

# 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

### Content Outline

### Standards

<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>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	
<p>Unit 1  <a href="#">Safety with Electricity</a>  1 week</p>	<p>Unit 2  <a href="#">Electrical Theory</a>  4 weeks</p>	<p>Unit 3  <a href="#">Circuit Construction</a>  4 weeks</p>	<p>Unit 4  <a href="#">Residential Electricity</a>  5 weeks</p>	<p>Unit 5  <a href="#">Digital Electronics/Computer</a>  4 weeks</p>

**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.