

## INTRODUCTION TO COMMUNICATIONS TECHNOLOGY

### Description

The topics deal with the practical application of electronics and computers to the everyday lives of the consumer. Major areas of study include: residential household wiring, communication wiring and computer networking, and computer software and hardware. Suitable projects and activities will be used to support concepts and allow “hands-on” experiences with tools, equipment and software. The course meets for one semester.

### Course Overview

#### Course Objectives

Students should be able to:

- understand and apply practical technological methods in a hands-on approach to problem-solving in relationship to electronic technology.
- use safely and efficiently, the resources, processes, concepts, and tools related to residential household wiring, communication wiring and computer networking, and computer software and hardware.
- develop the ability to solve problems through practical experiences with regard to electrical/electronic technology.
- combine useful math and science concepts to solve practical electrical/electronic problems
- recognize and learn the functions of electronic components/computer hardware.
- learn to follow, understand and construct electronic devices by following schematic diagrams.

#### Essential Questions

- Why is the practice of safety so rigidly enforced and adhered to by those who work on electrical systems/devices?
- How does the application of Ohm’s Law impact the world in which we live?
- What impact has DC electrical application had on society?
- What impact has AC electrical application had on society?
- How has the knowledge of electricity and its application impacted the residences we live in?
- How have digital electronics changed the world?

#### Assessments

- Quizzes and Tests

*Labs in:*

##### Electrical Theory

- Basic Circuits

##### Circuit Construction

- Safety
- Electric Circuits,
- Wires and Cables, Wiring Tools and Devices
- Soldering and Wire Splicing
- Chemical Cells and Batteries
- Special Devices and Integrated Circuits
- Printed Circuits

##### Residential Electricity

- Safety
- Electrical Terms
- Conductors and Wiring
- Switches and Outlets
- Wiring Systems and Circuits

##### Digital Electronics

- Electronic Components
- Logic Gates
- Binary System
- Digital Circuits
- Computer Components
- Computer Software
- Computer Networking

<p><b>Content Outline</b></p> <p>I. <a href="#">Unit 1</a> - Safety with Electricity  II. <a href="#">Unit 2</a> - Electrical Theory  III. <a href="#">Unit 3</a> - Circuit Construction  IV. <a href="#">Unit 4</a> - Residential Electricity  V. <a href="#">Unit 5</a> - Digital Electronics/Computer</p>	<p><b>Standards</b></p> <p>Connecticut State Technology Education standards have been met in the following area:</p> <ul style="list-style-type: none"> <li>• <i>Pre-Engineering</i></li> </ul> <p>A+ Correlation Chart Authorized Curriculum Program</p> <ul style="list-style-type: none"> <li>• <i>CompTIA A+ 220-702</i></li> </ul>	
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Pacing Guide				
1st Marking Period			2nd Marking Period	
Unit 1  <a href="#">Safety with Electricity</a>  1 week	Unit 2  <a href="#">Electrical Theory</a>  4 weeks	Unit 3  <a href="#">Circuit Construction</a>  4 weeks	Unit 4  <a href="#">Residential Electricity</a>  5 weeks	Unit 5  <a href="#">Digital Electronics/Computer</a>  4 weeks

**Unit 1, Safety with Electricity, 1 week [top](#)**

**Standards**

***Pre-Engineering Technology***

**ENG.06 Use engineering equipment, laboratory materials and tools appropriately and safely.**

ENG.06.01 Describe the function of a safety device.

ENG.06.02 Demonstrate safe personal behavior in the classroom.

ENG.06.03 Use all tools and equipment safely.

ENG.06.05 Describe and demonstrate the components of personal and group laboratory safety.

ENG.06.06 Describe and use safety laboratory equipment.

**Unit Objectives**

Students will be able to:

- describe the causes of electrical shock and methods of prevention.
- explain the importance of practicing general safety rules and practices.
- describe the purpose circuit protection.
- describe the components of personal and group laboratory safety.

**Essential Question**

- Why is the practice of safety so rigidly enforced and adhered to by those who work on electrical systems/devices?

**Focus Questions**

- What are causes of electrical shock and methods of prevention?
- What are common tools used in electrical environments and how are they used properly?
- Why is the concept of grounding important to those who work with electricity?

**Assessments**

- Quizzes
- Workbook Assignments
- Lab Safety Test

**Skill Objectives**

Students will:

- describe the function of a safety device.
- describe general safety rules and practices.
- identify ways of grounding electricity.
- identify common tools used in electrical environments and how to use them properly.
- demonstrate the components of personal and group laboratory safety.

**Unit 2, Electrical Theory, 4 weeks [top](#)**

**Standards**

***Pre-Engineering Technology***

**ENG.08 Demonstrate the application of science and math principles to the electrical engineering process.**

ENG.08.02 Apply Ohm's and Watt's laws.

**Unit Objectives**

Students will be able to:

- explain the purposes of a circuit diagram.
- describe the structural parts of the atom as associated with electrical charges.
- describe how parts of a basic electrical circuit function.
- explain various types of electrical symbols and schematic diagrams.

**Essential Question**

- How does the application of Ohm's Law impact the world in which we live?

**Focus Questions**

- What is the purpose of a circuit diagram?
- Why is it essential to know how the parts of a basic electrical circuit function?
- How does the application of Ohm's Law impact the world in which we live?
- Why is understanding the terminology of electricity important in the life of a technician?

