



Apprenticeship Training Program

Year Two



Syllabus

Year Two

TOPICS: AC Fundamentals & Commercial Wiring

CONTACT HOURS: 164.5

PREREQUISITES: None

INSTRUCTOR NAME:

INSTRUCTOR CONTACT INFORMATION:

START DATE:

END DATE:

Description: This semester focuses on the principles of alternating current. Major areas of focus are on inductance, capacitance, and electrical circuits. Electrical systems are also discussed in depth. Some equipment specific to alternating current will be introduced. Commercial wiring methods and practices will also be covered in depth during this training year.

Upon Successful completion students should be able to;

- List advantages of utilizing alternating current
- State the operation and purpose of overcurrent and ground fault protection
- Explain inductance and capacitance as well as their respective reactance
- 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
- Understand the importance of grounding and bonding
- Demonstrate proper use of PPE and electrical meters (Multimeters)
- Demonstrate good conduit bending techniques
- Install conductors in various raceway types correctly

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

- PPE
- The Electrical System
 - Current Flow
 - Utility Neutral Current Path
 - Utility Ground-Fault Current Path
 - Conductor Voltage Drop
 - Conductor Power Loss
 - Generating Plants
 - Transmission Line
 - Primary Distribution Feeders
 - Distribution Transformer
 - Secondary Distribution Line
- Protection Devices
 - Overcurrent Protective Devices
 - Ground-Fault Circuit Interrupters
 - Arc-Fault Circuit Interrupters
 - Ground-Fault Protection of Equipment
- Alternating Current
 - Current Flow
 - AC Generator
 - Waveform
 - Frequency
 - Phase
 - Degrees
 - Values
- Capacitance
 - Charged Capacitor
 - Electrical Field
 - Discharging a Capacitor
 - Determining Capacitance
 - Uses of Capacitors
 - Phase Relationship
- Induction
 - Self-Induction

- Induced Voltage and applied Current
- Conductor AC Resistance
- Impedance
- Magnetic Cores
- Current Flow
- Uses of Induction
- Power Factor and Efficiency
 - Power Factor
 - Efficiency
- Motors
 - Motor Basics
 - Direct-Current Motors
 - Alternating-Current Motors
- Generators
 - Direct-Current Generator
 - Alternating-Current Generator
 - Three-Phase Generator
- Transformers
 - Transformer Basics
 - Secondary Induced Voltage
 - Autotransformers
 - Power Losses
 - Harmonic Current
 - Transformer Turns Ratio
 - Transformer KVA Rating
 - Current Flow
 - Current Rating
- Grounding
- Surge Arresters
- TVSS
- Wiring Methods
- Conductors for General Wiring
- Cabinets
- Cutout Boxes
- Meter Sockets

- Outlets
- Devices
- Pull and Junction Boxes
- Conduit Bodies
- Handhole Enclosures
- NM Cable
- Service Entrance Cable
- UF Cable
- RNC
- AC Cable
- MC Cable
- MI Cable
- FMC
- LFMC
- LFNC
- EMT
- IMC
- RMC
- Metal Wireways
- Nonmetallic Wireways
- Surface Raceways
- Multioutlet Assembly
- Cable Trays
- Multifamily Dwellings
- Commercial Locations
- Cable
- Conduit Fitting Assembly
- Conduit Bending
- Conductor Installation

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.

