

GRADE LEVEL: 11

SUBJECT: DIGITAL ELECTRONICS PLTW

DATE: 2017-2018

GRADING PERIOD: QUARTER 1

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CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCABULARY	PRIORITY
LAB AND ELECTRICAL WIRING SAFETY					
• Safety Attire	DE – 1.1: Demonstrate the use of wearing safety attire.	<ul style="list-style-type: none"> • Exhibit appropriate safety practices while working with tools and equipment. 	<ul style="list-style-type: none"> • Demonstration • Formative assessment 	<ul style="list-style-type: none"> • Safety glasses 	Critical
• Material Handling	DE – 1.2: State the safety purposes of properly handling materials such as solder, batteries.	<ul style="list-style-type: none"> • Exhibit appropriate safety practices while working with tools and equipment. • Implement MSDS. 	<ul style="list-style-type: none"> • Demonstration • Activities <ul style="list-style-type: none"> – Dice game – Power supply 	<ul style="list-style-type: none"> • Solder • Soldering iron • Flux • Desoldering • Tinning 	Critical
• Electric Shock	DE – 1.3: Identify the causes of and dangers of electric shock and explain the methods to prevent it.	<ul style="list-style-type: none"> • Identify the causes of electrical dangers. • Explain the methods of preventing electrical shock. 	<ul style="list-style-type: none"> • Quiz • Summative assessment 	<ul style="list-style-type: none"> • Short circuit • Open circuit • Charge • Voltage • Current • Resistance 	Critical
• Environmentally Safe Circuits	DE – 1.4: Design electronic circuits that involve the environmental concerns with creating safe circuits.	<ul style="list-style-type: none"> • Understand the use of electrical components. • Develop circuits that are environmentally safe. 	<ul style="list-style-type: none"> • Activities throughout unit • Develop circuits that are environmentally friendly 	<ul style="list-style-type: none"> • Supply • Power • Ground 	Important

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCABULARY	PRIORITY
BASIC LAWS OF ELECTRICITY					
• Parallel Circuits	DE – 2.1: Design circuit boards that integrate parallel circuits.	<ul style="list-style-type: none"> Investigate various careers within the fields of engineering and technology. 	<ul style="list-style-type: none"> Activities throughout unit Formative assessment 	• Parallel circuit	Critical
• Series Circuits	DE – 2.2: Design circuit boards that integrate series circuits.	<ul style="list-style-type: none"> Communicate various key components of a career. 	<ul style="list-style-type: none"> Activities throughout unit Formative assessment 	• Series Circuit	Critical
• Ohm's Law	DE – 2.3: Calculate Ohm's Law for simple series and parallel circuits.	<ul style="list-style-type: none"> Calculate series and parallel circuit using Ohm's law. 	<ul style="list-style-type: none"> Activities throughout unit Formative assessment 	• Ohm's Law	Critical
• Atomic Structure	DE – 2.4: Identify and label the parts of an atom and what elements are good conductors, insulators, and semiconductors.	<ul style="list-style-type: none"> Understand atomic structure. Apply knowledge of elements to physical traits. 	<ul style="list-style-type: none"> Quiz Summative assessment 	<ul style="list-style-type: none"> Atom Nucleus Proton Neutron Electron Valence Shell Orbit Conductor Insulator Elements 	Important
• Insulators And Conductors	DE – 2.5: Explain Quantum energy in relationship to electrons classified as insulators or conductors.	<ul style="list-style-type: none"> Understand what insulators and conductors are. Identify and apply information from the periodical chart. 	<ul style="list-style-type: none"> Classroom discussion 	• Quantum energy	Additional
• Kirchhoff's Voltage Law	DE – 2.6: Calculate Kirchhoff's Voltage Law for simple series and parallel circuits.	<ul style="list-style-type: none"> Diagnose series and parallel circuits. Perform calculations. 	<ul style="list-style-type: none"> Activity assignment Complete calculations 	• Kirchhoff's voltage law	Important

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCABULARY	PRIORITY
BASIC LAWS OF ELECTRICITY					
• Kirchhoff's Current Law	DE – 2.7: Calculate Kirchhoff's Current Law for simple series and parallel circuits.	<ul style="list-style-type: none"> • Diagnose series and parallel circuits. • Perform calculations. 	<ul style="list-style-type: none"> • Activity assignment • Complete calculations 	• Kirchhoff's current law	Important
• AC/DC Current	DE – 2.8: Define and explain Alternating Current and Direct Current.	<ul style="list-style-type: none"> • Understand and explain AC/DC. 	<ul style="list-style-type: none"> • Activity assignment • Classroom discussion 	<ul style="list-style-type: none"> • AC • DC • Sine wave 	Important
ELECTRICAL COMPONENTS					
• Resistor Material	DE – 3.1: Summarize the material makeup of resistors and how they are used in circuit design.	<ul style="list-style-type: none"> • Identify the material makeup of resistors. • Exhibit how resistors are used in circuits. 	<ul style="list-style-type: none"> • Class discussion • Formative assessment 	• Resistors	Important
• Function Of Resistors	DE – 3.2: Relate the symbols associated with resistors and how they function.	<ul style="list-style-type: none"> • Identify electrical symbols. • Understand how resistors function. 	<ul style="list-style-type: none"> • Create drawings • Design circuits 		Important
• Resistor Calculations	DE – 3.3: Calculate tolerance levels of various resistors to determine if the measured value is within specifications.	<ul style="list-style-type: none"> • Calculate the size and tolerance of a resistor. 	<ul style="list-style-type: none"> • Measure resistors using a DMM. • Calculate resistor values. 	• Tolerance	Critical
• Capacitor Analysis	DE – 3.4: Analyze the component parts of a capacitor and how it holds a static charge.	<ul style="list-style-type: none"> • Understand the parts of a capacitor. • Describe how a capacitor holds a charge. 	<ul style="list-style-type: none"> • Quiz • Summative assessment 	<ul style="list-style-type: none"> • Dielectric • Rate of charge 	Critical
• Capacitor Units	DE – 3.5: Identify and describe the units of measurement for capacitors.	<ul style="list-style-type: none"> • Identify and describe the units of measurement for capacitors. 	<ul style="list-style-type: none"> • Classroom discussion • Activity assignment 	• Farad	Critical
• Capacitor Measurement	DE – 3.6: Calculate the values of capacitors and their voltage polarity requirements.	<ul style="list-style-type: none"> • Calculate the values of capacitors. 	<ul style="list-style-type: none"> • Quiz • Summative assessment 	• Polarity	Critical

