







Multiple Category Scope and Sequence: Scope and Sequence Report For Course Standards and Objectives, Content, Skills, Vocabulary

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Unit	Course Standards and Objectives	Content	Skills	Vocabulary	
<p>Hunter High Intermediate <u>Digital Electronics (47.0108) (District)</u> 2014-2015 <u>Watson, Scott</u></p>	<p><u>Safety</u>  (Week 1, 1 Week) </p>	<p>UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Digital Electronics Standard 01 Students will be able to understand and demonstrate safe practices.</p> <ul style="list-style-type: none"> ▪ Objective 0101 Use safe work practices. (A1) <ul style="list-style-type: none"> a. Describe the purposes of legislation concerning safety in the workplace. b. Describe safety precautions and procedures pertaining to and working with electricity. c. Describe correct safety procedures for hand and power tools. d. Locate and describe shop safety equipment. e. Use safe work practices. ▪ Objective 0102 Use Chemicals And Lubricants (B4) <ul style="list-style-type: none"> a. Identify chemicals and lubricants used in the electronics industry. b. Describe the safe storage, handling and disposal of chemicals and hazardous materials. 	<ul style="list-style-type: none"> ▪ The reason and purpose of safety regulations ▪ Safe practice around electrical circuitry ▪ Basic hand and power tool safety 	<ul style="list-style-type: none"> ▪ State reasons why we have safety regulations ▪ Discuss general safety practices to observe around electrical circuits ▪ Demonstrate proper hand and power tool use. 	<ul style="list-style-type: none"> ▪ Circuit Breaker ▪ Lock-out tag-out ▪ Material Safety Data Sheets (MSDS) ▪ Fatal Current ▪ Lethal Voltage
<p><u>Digital Numbering Systems and Mathematics</u>  (Week 2, 3 Weeks) </p>	<p>UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Digital Electronics Standard 02 Students will be able to understand and electronics.</p> <ul style="list-style-type: none"> ▪ Objective 0201 Perform arithmetic 	<ul style="list-style-type: none"> ▪ How to convert numbers between the common digital storage systems ▪ Why each of the different number systems exist and the common uses of each. 	<ul style="list-style-type: none"> ▪ Students will be able to convert decimal numbers into binary, octal, and hexadecimal representations of the decimal number. ▪ Students will be able to convert numbers stored in hexadecimal, octal, binary, or decimal systems into one of 	<ul style="list-style-type: none"> ▪ Binary ▪ Decimal ▪ Octal ▪ Hexidecimal ▪ Boolean Algebra 	

- operations in various numbering systems (j1)
- Use the decimal number system.
 - Use the octal number system.
 - Use the hexadecimal number system.
 - Use the binary number system.
 - Convert from decimal to binary.
 - Convert between octal and binary.
 - Convert between hexadecimal and binary.
 - Convert between octal and hexadecimal.
 - Convert decimal to octal or hexadecimal.
 - Perform binary addition.
 - Perform binary subtraction.

the other systems.

Basic Logic Gates



(Week 4, 4 Weeks)

UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Digital Electronics Standard 02
Students will be able to understand and electronics.

- Objective 0202
Construct and test simple logic circuits (j2)
 - Describe standard digital gates.
 - Simplify logic equations using Boolean algebra.
 - From the truth table or Boolean equation, draw the logic diagram and predict the voltage and logic levels in all parts of the digital circuit.
 - Describe the procedures for testing and troubleshooting logic circuits.

- Basic common digital logic gate operation
- How to use Boolean Algebra to simplify digital logic
- How to troubleshoot digital logic circuits

- Students will be able to describe the basic logic operation of the common digital logic gate types.
- Students will be able to use Boolean algebra to simplify a digital logic expression.
- Students will be able to isolate faults in digital logic circuits.

- GATE
- INVERTOR
- AND
- OR
- NAND
- NOR
- Exclusive OR
- Exclusive NOR
- Universal Gate

Digital Circuit Families



(Week 8, 2 Weeks)

UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Digital Electronics

- Transistor to Transistor Logic (TTL) operation and device identifiers.

- Students will be able to identify TTL devices by their common identifiers

- TTL
- CMOS
- 74

Standard 02
Students will be able to understand and electronics.

- Objective 0203
Use, test and select digital devices (j3)
 - a. Identify common digital families
 - b. Identify the levels of integration and chip component density.
 - c. Describe the procedures for testing and selecting digital devices.

- Complementary metal–oxide–semiconductor (CMOS) operation and device identifiers
- Common digital design problems of fan-out and propagation delay.

- Students will be able to identify CMOS devices by their common identifiers
- Students will be able to explain what fan-out and propagation delay are.

- 74LS
- LSI
- VHSI
- Fan-out
- Propagation Delay

Combinational Logic

Circuits  (Week 10, 4 Weeks) 

UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Digital Electronics
Standard 02
Students will be able to understand and electronics.



- Objective 0204
Construct, test and troubleshoot combinational logic circuits (j4)
 - a. Analyze combinational logic circuits and write the Boolean equation and truth table for each circuit.
 - b. Simplify combinational logic circuits using Boolean identities, de Morgan's Theorem and logical equivalencies.
 - c. Use Karnaugh maps to simplify combinational logic circuits.
 - d. Determine the logical expression for any combinational logic circuit.
 - e. From schematic diagrams and specifications, write a truth table and the Boolean equation for combinational logic circuits.
 - f. From the truth table, predict the logic levels in all parts of combinational logic circuits.

- What Combinational Logic is
- Karnaugh mapping use.
- Boolean algebra
- de Morgan theorem

- Students will be able to describe what Combinational Logic is
- Students will be able to describe Karnaugh mapping use.
- Students will be able to describe Boolean algebra
- Students will be able to describe de Morgan theorem

- Combinational logic
- Boolean algebra
- Karnaugh mapping
- De Morgan's theorem

- g. Write the truth table of arithmetic circuits and describe how each works.
- h. Describe the procedures for testing and troubleshooting combinational logic circuits.

**Sequential
(Programmable) Logic
Circuits**  (Week 14, 6
Weeks) 

UT: CTE: Skilled and Technical Sciences, UT: Grades 9-12, Digital Electronics Standard 02
Students will be able to understand and electronics.

- Objective 0205
Construct, test and troubleshoot sequential logic circuits (j5)
 - a. Define the properties of flip-flops.
 - b. Describe the principles of operation of a D flip-flop.
 - c. Describe the principles of operation of JK flip-flops.
 - d. Describe the operation and application of shift registers.
 - e. Describe the operation and application of frequency dividers and counters.
 - f. Describe the operation and application of synchronous up/down and shift counters.
 - g. Describe the operation and application of multivibrators.
 - h. Describe the procedures for testing and troubleshooting sequential logic circuits.

- Flip-flop operation
 - shift register operation
 - frequency divider and counter operation
 - sequential logic operation
- Students will be able to describe Flip-flop operation
 - Students will be able to describe shift register operation
 - Students will be able to describe frequency divider and counter operation
 - Students will be able to describe sequential logic operation
- flip-flops
 - shift registers
 - counters
 - dividers
 - sequential logic