

**EXAM INFORMATION****Items**

48

Points

70

Prerequisites

NONE

Grade Level

10-12

Course Length

ONE SEMESTER

Career Cluster

MANUFACTURING

SCIENCE, TECHNOLOGY,
ENGINEERING, AND MATHEMATICS**Performance Standards**

INCLUDED

Certificate Available

YES

DESCRIPTION

The first in a sequence of courses that prepares individuals to apply technical knowledge and skills to assemble and operate electrical/electronic equipment used in business, industry, and manufacturing. Instruction includes training in safety, electrical theory, parallel & series circuits, Kirchoff's Laws, schematic diagrams, electrical components, and soldering.

EXAM BLUEPRINT

STANDARD	PERCENTAGE OF EXAM
1- Safety Practices	18%
2- Proper use of Test Equipment	2%
3- Electronic Components	19%
4- Basic Electronic Theory	58%
5- Solder and Desolder Components	3%



STANDARD 1

STUDENTS WILL FOLLOW SAFETY PRACTICES

- Objective 1** Identify potential safety hazards and follow general laboratory safety practices.
1. Assess workplace conditions with regard to safety and health.
 2. Identify potential safety issues and align with relevant safety standards to ensure a safe workplace/jobsite.
 3. Describe typical electric shock hazards in industry.
 4. Describe the effects of electricity on the human body.
 5. Locate and understand the use of shop safety equipment.
 6. Select appropriate personal protective equipment.
- Objective 2** Use safe work practices.
1. Use personal protective equipment according to manufacturer rules and regulations.
 2. Follow correct procedures when using any hand or power tools.
- Objective 3** Complete a basic safety test without errors (100%) before using any tools or shop equipment.

Standard 1 Performance Evaluation included below (Optional)

STANDARD 2

STUDENTS WILL UNDERSTAND THE PROPER USE OF TEST EQUIPMENT

- Objective 1** Understand the proper configuration, handling, and storage of a(n):
1. Voltmeter
 2. Ammeter
 3. Ohm meter
 4. Bench power supply

Standard 2 Performance Evaluation included below (Optional)

STANDARD 3

STUDENTS WILL BE ABLE TO UNDERSTAND AND DEMONSTRATE HOW TO USE, TEST, AND SELECT ELECTRONIC COMPONENTS

- Objective 1** Identify the following components and draw their schematic symbols
1. Resistor
 2. Potentiometer
 3. Capacitor
 4. Variable Capacitor
 5. Relay Switch
 6. Transformer
 7. Diode
 8. Antennae



9. Transistor
10. Microphone
11. Speaker
12. Battery
13. AC power supply
14. Terminal Post
15. Normally-open switch
16. Normally-closed switch
17. Incandescent light bulb
18. Induction coil
19. Light emitting diode
20. Earth ground
21. Chassis ground
22. Single-pole single-throw switch
23. Single-pole double-throw switch
24. Ammeter
25. Volt meter
26. Ohm meter

Objective 2 Determine the values for electronic components from their markings and physical characteristics.

Objective 3 Describe the operation of and procedures for testing resistors and capacitors in both a series and in a parallel circuit.

Standard 3 Performance Evaluation included below (Optional)

STANDARD 4

STUDENTS WILL BE ABLE TO UNDERSTAND AND DEMONSTRATE BASIC ELECTRONIC THEORY

Objective 1 Describe basic principles of electrical theory.

1. Describe the atomic structure of matter.
2. Describe the units of electrical charge, voltage, current, resistance, capacitance, and power.
3. Describe the factors that affect the movement of electrical charges.
4. Clearly distinguish between direct (DC) and alternating (AC) current.

Objective 2 Verify Ohms Law.

1. State Ohms Law and graph the relationships between current, resistance, and voltage in circuits.
2. Describe the effect on current when changing voltage or resistance.
3. Use formulas and basic mathematics to solve Ohms Law problems.

Objective 3 Verify Watts Law.

1. State Watts Law and graph the relationships between voltage, current, and power in circuits.
2. Describe the effect on power if voltage, current or resistance is changed.
3. Use formulas and basic mathematics to solve Watts Law problems.

Objective 4 Construct, measure and analyze simple series resistive circuits.



1. Describe the principles of a series circuit.
2. State and use Kirchoff's voltage law and the voltage divider formula to solve a series circuit problem.
3. Calculate the theoretical values of voltage, current, resistance and power in all parts of a series circuit.
4. Use a VIRP table to predict the voltage, current, resistance, and power in all parts of a series circuit from a schematic diagram.

Objective 5 Construct measure and analyze simple parallel resistive circuits.

1. Describe the principles of a parallel circuit.
2. State and use Kirchoff's current law and the current divider formula to solve parallel circuit problems.
3. Calculate the theoretical values of voltage, current, resistance and power in all parts of a parallel circuit.
4. Use a VIRP table to predict the voltage, current, resistance, and power in all parts of a parallel circuit from a schematic diagram.

Standard 4 Performance Evaluation included below (Optional)

STANDARD 5

STUDENTS WILL DEMONSTRATE THE ABILITY TO SUCCESSFULLY SOLDER COMPONENTS AND DESOLDER COMPONENTS FROM A PRINTED CIRCUIT BOARD

- Objective 1 Describe principles of magnetism and electromagnetism.
- Objective 2 Describe the precautions to prevent electrostatic discharge (ESD) during soldering.
- Objective 3 Show appropriate use of heat sinks on solid state components.
- Objective 4 Solder and desolder wires and discrete components on a printed circuit board.

Standard 5 Performance Evaluation included below (Optional)



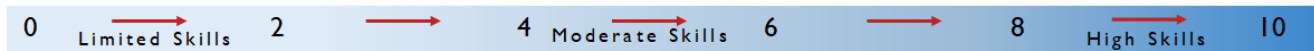
Electronics I Performance Standards (Optional)

Performance assessments may be completed and evaluated at any time during the course. The following performance skills are to be used in connection with the associated standards and exam. To pass the performance standard the student must attain a performance standard average of **8 or higher** on the rating scale. Students may be encouraged to repeat the objectives until they average **8 or higher**.

Students Name _____

Class _____

PERFORMANCE RATING SCALE



STANDARD 1 Safety Practices

Score:

- Follow safety practices

STANDARD 2 Test Equipment

Score:

- Understand and demonstrate the use of test equipment

STANDARD 3 Passive Electronic Components

Score:

- Understand and demonstrate how to use, test, and select, passive electronic components

STANDARD 4 Solder and Desolder Components

Score:

- Demonstrate the ability to successfully solder components to and desolder components from a printed circuit board

STANDARD 5 Basic Electronic Theory

Score:

- Understand and demonstrate basic electronic theory

PERFORMANCE STANDARD AVERAGE SCORE: