

# Electronics

Career Cluster	STEM
Course Code	17106
Prerequisite(s)	None
Credit	.5
Program of Study and Sequence	Foundation courses – cluster course – Introduction to Energy/Power – specialized pathway course – capstone experience
Student Organization	None
Coordinating Work-Based Learning	Field trips/tours, guest speakers
Industry Certifications	None
Dual Credit or Dual Enrollment	TBD
Teacher Certification	Information Technology Cluster Endorsement; Networking Systems & Information Support Pathway Endorsement; Manufacturing Cluster Endorsement; Arts, AV Technology & Communications Cluster Endorsement; STEM Cluster Endorsement; Engineering & Robotics Pathway Endorsement; Electronics Endorsement; 7-12 Technology Education Endorsement
Resources	Occupational Safety and Health Administration (OSHA)- <a href="http://www.osha.gov">http://www.osha.gov</a> Institute of Electrical and Electronics Engineers – <a href="https://www.ieee.org">https://www.ieee.org</a>

## Course Description:

The Introduction to Electronics course is designed to provide a basic understanding electronics which include how to design and create components, diagnose, troubleshoot and repair electronic components. Through classroom study and hands-on experience, students prepare for work within the electronics field using current technology, safety and ethical procedures.

## Program of Study Application

This is a pathway course in the STEM cluster Electronics pathway. It is recommended that the course be preceded by a series of foundation courses and a cluster course in STEM, and followed by a more specialized pathway course such as Robotics.

**Course Standards****Indicator # E1 Determine general technical literacy skills**

<i>Webb Level</i>	<i>Sub-indicator</i>	<i>Integrated Content</i>
One Recall	E 1.1 Employ appropriate units and abbreviations in electronics. <i>Examples:</i> <ul style="list-style-type: none"> <li>• Tabulate whole number expressions to appropriate electronic exponential expressions</li> <li>• Recognize differences between electronic exponential expression and scientific notation</li> <li>• Define abbreviations used in a schematic diagram</li> </ul>	Math skills
Two Skill/Concept	E 1.2 Determine unknown values in multiple types of electronic circuits <i>Examples:</i> <ul style="list-style-type: none"> <li>• Calculate unknown electronic unit values using given or measured values</li> <li>• Apply appropriate formula to solve for unknown values in a variety of circuits</li> <li>• Apply ratings of resistors based on color bands</li> </ul>	Math skills
One Recall	E 1.3 Identify proper terminology in electronics <i>Examples:</i> <ul style="list-style-type: none"> <li>• Label and identify the parts of a circuit</li> <li>• List the parts of a circuit</li> <li>• Draw a parallel and series circuit</li> </ul>	

**Notes:**

**Indicator # E2 Demonstrate proficiency in electronic safety**

<i>Webb Level</i>	<i>Sub-indicator</i>	<i>Integrated Content</i>
Two Skill/Concept	<p>E 2.1. Determine physiological responses to electrical shock</p> <p><i>Examples:</i></p> <ul style="list-style-type: none"> <li>• Classify ways electrical shock can damage the human body</li> <li>• Tell how electrical shock can cause death</li> <li>• Summarize safety concerns in various working environments</li> </ul>	<p>Safety skills</p> <p>General classroom procedures</p> <p>Program procedures</p> <p>Review OSHA handbook</p>
One Recall	<p>E 2.2. Demonstrate proper safety procedures in the use of soldering and electronics testing equipment</p> <p><i>Examples:</i></p> <ul style="list-style-type: none"> <li>• Use proper personal protective equipment</li> <li>• Define methods to reduce the severity of electrical shock</li> <li>• State and follow all safety rules based on <i>Occupational Safety and Health Administration (OSHA)</i> standards</li> </ul>	<p>*OSHA</p>

**Notes:**

**Indicator # E3      Demonstrate proficiency in circuit assembly**

<i>Webb Level</i>	<i>Sub-indicator</i>	<i>Integrated Content</i>
Two Skill/Concept	E 3.1. Construct a circuit using schematic symbols for identified components <i>Examples:</i> <ul style="list-style-type: none"> <li>• Apply resistor color code to identify proper resistor values</li> <li>• Determine proper polarity for electrolytic capacitors</li> <li>• Distinguish components correctly in relation to a schematic diagram</li> </ul>	
Two Skill/Concept	E 3.2. Construct circuit boards using correct soldering principles and techniques <i>Examples:</i> <ul style="list-style-type: none"> <li>• Connect components in proper position on circuit board</li> <li>• Show ability to handle components carefully</li> <li>• Determine proper amounts of solder to cover the connection</li> </ul>	
Three Strategic Thinking	E 3.3. Determine cause of non-operational circuits <i>Examples:</i> <ul style="list-style-type: none"> <li>• Assess a non-operational bread-board circuit</li> <li>• Draw conclusions to select proper test equipment for repair of faulty circuits</li> <li>• Investigate and repair circuit board</li> </ul>	

**Notes:**

**Indicator # E4 Determine proper use of electronic test equipment**

<i>Webb Level</i>	<i>Sub-indicator</i>	<i>Integrated Content</i>
One Recall	E 4.1. Measure resistance, voltage, and current in circuits <i>Examples:</i> <ul style="list-style-type: none"> <li>• Match test leads in proper positions</li> <li>• Arrange meter selector switch in proper position</li> <li>• Recite meter reading using correct measurement values</li> </ul>	
One Recall	E 4.2. Classify equipment for signal analysis <i>Examples:</i> <ul style="list-style-type: none"> <li>• List equipment that provides signal outputs</li> <li>• Identify equipment that measures signals</li> <li>• Identify the various signals</li> </ul>	

**Notes:****Indicator # E5 Troubleshoot circuits for proper operation**

<i>Webb Level</i>	<i>Sub-indicator</i>	<i>Integrated Content</i>
Two Skill/Concept	E 5.1. Calculate voltage, current, and power solutions in circuits <i>Examples:</i> <ul style="list-style-type: none"> <li>• Predict correct formula or law to solve for unknown values</li> <li>• Show calculated values using proper measurement values</li> <li>• Make observations for proper operation of circuits</li> </ul>	
Two Skill/Concept	E 5.2. Troubleshoot solutions to analyze circuit operation <i>Examples:</i> <ul style="list-style-type: none"> <li>• Estimate the values of components within a circuit</li> <li>• Graph calculated and measured values</li> <li>• Compare values to determine if they are within circuit parameters</li> </ul>	

**Notes:**

**Indicator # E6      Explore electronics career options**

<i>Webb Level</i>	<i>Sub-indicator</i>	<i>Integrated Content</i>
Three Strategic Thinking	<p>E 6.1 Research career opportunities in electronics fields</p> <p><i>Examples:</i></p> <ul style="list-style-type: none"> <li>• Investigate and research career opportunities in the electronics field using career exploration software</li> <li>• Investigate the career exploration software to research educational requirements for chosen career path</li> <li>• Formulate a report about career opportunities in the electronics field</li> <li>• Revise and update student portfolio</li> </ul>	<p>Internet ethics Job Services High school counselors Community/ Industry SDMyLife BLS.gov Robotics, engineering, and electronics</p> <p>Career Development</p>
One Recall	<p>E 6.2 Explore career outlook for robotic applications</p> <p><i>Example:</i></p> <ul style="list-style-type: none"> <li>• Identify jobs that will be created/eliminated by robotics</li> <li>• List new robotics related careers</li> </ul>	

**Notes:**