STRANDS AND STANDARDS
ELECTRONICS 1

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>
<th>38.01.00.00.021</th>
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<tr>
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<td>Intended Grade Level</td>
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<td>Prerequisite</td>
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<tr>
<td>Skill Certification Test Number</td>
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<td>Test Weight</td>
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<td>License Type</td>
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<td>T&amp;E Electronics</td>
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ADA Compliant: September 2018
STRAND 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.

STRAND 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

STRAND 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
• 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>
<th>Test #</th>
<th>Number of Test Points by Strand</th>
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<td>651</td>
<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).