**Assessments**

- Quizzes and Test on Unit material

**Lab Activities**

- Basic Circuits

**Skill Objectives**

Students will:

- apply Ohm's and Watt's laws.
- identify series, parallel, and combination circuits.
- explain AC and DC systems.
- use appropriate electrical units to solve problems.
- draw a circuit diagram and lay out the circuit.
- describe work in electrical systems.
- explain rate in electrical systems.
- describe resistance in electrical systems.
- define the terminology: Atoms, Electrons, and Electric Charges Voltage, Current and Power, Ohm's Law and Power Formulas, Conductors and Insulators, Resistance and Resistors, Capacitance and Capacitors, Semiconductors and Diodes, Transistors, Series, Parallel, and Series-Parallel Circuits.

### Unit 3- Circuit Construction, 3 weeks [top](#)

#### Standards

##### *Pre-Engineering Technology*

#### **ENG.06 Use engineering equipment, laboratory materials and tools appropriately and safely.**

ENG.06.03 Use all tools and equipment safely.

#### **ENG.08 Demonstrate the application of science and math principles to the electrical engineering process.**

ENG.08.02 Apply Ohm's and Watt's laws.

ENG.08.03 Identify series, parallel, and combination circuits.

ENG.08.05 Use appropriate electrical units to solve problems.

ENG.08.06 Draw a circuit diagram and lay out the circuit.

#### Unit Objectives

Students will be able to:

- explain AC and DC systems.
- use appropriate electrical units to solve problems.
- explain the purpose of a circuit diagram.
- describe the appropriate application of tools in the construction of circuits.

#### Essential Questions

- What impact has DC electrical application had on society?
- What impact has AC electrical application had on society?

#### Focus Questions

- What is the difference between the construction of series, parallel, and combination circuits?
- Why does a technician need to understand the application of Ohm's Law in relation to series, parallel, and combination circuits?
- Why is it necessary to be able to demonstrate how to build circuits of different types properly?

#### Assessments

- Circuit Construction Labs

#### Skill Objectives

Students will:

- draw a circuit diagram and lay out the circuit.
- apply the terminology in circuit construction: Electric Charges, Voltage, Current and Power, Ohm's Law and Power Formulas, Conductors and Insulators, Resistance and Resistors, Capacitance and Capacitors, Semiconductors and Diodes, Transistors, Series, Parallel, and Series-Parallel Circuits
- demonstrate the application and correct use of Electric Circuits, Diagrams, and Symbols, Wires and Cables, Wiring Tools and Devices, Soldering and Wire Splicing, Chemical Cells and Batteries, Special Devices.

## Unit 4 – Residential Electricity, 5 weeks [top](#)

### Standards

#### *Pre-Engineering Technology*

#### **ENG.08 Demonstrate the application of science and math principles to the electrical engineering process.**

- ENG.08.03 Identify series, parallel, and combination circuits.
- ENG.08.04 Explain AC and DC systems.
- ENG.08.05 Use appropriate electrical units to solve problems.
- ENG.08.06 Draw a circuit diagram and lay out the circuit.
- ENG.08.07 Describe work in electrical systems.

### Unit Objectives

Students will be able to:

- describe the causes of electrical shock and methods of prevention.
- describe common residential house wiring parts and circuits.
- explain the differences in wiring types.
- describe different types of switches and outlets.
- read and understand house wiring diagrams.

### Essential Question

- How has the knowledge of electricity and its application impacted the residences we live in?

### Focus Questions

- What are causes of electrical shock and methods of prevention in residential wiring?
- How does the design of circuits in residential wiring impact function?
- What are house wiring diagrams and how are they to be used?

### Assessments

- Quizzes and Test on Unit material

Lab Activities

- Residential wiring circuit construction.

### Skill Objectives

Students will:

- define and identify common residential house wiring parts and circuits.
- identify the different types of switches and outlets
- discuss general safety rules and practices.
- identify ways of grounding electricity.
- Identify the purpose of various types of cables and wires.
- calculate current, voltage, and resistance properties.
- choose appropriate wire sizes, types, and associated parts.
- install wire circuits connecting outlets, switches, and light fixtures.

**Unit 5 –Digital Electronics/ Computer, 5 weeks [top](#)**

**Standards**

***Pre-Engineering Technology***

**ENG.06 Use engineering equipment, laboratory materials and tools appropriately and safely.**

ENG.06.03 Use all tools and equipment safely.

**ENG.08 Demonstrate the application of science and math principles to the electrical engineering process.**

ENG.08.05 Use appropriate electrical units to solve problems.

ENG.08.06 Draw a circuit diagram and lay out the circuit.

***Core Hardware***

**Domain 1.0 Installation, Configuration, and Upgrading**

1.1 Identify the names, purpose, and characteristics of system modules. Recognize these modules by sight or definition.

**Domain 6.0 Basic Networking**

6.2 Identify basic networking concepts including how a network works.

***OS Technologies***

**Domain 1.0 Operating System Fundamentals**

1.1 Identify the major desktop components and interfaces, and their functions. Differentiate the characteristics of Windows 9x/Me, Windows NT 4.0 Workstation, Windows 2000 Professional, and Windows XP

**Unit Objectives**

Students will be able to:

- describe the purpose of electronic components.
- explain the purpose of a logic gate.
- describe a binary system and how it relates to digital electronics.
- acquire experience building digital circuits.
- describe the basic functions of computer hardware.
- describe basic networking concepts including how a network works.

**Essential Question**

- How have digital electronics changed the world?

**Focus Questions**

- What is a logic gate?
- What is a binary system and how does it relate to digital electronics?
- What are the basic functions of computer hardware?
- What are the major desktop components?
- How does a basic computer network function?

**Assessments**

- Quizzes and Test on Unit material

**Lab Activities**

- Basic Digital Circuit construction
- Computer hardware functions

**Skill Objectives**

Students will:

- identify and describe the purpose of electronic components.
- identify various digital circuits and associated components.
- build digital circuits.
- describe the basic functions of computer hardware.
- identify basic networking concepts including how a network works.
- identify the major desktop components and interfaces, and their functions.