Mike Holt's

Apprenticeship Training Program

Year One

MIKE HOLT ENTERPRISES, INC.
Since 1974
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Revised Date: August19, 2010

Syllabus

Year One

TOPICS: DC Fundamentals & Residential Wiring

CONTACT HOURS: 164.5

PREREQUISITES: None

INSTRUCTOR NAME:

INSTRUCTOR CONTACT INFORMATION:

START DATE: **END DATE:**

Description: The first year introduces apprentices to the principles associated with electricity and electrical theory pertaining to direct current. These basic fundamentals are necessary in understanding complex national electrical code requirements covered throughout the program. In the latter part of the year students will begin utilizing the National Electrical Code and learn proper installation methods commonly used in residential wiring.

Upon Successful completion students should be able to;

- Identify hazards associated with electricity and in the construction field
- Explain the proper PPE required for specific applications
- Discuss methods of minimizing or eliminating the potential for hazards when working around electricity
- Understand the components of matter and their electrical properties
- Analyze basic electrical circuits (Series, Parallel, and Series-Parallel)
- Calculate unknown values using Ohm's Law
- Explain the purpose of the National Electrical Code and its arrangement
- Understand terms as used in the National Electrical Code
- Layout electrical equipment in accordance with required working space
- Demonstrate proficiency referencing code articles in the general requirements
- List locations requiring ground fault and arc fault protection
- Determine required locations of receptacle and lighting outlets in dwelling units
- List types of overcurrent protection and their standard ratings
- Properly size equipment grounding and grounding electrode conductors

Textbooks

Basic Electrical Theory. 2nd. Leesburg: Mike Holt Enterprises, Inc,

ISBN 1-932685-12-X, 2007

Understanding the NEC Volume 1. Leesburg: Mike Holt Enterprises, Inc,
ISBN 978-1-932685-33-6, 2008

Understanding the NEC Volume 1 Workbook. Leesburg: Mike Holt Enterprises, Inc,
ISBN 978-1-932685-45-9, 2008

National Electrical Code 2008. Batterymarch Park: National Fire Protection Association,
ISBN 978-087765790-3, 2007

Printreading Based On the 2008 NEC. 2008. Homewood: American Technical Publishers, Inc, ISBN 978-08269-1567-2, 2008 R.T. Miller

Teaching Strategies

Teaching strategies could include lecture, board work, demonstration, lab activity, classroom exercises, discussion, practice questions, examination, reading assignments, field trips, guest lectures, group projects, presentations.

Topical Outline

- OSHA 10hr Safety Training
    - Introduction to OSHA
    - Electrical Safety
    - Fall Protection
    - Excavations
    - Cranes
    - Materials, Handling, Use, and Disposal
    - Tools – Hand & Power
    - (PPE) Personal Protective Equipment
    - Scaffolds
    - Stairways & Ladders
- Matter
    - Atomic Theory
    - Law of Charges
        - Electrical
        - Atomic
    - Static Charge
    - Lightning and Protection
- Electron Theory
    - Electron Orbit
    - Valence
        - Valence Electrons
        - Conductors
        - Insulators
        - Semi Conductors
    - Atomic Bonding
    - Compounds
- Magnetism
    - Natural Magnet
    - Polarities
    - Compass
    - Magnetic Molecule
    - Properties
    - Retentivity
    - Permeability
- Electricity
    - Current Flow
    - Useful Purposes

- Dangers of Electricity
- National Electrical Code

- Electromagnetism
  - In a wire
  - Field Intensity
  - Field Interaction
    - Loops
  - Electromagnetism in a Coil
  - Magnetic Core
  - Ampere and Turns
- Uses of Electromagnetism
  - Basic Electric Meters
  - Electric Motors
  - Electric Generators
  - Electromagnetic Relays
- The Electric Circuit
  - Electron Current Flow Theory
  - Conventional Current Flow Theory
  - Voltage
  - Resistance
  - Current
  - Power
  - Electrical Formulas
- Math
  - Whole Numbers
  - Decimals
  - Fractions
  - Percentages
  - Multipliers
  - Percent Increase
  - Reciprocals
  - Squaring a Number
  - Square Root
  - Volume
  - Kilo
  - Rounding Off
  - Parentheses
  - Testing your Answer
- Electrical Formulas
  - Conductance
  - Resistance
  - Ohm's Law
  - Power Losses
  - Cost of Power
- Series Circuits
  - Practical Uses
  - Calculations
  - Circuit Notes
  - Variations
  - Power Supplies
- Parallel Circuits
  - Practical Uses
  - Calculations
  - Circuit Notes
  - Power Supplies
- Series-Parallel Circuits
  - Review
  - Working with Series-Parallel Circuits
  - Voltage
- Multiwire Circuits
  - Neutral Conductor
  - Grounded Conductor
  - Current Flow (Grounded Conductor)
  - Balanced Systems
  - Unbalanced Current
  - Multiwire Branch Circuits
  - Dangers
  - NEC Requirements
- How to Use the NEC
- NEC General Introduction
- Definitions
- Requirements for Electrical Installations
- Grounded Conductors
- Branch Circuits
- Feeders
- Service Calculations
- Outside Wiring
- Services
- Overcurrent Protection
- Print Reading
- One-Family Dwellings
- Device Wiring
- Terminations
- Switching Circuits
- Circuit Layout
- Installation
- CPR

Assessment

Methods of assessment may include projects, quizzes, exams, in or out of class activities, and class participation

Item	% of Grade
Participation	10%
Projects & Assignments	10%
Quizzes	20%
Exams	30%
Labs	30%
Total	**100%**

To the Instructor:

This lesson plan is intended as an outline to help you schedule the semester. You will find that every class is different, and some sessions may require more time than allowed, others may go quickly. Please make notes during the semester and provide us with your feed-back so we may evaluate this schedule for future application.

Please read the forward information in each book used for additional help in understanding the material covered in each lesson. Students learn differently, and the same methods of presentation and study do not necessarily bring the same results for different individuals. Be aware of the differences in learning styles as you present this material to the class. Some individuals learn better visually, and need to see diagrams and illustrations. Others learn from audible input, lectures, and class group discussions.

Hands-on learning is an important component of education, and much of the hands-on learning will be done on the job-site rather than in the classroom. Due to the limitations of classroom facilities, there is not much of an opportunity for hands-on experiments. Keep your eyes open for opportunities to bring equipment and material in to show the class when it is feasible. Just a little “show and tell” of components they have not used yet, like control pushbuttons or AFCI breakers can help add understanding to a lesson. When possible, try to supplement classroom instruction with field trips to view live construction projects that showcase the material being studied.

It is recommended that the lesson material be presented using lecture, including visual aids when possible. PowerPoint presentations using a LCD projector can be very beneficial, but it is understood that the necessary equipment is not always available. In some cases, facilities available may limit the presentation to the use of student books and blackboards.

Make use of student discussion and involvement as much as possible. For instance, in many cases there are workbook questions that are assigned. After completing the questions, have the students take turns reading the question and their answer so they are involved in the process. Do not just read the answers to them or post the answers. Do what you can to involve the students in discussion and allow their input. Answer questions honestly, and don’t be afraid to tell them if you don’t know the answer, but take time to look it up.

