Course Description
The second 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, numbering systems, Boolean algebra, logic diagrams, digital devices, and combinational logic circuits.

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<tr>
<td>Prerequisite</td>
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</tr>
<tr>
<td>Skill Certification Test Number</td>
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<td>T&amp;E Electronics</td>
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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 various number systems used in digital electronics.

Standard 1
Understand the structure of, and how to count in, various numbering systems.
- Use the decimal number system.
- Use the octal number system.
- Use the hexadecimal number system.
- Use the binary number system.

Standard 2
Perform operations in various numbering systems.
- Convert between decimal and binary.
- Convert between octal and binary.
- Convert between hexadecimal and binary.

STRAND 3
Students will understand the functions of typical logic gates and their logic states.

Standard 1
Describe the function of and create truth tables for typical logic gates.
• AND, NAND
• OR, NOR
• XOR, XNOR
• Buffer (YES), Inverter (NOT)

STRAND 4
Students will understand, construct, and test combinational logic circuits.

Standard 1
From schematic diagrams and specifications, write a truth table and the Boolean equation for combinational logic circuits.

Standard 2
Simplify combinational logic circuits using Boolean identities, De Morgan's Theorems, and logical equivalencies.

Standard 3
Construct combinational logic circuits.

Standard 4
Predict the logic levels in all parts of combinational logic circuits.

Standard 5
Use a logic probe to test and verify logic levels in all parts of combinational logic circuits.

STRAND 5
Students will understand, construct, and test sequential logic circuits.

Standard 1
Define the properties of:
• D flip-flop
• JK flip-flop

Standard 2
Describe the operation and application of:
• shift registers
• frequency dividers and counters
• synchronous up/down and shift counters
• multi-vibrators

Standard 3
Construct and test sequential logic circuits.
Skill Certificate Test Points by Strand

<table>
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<tr>
<th>Test Name</th>
<th>Test #</th>
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<td>4 10 16 6 4</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).