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
Orientation <i>Orientation</i>	1	<ul style="list-style-type: none"> • Orientation 	<ul style="list-style-type: none"> • Orientation 	N/A	<hr/> <hr/> <hr/> <hr/> <hr/>
Orientation <i>Orientation</i>	2	<ul style="list-style-type: none"> • Orientation 	<ul style="list-style-type: none"> • Orientation 	N/A	<hr/> <hr/> <hr/> <hr/> <hr/>
Orientation <i>Orientation</i>	3.5	<ul style="list-style-type: none"> • Orientation 	<ul style="list-style-type: none"> • Orientation 	N/A	<hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>Safety <i>PPE</i></p>	<p>4.5</p>	<ul style="list-style-type: none"> Cover various types of PPE and their proper use 	<ul style="list-style-type: none"> Explain the importance of PPE Demonstrate the proper use of applicable PPE for a given application 	<p>N/A</p>	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>Safety <i>PPE</i></p>	<p>5.5</p>	<ul style="list-style-type: none"> Cover various types of PPE and their proper use 	<ul style="list-style-type: none"> Explain the importance of PPE Demonstrate the proper use of applicable PPE for a given application 	<p>N/A</p>	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>Safety <i>PPE</i></p>	<p>7</p>	<ul style="list-style-type: none"> Cover various types of PPE and their proper use 	<ul style="list-style-type: none"> Explain the importance of PPE Demonstrate the proper use of applicable PPE for a given application 	<p>N/A</p>	<hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>Chapter 4</p> <p>Unit 14 <i>The Electrical System</i></p> <p>Section 14.0 – 14.8</p>	<p>8</p>	<ul style="list-style-type: none"> • Design of typical electrical systems in relation to intended paths for current • Utility ground-fault current path, premises neutral current path, premises ground-fault current path should be discussed 	<ul style="list-style-type: none"> • Define components of the system and state their function(s) • Reference code sections that state requirements for construction of these systems 	<ul style="list-style-type: none"> • Text <i>Basic Electrical Theory</i> • Presentation <i>Chapter 4, Unit 14</i> • Video <i>Electrical Circuits Systems and Protection</i> • Additional Resources NEETS Module 2 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>Chapter 4</p> <p>Unit 14 <i>The Electrical System</i></p> <p>Section 14.9 – 14.16</p>	<p>9</p>	<ul style="list-style-type: none"> • Explain high voltage transmission & step-down for service voltage. Use voltage drop & power loss to justify high voltage transmission • Explain the gradual voltage adjustments throughout transmission by transmission lines, substations and distribution transformers 	<ul style="list-style-type: none"> • Recall the mathematical formula for power loss and calculate power loss • Explain the reduction of power loss by use of transformers • Calculate primary and secondary electrical quantities of transformers under given scenarios 	<ul style="list-style-type: none"> • Text <i>Basic Electrical Theory</i> • Presentation <i>Chapter 4, Unit 14</i> • Video <i>Electrical Circuits Systems and Protection</i> • Additional Resources NEETS Module 2 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>Chapter 4</p> <p>Unit 14 <i>The Electrical System</i></p> <p>Review & Quiz</p>	<p>10.5</p>	<ul style="list-style-type: none"> • Take this time to review the unit using the unit summary • Direct students to take the unit quiz online 	<ul style="list-style-type: none"> • Successfully pass the unit exam within the program completion requirements 	<ul style="list-style-type: none"> • Text <i>Basic Electrical Theory</i> • Presentation <i>Chapter 4, Unit 14</i> • Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