Let your students know that you do not know all the answers, but you are there to help them in the learning process. Make them responsible to read and study the information in their text books and participate in discussions. Let them know that learning is a life-long process, and there are always new things to learn in the electrical field. You will be successful as an instructor if you have a heart for your student and help them develop a respect for the electrical profession and a love for learning.

Lesson Plan

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
Orientation *Orientation*	**1**	Orientation	Orientation	**N/A**	
Orientation *Orientation*	**2**	Orientation	Orientation	**N/A**	
Orientation *Orientation*	**3.5**	Orientation	Orientation	**N/A**	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
OSHA 10hr Construction Safety *Introduction to OSHA*	**4.5**	• OSHA lesson plan Introduction to OSHA • Sample lesson plans for the OSHA 10hr Construction Safety Program were obtained from OSHA's website along with the presentations at www.osha.gov	Also contained in the OSHA lesson plans	**Presentation** Introduction to OSHA	
OSHA 10hr Construction Safety *Electrical Safety*	**5.5**	• OSHA lesson plan Electrical Safety • Sample lesson plans for the OSHA 10hr Construction Safety Program were obtained from OSHA's website along with the presentations at www.osha.gov	Also contained in the OSHA lesson plans	**Presentation** Electrical Safety	
OSHA 10hr Construction Safety *Fall Protection*	**7**	• OSHA lesson plan Fall Protection • Sample lesson plans for the OSHA 10hr Construction Safety Program were obtained from OSHA's website along with the presentations at www.osha.gov	Also contained in the OSHA lesson plans	**Presentation** Fall Protection	

Lesson Plan

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
OSHA 10hr Construction Safety *Excavations*	**8**	• OSHA lesson plan Excavations • Sample lesson plans for the OSHA 10hr Construction Safety Program were obtained from OSHA's website along with the presentations at www.osha.gov	Also contained in the OSHA lesson plans	**Presentation** Excavations	
OSHA 10hr Construction Safety *Cranes*	**9**	• OSHA lesson plan Cranes • Sample lesson plans for the OSHA 10hr Construction Safety Program were obtained from OSHA's website along with the presentations at www.osha.gov	Also contained in the OSHA lesson plans	**Presentation** Cranes	
OSHA 10hr Construction Safety *Materials, Handling, Use, and Disposal*	**10.5**	• OSHA lesson plan Materials, Handling, Use, and Disposal • Sample lesson plans for the OSHA 10hr Construction Safety Program were obtained from OSHA's website along with the presentations at www.osha.gov	Also contained in the OSHA lesson plans	**Presentation** Materials, Handling, Use, and Disposal	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
OSHA 10hr Construction Safety *Tools – Hand & Power*	**11.5**	OSHA lesson plan Tools – Hand & Power Sample lesson plans for the OSHA 10hr Construction Safety Program were obtained from OSHA's website along with the presentations at www.osha.gov	Also contained in the OSHA lesson plans	**Presentation** Tools – Hand & Power	
OSHA 10hr Construction Safety *Personal Protective Equipment (PPE)*	**12.5**	OSHA lesson plan Personal Protective Equipment Sample lesson plans for the OSHA 10hr Construction Safety Program were obtained from OSHA's website along with the presentations at www.osha.gov	Also contained in the OSHA lesson plans	**Presentation** Personal Protective Equipment	
OSHA 10hr Construction Safety *Scaffolds*	**14**	OSHA lesson plan Scaffolds Stairways & Ladders Sample lesson plans for the OSHA 10hr Construction Safety Program were obtained from OSHA's website along with the presentations at www.osha.gov	Also contained in the OSHA lesson plans	**Presentation** Scaffolds Stairways & Ladders	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
Chapter 1 **Unit 1*Matter*** **Section 1.1 – 1.4**	**15**	Discuss matter, atomic theory and the law of charges Explain the process of how atoms become ionized both positive and negative	Relate the lesson to an experience they had with static, such as a static shock they may have had	**Text** *Basic Electrical Theory* **Presentation** *Chapter 1, Unit 1* **Video** *Electrical Fundamentals and Basic Electricity* **Additional Resources** NEETS Module 1	
Chapter 1 **Unit 1*Matter*** **Section 1.5 – 1.8**	**16**	Go over static charge, be sure to give examples of how they may have seen static charge in everyday life	Explain the basic components of an atom and describe their charges Understand how an atom becomes positively or negatively charged	**Text** *Basic Electrical Theory* **Presentation** *Chapter 1, Unit 1* **Video** *Electrical Fundamentals and Basic Electricity* **Additional Resources** NEETS Module 1	
Chapter 1 **Unit 1** *Matter* **Review & Quiz**	**17.5**	Take this time to review the unit using the unit summary Direct students to take the unit quiz online	Successfully pass the unit exam within the program completion requirements	**Text** *Basic Electrical Theory* **Presentation** *Chapter 1, Unit 1* **Service** Mike Holt's Online Testing Service	

Lesson Plan

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
Chapter 1 **Unit 2** *Electron Theory* **Section** **2.0 – 2.3**	**18.5**	Introduce the unit and move onto electron orbit, could possibly relate the orbit to that of the solar system Discuss the role of valence electrons on current flow and how electrons are freed from their orbit	Explain orbits and the role the electron plays in electricity Understand the significance of valence electrons	**Text** *Basic Electrical Theory* **Presentation** *Chapter 1, Unit 2* **Video** *Electrical Fundamentals and Basic Electricity* **Additional Resources** NEETS Module 1	
Chapter 1 **Unit 2** *Electron Theory* **Section** **2.4 – 2.8**	**19.5**	Cover sections related to conductors, semiconductors, and insulators Discuss atomic bonding and compounds	Relate the number of valence electrons of an atom to identify it as a conductor, semiconductor, or insulator Give an example of a compound	**Text** *Basic Electrical Theory* **Presentation** *Chapter 1, Unit 2* **Video** *Electrical Fundamentals and Basic Electricity* **Additional Resources** NEETS Module 1	
Chapter 1 **Unit 2** *Electron Theory* **Review & Quiz**	**21**	Take this time to review the unit using the unit summary Direct students to take the unit quiz online	Successfully pass the unit exam within the program completion requirements	**Text** *Basic Electrical Theory* **Presentation** *Chapter 1, Unit 2* **Service** Mike Holt's Online Testing Service	

Lesson Plan

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
Chapter 1 **Unit 3** *Magnetism* **Section** **3.0 – 3.4**	**22**	Discuss how magnetism plays a role in much of the electrical equipment used today Also go over some of the history and early uses of magnetism	Explain the operation of a compass in respect to magnetic polarity	**Text** *Basic Electrical Theory* **Presentation** *Chapter 1, Unit 3* **Video** *Electrical Fundamentals and Basic Electricity* **Additional Resources** NEETS Module 1	
Chapter 1 **Unit 3** *Magnetism* **Section** **3.5 – 3.13**	**23**	Finish the unit here covering all the principles and properties of magnets both permanent and temporary List some electrical components that utilize some form of magnetism	Understand the concepts of magnetism Explain the laws of attraction of magnetic poles Discuss the process in which materials can become magnetized	**Text** *Basic Electrical Theory* **Presentation** *Chapter 1, Unit 3* **Video** *Electrical Fundamentals and Basic Electricity* **Additional Resources** NEETS Module 1	
Chapter 1 **Unit 3** *Magnetism* **Review & Quiz**	**24.5**	Take this time to review the unit using the unit summary Direct students may take the unit quiz online	Successfully pass the unit exam within the program completion requirements	**Text** *Basic Electrical Theory* **Presentation** *Chapter 1, Unit 3* **Service** Mike Holt's Online Testing Service	

