Texas CTE

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

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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

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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