

# 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 converters.

**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 of 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

11/07/24\_  
Date