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCABULARY	PRIORITY
ELECTRICAL COMPONENTS					
<ul style="list-style-type: none"> Capacitor Types 	DE – 3.7: Distinguish between the different types of capacitors and their voltage polarity requirements.	<ul style="list-style-type: none"> Identify the different types of capacitors. Diagnose the voltage polarity requirement for capacitors. 	<ul style="list-style-type: none"> Classroom discussion Formative assessment 		Important
DIGITAL LOGIC CIRCUITS					
<ul style="list-style-type: none"> Solutions 	DE – 4.9: Use schematics and symbolic Algebra to represent digital logic gates in the creation of solutions to design problems.	<ul style="list-style-type: none"> Use schematics and symbolic Algebra to represent digital logic gates in the creation of solutions to design problems. 	<ul style="list-style-type: none"> Activity assignment Build a circuit 	<ul style="list-style-type: none"> Schematic Symbol Sign 	Critical
<ul style="list-style-type: none"> Logic Gates 	DE – 4.11: Apply logic to design and create, using gates, solutions to a problem.	<ul style="list-style-type: none"> Develop solutions utilizing logic gates. 	<ul style="list-style-type: none"> Activity assignment Build a circuit 	<ul style="list-style-type: none"> Logic gates 	Important
<ul style="list-style-type: none"> Flip Flops 	DE – 4.12: Assemble circuits and compile information about the various applications of flip-flops.	<ul style="list-style-type: none"> Build circuits. Analyze circuits. Compile information from the circuits. 	<ul style="list-style-type: none"> Activity assignment Build a circuit Analyze a circuit Seat Belt project 	<ul style="list-style-type: none"> Flip-flop 	Critical
AC WAVEFORM AND AC VOLTAGE GENERATION					
<ul style="list-style-type: none"> Digital Waveforms 	DE – 5.1: Analyze a digital waveform and identify the anatomy of the waveform.	<ul style="list-style-type: none"> Demonstrate use of an oscilloscope. Analyze a digital waveform. Identify the anatomy of the waveform. 	<ul style="list-style-type: none"> Activity assignment 	<ul style="list-style-type: none"> Waveform Period frequency 	Important

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCABULARY	PRIORITY
AC WAVEFORM AND AC VOLTAGE GENERATION					
• Signals	DE – 5.2: Differentiate between digital and analog signals when given the waveforms.	<ul style="list-style-type: none"> Differentiate between digital and analog signals. 	<ul style="list-style-type: none"> Quiz Summative assessment 		Important
• Circuits	DE – 5.3: Design, create and test circuits.	<ul style="list-style-type: none"> Design, create and test circuits. 	<ul style="list-style-type: none"> Activity assignment Build a circuit 		Critical
• Calculating Frequency	DE – 5.4: Calculate the output frequency of circuits using observations and the oscilloscope.	<ul style="list-style-type: none"> Be able to read an oscilloscope. Produce calculations for frequency based upon oscilloscope output. 	<ul style="list-style-type: none"> Activity assignment 		Important
SOLDERING, EQUIPMENT, AND SUPPLIES					
• Circuit Creation	DE – 7.1: Create circuits using circuit design software.	<ul style="list-style-type: none"> Create circuits using circuit design software. 	<ul style="list-style-type: none"> Activity assignment Build a circuit 		Critical
• Circuit Testing	DE – 7.2: Test circuit and measure values using a Digital Multi-Meter.	<ul style="list-style-type: none"> Exhibit your ability to use a DMM by measuring a circuit. 	<ul style="list-style-type: none"> Activity assignment Demonstrate how to use a DMM to the teacher 		Critical
• Soldering	DE – 7.3: Demonstrate successful soldering and desoldering techniques.	<ul style="list-style-type: none"> Demonstrate successful soldering and desoldering techniques. 	<ul style="list-style-type: none"> Activity assignment Build Dice Game Build power supply 	<ul style="list-style-type: none"> Solder Desolder Flux 	Critical
• Breadboarding	DE – 7.4: Demonstrate breadboarding techniques.	<ul style="list-style-type: none"> Demonstrate breadboarding techniques. 	<ul style="list-style-type: none"> Activity assignment Build a circuit 	<ul style="list-style-type: none"> Breadboard Prototype 	Critical
• Circuit Systems	DE – 7.5: Identify the appropriate tools for working on circuit systems using safety guidelines.	<ul style="list-style-type: none"> Identify the appropriate tools for working on circuits. Demonstrate safe techniques while working on a circuit. 	<ul style="list-style-type: none"> Quiz Summative assessment Activity assignments 		Important

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCABULARY	PRIORITY
NUMBER SYSTEMS, SIMPLIFYING					
• Number Systems	DE – 8.1: Convert numbers between the binary and decimal number systems.	• Convert numbers between the binary and decimal number systems.	• Quiz • Summative assessment	• Binary • Most significant digit • Least significant digit	Important
• Truth Tables	DE – 8.2: Translate design specifications into truth tables.	• Translate design specifications into truth tables.	• Activity assignment	• Truth table	Critical
• Numerical Values	DE – 8.4: Understand numerical place value.	• Understand numerical place value.	• Quiz • Summative assessment		Important
• Bits And Bytes	DE – 8.6: Demonstrate the relationship of binary and hexadecimal to bits and bytes of information used in computers.	• Demonstrate the relationship of binary and hexadecimal to bits and bytes.	• Quiz • Summative assessment	• Hexadecimal	Important
• Number Conversion	DE – 8.7: Convert values from one number systems to another.	• Convert values from one number systems to another.	• Quiz • Summative assessment		Important