Chapter 4 Unit 15 <i>Protection Devices</i> Section 15.0 – 15.10	11.5	<ul style="list-style-type: none"> Explain the different types of faults Discuss the common types of OCPDs Discuss the construction of the different types of OCPDs Explain the AIR ratings of OCPDs as well as short-circuit current ratings of equipment 	<ul style="list-style-type: none"> Explain the purpose of over-current protection & list the types of faults Describe types and operation of different OCPDs along with their ratings 	<ul style="list-style-type: none"> Text <i>Basic Electrical Theory</i> Presentation <i>Chapter 4, Unit 14</i> Video <i>Electrical Circuits Systems and Protection</i> Additional Resources NEETS Module 2 	<hr/> <hr/> <hr/> <hr/> <hr/>
Chapter 4 Unit 15 <i>Protection Devices</i> Section 15.11 – 15.20	12.5	<ul style="list-style-type: none"> Explain the operational characteristics of GFCIs as well as common uses of this type of protection for persons & utilization equipment Explain the operational characteristics of AFCIs as well as common uses this type of protection 	<ul style="list-style-type: none"> Explain the purpose of GFCIs, their common uses, and how they operate Explain the purpose of AFCIs, their common uses, and how they operate Reference code sections that support the common uses 	<ul style="list-style-type: none"> Text <i>Basic Electrical Theory</i> Presentation <i>Chapter 4, Unit 14</i> Video <i>Electrical Circuits Systems and Protection</i> Additional Resources NEETS Module 2 	<hr/> <hr/> <hr/> <hr/> <hr/>
Chapter 4 Unit 15 <i>Protection Devices</i> Review & Quiz	14	<ul style="list-style-type: none"> Take this time to review the unit using the unit summary Direct students to take the unit quiz online 	<ul style="list-style-type: none"> Successfully pass the unit exam within the program completion requirements 	<ul style="list-style-type: none"> Text <i>Basic Electrical Theory</i> Presentation <i>Chapter 4, Unit 14</i> Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>Chapter 5</p> <p>Unit 16 <i>Alternating Current</i></p> <p>Section 16.0 – 16.5</p>	<p>15</p>	<ul style="list-style-type: none"> • Explain the comparison of AC with reference to DC in order to gain acceptance of the use of AC • Explain the production AC voltage by means of the generator • Have the students visualize the changing value of AC voltage by illustration of the sine wave 	<ul style="list-style-type: none"> • Explain why AC is used for transmission • Explain the production of AC 	<ul style="list-style-type: none"> • Text <i>Basic Electrical Theory</i> • Presentation <i>Chapter 5, Unit 16</i> • Video <i>Alternating Current, Motors, Generators and Transformers</i> • Additional Resources NEETS Module 2 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Chapter 5</p> <p>Unit 16 <i>Alternating Current</i></p> <p>Section 16.6 – 16.12</p>	<p>16</p>	<ul style="list-style-type: none"> • Discuss wave form values of frequency, and time measured in degrees of rotation • Discuss the phase relationships of two wave forms • Explain values of AC and review formulas on the calculation of these values 	<ul style="list-style-type: none"> • Recognize illustrations of sine waves and describe the phase relationship of two or more sine waves that are related to one another • Recall formulas and calculate AC values 	<ul style="list-style-type: none"> • Text <i>Basic Electrical Theory</i> • Presentation <i>Chapter 5, Unit 16</i> • Video <i>Alternating Current, Motors, Generators and Transformers</i> • Additional Resources NEETS Module 2 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Chapter 5</p> <p>Unit 16 <i>Alternating Current</i></p> <p>Review & Quiz</p>	<p>17.5</p>	<ul style="list-style-type: none"> • Take this time to review the unit using the unit summary • Direct students to take the unit quiz online 	<ul style="list-style-type: none"> • Successfully pass the unit exam within the program completion requirements 	<ul style="list-style-type: none"> • Text <i>Basic Electrical Theory</i> • Presentation <i>Chapter 5, Unit 16</i> • Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
