 2
Describe the necessary precautions to prevent electrostatic discharge (ESD) during soldering.

Standard 3
Show appropriate use of heat sinks on solid state components.
**Standard 4**
Solder and desolder wires and discrete components on a printed circuit board.

**Skill Certificate Test Points by Strand**

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<th>Test Name</th>
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<td>13, 1, 13.5, 41.5, 2</td>
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**Performance Skills**

1. Create and utilize an engineering notebook per established conventions. [https://schools.utah.gov/cte/tech/publicationsresources](https://schools.utah.gov/cte/tech/publicationsresources)


3. Participate in a significant activity that provides each student with an opportunity to render service to others, employ leadership skills, or demonstrate skills they have learned through this course, preferably through participation in a Career & Technical Student Organization (CTSO) such as the Technology Student Association (TSA).