

Solid State Electronics

Knowledge and skills. **SOSTELEC**

1 The student demonstrates the skills necessary for success in a technical career.

The student is expected to: **SOSTELEC.1**

- A** identify training, education, employment, and career opportunities, including differences between an electronic technician, electronic technologist, and electrical engineer; **SOSTELEC.1A**
- B** identify employment and career opportunities; **SOSTELEC.1B**
- C** identify industry certifications; **SOSTELEC.1C**
- D** discuss ethical issues related to electronics and incorporate proper ethics in submitted projects; **SOSTELEC.1D**
- E** identify and demonstrate respect for diversity in the workplace; **SOSTELEC.1E**
- F** identify appropriate actions and consequences relating to discrimination, harassment, and inequality; **SOSTELEC.1F**
- G** explore electronics career and preparation programs; **SOSTELEC.1G**
- H** explore career preparation learning experiences, including, but not limited to, job shadowing, mentoring, and apprenticeship training; and **SOSTELEC.1H**
- I** discuss Accreditation Board for Engineering and Technology (ABET) accreditation and implications. **SOSTELEC.1I**

2 The student participates in team projects in various roles. The student is expected to: **SOSTELEC.2**

- A** explain the importance of teamwork in the field of electronics; **SOSTELEC.2A**
- B** apply principles of effective teamwork and problem solving, including collaboration and conflict resolution; and **SOSTELEC.2B**
- C** demonstrate proper attitudes as a team leader and team member. **SOSTELEC.2C**

3 The student develops skills for managing a project. The student is expected to: **SOSTELEC.3**

- A** implement project management methodologies, including initiating, planning, executing, monitoring and controlling, and closing a project; **SOSTELEC.3A**
- B** develop a project schedule and complete work according to established criteria; **SOSTELEC.3B**
- C** participate in the organization and operation of a real or simulated engineering project; and **SOSTELEC.3C**
- D** develop a plan for production of an individual product. **SOSTELEC.3D**

4 The student demonstrates principles of project documentation and work flow. The student is expected to: **SOSTELEC.4**

- A complete work orders and related documentation; **SOSTELEC.4A**
 - B identify factors affecting cost and strategies to minimize costs; **SOSTELEC.4B**
 - C prepare a project budget; **SOSTELEC.4C**
 - D prepare a production schedule; **SOSTELEC.4D**
 - E identify intellectual property and other legal restrictions; and **SOSTELEC.4E**
 - F read and interpret technical drawings, manuals, and bulletins. **SOSTELEC.4F**
-

5 The student practices safe and proper work habits. The student is expected to: **SOSTELEC.5**

- A master relevant safety tests; **SOSTELEC.5A**
 - B comply with safety guidelines as described in various manuals, instructions, and regulations; **SOSTELEC.5B**
 - C identify governmental and organizational regulations for health and safety in the workplace related to electronics; **SOSTELEC.5C**
 - D identify and classify hazardous materials and wastes according to Occupational Safety and Health Administration (OSHA) regulations and industry standards; **SOSTELEC.5D**
 - E dispose of hazardous materials and wastes appropriately; **SOSTELEC.5E**
 - F perform maintenance on selected tools, equipment, and machines; **SOSTELEC.5F**
 - G handle and store tools and materials correctly; and **SOSTELEC.5G**
 - H describe the results of negligent or improper maintenance of material, tools, and equipment. **SOSTELEC.5H**
-

6 The student implements the concepts and skills that form advanced knowledge of electronics using project-based rubrics. The student is expected to: **SOSTELEC.6**

- A apply Ohm's law, Kirchhoff's laws, and power laws to advanced circuit theory; **SOSTELEC.6A**
- B demonstrate advanced knowledge of the theory of direct current, alternating current, digital circuits, and semi-conductor circuits through Thevenin and Norton's theorems; **SOSTELEC.6B**
- C apply knowledge of voltage regulation devices; **SOSTELEC.6C**
- D apply knowledge of the design and use of diodes, transistors, and analog components with integrated circuits; **SOSTELEC.6D**
- E implement knowledge of solid-state components and devices such as a power supply design; **SOSTELEC.6E**
- F demonstrate knowledge of the similarities and differences in optoelectronic devices; **SOSTELEC.6F**
- G implement knowledge of transmission theory; **SOSTELEC.6G**

- H implement knowledge of microprocessor applications; [SOSTELEC.6H](#)
 - I apply electronic theory to generators, electric motors, power supplies, electronic amplifiers, electronic oscillators, communication circuits, and systems; and [SOSTELEC.6I](#)
 - J complete advanced electrical-electronic troubleshooting assignments to industry standards. [SOSTELEC.6J](#)
-

7 The student learns the function and application of the tools, equipment, and materials used in electronics through specific project-based assessments. The student is expected to: [SOSTELEC.7](#)

- A use tools and laboratory equipment in a safe manner to construct and repair circuits; [SOSTELEC.7A](#)
 - B use precision measuring instruments to analyze circuits and prototypes; [SOSTELEC.7B](#)
 - C describe and perform measurement techniques with analog, digital, or storage oscilloscopes; [SOSTELEC.7C](#)
 - D use multiple software applications to simulate circuit behavior and present concepts; and [SOSTELEC.7D](#)
 - E identify and describe the functions of computer hardware devices. [SOSTELEC.7E](#)
-

8 The student designs products using appropriate design processes and techniques. The student is expected to: [SOSTELEC.8](#)

- A interpret advanced industry standard schematics; [SOSTELEC.8A](#)
 - B identify areas where quality, reliability, and safety can be designed into a product; [SOSTELEC.8B](#)
 - C improve a product design to meet a specified need; [SOSTELEC.8C](#)
 - D produce advanced schematics to industry standards; [SOSTELEC.8D](#)
 - E discuss the process of obtaining a patent; [SOSTELEC.8E](#)
 - F use a variety of technologies to design components such as computer simulation software; and [SOSTELEC.8F](#)
 - G explore innovative technologies that may affect electronics. [SOSTELEC.8G](#)
-

9 The student builds a simulated or physical prototype using the appropriate tools, materials, and techniques. The student is expected to: [SOSTELEC.9](#)

- A identify and describe the steps needed to produce a prototype; [SOSTELEC.9A](#)
- B identify and use appropriate tools, equipment, machines, and materials to produce the prototype; and [SOSTELEC.9B](#)
- C present the prototype using a variety of media to a panel. [SOSTELEC.9C](#)