2025 Electronics Technology

Program Standards

CONTENT STANDARD 1.0: PROFESSIONAL ORGANIZATIONS AND LEADERSHIP

Performance Standard 1.1: Student Leadership in Career Technical Student Organizations (CTSO) and Professional Associations

1.1.1	Explore the role of professional organizations and/or associations in the Electronics industry
1.1.2	Define the value, role, and opportunities provided through career technical student organizations.
1.1.3	Engage in career exploration and leadership development.

CONTENT STANDARD 2.0: SAFETY AND TOOLS

Performance Standard 2.1: General Lab Safety Rules and Procedures

2.1.1	Identify electrical hazards and impacts.
2.1.2	Identify electrical emergency response procedures.
2.1.3	Describe precautions for untrained people in the lab.
2.1.4	Identify the need for industry safety standards.
2.1.5	Demonstrate general industry safety practices (e.g., lifting, fire, emergencies).
2.1.6	Describe a job hazard analysis.
2.1.7	Describe procedures and reasons for lock-out/tag-out.

Performance Standard 2.2: Tools and Equipment

2.2.1	Identify appropriate tools and equipment and their usage in electronic applications.
2.2.2	Inspect, clean, store, and maintain tools and equipment.
2.2.3	Identify meter selection, setup, protection, safety, and usage.

CONTENT STANDARD 3.0: ELECTRICAL THEORY

Performance Standard 3.1: Principles of Electrical Theory

3.1.1	Describe the Bohr atomic model.
3.1.2	Define fundamental electrical properties and their relationships (e.g., Ohm's law, Watt's law).
3.1.3	List units of measurement, letters, and symbols representing fundamental electrical properties.
3.1.4	Describe the functions of insulators and conductors.
3.1.5	Describe the function of capacitors.
3.1.6	Describe the function of inductors.
3.1.7	Identify electrical energy sources (e.g., battery, solar, wind, hydro).

Performance Standard 3.2: Schematics and Technical Diagrams

3.2.1	Interpret common electrical/electronic symbols found in schematics and diagrams.
3.2.2	Interpret technical diagrams.
3.2.3	Describe the function of technical diagrams used in electronic products.
3.2.4	Identify test points and their functions.

Performance Standard 3.3: Basic Wiring Principles

3.3.1	List wire types and construction.
3.3.2	List American wire gauges used for various purposes.
3.3.3	Identify protection devices (e.g., fuses, breakers, GFCI).
3.3.4	Describe the effects of proper and improper wire termination.
3.3.5	Describe the purposes of grounding and other common conventions of electrical systems and electronics wiring.

CONTENT STANDARD 4.0: ELECTRONICS

Performance Standard 4.1: Electronic Components

4.1.1	Describe the effects of environmental conditions on electronic components.
4.1.2	Describe capacitor types and their functions.
4.1.3	Describe inductor types and their functions.
4.1.4	Identify common types of transformers.
4.1.5	Identify common semi-conductor devices.
4.1.6	Identify precautions for working with electronic components.

Performance Standard 4.2: Electronic Measurements and Conversions

4.2.1	Identify basic units of electronic measurement.
4.2.2	Convert numbers in scientific, engineering, and metric notations.
4.2.3	Identify component values.

CONTENT STANDARD 5.0: CIRCUITS

Performance Standard 5.1: Series Circuits

5.1.1	Identify series circuit configuration.
5.1.2	Apply Kirchhoff's voltage law to find unknown values in series circuits.
5.1.3	Describe why polarity is important in a series circuit.
5.1.4	Calculate voltage, current, resistance, and power in series circuits.
5.1.5	Measure series circuits.

Performance Standard 5.2: Parallel Circuits

5.2.1	Identify parallel circuit configuration.
5.2.2	Apply Kirchhoff's current law to find unknown values in parallel circuits.
5.2.3	Describe why polarity is important in a parallel circuit.
5.2.4	Calculate voltage, current, resistance, and power in parallel circuits.
5.2.5	Measure parallel circuits.

Performance Standard 5.3: Series-Parallel Circuits

5.3.1	Identify series-parallel circuit configuration.
5.3.2	Apply Kirchhoff's laws to find unknown values in series-parallel circuits.
5.3.3	Describe why polarity is important in a series-parallel circuit.
5.3.4	Calculate voltage, current, resistance, and power in series-parallel circuits.
5.3.5	Measure series-parallel circuits.

Performance Standard 5.4: AC Circuits

5.4.1	Measure AC circuits.
5.4.2	Define impedance, reactance, resistance, and phase relationships.
5.4.3	Identify waveform types and characteristics.
5.4.4	Describe the functions of cycle, hertz, phase, and frequency in AC circuits.
5.4.5	Calculate peak, peak-to-peak, root-mean, square (RMS), and average voltage values for an AC waveform (e.g., effective voltage, wavelength, amplitude, period, frequency).
5.4.6	Describe the procedures for using an oscilloscope.
5.4.7	Identify high-pass and low-pass filter circuits.

CONTENT STANDARD 6.0: DIGITAL PRINCIPLES

Performance Standard 6.1: Digital Concepts

6.1.1	Identify numbering systems (e.g., decimal, binary, hexadecimal, binary coded decimal [BCD]).
6.1.2	Compare "1" (i.e., high) and "0" (i.e., low or ground) values.
6.1.3	Describe basic logic functions (e.g., AND, OR, buffer, inverter, NAND).
6.1.4	Interpret data sheet information.
6.1.5	Describe the use of analog-to-digital and digital-to-analog convertors.

Performance Standard 6.2: Microcontrollers/Programmable Logic Controllers (PLCs)

6.2.1	Describe the operational principles of microcontrollers/PLCs.
6.2.2	Create a flowchart for a program or process.

6.2.3	Describe the process for instruction coding and program debugging.
6.2.4	Describe the fundamental principles for microcontroller/PLC interfacing (e.g., inputs, outputs, communication protocols).
6.2.5	Demonstrate wiring procedures for microcontrollers/PLCs.
6.2.6	Create original microcontroller/PLC programs.
6.2.7	Describe issues in microcontroller/PLC integration (e.g., Internet of Things [IoT], security, wearables, supervisory control and data acquisition [SCADA]).

CONTENT STANDARD 7.0: SOLDERING AND DESOLDERING

Performance Standard 7.1: Soldering

7.1.1	Describe soldering safety, hazards, and precautions.
7.1.2	Describe types of flux usage and their functions.
7.1.3	List types soldering and their functions.
7.1.4	Describe techniques for using soldering and desoldering tools and equipment.
7.1.5	Compare proper and improper mechanical and electrical solder connections.

CONTENT STANDARD 8.0: TROUBLESHOOTING AND MAINTENANCE

Performance Standard 8.1: Troubleshooting

8.1.1	Describe troubleshooting techniques and root-cause analysis.
8.1.2	Create a non-routine task form.
8.1.3	Describe the system isolation process and related safety procedures.
8.1.4	Select appropriate tools for electronics troubleshooting.
8.1.5	Identify the technical sources for maintenance and repair procedures.
8.1.6	Create technical documentation to identify faulty components and processes.
8.1.7	Identify circuit faults, using proper measurement techniques.

Performance Standard 8.2: Maintenance and Repair

8.2.1	Describe the difference between maintenance and repair.
8.2.2	Identify the common causes of system and equipment failures.
8.2.3	Identify common preventive maintenance measures (e.g., lubrication, housekeeping, alignment, filters).
8.2.4	Describe the purposes and requirements for recordkeeping.
8.2.5	Interpret preventive maintenance and inspection schedules.

I certify these program standards are approved:

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IDCTE State Administrator   Date