Chapter 5 Unit 17 <i>Capacitance</i> Section 17.0 – 17.3	18.5	<ul style="list-style-type: none"> Define capacitance Explain the operation of capacitors in an AC circuit Explain the use of capacitors as filters Explain the safe discharging of capacitors 	<ul style="list-style-type: none"> Define capacitance List the steps in safely discharging a charged capacitor 	<ul style="list-style-type: none"> Text <i>Basic Electrical Theory</i> Presentation <i>Chapter 5, Unit 17</i> Video <i>Alternating Current, Motors, Generators and Transformers</i> Additional Resources NEETS Module 2 	<hr/> <hr/> <hr/> <hr/> <hr/>
Chapter 5 Unit 17 <i>Capacitance</i> Section 17.4 – 17.6	19.5	<ul style="list-style-type: none"> Explain the magnitude of capacitance in relation to the physical characteristics of the capacitor Explain the calculation of capacitive reactance within simple RC circuits. Explain the phase relationship of voltage and current in a purely capacitive circuit 	<ul style="list-style-type: none"> Determine capacitance, capacitive reactance, and phase angle between voltage and current of an RC circuit 	<ul style="list-style-type: none"> Text <i>Basic Electrical Theory</i> Presentation <i>Chapter 5, Unit 17</i> Video <i>Alternating Current, Motors, Generators and Transformers</i> Additional Resources NEETS Module 2 	<hr/> <hr/> <hr/> <hr/> <hr/>
Chapter 5 Unit 17 <i>Capacitance</i> Review & Quiz	21	<ul style="list-style-type: none"> Take this time to review the unit using the unit summary Direct students to take the unit quiz online 	<ul style="list-style-type: none"> Successfully pass the unit exam within the program completion requirements 	<ul style="list-style-type: none"> Text <i>Basic Electrical Theory</i> Presentation <i>Chapter 5, Unit 17</i> Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>Chapter 5</p> <p>Unit 18 <i>Induction</i></p> <p>Section 18.0 – 18.2</p>	<p>22</p>	<ul style="list-style-type: none"> • Explain alternating current flow & fluctuating magnetic fields • Explain fluctuating magnetic fields and induction • Explain counter EMF 	<ul style="list-style-type: none"> • Understand the directional forces of voltage and current of an inductor • Understand how the magnetic field, the shape of the conductor, and fluctuation of the magnetic field cause reactive forces 	<ul style="list-style-type: none"> • Text <i>Basic Electrical Theory</i> • Presentation <i>Chapter 5, Unit 18</i> • Video <i>Alternating Current, Motors, Generators and Transformers</i> • Additional Resources NEETS Module 2 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>Chapter 5</p> <p>Unit 18 <i>Induction</i></p> <p>Section 18.3 – 18.10</p>	<p>23</p>	<ul style="list-style-type: none"> • Explain the phase relationship of applied voltage and self-induced voltage • Explain inductance • Explain conductor resistance • Explain inductive reactance • Explain impedance 	<ul style="list-style-type: none"> • Calculate resistance, inductive reactance, and inductance of inductors 	<ul style="list-style-type: none"> • Text <i>Basic Electrical Theory</i> • Presentation <i>Chapter 5, Unit 18</i> • Video <i>Alternating Current, Motors, Generators and Transformers</i> • Additional Resources NEETS Module 2 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>Chapter 5</p> <p>Unit 18 <i>Induction</i></p> <p>Review & Quiz</p>	<p>24.5</p>	<ul style="list-style-type: none"> • Take this time to review the unit using the unit summary • Direct students may take the unit quiz online 	<ul style="list-style-type: none"> • Successfully pass the unit exam within the program completion requirements 	<ul style="list-style-type: none"> • Text <i>Basic Electrical Theory</i> • Presentation <i>Chapter 5, Unit 18</i> • Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>Chapter 5</p> <p>Unit 19 <i>Power Factor and Efficiency</i></p> <p>Section 19.0 – 19.4</p>	<p>25.5</p>	<ul style="list-style-type: none"> • Explain apparent power & true power as well as units of measurement • Explain power factor of AC circuits • Explain the unity power factor. 	