GRADE LEVEL: 11

SUBJECT: DIGITAL ELECTRONICS PLTW

DATE: 2017-2018

GRADING PERIOD: QUARTER 2

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CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
PROJECT MANAGEMENT					
• Parallel Circuits	DE – 2.1: Design circuit boards that integrate parallel circuits.	<ul style="list-style-type: none"> Investigate various careers within the fields of engineering and technology. 	<ul style="list-style-type: none"> Activities throughout unit (1.1.5A) Formative assessment 	• Parallel circuit	Critical
• Series Circuits	DE – 2.2: Design circuit boards that integrate series circuits.	<ul style="list-style-type: none"> Communicate various key components of a career. 	<ul style="list-style-type: none"> Activities throughout unit (1.1.5A) Formative assessment 	• Series Circuit	Critical
• Ohm's Law	DE – 2.3: Calculate Ohm's Law for simple series and parallel circuits.	<ul style="list-style-type: none"> Calculate series and parallel circuit using Ohm's law. 	<ul style="list-style-type: none"> Activities throughout unit (1.1.5A) Formative assessment 	• Ohm's Law	Critical
ELECTRICAL COMPONENTS					
• Function of Resistors	DE – 3.2: Relate the symbols associated with resistors and how they function.	<ul style="list-style-type: none"> Identify electrical symbols. Understand how resistors function. 	<ul style="list-style-type: none"> Create drawings (1.1.4A) Design circuits 	<ul style="list-style-type: none"> Resistor Ceramic Electron flow 	Important
• Resistor Calculations	DE – 3.3: Calculate tolerance levels of various resistors to determine if the measured value is within specifications.	<ul style="list-style-type: none"> Calculate the size and tolerance of a resistor. 	<ul style="list-style-type: none"> Measure resistors using a DMM Calculate resistor values (1.1.5A) 	<ul style="list-style-type: none"> Tolerance Ohm's law Digital multi-meter 	Critical
• Capacitor Measurement	DE – 3.6: Calculate the values of capacitors and their voltage polarity requirements.	<ul style="list-style-type: none"> Calculate the values of capacitors. 	<ul style="list-style-type: none"> Quiz Summative assessment 	<ul style="list-style-type: none"> Polarity Capacitance 	Critical

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
DIGITAL LOGIC CIRCUITS					
<ul style="list-style-type: none"> Relationships in Circuit Design 	DE – 4.1: Recognize the relationship between the Boolean expression, logic diagram, and the truth table.	<ul style="list-style-type: none"> Recognize the relationship between the Boolean expression, logic diagram, and the truth table. 	<ul style="list-style-type: none"> Recognize a truth table from Boolean expressions on a quiz or worksheet Recognize Boolean expressions from truth table on a quiz or worksheet 	<ul style="list-style-type: none"> Boolean expression Logic diagram Truth table 	Critical
<ul style="list-style-type: none"> Develop Answers from Design Problems 	DE – 4.2: Design Boolean Expressions, logic circuit diagrams or truth tables from information provided in the solution of design problems.	<ul style="list-style-type: none"> Design Boolean Expressions, logic circuit diagrams or truth tables from information provided in the solution of design problems. 	<ul style="list-style-type: none"> Create a truth table from Boolean expressions Diagram schematic from Boolean expression Label Boolean expressions from truth table 	<ul style="list-style-type: none"> Boolean expression Logic diagram Truth table 	Critical
<ul style="list-style-type: none"> Sum-of-Products 	DE – 4.3: Select the Sum-of Products or the Products-of-Sums form of a Boolean Expression to use in the solution of a problem.	<ul style="list-style-type: none"> Select the Sum-of Products or the Products-of-Sums form of a Boolean Expression to use in the solution of a problem. 	<ul style="list-style-type: none"> From a truth table create the SOP or POS for a circuit (Lesson 2.1) 	<ul style="list-style-type: none"> Sum-of-Products Products-of-Sums 	Important
<ul style="list-style-type: none"> Boolean Algebra 	DE – 4.4: Apply the rules of Boolean algebra to logic diagrams and truth tables to minimize the circuit size necessary to solve a design problem.	<ul style="list-style-type: none"> Apply the rules of Boolean algebra to logic diagrams and truth tables to minimize the circuit size necessary to solve a design problem. 	<ul style="list-style-type: none"> Activity/worksheet (Lesson 2.1) 	<ul style="list-style-type: none"> Boolean expression Logic diagram Truth table 	Important

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
DIGITAL LOGIC CIRCUITS					
• DeMorgan's Theorem	DE – 4.5: Demonstrate DeMorgan's to simplify a negated expression and to convert a SOP to a POS and vice versa in order to save resources in the production of circuits.	• Demonstrate DeMorgan's to simplify a negated expression and to convert a SOP to a POS and vice versa in order to save resources in the production of circuits.	• Activity/worksheet (Lesson 2.1)	• DeMorgan's theorem	Important
• Karnaugh Map	DE – 4.6: Formulate and employ a Karnaugh Map to reduce Boolean expressions and logic circuits to their simplest forms.	• Formulate and employ a Karnaugh Map to reduce Boolean expressions and logic circuits to their simplest forms.	• Activity/worksheet (Lesson 2.2)	• Karnaugh map	Important
• NAND or NOR Gates	DE – 4.7: Create circuits to solve a problem using NAND or NOR gates to replicate all logic functions.	• Create circuits to solve a problem using NAND or NOR gates to replicate all logic functions.	• Build circuit simulation • Breadboard circuit (Lesson 1.2)	• NAND gate • NOR gate • Breadboard	Important
• Circuit Reduction	DE – 4.8: Apply their understanding of the workings of NOR and NAND gates to make comparisons with standard combinational logic solutions to determine amount of resource reduction.	• Apply their understanding of the workings of NOR and NAND gates to make comparisons with standard combinational logic solutions to determine amount of resource reduction.	• Activity/worksheet (Lesson 2.1) • Quiz		Important