Lesson Plan

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
Chapter 1 **Unit 4** *Electricity* **Section** **4.0 – 4.2**	**25.5**	Introduce the unit and discuss the importance of understanding the theory of electricity in respect to understanding complex code rules Explain that throughout the program we will be working with the electron current flow theory Discuss methods in which electrical energy is produced	Understand the importance of a strong knowledge of electrical theory List other current flow theories List methods of creating Electromotive Force	**Text** *Basic Electrical Theory* **Presentation** *Chapter 1, Unit 4* **Video** *Electrical Fundamentals and Basic Electricity* **Additional Resources** NEETS Module 1	
Chapter 1 **Unit 4** *Electricity* **Section** **4.3 – 4.5**	**26.5**	Give examples of each source, their uses, and common applications	Identify uses of each source of electrical energy	**Text** *Basic Electrical Theory* **Presentation** *Chapter 1, Unit 4* **Video** *Electrical Fundamentals and Basic Electricity* **Additional Resources** NEETS Module 1	
Chapter 1 **Unit 4** *Electricity* **Review & Quiz**	**28**	Take this time to review the unit using the unit summary Direct students to take the unit quiz online	Successfully pass the unit exam within the program completion requirements	**Text** *Basic Electrical Theory* **Presentation** *Chapter 1, Unit 4* **Service** Mike Holt's Online Testing Service	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
Chapter 1 **Unit 5** *Electromagnetism* **Section** **5.0 – 5.3**	**29**	Discuss the relationship between current flow and magnetic lines of flux Explain what determines an electromagnet's field intensity Go over field interaction and relate it to prior lessons on laws of attraction	Explain the interaction of magnetic lines of flux in a conductor Utilize prior learning on laws of attraction to determine if conductors would push or pull one another	**Text** *Basic Electrical Theory* **Presentation** *Chapter 1, Unit 5* **Video** *Electrical Fundamentals and Basic Electricity* **Additional Resources** NEETS Module 1	
Chapter 1 **Unit 5** *Electromagnetism* **Section** **5.4 – 5.7**	**30**	Utilizing the left hand rule for conductors explain how the electromagnetic field interacts in a looped conductor Discuss coils and relate it to practical uses such as solenoids Introduce strength of field in respect to cores and Amperes & Turns	Demonstrate the left hand rule for conductors Understand the factors that affect a coils magnetic field	**Text** *Basic Electrical Theory* **Presentation** *Chapter 1, Unit 5* **Video** *Electrical Fundamentals and Basic Electricity* **Additional Resources** NEETS Module 1	
Chapter 1 **Unit 5** *Electromagnetism* **Review & Quiz**	**31.5**	Take this time to review the unit using the unit summary Direct students to take the unit quiz online	Successfully pass the unit exam within the program completion requirements	**Text** *Basic Electrical Theory* **Presentation** *Chapter 1, Unit 5* **Service** Mike Holt's Online Testing Service	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
Chapter 1 **Unit 6** *Uses of Electromagnetism* **Section** **6.0 – 6.1**	**32.5**	Explain how different electrical metering devices utilize electromagnetism to measure different circuit values	List types of electric meters Understand each device and how it utilize a coil for measurement	**Text** *Basic Electrical Theory* **Presentation** *Chapter 1, Unit 6* **Video** *Electrical Fundamentals and Basic Electricity* **Additional Resources** NEETS Module 1	
Chapter 1 **Unit 6** *Uses of Electromagnetism* **Section** **6.2 – 6.4**	**33.5**	Identify other commonly used equipment which utilizes electromagnetism such as motors, generators, and electromagnetic relays	List several electromechanical devices that operate with electromagnetism	**Text** *Basic Electrical Theory* **Presentation** *Chapter 1, Unit 6* **Video** *Electrical Fundamentals and Basic Electricity* **Additional Resources** NEETS Module 1	
Chapter 1 **Unit 6** *Uses of Electromagnetism* **Review & Quiz**	**35**	Take this time to review the unit using the unit summary Direct students to take the unit quiz online Any time available could be used to start the Chapter Review	Successfully pass the unit exam within the program completion requirements	**Text** *Basic Electrical Theory* **Presentation** *Chapter 1, Unit 6* **Service** Mike Holt's Online Testing Service	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
Chapter 2 **Unit 7** *The Electrical Circuit* **Section** **7.0 – 7.3**	**36**	Outline the basic components of an electrical circuit and their significance to it Discuss the differences of electron and convention current flow theories	List electrical characteristics of a circuit and their units of measure Explain the difference between electron and conventional current flow *(student should be aware that we regularly use electron theory in the lessons)*	**Text** *Basic Electrical Theory* **Presentation** *Chapter 2, Unit 7* **Video** *Electrical Fundamentals and Basic Electricity* **Additional Resources** NEETS Module 1	
Chapter 2 **Unit 7** *The Electrical Circuit* **Section** **7.5 – 7.7**	**37**	In detail discuss voltage *(EMF)*, resistance, current *(intensity)*, and power Ensure students understand their relationship and function in the circuit	Understand the relationship of voltage, current, resistance, and power in an electrical circuit	**Text** *Basic Electrical Theory* **Presentation** *Chapter 2, Unit 7* **Video** *Electrical Fundamentals and Basic Electricity* **Additional Resources** NEETS Module 1	
Chapter 2 **Unit 7** *The Electrical Circuit* **Review & Quiz**	**38.5**	Take this time to review the unit using the unit summary Direct students to take the unit quiz online	Successfully pass the unit exam within the program completion requirements	**Text** *Basic Electrical Theory* **Presentation** *Chapter 2, Unit 7* **Service** Mike Holt's Online Testing Service	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
1st Quarter Review	**39.5**	• Review all material from the 1st quarter utilizing unit summaries to prepare students for the quarter final examination • Make sure that all of the information that will be on the exam is covered	N/A	• **All quarter material used**	
1st Quarter Review	**40.5**	• Review all material from the 1st quarter utilizing unit summaries to prepare students for the quarter final examination • Make sure that all of the information that will be on the exam is covered	N/A	• **All quarter material used**	
1st Quarter Review	**42**	• Review all material from the 1st quarter utilizing unit summaries to prepare students for the quarter final examination • Make sure that all of the information that will be on the exam is covered	N/A	• **All quarter material used**	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
1st Quarter Final Examination	**43**	• N/A	Successfully pass the 1st quarter final exam within the program completion requirements	Not an open book exam	
1st Quarter Final Examination	**44**	• N/A	Successfully pass the 1st quarter final exam within the program completion requirements	Not an open book exam	
1st Quarter Final Examination	**45.5**	• N/A	Successfully pass the 1st quarter final exam within the program completion requirements	Not an open book exam	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
Chapter 2 **Unit 8** *Math* **Section** **8.0 – 8.7**	**46.5**	• Utilizing the textbook, introduce some basic mathematical terms and rules like whole numbers, decimals, fractions, percentages, multipliers, percent increases, and reciprocals • Be sure that students have a sound understanding of these basic rules as it is essential to their understanding of the trade	• Demonstrate the ability to perform the basic mathematics in this unit as it is essential to the electrical trade	• **Text** *Basic Electrical Theory* • **Presentation** *Chapter 2, Unit 8* • **Video** *Electrical Fundamentals and Basic Electricity* • **Additional Resources** NEETS Module 1	
Chapter 2 **Unit 8** *Math* **Section** **8.8 – 8.14**	**47.5**	• Finish up the unit going over squaring, square roots, volume, metric prefix kilo, rounding, and parentheses	• Demonstrate the ability to perform the basic mathematics in this unit as it is essential to the electrical trade	• **Text** *Basic Electrical Theory* • **Presentation** *Chapter 2, Unit 8* • **Video** *Electrical Fundamentals and Basic Electricity* • **Additional Resources** NEETS Module 1	
Chapter 2 **Unit 8** *Math* **Review & Quiz**	**49**	• Take this time to review the unit using the unit summary • Direct students to take the unit quiz online	• Successfully pass the unit exam within the program completion requirements	• **Text** *Basic Electrical Theory* • **Presentation** *Chapter 2, Unit 8* • **Service** Mike Holt's Online Testing Service	