<ul style="list-style-type: none"> • Relate true power and apparent power to components of simple AC circuits. 	<ul style="list-style-type: none"> • Text <i>Basic Electrical Theory</i> • Presentation <i>Chapter 5, Unit 19</i> • Video <i>Alternating Current, Motors, Generators and Transformers</i> • Additional Resources NEETS Module 2 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>Chapter 5</p> <p>Unit 19 <i>Power Factor and Efficiency</i></p> <p>Section 19.5 – 19.9</p>	<p>26.5</p>	<ul style="list-style-type: none"> • Explain the mathematical relationship of true power, apparent power, and power factor • Explain the cost of true power in kilo-watt-hours • Explain power factor as an efficiency that affects the loading of electrical equipment 	<ul style="list-style-type: none"> • Calculate the cost of using an electrical appliance or load over a selected length of time • Calculate loads for selecting circuit equipment when power factor is involved 	<ul style="list-style-type: none"> • Text <i>Basic Electrical Theory</i> • Presentation <i>Chapter 5, Unit 19</i> • Video <i>Alternating Current, Motors, Generators and Transformers</i> • Additional Resources NEETS Module 2 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>Chapter 5</p> <p>Unit 19 <i>Power Factor and Efficiency</i></p> <p>Review & Quiz</p>	<p>28</p>	<ul style="list-style-type: none"> • Take this time to review the unit using the unit summary • Direct students to take the unit quiz online 	<ul style="list-style-type: none"> • Successfully pass the unit exam within the program completion requirements 	<ul style="list-style-type: none"> • Text <i>Basic Electrical Theory</i> • Presentation <i>Chapter 5, Unit 19</i> • Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
Chapter 6 Unit 20 <i>Motors</i> Section 20.0 – 20.9	29	<ul style="list-style-type: none"> Explain principles of motor operation Explain all ratings listed on the motor nameplate, as well as FLC compared to FLA Explain motor starting current, motor running current, and overload protection 	<ul style="list-style-type: none"> Recognize the fundamentals of motor operation Reference information on motor nameplates Select FLA or FLC for equipment size and rating 	<ul style="list-style-type: none"> Text <i>Basic Electrical Theory</i> Presentation <i>Chapter 6, Unit 20</i> Video <i>Electrical Fundamentals and Basic Electricity</i> Additional Resources NEETS Module 2 	
Chapter 6 Unit 20 <i>Motors</i> Section 20.10 – 20.14	30	<ul style="list-style-type: none"> Explain the operation of direct-current motors & explain the types of DC motors Explain the operation of the AC induction motor & explain the types of AC motors 	<ul style="list-style-type: none"> Check the leads of different types of DC motors and identify them Check the leads of different types of AC motors and identify them 	<ul style="list-style-type: none"> Text <i>Basic Electrical Theory</i> Presentation <i>Chapter 6, Unit 20</i> Video <i>Electrical Fundamentals and Basic Electricity</i> Additional Resources NEETS Module 2 	
Chapter 6 Unit 20 <i>Motors</i> Review & Quiz	31.5	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Successfully pass the unit exam within the program completion requirements 	<ul style="list-style-type: none"> Text <i>Basic Electrical Theory</i> Presentation <i>Chapter 6, Unit 20</i> Service Mike Holt's Online Testing Service 	