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
DIGITAL LOGIC CIRCUITS					
• Solutions	DE – 4.9: Use schematics and symbolic Algebra to represent digital logic gates in the creation of solutions to design problems.	<ul style="list-style-type: none"> Use schematics and symbolic Algebra to represent digital logic gates in the creation of solutions to design problems. 	<ul style="list-style-type: none"> Activity assignment (Lesson 2.1) Build a circuit 	<ul style="list-style-type: none"> Schematic Symbol Sign 	Critical
• Basic Logic Gates	DE – 4.10: Identify the name, symbol, and function and create truth tables and Boolean Expression for the basic logic gates through research and experimentation.	<ul style="list-style-type: none"> Identify the name, symbol, and function and create truth tables and Boolean Expression for the basic logic gates through research and experimentation. 	<ul style="list-style-type: none"> Activity assignment Build a circuit 	<ul style="list-style-type: none"> Truth table Boolean Experimentation 	Critical
• Logic Gates	DE – 4.11: Apply logic to design and create, using gates, solutions to a problem.	<ul style="list-style-type: none"> Develop solutions utilizing logic gates. 	<ul style="list-style-type: none"> Activity assignment Build a circuit 	<ul style="list-style-type: none"> Logic gates 	Important
• Flip flops	DE – 4.12: Assemble circuits and compile information about the various applications of flip-flops.	<ul style="list-style-type: none"> Build circuits. Analyze circuits. Compile information from the circuits. 	<ul style="list-style-type: none"> Activity assignment Build a circuit Analyze a circuit Seat Belt project 	<ul style="list-style-type: none"> Flip-flop 	Critical
AC WAVEFORM AND VOLTAGE GENERATION					
• Digital Waveforms	DE – 5.1: Analyze a digital waveform and identify the anatomy of the waveform.	<ul style="list-style-type: none"> Demonstrate use of an oscilloscope. Analyze a digital waveform. Identify the anatomy of the waveform. 	<ul style="list-style-type: none"> Activity assignment 	<ul style="list-style-type: none"> Waveform Period frequency 	Important

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
AC WAVEFORM AND VOLTAGE GENERATION					
• Circuits	DE – 5.3: Design, create and test circuits.	• Design, create and test circuits.	• Activity assignment • Build a circuit		Critical
SOLDERING EQUIPMENT AND SUPPLIES					
• Circuit Creation	DE – 7.1: Create circuits using circuit design software.	• Create circuits using circuit design software.	• Activity assignment • Build a circuit		Critical
• Circuit Testing	DE – 7.2: Test circuit and measure values using a Digital Multi-Meter.	• Exhibit your ability to use a DMM by measuring a circuit.	• Activity assignment • Demonstrate how to use a DMM to the teacher		Critical
• Breadboarding	DE – 7.4: Demonstrate breadboarding techniques.	• Demonstrate breadboarding techniques.	• Activity assignment • Build a circuit	• Breadboard • Prototype	Critical
• Circuit Systems	DE – 7.5: Identify the appropriate tools for working on circuit systems using safety guidelines.	• Identify the appropriate tools for working on circuits. • Demonstrate safe techniques while working on a circuit.	• Quiz • Summative assessment • Activity assignments		Important
NUMBER SYSTEMS, SIMPLIFYING					
• Number Systems	DE – 8.1: Convert numbers between the binary and decimal number systems.	• Convert numbers between the binary and decimal number systems.	• Quiz • Summative assessment	• Binary • Most significant digit • Least significant digit	Important

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
NUMBER SYSTEMS, SIMPLIFYING					
<ul style="list-style-type: none"> Design Specifications to Truth Tables 	DE – 8.2: Translate design specifications into truth tables.	<ul style="list-style-type: none"> Translate design specifications into truth tables. 	<ul style="list-style-type: none"> Activity assignment 	<ul style="list-style-type: none"> Truth table 	Critical
<ul style="list-style-type: none"> Truth Tables from Logic Expressions 	DE – 8.3: Construct truth tables from logic expressions.	<ul style="list-style-type: none"> Construct truth tables from logic expressions. 	<ul style="list-style-type: none"> Activity assignment 		Important
<ul style="list-style-type: none"> Numerical Values 	DE – 8.4: Understand numerical place value.	<ul style="list-style-type: none"> Understand numerical place value. 	<ul style="list-style-type: none"> Quiz Summative assessment 		Important
<ul style="list-style-type: none"> Mathematical Symbols 	DE – 8.5: Use mathematical symbols to represent bases and will communicate concepts using different number systems.	<ul style="list-style-type: none"> Use mathematical symbols to represent bases. 	<ul style="list-style-type: none"> Activity assignment 	<ul style="list-style-type: none"> Mathematical symbols in Boolean logic 	Critical
<ul style="list-style-type: none"> Numbering Systems to Bits and Bytes 	DE – 8.6: Demonstrate the relationship of binary and hexadecimal to bits and bytes of information used in computers.	<ul style="list-style-type: none"> Demonstrate the relationship of binary and hexadecimal to bits and bytes of information used in computers. 	<ul style="list-style-type: none"> Quiz Summative assessment 	<ul style="list-style-type: none"> Binary Hexadecimal Bits Bytes 	Important
<ul style="list-style-type: none"> Number Conversion 	DE – 8.7: Convert values from one number systems to another.	<ul style="list-style-type: none"> Convert values from one number systems to another. 	<ul style="list-style-type: none"> Quiz Summative assessment 		Important
<ul style="list-style-type: none"> Number Prefixes 	DE – 8.9: Re-write any number using conventional prefix definitions.	<ul style="list-style-type: none"> Have the ability to Re-write any number using conventional prefix definitions. 	<ul style="list-style-type: none"> Quiz Summative assessment 		Important
<ul style="list-style-type: none"> Using Truth Tables 	DE – 8.11: Create and prove truth tables.	<ul style="list-style-type: none"> Create and prove truth tables. 	<ul style="list-style-type: none"> Activity assignment 		Critical