Lesson Plan

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
Chapter 2 **Unit 9** *Electrical Formulas* **Section** **9.0 – 9.4**	**50**	• Identify the basic components of the electric circuit • State some advantages of AC over DC especially in respect to power transmission and distribution • List the best electrical conductors in order • Discuss all contributing factors in determining overall resistance in a circuit	• Understand components of electrical circuits • Explain both types of current, direct and alternating • State in order the best conductors of electricity	• **Text** *Basic Electrical Theory* • **Presentation** *Chapter 2, Unit 9* • **Video** *Electrical Fundamentals and Basic Electricity* • **Additional Resources** NEETS Module 1	
Chapter 2 **Unit 9** *Electrical Formulas* **Section** **9.5 – 9.13**	**51**	• Discuss Ohm's Law in DC and AC Circuits • Instruct students on the proper use of the power wheel for calculating circuit values • Explain aspects of power in relation to losses, cost, and voltage	• Demonstrate a mastery of utilizing the power wheel to calculate unknown values for given circuits	• **Text** *Basic Electrical Theory* • **Presentation** *Chapter 2, Unit 9* • **Video** *Electrical Fundamentals and Basic Electricity* • **Additional Resources** NEETS Module 1	
Chapter 2 **Unit 9** *Electrical Formulas* **Review & Quiz**	**52.5**	• Take this time to review the unit using the unit summary • Direct students to take the unit quiz online	• Successfully pass the unit exam within the program completion requirements	• **Text** *Basic Electrical Theory* • **Presentation** *Chapter 2, Unit 9* • **Service** Mike Holt's Online Testing Service	

Lesson Plan

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
Chapter 3 **Unit 10** *Series Circuits* **Section** **10.0 – 10.2**	**53.5**	• Discuss common uses of series circuits as it applies to electrical construction • State laws for series circuits	• List the rules for series circuits	• **Text** *Basic Electrical Theory* • **Presentation** *Chapter 3, Unit 10* • **Video** *Electrical Circuits, Systems, and Protection* • **Additional Resources** NEETS Module 1	
Chapter 3 **Unit 10** *Series Circuits* **Section** **10.3 – 10.7**	**54.5**	• Instruct students on how to perform calculations pertaining to series circuits • Allow the students to do some practice problems	• Perform all basic circuit calculations for series circuits	• **Text** *Basic Electrical Theory* • **Presentation** *Chapter 3, Unit 10* • **Video** *Electrical Circuits, Systems, and Protection* • **Additional Resources** NEETS Module 1	
Chapter 3 **Unit 10** *Series Circuits* **Review & Quiz**	**56**	• Take this time to review the unit using the unit summary • Direct students to take the unit quiz online	• Successfully pass the unit exam within the program completion requirements	• **Text** *Basic Electrical Theory* • **Presentation** *Chapter 3, Unit 10* • **Service** Mike Holt's Online Testing Service	