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>Chapter 6</p> <p>Unit 21 <i>Generators</i></p> <p>Section 20.0 – 20.9</p>	<p>32.5</p>	<ul style="list-style-type: none"> • Explain the operation of DC generators • Explain the operation of AC generators 	<ul style="list-style-type: none"> • Recognize and understand the operation of generators • Identify leads of windings for proper connections 	<ul style="list-style-type: none"> • Text <i>Basic Electrical Theory</i> • Additional Resources NEETS Module 2 • Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/>
<p>Chapter 6</p> <p>Unit 21 <i>Generators</i></p> <p>Section 20.0 – 20.9</p>	<p>33.5</p>	<ul style="list-style-type: none"> • Explain the three-phase generator 	<ul style="list-style-type: none"> • Recognize and understand the operation of three-phase generators • Identify leads of windings for proper connections 	<ul style="list-style-type: none"> • Text <i>Basic Electrical Theory</i> • Additional Resources NEETS Module 2 • Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/>
<p>Chapter 6</p> <p>Unit 21 Review & Quiz</p>	<p>35</p>	<ul style="list-style-type: none"> • Go over the exam when everyone has finished • If time is available this would be a good time to introduce the next lesson topic 	<ul style="list-style-type: none"> • Successfully pass the unit exam within the program completion requirements 	<ul style="list-style-type: none"> • Text <i>Basic Electrical Theory</i> • Additional Resources NEETS Module 2 • Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
Chapter 6 Unit 22 <i>Transformers</i> Section 22.0 – 22.5	36	<ul style="list-style-type: none"> Discuss the components of different type transformers and explain their operations Recap inductance 	<ul style="list-style-type: none"> Identify the components of transformers and explain their function as a part of the transformer 	<ul style="list-style-type: none"> Text <i>Basic Electrical Theory</i> Presentation <i>Chapter 6, Unit 22</i> Video <i>Electrical Fundamentals and Basic Electricity</i> Additional Resources NEETS Module 2 	
Chapter 6 Unit 22 <i>Transformers</i> Section 22.6 – 22.10	37	<ul style="list-style-type: none"> Explain the mathematical relationship of primary and secondary voltage and current, relative to the turns ratio 	<ul style="list-style-type: none"> Understand efficiency, applied & induced voltages, load current & primary current on transformer windings Calculate line current for single-phase and three-phase transformers 	<ul style="list-style-type: none"> Text <i>Basic Electrical Theory</i> Presentation <i>Chapter 6, Unit 22</i> Video <i>Electrical Fundamentals and Basic Electricity</i> Additional Resources NEETS Module 2 	
Chapter 6 Chapter Review & Final Examination	38.5	<ul style="list-style-type: none"> Take this time to review the unit using the unit summary Direct students to take the unit quiz online 	<ul style="list-style-type: none"> Successfully pass the unit exam within the program completion requirements 	<ul style="list-style-type: none"> Text <i>Basic Electrical Theory</i> Presentation <i>Chapter 6, Unit 22</i> Service Mike Holt's Online Testing Service 	

