Course Description
The third 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 and passive AC circuits with topics addressing waveforms, transformers, capacitors, inductors, reactance, impedance and resonance.

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<tr>
<td>Prerequisite</td>
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<tr>
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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 AC waveforms vs. DC and the advantages of using AC power for distribution.

Standard 1
Describe advantages of using AC for electrical power distribution.

Standard 2
Describe the characteristics of sinusoidal waveforms including frequency, period, and amplitude at any point within the wave.

Standard 3
Determine peak, peak-to-peak, average, and RMS values for a given sine wave.

STRAND 3
Students will understand how to change AC voltage and current levels using transformers.

Standard 1
Describe step-up vs. step-down as related to turns ratio.

Standard 2
Describe primary and secondary as related to step-up and step-down.
Standard 3
Determine input and output voltage & current based on turns ratio.

**STRAND 4**
Students will know how to calculate capacitance when connecting multiple capacitors.

**Standard 1**
Determine the equivalent capacitance of capacitors connected in series.

**Standard 2**
Determine the equivalent capacitance of capacitors connected in parallel.

**STRAND 5**
Students will know how to calculate inductance when connecting multiple inductors.

**Standard 1**
Determine the equivalent inductance of inductors connected in series.

**Standard 2**
Determine the equivalent inductance of inductors connected in parallel.

**STRAND 6**
Students will know how to calculate capacitive and inductive reactance.

**Standard 1**
Describe the concept of reactance and its unit of measure.

**Standard 2**
Determine the capacitive reactance of a capacitor given the frequency.

**Standard 3**
Determine the inductive reactance of an inductor given the frequency.

**STRAND 7**
Students will understand circuit impedance.

**Standard 1**
Describe the concept of impedance and its unit of measure.

**Standard 2**
Determine the impedance of a basic RC or RL series circuit.

**STRAND 8**
Students will understand resonance and how it is used in circuits.
**Standard 1**
Describe the concept of resonance.

**Standard 2**
Describe applications for resonance in AC circuits.

**Skill Certificate Test Points by Strand**
None

**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).