Lesson Plan

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
Chapter 3 **Unit 11** ***Parallel Circuits*** **Section** **11.0 – 11.2**	**57**	• Discuss common uses of parallel circuits as it applies to electrical construction • State laws for parallel circuits	• List the rules for parallel circuits	• **Text** *Basic Electrical Theory* • **Presentation** *Chapter 3, Unit 11* • **Video** *Electrical Circuits, Systems, and Protection* • **Additional Resources** NEETS Module 1	
Chapter 3 **Unit 11** ***Parallel Circuits*** **Section** **11.3 – 11.5**	**58**	• Instruct students on how to perform calculations pertaining to parallel circuits • Allow the students to do some practice problems	• Perform all basic circuit calculations for parallel circuits	• **Text** *Basic Electrical Theory* • **Presentation** *Chapter 3, Unit 11* • **Video** *Electrical Circuits, Systems, and Protection* • **Additional Resources** NEETS Module 1	
Chapter 3 **Unit 11** ***Parallel Circuits*** **Review & Quiz**	**59.5**	• Take this time to review the unit using the unit summary • Direct students to take the unit quiz online	• Successfully pass the unit exam within the program completion requirements	• **Text** *Basic Electrical Theory* • **Presentation** *Chapter 3, Unit 11* • **Service** Mike Holt's Online Testing Service	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
Chapter 3 **Unit 12** ***Series-Parallel Circuits*** **Section** **12.0 – 12.1**	**60.5**	• Review series and parallel circuits • Discuss how the circuit rules apply to series and parallel connected devices when working with series-parallel circuits	• Understand how components are affected when connected series-parallel	• **Text** *Basic Electrical Theory* • **Presentation** *Chapter 3, Unit 12* • **Video** *Electrical Circuits, Systems, and Protection* • **Additional Resources** NEETS Module 1	
Chapter 3 **Unit 12** ***Series-Parallel Circuits*** **Section** **12.2 – 12.3**	**61.5**	• Discuss practical uses of series-parallel circuits • List circuits that contain series-parallel connections	• Identify several examples of where and why one might utilize series-parallel connections	• **Text** *Basic Electrical Theory* • **Presentation** *Chapter 3, Unit 12* • **Video** *Electrical Circuits, Systems, and Protection* • **Additional Resources** NEETS Module 1	
Chapter 3 **Unit 12** ***Series-Parallel Circuits*** **Review & Quiz**	**63**	• Take this time to review the unit using the unit summary • Direct students to take the unit quiz online	• Successfully pass the unit exam within the program completion requirements	• **Text** *Basic Electrical Theory* • **Presentation** *Chapter 3, Unit 12* • **Service** Mike Holt's Online Testing Service	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
Chapter 3 **Unit 13** ***Multiwire Circuits*** **Section** **13.0 – 13.5**	**64**	• Discuss the role the neutral conductor plays in multiwire circuits and its current flow • Explain unbalanced current and balance systems	• Understand the advantages and dangers of multiwire circuits • Determine the unbalanced current for some given circuits and systems	• **Text** *Basic Electrical Theory* • **Presentation** *Chapter 3, Unit 13* • **Video** *Electrical Circuits, Systems, and Protection* • **Additional Resources** NEETS Module 1	
Chapter 3 **Unit 13** ***Multiwire Circuits*** **Section** **13.6 – 13.8**	**65**	• Introduce branch circuits and utilizing multiwire circuits • Talk about some of the code requirements when employing multiwire circuits *(These requirements will be discussed in greater detail in year two)*	• Demonstrate a basic understanding of the requirements when working with multiwire branch circuits	• **Text** *Basic Electrical Theory* • **Presentation** *Chapter 3, Unit 13* • **Video** *Electrical Circuits, Systems, and Protection* • **Additional Resources** NEETS Module 1	
Chapter 3 **Unit 13** ***Multiwire Circuits*** **Review & Quiz**	**66.5**	• Take this time to review the unit using the unit summary • Direct students to take the unit quiz online	• Successfully pass the unit exam within the program completion requirements	• **Text** *Basic Electrical Theory* • **Presentation** *Chapter 3, Unit 13* • **Service** Mike Holt's Online Testing Service	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
How to use the NEC *Video*	**67.5**	• Show the video on "How to Use the NEC"	• Possess a general understanding of how to use the National Electrical Code and its intent • Explain the general layout of the NEC	• **Video** *How to Use the NEC*	
How to use the NEC *Video*	**68.5**	• Show the video on "How to Use the NEC"	• Possess a general understanding of how to use the National Electrical Code and its intent • Explain the general layout of the NEC	• **Video** *How to Use the NEC*	
How to use the NEC *Video*	**70**	• Show the video on "How to Use the NEC"	• Possess a general understanding of how to use the National Electrical Code and its intent • Explain the general layout of the NEC	• **Video** *How to Use the NEC*	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
The National Electrical Code *Introduction* **Article 90.1 – 90.2**	**71**	• Discuss the history of the NEC in regards to when it was established and how it is updated • Explain the purpose of the NEC, practical safeguarding, adequacy, and intention • Cover the scope of the NEC, What is and isn't covered	• Understand the intent and purpose of the NEC • List locations both covered and not covered by the NEC	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 90-110* • **Video** *General Requirements, Circuits and Protection 1*	
The National Electrical Code *Introduction* **Article 90.3 – 90.9**	**72**	• Go over how the code is arranged and how articles relate to one another • Discuss mandatory and permissive rules as well as explanatory material	• List the general articles and the supplemental and modifying articles as well as communications and tables • Identify key words that signify mandatory and permissive rules	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 90-110* • **Video** *General Requirements, Circuits and Protection 1*	
The National Electrical Code *Introduction* **Article Quiz 90**	**73.5**	• Take this time to review the articles • Direct students to take the article quiz online	• Successfully pass the article exam within the program completion requirements	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 90-110* • **Service** Mike Holt's Online Testing Service	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
2nd Quarter Review	**74.5**	• Review all material from the 2nd quarter utilizing unit summaries to prepare students for the quarter final examination • Make sure that all of the information that will be on the exam is covered	• N/A	• **All quarter material used**	_____ _____ _____ _____ _____
2nd Quarter Review	**75.5**	• Review all material from the 2nd quarter utilizing unit summaries to prepare students for the quarter final examination • Make sure that all of the information that will be on the exam is covered	• N/A	• **All quarter material used**	_____ _____ _____ _____ _____
2nd Quarter Review	**77**	• Review all material from the 2nd quarter utilizing unit summaries to prepare students for the quarter final examination • Make sure that all of the information that will be on the exam is covered	• N/A	• **All quarter material used**	_____ _____ _____ _____ _____

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
2nd Quarter Final Examination	**78**	• N/A	• Successfully pass the 2nd quarter final exam within the program completion requirements	• Not an open book exam	
2nd Quarter Final Examination	**79**	• N/A	• Successfully pass the 2nd quarter final exam within the program completion requirements	• Not an open book exam	
2nd Quarter Final Examination	**80.5**	• N/A	• Successfully pass the 2nd quarter final exam within the program completion requirements	• Not an open book exam	

Lesson Plan

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
The National Electrical Code *Definitions 1* **Article 100**	**81.5**	• Explain the importance of understanding the language of the code and the meaning of the terms contain within the NEC Cover definitions A - E	• Understand the meaning of terms used throughout the NEC • Explain why some terms are contained in specific articles	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 90-110* • **Video** *General Requirements, Circuits and Protection 1*	
The National Electrical Code *Definitions 1* **Article 100**	**82.5**	• Explain the importance of understanding the language of the code and the meaning of the terms contain within the NEC Cover definitions F - K	• Understand the meaning of terms used throughout the NEC • Explain why some terms are contained in specific articles	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 90-110* • **Video** *General Requirements, Circuits and Protection 1*	
The National Electrical Code *Definitions 1* **Article 100**	**84**	• Explain the importance of understanding the language of the code and the meaning of the terms contain within the NEC Cover definitions L - P	• Understand the meaning of terms used throughout the NEC • Explain why some terms are contained in specific articles	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 90-110* • **Video** *General Requirements, Circuits and Protection 1*	