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
1 st Quarter Review	39.5	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> All quarter material used 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
1 st Quarter Review	40.5	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> All quarter material used 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
1 st Quarter Review	42	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> All quarter material used 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
1 st Quarter Final Examination	43	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Successfully pass the 1st quarter final exam within the program completion requirements 	Not an open book exam	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
1 st Quarter Final Examination	44	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Successfully pass the 1st quarter final exam within the program completion requirements 	Not an open book exam	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
1 st Quarter Final Examination	45.5	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Successfully pass the 1st quarter final exam within the program completion requirements 	Not an open book exam	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
Practical Application	46.5	<ul style="list-style-type: none"> Utilize this time for a flexible application (<i>Vender Training, Lab, Field Trip, or Guest Speaker</i>) 	<ul style="list-style-type: none"> Grasp concepts learned from the day's activity 	N/A	<hr/> <hr/> <hr/> <hr/> <hr/>
Practical Application	47.5	<ul style="list-style-type: none"> Utilize this time for a flexible application (<i>Vender Training, Lab, Field Trip, or Guest Speaker</i>) 	<ul style="list-style-type: none"> Grasp concepts learned from the day's activity 	N/A	<hr/> <hr/> <hr/> <hr/> <hr/>
Practical Application	49	<ul style="list-style-type: none"> Utilize this time for a flexible application (<i>Vender Training, Lab, Field Trip, or Guest Speaker</i>) 	<ul style="list-style-type: none"> Grasp concepts learned from the day's activity 	N/A	<hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>The National Electrical Code</p> <p><i>Wiring & Protection Grounding 1</i></p> <p>Article 250</p>	<p>50</p>	<ul style="list-style-type: none"> Review definitions related to grounding Discuss general requirements for grounding and bonding 	<ul style="list-style-type: none"> Understand, in detail, the definitions in Article 250 Understand the general requirements of 240.4 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 200-285</i> Video <i>General Requirements, Circuits and Protection 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Wiring & Protection Grounding 1</i></p> <p>Article 250</p>	<p>51</p>	<ul style="list-style-type: none"> Cover system grounding and bonding 	<ul style="list-style-type: none"> Understand the systems required to be grounded as mentioned in Part II of Article 250 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 200-285</i> Video <i>General Requirements, Circuits and Protection 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Wiring & Protection Grounding 1</i></p> <p>Article 250</p>	<p>52.5</p>	<ul style="list-style-type: none"> Go over sections related to service equipment grounding and bonding Discuss bonding jumpers Explain separately derived systems 	<ul style="list-style-type: none"> Understand and apply the requirements for service equipment grounding and bonding Understand how to recognize separately derived systems 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 200-285</i> Video <i>General Requirements, Circuits and Protection 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>The National Electrical Code</p> <p><i>Wiring & Protection Grounding 2</i></p> <p>Article 250</p>	<p>53.5</p>	<ul style="list-style-type: none"> List types of grounding electrodes and respective requirements 	<ul style="list-style-type: none"> Comprehend permitted resistance of grounding electrodes 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 200-285</i> Video <i>General Requirements, Circuits and Protection 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Wiring & Protection Grounding 2</i></p> <p>Article 250</p>	<p>54.5</p>	<ul style="list-style-type: none"> Introduce auxiliary grounding electrodes Explain resistance to ground of electrodes 	<ul style="list-style-type: none"> Recognize different types of grounding electrodes 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 200-285</i> Video <i>General Requirements, Circuits and Protection 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Wiring & Protection Grounding 2</i></p> <p>Article 250</p>	<p>56</p>	<ul style="list-style-type: none"> Cover the purpose of the grounding electrode conductor Discuss the installation of grounding electrode conductor 	<ul style="list-style-type: none"> Size the grounding electrode conductor Recognize conductors permitted to be used as grounding electrode conductors 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 200-285</i> Video <i>General Requirements, Circuits and Protection 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>The National Electrical Code</p> <p><i>Wiring & Protection Grounding 3</i></p> <p>Article 250</p>	57	<ul style="list-style-type: none"> Determining the proper size grounding electrode conductor Demonstrate the proper termination of GEC to the grounding electrode 	<ul style="list-style-type: none"> Properly install grounding electrode conductors 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 200-285</i> Video <i>General Requirements, Circuits and Protection 2</i> 	
<p>The National Electrical Code</p> <p><i>Wiring & Protection Grounding 3</i></p> <p>Article 250</p>	58	<ul style="list-style-type: none"> Show differences of bonding other enclosures Introduce equipment bonding jumpers Discuss bonding of piping systems and exposed structural metal 	<ul style="list-style-type: none"> Recognize equipment which is not part of the electrical system that needs to be bonded and grounded 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 200-285</i> Video <i>General Requirements, Circuits and Protection 2</i> 	
<p>The National Electrical Code</p> <p><i>Wiring & Protection Grounding 3</i></p> <p>Article Quiz 250</p>	59.5	<ul style="list-style-type: none"> Take this time to review the article Direct students to take the article quiz online 	<ul style="list-style-type: none"> Successfully pass the article quiz within the program completion requirements 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 200-285</i> Service Mike Holt's Online Testing Service 	