GRADE LEVEL: 11

SUBJECT: DIGITAL ELECTRONICS PLTW

DATE: 2017-2018

GRADING PERIOD: QUARTER 3

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CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
PROJECT MANAGEMENT					
• Parallel Circuits	DE – 2.1: Design circuit boards that integrate parallel circuits.	<ul style="list-style-type: none"> Investigate various careers within the fields of engineering and technology. 	<ul style="list-style-type: none"> Activities throughout unit (1.1.5A) Formative assessment 	• Parallel circuit	Critical
• Series Circuits	DE – 2.2: Design circuit boards that integrate series circuits.	<ul style="list-style-type: none"> Communicate various key components of a career. 	<ul style="list-style-type: none"> Activities throughout unit (1.1.5A) Formative assessment 	• Series Circuit	Critical
• Ohm's Law	DE – 2.3: Calculate Ohm's Law for simple series and parallel circuits.	<ul style="list-style-type: none"> Calculate series and parallel circuit using Ohm's law. 	<ul style="list-style-type: none"> Activities throughout unit (1.1.5A) Formative assessment 	• Ohm's Law	Critical
ELECTRICAL COMPONENTS					
• Functions of Resistors	DE – 3.2: Relate the symbols associated with resistors and how they function.	<ul style="list-style-type: none"> Identify electrical symbols. Understand how resistors function. 	<ul style="list-style-type: none"> Create drawings (1.1.4A) Design circuits 	<ul style="list-style-type: none"> Resistor Ceramic Electron flow 	Important
• Resistor Calculations	DE – 3.3: Calculate tolerance levels of various resistors to determine if the measured value is within specifications.	<ul style="list-style-type: none"> Calculate the size and tolerance of a resistor. 	<ul style="list-style-type: none"> Measure resistors using a DMM Calculate resistor values (1.1.5A) 	<ul style="list-style-type: none"> Tolerance Ohm's law Digital multi-meter 	Critical
• Capacitor Measurement	DE – 3.6: Calculate the values of capacitors and their voltage polarity requirements.	<ul style="list-style-type: none"> Calculate the values of capacitors. 	<ul style="list-style-type: none"> Quiz Summative assessment 	<ul style="list-style-type: none"> Polarity Capacitance 	Critical

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
DIGITAL LOGIC CIRCUITS					
<ul style="list-style-type: none"> Relationships in Circuit Design 	<p>DE – 4.1: Recognize the relationship between the Boolean expression, logic diagram, and the truth table.</p>	<ul style="list-style-type: none"> Recognize the relationship between the Boolean expression, logic diagram, and the truth table. 	<ul style="list-style-type: none"> Recognize a truth table from Boolean expressions on a quiz or worksheet Recognize Boolean expressions from truth table on a quiz or worksheet 	<ul style="list-style-type: none"> Boolean expression Logic diagram Truth table 	Critical
<ul style="list-style-type: none"> Develop Answers from Design Problems 	<p>DE – 4.2: Design Boolean Expressions, logic circuit diagrams or truth tables from information provided in the solution of design problems.</p>	<ul style="list-style-type: none"> Design Boolean Expressions, logic circuit diagrams or truth tables from information provided in the solution of design problems. 	<ul style="list-style-type: none"> Create a truth table from Boolean expressions Diagram schematic from Boolean expression Label Boolean expressions from truth table 	<ul style="list-style-type: none"> Boolean expression Logic diagram Truth table 	Critical
<ul style="list-style-type: none"> Sum-of-Products 	<p>DE – 4.3: Select the Sum-of Products or the Products-of-Sums form of a Boolean Expression to use in the solution of a problem.</p>	<ul style="list-style-type: none"> Select the Sum-of Products or the Products-of-Sums form of a Boolean Expression to use in the solution of a problem. 	<ul style="list-style-type: none"> From a truth table create the SOP or POS for a circuit (Lesson 2.1) 	<ul style="list-style-type: none"> Sum-of-Products Products-of-Sums 	Important
<ul style="list-style-type: none"> Boolean Algebra 	<p>DE – 4.4: Apply the rules of Boolean algebra to logic diagrams and truth tables to minimize the circuit size necessary to solve a design problem.</p>	<ul style="list-style-type: none"> Apply the rules of Boolean algebra to logic diagrams and truth tables to minimize the circuit size necessary to solve a design problem. 	<ul style="list-style-type: none"> Activity/worksheet (Lesson 2.1) 	<ul style="list-style-type: none"> Boolean expression Logic diagram Truth table 	Important