Lesson Plan

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
The National Electrical Code *Definitions 2* **Article 100**	**85**	• Explain the importance of understanding the language of the code and the meaning of the terms contain within the NEC • Cover definitions Q - U	• Understand the meaning of terms used throughout the NEC • Explain why some terms are contained in specific articles	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 90-110* • **Video** *General Requirements, Circuits and Protection 1*	
The National Electrical Code *Definitions 2* **Article 100**	**86**	• Explain the importance of understanding the language of the code and the meaning of the terms contain within the NEC • Cover definitions V - Z	• Understand the meaning of terms used throughout the NEC • Explain why some terms are contained in specific articles	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 90-110* • **Video** *General Requirements, Circuits and Protection 1*	
The National Electrical Code *Definitions 1 & 2* **Article Quiz 100**	**87.5**	• Take this time to review the articles • Direct students to take the article quiz online	• Successfully pass the article exam within the program completion requirements	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 90-110* • **Service** Mike Holt's Online Testing Service	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
The National Electrical Code *Requirements for Electrical Installations 1* **Article 110.1 – 110.9**	**88.5**	• Introduce article 110 by covering the scope • Ensure students understand the significance of 110.3(B) • Discuss interrupting ratings of overcurrent devices	• Demonstrate a clear understanding of the importance of installing products in accordance to their listing and or labeling	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 90-110* • **Video** *General Requirements, Circuits and Protection 1*	
The National Electrical Code *Requirements for Electrical Installations 1* **Article 110.10 – 110.14**	**89.5**	• Explain short circuit current and short circuit current ratings of electrical equipment • Cover deteriorating agents and mechanical execution of work • Thoroughly explain electrical connections focusing on temperature limitations and equipment provisions	• Select overcurrent devices properly in respect to available short circuit current and interrupting rating • Identify lowest associated temperature rating for a circuit and understand how it applies to conductor sizing	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 90-110* • **Video** *General Requirements, Circuits and Protection 1*	
The National Electrical Code *Requirements for Electrical Installations 1* **Article 110.15 – 110.22**	**91**	• Discuss 4 wire delta connected systems, the high leg, and its required identification • Go over flash protection warnings • Utilize the NEC table to explain enclosure types and selection	• Explain the requirements for high leg identification and flash protection warning signs • Properly select an enclosure for a given installation condition	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 90-110* • **Service** Mike Holt's Online Testing Service	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
The National Electrical Code *Requirements for Electrical Installations 2* ***Article 110.26***	**92**	• Explain spaces about electrical equipment • Discuss working depth in relation to voltage and condition as shown in table 110.26(A)(1) • Also cover working width, height, and clear spaces here	• Determine the proper working depth utilizing table 110.26(A)(1) for given voltages and conditions • State the required working width and height for given equipment sizes	• ***Text*** *Understanding the NEC Volume 1 & The NEC 2008* • ***Presentation*** *UNEC Vol 1, 90-110* • ***Video*** *General Requirements, Circuits and Protection 1*	
The National Electrical Code *Requirements for Electrical Installations 2* ***Article 110.26***	**93**	• Cover entrances and egresses of working space including requirements for large equipment • Wrap up working spaces with head room, dedicated space, and locked rooms and enclosures	• Layout electrical equipment with proper clearances along with adequate entrance/egress • Explain the requirements for foreign systems in dedicated electrical spaces	• ***Text*** *Understanding the NEC Volume 1 & The NEC 2008* • ***Presentation*** *UNEC Vol 1, 90-110* • ***Video*** *General Requirements, Circuits and Protection 1*	
The National Electrical Code *Requirements for Electrical Installations 2* ***Article Quiz 110***	**94.5**	• Take this time to review the articles • Direct students to take the article quiz online	• Successfully pass the article exam within the program completion requirements	• ***Text*** *Understanding the NEC Volume 1 & The NEC 2008* • ***Presentation*** *UNEC Vol 1, 90-110* • ***Service*** *Mike Holt's Online Testing Service*	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
The National Electrical Code *Wiring & Protection Grounded (Neutral) Conductor* **Article 200.1 – 200.6**	**95.5**	• Introduce the article and then discuss neutral conductor continuity requirements • Discuss and demonstrate proper methods of identification for grounded conductors	• List acceptable methods of identification for grounded conductors for given size conductors	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Video** *General Requirements, Circuits and Protection 2*	
The National Electrical Code *Wiring & Protection Grounded (Neutral) Conductor* **Article 200.7 – 200.11**	**96.5**	• Discuss methods of re-identifying white conductors within multi-conductor cables • Explain terminal identification • Give examples of the dangers of incorrect polarity of neutral terminals or leads	• Identify grounded (neutral) conductor terminals	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Video** *General Requirements, Circuits and Protection 2*	
The National Electrical Code *Wiring & Protection Grounded (Neutral) Conductor* **Article Quiz 200**	**98**	• Take this time to review the article • Direct students to take the article quiz online	• Successfully pass the article quiz within the program completion requirements	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Service** Mike Holt's Online Testing Service	

Lesson Plan

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
The National Electrical Code *Wiring & Protection Branch Circuits 1* **Article 210.1 – 210.7**	**99**	• Introduce the article and discuss articles with specific branch circuit requirements • Explain what determines a branch circuits rating • Cover multiwire branch circuit requirements	• Identify the components of branch circuits • Reference the branch circuit rating with respect to installed equipment • Explain the NEC requirements of multiwire branch circuits	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Video** *General Requirements, Circuits and Protection 2*	
The National Electrical Code *Wiring & Protection Branch Circuits 1* **Article 210.8 – 210.11**	**100**	• Relate prior lessons on ground fault devices and protection to GFCI branch circuit requirements • Discuss required branch circuits focusing on specific dwelling unit requirements	• Explain and reference GFCI requirements as covered by the NEC • List all outlets and equipment, in dwelling occupancies, that require GFCI protection as covered by the NEC	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Video** *General Requirements, Circuits and Protection 2*	
The National Electrical Code *Wiring & Protection Branch Circuits 1* **Article 210.12 – 210.19**	**101.5**	• Cover AFCI requirements for dwelling unit branch circuits • Discuss branch circuit ratings • Point out that neutral conductors not terminating on an overcurrent device do not have to be sized at 125% for continuous loads	• Explain and reference AFCI requirements as covered by the NEC • List all outlets and equipment, in dwelling occupancies, that require AFCI protection as covered by the NEC	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Video** *General Requirements, Circuits and Protection 2*	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
The National Electrical Code *Wiring & Protection Branch Circuits 2* **Article 210.20 – 210.50**	**102.5**	• Cover branch circuit overcurrent protection • Explain outlet device ratings for branch circuits and cord and plug connected loads • Cover sections on permissible loads, multiple occupancies and required outlets general requirements	• Select the proper OCPD for branch circuits based on intended use as required by the NEC • Select appropriate outlet device ratings for circuit installation as required by the NEC • Iterate requirements for cord-and-plug connected loads	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Video** *General Requirements, Circuits and Protection 2*	
The National Electrical Code *Wiring & Protection Branch Circuits 2* **Article 210.52 – 210.52(A)**	**103.5**	• Begin the article dealing with required dwelling unit receptacle outlets • Discuss general provisions, spacing, wall space, and floor receptacles	• Explain the constitution of “wall space” according to the NEC, as it pertains to the location of “general use” receptacle outlets within dwelling occupancies	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Video** *General Requirements, Circuits and Protection 2*	
The National Electrical Code *Wiring & Protection Branch Circuits 2* **Article 210.52(B) - 210.52(C)**	**105**	• Cover small appliance outlet requirements • Explain spacing of receptacles for all countertop spaces	• Explain the constitution of “countertop space” according to the NEC, as it pertains to the location of receptacles served by small appliance branch circuits	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Video** *General Requirements, Circuits and Protection 2*	