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
DIGITAL LOGIC CIRCUITS					
<ul style="list-style-type: none"> Demorgan's Theorem 	DE – 4.5: Demonstrate DeMorgan's to simplify a negated expression and to convert a SOP to a POS and vice versa in order to save resources in the production of circuits.	<ul style="list-style-type: none"> Demonstrate DeMorgan's to simplify a negated expression and to convert a SOP to a POS and vice versa in order to save resources in the production of circuits. 	<ul style="list-style-type: none"> Activity/worksheet (Lesson 2.1) 	<ul style="list-style-type: none"> DeMorgan's theorem 	Important
<ul style="list-style-type: none"> Karnaugh Map 	DE – 4.6: Formulate and employ a Karnaugh Map to reduce Boolean expressions and logic circuits to their simplest forms.	<ul style="list-style-type: none"> Formulate and employ a Karnaugh Map to reduce Boolean expressions and logic circuits to their simplest forms. 	<ul style="list-style-type: none"> Activity/worksheet (Lesson 2.2) 	<ul style="list-style-type: none"> Karnaugh map 	Important
<ul style="list-style-type: none"> NAND or NOR Gates 	DE – 4.7: Create circuits to solve a problem using NAND or NOR gates to replicate all logic functions.	<ul style="list-style-type: none"> Create circuits to solve a problem using NAND or NOR gates to replicate all logic functions. 	<ul style="list-style-type: none"> Build circuit simulation Breadboard circuit (Lesson 1.2) 	<ul style="list-style-type: none"> NAND gate NOR gate Breadboard 	Important
<ul style="list-style-type: none"> Circuit Reduction 	DE – 4.8: Apply their understanding of the workings of NOR and NAND gates to make comparisons with standard combinational logic solutions to determine amount of resource reduction.	<ul style="list-style-type: none"> Apply their understanding of the workings of NOR and NAND gates to make comparisons with standard combinational logic solutions to determine amount of resource reduction. 	<ul style="list-style-type: none"> Activity/worksheet (Lesson 2.1) Quiz 		Important

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
DIGITAL LOGIC CIRCUITS					
• Design Solutions	DE – 4.9: Use schematics and symbolic Algebra to represent digital logic gates in the creation of solutions to design problems.	<ul style="list-style-type: none"> Use schematics and symbolic Algebra to represent digital logic gates in the creation of solutions to design problems. 	<ul style="list-style-type: none"> Activity assignment (Lesson 2.1) Build a circuit 	<ul style="list-style-type: none"> Schematic Symbol Sign 	Critical
• Basic Logic Gates	DE – 4.10: Identify the name, symbol, and function and create truth tables and Boolean Expression for the basic logic gates through research and experimentation.	<ul style="list-style-type: none"> Identify the name, symbol, and function and create truth tables and Boolean Expression for the basic logic gates through research and experimentation. 	<ul style="list-style-type: none"> Activity assignment Build a circuit 	<ul style="list-style-type: none"> Truth table Boolean Experimentation 	Critical
• Building with Logic Gates	DE – 4.11: Apply logic to design and create, using gates, solutions to a problem.	<ul style="list-style-type: none"> Develop solutions utilizing logic gates. 	<ul style="list-style-type: none"> Activity assignment Build a circuit 	<ul style="list-style-type: none"> Logic gates 	Important
• Flip Flops	DE – 4.12: Assemble circuits and compile information about the various applications of flip-flops.	<ul style="list-style-type: none"> Build circuits. Analyze circuits. Compile information from the circuits. 	<ul style="list-style-type: none"> Activity assignment Build a circuit Analyze a circuit Seat Belt project 	<ul style="list-style-type: none"> Flip-flop 	Critical
AC WAVEFORM AND VOLTAGE GENERATION					
• Digital Waveforms	DE – 5.1: Analyze a digital waveform and identify the anatomy of the waveform.	<ul style="list-style-type: none"> Demonstrate use of an oscilloscope. Analyze a digital waveform. Identify the anatomy of the waveform. 	<ul style="list-style-type: none"> Activity assignment 	<ul style="list-style-type: none"> Waveform Period frequency 	Important

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
AC WAVEFORM AND VOLTAGE GENERATION					
• Circuits	DE – 5.3: Design, create and test circuits.	• Design, create and test circuits.	• Activity assignment • Build a circuit		Critical
SOLDERING EQUIPMENT AND SUPPLIES					
• Circuit Creation	DE – 7.1: Create circuits using circuit design software.	• Create circuits using circuit design software.	• Activity assignment • Build a circuit		Critical
• Circuit Testing	DE – 7.2: Test circuit and measure values using a Digital Multi-Meter.	• Exhibit your ability to use a DMM by measuring a circuit.	• Activity assignment • Demonstrate how to use a DMM to the teacher		Critical
• Circuit Systems	DE – 7.5: Identify the appropriate tools for working on circuit systems using safety guidelines.	• Identify the appropriate tools for working on circuits. • Demonstrate safe techniques while working on a circuit.	• Quiz • Summative assessment • Activity assignments		Important
NUMBER SYSTEMS, SIMPLIFYING					
• Number Systems	DE – 8.1: Convert numbers between the binary and decimal number systems.	• Convert numbers between the binary and decimal number systems.	• Quiz • Summative assessment	• Binary • Most significant digit • Least significant digit	Important
• Design Specifications and Truth tables	DE – 8.2: Translate design specifications into truth tables.	• Translate design specifications into truth tables.	• Activity assignment	• Truth table	Critical
• Truth Tables to Logic Expressions	DE – 8.3: Construct truth tables from logic expressions.	• Construct truth tables from logic expressions.	• Activity assignment		Important

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
NUMBER SYSTEMS, SIMPLIFYING					
• Numerical Values	DE – 8.4: Understand numerical place value.	<ul style="list-style-type: none"> Understand numerical place value. 	<ul style="list-style-type: none"> Quiz Summative assessment 		Important
• Adder Circuits	DE – 8.8: Design, construct and test adder circuits using both discrete and MSI gates.	<ul style="list-style-type: none"> Understand adder circuits Construct and test adder circuits using discrete and MSI gates. 	<ul style="list-style-type: none"> Activity assignment 	<ul style="list-style-type: none"> Discrete logic gates SSI, MSI, LSI logic gates 	Important
• Binary Addition and Subtraction	DE – 8.10: Demonstrate understanding of binary addition and subtraction.	<ul style="list-style-type: none"> Produce outcomes through addition and subtraction of binary numbers. 	<ul style="list-style-type: none"> Activity assignment Quiz 	<ul style="list-style-type: none"> One's compliment Two's compliment 	Important

GRADE LEVEL: 11

SUBJECT: DIGITAL ELECTRONICS PLTW

DATE: 2017-2018

GRADING PERIOD: QUARTER 4

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CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCABULARY	PRIORITY
PROJECT MANAGEMENT					
• Electric Shock	DE – 1.3: Identify the causes of and dangers of electric shock and explain the methods to prevent it.	<ul style="list-style-type: none"> Identify the causes of electrical dangers. Explain the methods of preventing electrical shock. 	<ul style="list-style-type: none"> Quiz Summative assessment 	<ul style="list-style-type: none"> Short circuit Open circuit Charge Voltage Current Resistance 	Critical
• Environmentally Safe Circuits	DE – 1.4: Design electronic circuits that involve the environmental concerns with creating safe circuits.	<ul style="list-style-type: none"> Understand the use of electrical components. Develop circuits that are environmentally safe. 	<ul style="list-style-type: none"> Activities throughout unit Develop circuits that are environmentally friendly 	<ul style="list-style-type: none"> Supply Power Ground 	Important
• Parallel Circuits	DE – 2.1: Design circuit boards that integrate parallel circuits.	<ul style="list-style-type: none"> Investigate various careers within the fields of engineering and technology. 	<ul style="list-style-type: none"> Activities throughout unit Formative assessment 	<ul style="list-style-type: none"> Parallel circuit 	Critical
• Series Circuits	DE – 2.2: Design circuit boards that integrate series circuits.	<ul style="list-style-type: none"> Communicate various key components of a career. 	<ul style="list-style-type: none"> Activities throughout unit Formative assessment 	<ul style="list-style-type: none"> Series Circuit 	Critical
• Ohm's Law	DE – 2.3: Calculate Ohm's Law for simple series and parallel circuits.	<ul style="list-style-type: none"> Calculate series and parallel circuit using Ohm's law. 	<ul style="list-style-type: none"> Activities throughout unit Formative assessment 	<ul style="list-style-type: none"> Ohm's Law 	Critical
• Insulators And Conductors	DE – 2.5: Explain Quantum energy in relationship to electrons classified as insulators or conductors.	<ul style="list-style-type: none"> Understand what insulators and conductors are. Identify and apply information from the periodical chart. 	<ul style="list-style-type: none"> Classroom discussion 	<ul style="list-style-type: none"> Quantum energy 	Additional

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCABULARY	PRIORITY
ELECTRICAL COMPONENTS					
<ul style="list-style-type: none"> Function Of Resistors 	DE – 3.2: Relate the symbols associated with resistors and how they function.	<ul style="list-style-type: none"> Identify electrical symbols. Understand how resistors function. 	<ul style="list-style-type: none"> Create drawings Design circuits 	<ul style="list-style-type: none"> Resistor Ceramic Electron flow 	Important
<ul style="list-style-type: none"> Resistor Calculations 	DE – 3.3: Calculate tolerance levels of various resistors to determine if the measured value is within specifications.	<ul style="list-style-type: none"> Calculate the size and tolerance of a resistor. 	<ul style="list-style-type: none"> Measure resistors using a DMM. Calculate resistor values. 	<ul style="list-style-type: none"> Tolerance Ohm's law Digital multi-meter 	Critical
<ul style="list-style-type: none"> Capacitor Measurement 	DE – 3.6: Calculate the values of capacitors and their voltage polarity requirements.	<ul style="list-style-type: none"> Calculate the values of capacitors. 	<ul style="list-style-type: none"> Quiz Summative assessment 	<ul style="list-style-type: none"> Polarity Capacitance 	Critical
DIGITAL LOGIC CIRCUITS					
<ul style="list-style-type: none"> Relationships In Circuit Design 	DE – 4.1: Recognize the relationship between the Boolean expression, logic diagram, and the truth table.	<ul style="list-style-type: none"> Recognize the relationship between the Boolean expression, logic diagram, and the truth table. 	<ul style="list-style-type: none"> Recognize a truth table from Boolean expressions on a quiz or worksheet Recognize Boolean expressions from truth table on a quiz or worksheet 	<ul style="list-style-type: none"> Boolean expression Logic diagram Truth table 	Critical
<ul style="list-style-type: none"> Develop Answers From Design Problems 	DE – 4.2: Design Boolean Expressions, logic circuit diagrams or truth tables from information provided in the solution of design problems.	<ul style="list-style-type: none"> Design Boolean Expressions, logic circuit diagrams or truth tables from information provided in the solution of design problems. 	<ul style="list-style-type: none"> Create a truth table from Boolean expressions Diagram schematic from Boolean expression Label Boolean expressions from truth table 	<ul style="list-style-type: none"> Boolean expression Logic diagram Truth table 	Critical