Lesson Plan

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
The National Electrical Code *Wiring & Protection Branch Circuits 3* **Article 210.52(D) – 210.52(H)**	**106**	• Discuss the requirements for dwelling unit bathrooms, garages, basements, outdoors, and hallways	• Iterate branch circuits permitted to serve the required outlets of 210.52(D) through 210.52(H) • Iterate specific requirements of these outlets	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Video** *General Requirements, Circuits and Protection 2*	
The National Electrical Code *Wiring & Protection Branch Circuits 3* **Article 210.60 - 210.70**	**107**	• Explain permissions for guest room, suite, dormitories, and similar occupancies in respect to placement for permanent furniture layout	• Iterate how locations of outlets may be deviate from the requirements normally imposed for these occupancy types	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Video** *General Requirements, Circuits and Protection 2*	
The National Electrical Code *Wiring & Protection Branch Circuits 1, 2, & 3* **Article Quiz 210**	**108.5**	• Take this time to review the article • Direct students to take the article quiz online	• Successfully pass the article quiz within the program completion requirements	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Service** Mike Holt's Online Testing Service	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
The National Electrical Code *Wiring & Protection of Feeders* **Article 215.1-215.6**	**109.5**	• Explain the scope of the article with practical examples of equipment and illustrations • Discuss ampacity calculation for feeder conductors • Discuss load calculation for selecting OCPD for feeder conductors • Discuss equipment grounding conductor sizing and terminating	• Determine selection ampacity for feeder conductors • Determine OCPD ratings of feeder conductors • Determine minimum equipment grounding conductor size for feeder circuits	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Video** *General Requirements, Circuits and Protection 2*	
The National Electrical Code *Wiring & Protection of Feeders* **Article 215.7-215.12**	**110.5**	• Discuss ground-fault protection of equipment • Discuss identification for feeder conductors	• Properly identify feeder conductors according to NEC requirements	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Video** *General Requirements, Circuits and Protection 2*	
The National Electrical Code *Wiring & Protection of Feeders* **Article Quiz 215**	**112**	• Take this time to review the article • Direct students to take the article quiz online	• Successfully pass the article quiz within the program completion requirements	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Service** Mike Holt's Online Testing Service	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
The National Electrical Code *Wiring & Protection of Branch Circuits, Feeders, and Service Calculations* **Article 220.1 – 220.18**	**113**	• Express the realization of branch circuit loading, not service/feeder loading • Point out continuous loads by reference to other articles • Recap selection ampacity calculations, proper use of Table 310.16, and standard OCPD ratings listed in 240.6(A)	• Calculate branch circuit loads and selection ampacities • Select proper OCPD for branch circuits • Select minimum conductor size for branch circuits	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Video** *General Requirements, Circuits and Protection 2*	
The National Electrical Code *Wiring & Protection of Branch Circuits, Feeders, and Service Calculations* **Article 220.40 – 220.85**	**114**	• Express the realization of service/feeder loading, not branch circuit loading • Point out continuous loads by reference to other articles • Recap selection ampacity calculations, proper use of Table 310.16, permission to use Table 310.15(B)(6), and standard OCPD ratings listed in 240.6(A)	• Calculate service/feeder loads and selection ampacities • Select proper OCPD for service/feeder loads • Select minimum conductor size for service/feeders	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Video** *General Requirements, Circuits and Protection 2*	
The National Electrical Code *Wiring & Protection of Branch Circuits, Feeders, and Service Calculations* **Article Quiz 220**	**115.5**	• Take this time to review the article • Direct students to take the article quiz online	• Successfully pass the article quiz within the program completion requirements	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Service** Mike Holt's Online Testing Service	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
The National Electrical Code *Wiring & Protection Outside Wiring* **Article 225**	**116.5**	• Cover Article 225 in its entirety • Exhibit equipment commonly used for outdoor installations • Exhibit the function and mechanics of equipment commonly used for outdoor installations	• Select appropriate equipment for outside wiring • Assemble appropriate equipment necessary for outdoor wiring installations	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Video** *General Requirements, Circuits and Protection 2*	
The National Electrical Code *Wiring & Protection Outside Wiring* **Article 230**	**117.5**	• Cover Article 225 in its entirety • Exhibit commonly used service equipment • Exhibit the function and mechanics of commonly used service equipment	• Select appropriate equipment for service installations • Assemble appropriate equipment necessary for service installations	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Video** *General Requirements, Circuits and Protection 2*	
The National Electrical Code *Wiring & Protection Outside Wiring* **Article Quiz 225 & 230**	**119**	• Take this time to review the articles • Direct students to take the article quizzes online	• Successfully pass the article quizzes within the program completion requirements	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Service** Mike Holt's Online Testing Service	

Lesson Plan

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
The National Electrical Code *Wiring & Protection of Services* **Article 225**	**120**	• Cover Article 230 in its entirety • Exhibit equipment commonly used for outdoor installations Exhibit the function and mechanics of equipment commonly used for outdoor installations	• Select appropriate equipment for outside wiring • Assemble appropriate equipment necessary for outdoor wiring installations	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Video** *General Requirements, Circuits and Protection 2*	
The National Electrical Code *Wiring & Protection of Services* **Article 230**	**121**	• Cover Article 230 in its entirety • Exhibit commonly used service equipment • Exhibit the function and mechanics of commonly used service equipment	• Select appropriate equipment for service installations • Assemble appropriate equipment necessary for service installations	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Video** *General Requirements, Circuits and Protection 2*	
The National Electrical Code *Wiring & Protection of Services* **Article Quiz 225 & 230**	**122.5**	• Take this time to review the articles • Direct students to take the article quizzes online	• Successfully pass the article quizzes within the program completion requirements	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Service** Mike Holt's Online Testing Service	

Lesson Plan

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
The National Electrical Code *Wiring & Protection* *Overcurrent Protection* **Article 240.1-240.15**	**123.5**	• Cover definitions of article 240 • Point out that overcurrent protection for specific appliances should be referenced within the article that governs that type of equipment • Be sure to cover 240.4 • Point out the list of standard OCPD ratings	• Be able to reference OCPD for specific equipment or appliances • Know the conditions necessary for choosing the next OCPD rating above the ampacity of a conductor • Reference standard OCPD ratings	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Video** *General Requirements, Circuits and Protection 2*	
The National Electrical Code *Wiring & Protection* *Overcurrent Protection* **Article 240.21-240.85**	**124.5**	• Discuss the location of OCPD in the circuit • Make an emphasis on understanding tap conductors • Cover fuse and circuit breaker types and requirements	• Install the OCPD at the branch circuit origin • Utilize tap rules properly where permitted • Iterate fuse types and requirements as well as breaker types and requirements	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Video** *General Requirements, Circuits and Protection 2*	
The National Electrical Code *Wiring & Protection* *Overcurrent Protection* **Article Quiz 240**	**126**	• Take this time to review the article • Direct students to take the article quiz online	• Successfully pass the article quiz within the program completion requirements	• **Text** *Understanding the NEC Volume 1 & The NEC 2008* • **Presentation** *UNEC Vol 1, 200-285* • **Service** Mike Holt's Online Testing Service	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
3rd Quarter Review	**127**	• Review all material from the 3rd quarter utilizing unit summaries to prepare students for the quarter final examination • Make sure that all of the information that will be on the exam is covered	• N/A	• **All quarter material used**	
3rd Quarter Review	**128**	• Review all material from the 3rd quarter utilizing unit summaries to prepare students for the quarter final examination • Make sure that all of the information that will be on the exam is covered	• N/A	• **All quarter material used**	
3rd Quarter Review	**129.5**	• Review all material from the 3rd quarter utilizing unit summaries to prepare students for the quarter final examination • Make sure that all of the information that will be on the exam is covered	• N/A	• **All quarter material used**	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
3rd Quarter Final Examination	**130.5**	• N/A	• Successfully pass the 3rd quarter final exam within the program completion requirements	Not an open book exam	
3rd Quarter Final Examination	**131.5**	• N/A	• Successfully pass the 3rd quarter final exam within the program completion requirements	Not an open book exam	
3rd Quarter Final Examination	**133**	• N/A	• Successfully pass the 3rd quarter final exam within the program completion requirements	Not an open book exam	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
Blueprint Reading *Print-reading* **Chapter 1** **Pages 5-13**	**134**	***Cover sections on:*** • Prints • Shape Description • Written Description •	• Take measurements based on drawing scales • Decipher drawing scales when dimensions are given	• **Text** *Printreading Based on the 2008 NEC*	
Blueprint Reading *Print-reading* **Chapter 1** **Pages 13-22**	**135**	***Cover sections on:*** • Printreading • Plot and Plans • Details •	• Recognize and use symbols in order to read and create plans • Reference relevant details within the plan that happen to not be in the electrical portion of the plan	• **Text** *Printreading Based on the 2008 NEC*	
Blueprint Reading **Chapter 1** *Print-reading* **Review & Quiz**	**136.5**	• Take this time to review the chapter • Direct students to take the chapter quiz	• Successfully pass the chapter exam within the program completion requirements	• **Text** *Printreading Based on the 2008 NEC*	