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCABULARY	PRIORITY
DIGITAL LOGIC CIRCUITS					
• Sum-Of-Products	DE – 4.3: Select the Sum-of Products or the Products-of-Sums form of a Boolean Expression to use in the solution of a problem.	<ul style="list-style-type: none"> Select the Sum-of Products or the Products-of-Sums form of a Boolean Expression to use in the solution of a problem. 	<ul style="list-style-type: none"> From a truth table create the SOP or POS for a circuit 	<ul style="list-style-type: none"> Sum-of-Products Products-of-Sums 	Important
• Boolean Algebra	DE – 4.4: Apply the rules of Boolean algebra to logic diagrams and truth tables to minimize the circuit size necessary to solve a design problem.	<ul style="list-style-type: none"> Apply the rules of Boolean algebra to logic diagrams and truth tables to minimize the circuit size necessary to solve a design problem. 	<ul style="list-style-type: none"> Activity/worksheet 	<ul style="list-style-type: none"> Boolean expression Logic diagram Truth table 	Important
• DeMorgan's Theorem	DE – 4.5: Demonstrate DeMorgan's to simplify a negated expression and to convert a SOP to a POS and vice versa in order to save resources in the production of circuits.	<ul style="list-style-type: none"> Demonstrate DeMorgan's to simplify a negated expression and to convert a SOP to a POS and vice versa in order to save resources in the production of circuits. 	<ul style="list-style-type: none"> Activity/worksheet 	<ul style="list-style-type: none"> DeMorgan's theorem 	Important
• Karnaugh Map	DE – 4.6: Formulate and employ a Karnaugh Map to reduce Boolean expressions and logic circuits to their simplest forms.	<ul style="list-style-type: none"> Formulate and employ a Karnaugh Map to reduce Boolean expressions and logic circuits to their simplest forms. 	<ul style="list-style-type: none"> Activity/worksheet 	<ul style="list-style-type: none"> Karnaugh map 	Important
• NAND Or NOR Gates	DE – 4.7: Create circuits to solve a problem using NAND or NOR gates to replicate all logic functions.	<ul style="list-style-type: none"> Create circuits to solve a problem using NAND or NOR gates to replicate all logic functions. 	<ul style="list-style-type: none"> Build circuit simulation Breadboard circuit 	<ul style="list-style-type: none"> NAND gate NOR gate Breadboard 	Important

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCABULARY	PRIORITY
DIGITAL LOGIC CIRCUITS					
• Circuit Reduction	DE – 4.8: Apply their understanding of the workings of NOR and NAND gates to make comparisons with standard combinational logic solutions to determine amount of resource reduction.	<ul style="list-style-type: none"> Apply their understanding of the workings of NOR and NAND gates to make comparisons with standard combinational logic solutions to determine amount of resource reduction. 	<ul style="list-style-type: none"> Activity/worksheet Quiz 		Important
• Solutions	DE – 4.9: Use schematics and symbolic Algebra to represent digital logic gates in the creation of solutions to design problems.	<ul style="list-style-type: none"> Use schematics and symbolic Algebra to represent digital logic gates in the creation of solutions to design problems. 	<ul style="list-style-type: none"> Activity assignment Build a circuit 	<ul style="list-style-type: none"> Schematic Symbol Sign 	Critical
• Basic Logic Gates	DE – 4.10: Identify the name, symbol, and function and create truth tables and Boolean Expression for the basic logic gates through research and experimentation.	<ul style="list-style-type: none"> Identify the name, symbol, and function and create truth tables and Boolean Expression for the basic logic gates through research and experimentation. 	<ul style="list-style-type: none"> Activity assignment Build a circuit 	<ul style="list-style-type: none"> Truth table Boolean Experimentation 	Critical
• Logic Gates	DE – 4.11: Apply logic to design and create, using gates, solutions to a problem.	<ul style="list-style-type: none"> Develop solutions utilizing logic gates. 	<ul style="list-style-type: none"> Activity assignment Build a circuit 	<ul style="list-style-type: none"> Logic gates 	Important
• Flip Flops	DE – 4.12: Assemble circuits and compile information about the various applications of flip-flops.	<ul style="list-style-type: none"> Build circuits. Analyze circuits. Compile information from the circuits. 	<ul style="list-style-type: none"> Activity assignment Build a circuit Analyze a circuit Seat Belt project 	<ul style="list-style-type: none"> Flip-flop 	Critical

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCABULARY	PRIORITY
AC WAVEFORM AND VOLTAGE GENERATION					
• Circuits	DE – 5.3: Design, create and test circuits.	• Design, create and test circuits.	• Activity assignment • Build a circuit		Critical
Soldering Equipment And Supplies					
• Circuit Creation	DE – 7.1: Create circuits using circuit design software.	• Create circuits using circuit design software.	• Activity assignment • Build a circuit		Critical
• Circuit Testing	DE – 7.2: Test circuit and measure values using a Digital Multi-Meter.	• Exhibit your ability to use a DMM by measuring a circuit.	• Activity assignment • Demonstrate how to use a DMM to the teacher		Critical
• Breadboarding	DE – 7.4: Demonstrate breadboarding techniques.	• Demonstrate breadboarding techniques.	• Activity assignment • Build a circuit	• Breadboard • Prototype	Critical
• Circuit Systems	DE – 7.5: Identify the appropriate tools for working on circuit systems using safety guidelines.	• Identify the appropriate tools for working on circuits. • Demonstrate safe techniques while working on a circuit.	• Quiz • Summative assessment • Activity assignments		Important
NUMBER SYSTEMS, SIMPLIFYING					
• Number Systems	DE – 8.1: Convert numbers between the binary and decimal number systems.	• Convert numbers between the binary and decimal number systems.	• Quiz • Summative assessment	• Binary • Most significant digit • Least significant digit	Important
• Design Specifications To Truth Tables	DE – 8.2: Translate design specifications into truth tables.	• Translate design specifications into truth tables.	• Activity assignment	• Truth table	Critical
• Truth Tables From Logic Expressions	DE – 8.3: Construct truth tables from logic expressions.	• Construct truth tables from logic expressions.	• Activity assignment		Important

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCABULARY	PRIORITY
NUMBER SYSTEMS, SIMPLIFYING					
• Numerical Values	DE – 8.4: Understand numerical place value.	• Understand numerical place value.	• Quiz • Summative assessment		Important
MICROPROCESSORS					
• Microprocessor	DE – 9.1: Formulate a flow chart to correctly apply basic programming concepts in the planning of a project.	• Formulate a flow chart to correctly apply basic programming concepts in the planning of a project.	• Boe-Bot project	• Microprocessor • Programming • Sensors • Processor • Firmware • Hardware • Software • Arduino • Basic Stamp	Critical