Lesson Plan

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
Blueprint Reading *Print-Reading* *One Family Dwellings* **Chapter 2** **Pages 31 - 50**	**137.5**	***Cover sections on:*** • Symbols • Details • Description	• Take measurements based on drawing scales • Decipher drawing scales when dimensions are given	• **Text** *Printreading Based on the 2008 NEC*	
Blueprint Reading *Print-Reading* *One Family Dwellings* **Chapter 2** **Pages 51 - 70**	**138.5**	***Cover sections on:*** • Printreading • Plot and Plans • Details	• Recognize and use symbols in order to read and create plans • Reference relevant details within the plan that happen to not be in the electrical portion of the plan	• **Text** *Printreading Based on the 2008 NEC*	
Blueprint Reading **Chapter 2** ***Print*-Reading** *One Family Dwellings* **Review & Quiz**	**140**	• Take this time to review the chapter • Direct students to take the chapter quiz	• Successfully pass the chapter exam within the program completion requirements	• **Text** *Printreading Based on the 2008 NEC*	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
Practical Application 1 *Residential Wiring Device Wiring & Terminations*	**141**	• Explain proper device wiring and terminations	• Recognize proper device wiring and terminations	• **Discussion** • **Demonstration** • **Practical Applications**	
Practical Application 1 *Residential Wiring Device Wiring & Terminations*	**142**	• Exhibit proper device wiring and terminations	• Exhibit proper device wiring and terminations	• **Discussion** • **Demonstration** • **Practical Applications**	
Practical Application 1 *Residential Wiring Device Wiring & Terminations*	**143.5**	• Aid students in proper device wiring and terminations	• Exhibit proper device wiring and terminations	• **Discussion** • **Demonstration** • **Practical Applications**	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
Practical Application 2 *Residential Wiring Switching Circuits*	**144.5**	• Explain the operation of switching circuits • Show different scenarios of supply location at different devices	• Recognize different scenarios of supply location at different devices	• **Discussion** • **Demonstration** • **Practical Applications**	
Practical Application 2 *Residential Wiring Switching Circuits*	**145.5**	• Exhibit proper connections when source is at a switch location	• Exhibit proper connections when source is at a switch location	• **Discussion** • **Demonstration** • **Practical Applications**	
Practical Application 2 *Residential Wiring Switching Circuits*	**147**	• Exhibit proper connections when source is at a lighting outlet location	• Exhibit proper connections when source is at a lighting outlet location	• **Discussion** • **Demonstration** • **Practical Applications**	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
Practical Application 3 *Residential Wiring Circuit Layout & Installation 1*	**148**	• Exhibit proper installation of boxes, cables, and supporting means	• Exhibit proper installation of boxes, cables, and supporting means	• **Discussion** • **Demonstration** • **Practical Applications**	
Practical Application 3 *Residential Wiring Circuit Layout & Installation 1*	**149**	• Exhibit the practical order of installation	• Exhibit the practical order of installation	• **Discussion** • **Demonstration** • **Practical Applications**	
Practical Application 3 *Residential Wiring Circuit Layout & Installation 1*	**150.5**	• Exhibit the proper methods of installation as to not damage the cables, conductors, or boxes	• Exhibit the proper methods of installation as to not damage the cables, conductors, or boxes	• **Discussion** • **Demonstration** • **Practical Applications**	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
Practical Application 4 *First Aid & CPR*	**151.5**	• *First Aid & CPR*	• *First Aid & CPR*	• **Discussion** • **Demonstration** • **Practical Applications**	
Practical Application 4 *First Aid & CPR*	**152.5**	• *First Aid & CPR*	• *First Aid & CPR*	• **Discussion** • **Demonstration** • **Practical Applications**	
Practical Application 4 *First Aid & CPR*	**154**	• *First Aid & CPR*	• *First Aid & CPR*	• **Discussion** • **Demonstration** • **Practical Applications**	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
4th Quarter Review	**155**	• Review all material from the 4th quarter utilizing unit summaries to prepare students for the semester final examination • Make sure that all of the information that will be on the exam is covered	• N/A	• **All semester material used** •	_____ _____ _____ _____ _____
4th Quarter Review	**156**	• Review all material from the 4th quarter utilizing unit summaries to prepare students for the semester final examination • Make sure that all of the information that will be on the exam is covered	• N/A	• **All semester material used** •	_____ _____ _____ _____ _____
4th Quarter Review	**157.5**	• Review all material from the 4th quarter utilizing unit summaries to prepare students for the semester final examination • Make sure that all of the information that will be on the exam is covered	• N/A	• **All semester material used** •	_____ _____ _____ _____ _____

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
4th Quarter Final Examination	**158.5**	• N/A	• Successfully pass the 4th quarter final exam within the program completion requirements	Not an open book exam	
4th Quarter Final Examination	**159.5**	• N/A	• Successfully pass the 4th quarter final exam within the program completion requirements	Not an open book exam	
4th Quarter Final Examination	**161**	• N/A	• Successfully pass the 4th quarter final exam within the program completion requirements	Not an open book exam	

Section/Topic	Hour	Teaching Outline *Instructor should:*	Learning Objectives *Students should be able to:*	Text / Resources	Notes
4th Quarter Examination Review	**162**	• Handout graded exams • Go over the exam questions and answers • Collect the exams and file them in accordance to school policy	• Identify questions they answered incorrectly and where the mistakes were made • Review deficient areas	• **All semester material used**	
4th Quarter Examination Review	**163**	• Handout graded exams • Go over the exam questions and answers • Collect the exams and file them in accordance to school policy	• Identify questions they answered incorrectly and where the mistakes were made • Review deficient areas	• **All semester material used**	
4th Quarter Examination Review	**164.5**	• Handout graded exams • Go over the exam questions and answers • Collect the exams and file them in accordance to school policy	• Identify questions they answered incorrectly and where the mistakes were made • Review deficient areas	• **All semester material used**	