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>The National Electrical Code</p> <p><i>Wiring & Protection Grounding 4</i></p> <p>Article 250</p>	<p>60.5</p>	<ul style="list-style-type: none"> Cover equipment grounding and equipment grounding conductors List types of EGCs 	<ul style="list-style-type: none"> Understand the reason for equipment grounding and bonding Recognize types of EGCs 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 200-285</i> Video <i>General Requirements, Circuits and Protection 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Wiring & Protection Grounding 4</i></p> <p>Article 250</p>	<p>61.5</p>	<ul style="list-style-type: none"> Demonstrate the proper identification of EGCs Determining size of EGCs Explain methods of equipment grounding 	<ul style="list-style-type: none"> Apply identification methods of EGCs Determine the proper size of EGCs 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 200-285</i> Video <i>General Requirements, Circuits and Protection 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Wiring & Protection Grounding 4</i></p> <p>Article Quiz 250</p>	<p>63</p>	<ul style="list-style-type: none"> Take this time to review the article Direct students to take the article quiz online 	<ul style="list-style-type: none"> Successfully pass the article quiz within the program completion requirements 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 200-285</i> Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>The National Electrical Code</p> <p><i>Wiring & Protection Grounding 5</i></p> <p>Article 250</p>	<p>64</p>	<ul style="list-style-type: none"> Cover proper grounding and bonding methods 	<ul style="list-style-type: none"> Demonstrate the ability to make proper connections of grounding terminals and conductors 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 200-285</i> Video <i>General Requirements, Circuits and Protection 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Wiring & Protection Grounding 5</i></p> <p>Article 250</p>	<p>65</p>	<ul style="list-style-type: none"> Cover proper grounding and bonding methods 	<ul style="list-style-type: none"> Demonstrate the ability to make proper connections of grounding terminals and conductors 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 200-285</i> Video <i>General Requirements, Circuits and Protection 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Wiring & Protection Grounding 5</i></p> <p>Article Quiz 250</p>	<p>66.5</p>	<ul style="list-style-type: none"> Take this time to review the article Direct students to take the article quiz online 	<ul style="list-style-type: none"> Successfully pass the article quiz within the program completion requirements 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 200-285</i> Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>The National Electrical Code</p> <p><i>Wiring & Protection Surge Arrestors & TVSS</i></p> <p>Article 285</p>	<p>67.5</p>	<ul style="list-style-type: none"> Define an SPD Discuss uses not permitted Discuss the number of SPDs required Discuss the ratings of SPDs 	<ul style="list-style-type: none"> Recognize the uses of SPDs Recognize the permitted uses of SPDs Understand how SPDs are rated 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 200-285</i> Video <i>General Requirements, Circuits and Protection 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Wiring & Protection Surge Arrestors & TVSS</i></p> <p>Article 285</p>	<p>68.5</p>	<ul style="list-style-type: none"> Discuss the installations of SPDs Discuss the different types of SPDs 	<ul style="list-style-type: none"> Understand how to properly install SPDs Recognize different types of SPDs along with common applications of the different types 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 200-285</i> Video <i>General Requirements, Circuits and Protection 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Wiring & Protection Surge Arrestors & TVSS</i></p> <p>Article Quiz 285</p>	<p>70</p>	<ul style="list-style-type: none"> Take this time to review the article Direct students to take the article quiz online 	<ul style="list-style-type: none"> Successfully pass the article quiz within the program completion requirements 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 200-285</i> Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
2 nd Quarter Review	71	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> All quarter material used 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
2 nd Quarter Review	72	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> All quarter material used 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
2 nd Quarter Review	73.5	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> All quarter material used 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
2 nd Quarter Final Examination	74.5	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Successfully pass the 2nd quarter final exam within the program completion requirements 	Not an open book exam	<hr/> <hr/> <hr/> <hr/>
2 nd Quarter Final Examination	75.5	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Successfully pass the 2nd quarter final exam within the program completion requirements 	Not an open book exam	<hr/> <hr/> <hr/> <hr/>
2 nd Quarter Final Examination	77	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Successfully pass the 2nd quarter final exam within the program completion requirements 	Not an open book exam	<hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
First Aid <i>AED</i>	78	<ul style="list-style-type: none"> • First Aid 	<ul style="list-style-type: none"> • First Aid 	<ul style="list-style-type: none"> • N/A 	<hr/> <hr/> <hr/> <hr/> <hr/>
First Aid <i>AED</i>	79	<ul style="list-style-type: none"> • First Aid 	First Aid	<ul style="list-style-type: none"> • N/A 	<hr/> <hr/> <hr/> <hr/> <hr/>
First Aid <i>AED</i>	80.5	<ul style="list-style-type: none"> • First Aid 	<ul style="list-style-type: none"> • First Aid 	<ul style="list-style-type: none"> • N/A 	<hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>The National Electrical Code <i>Wiring Methods 1</i> Article 300.1 – 300.6</p>	<p>81.5</p>	<ul style="list-style-type: none"> • Discuss general conductor requirements • Cover protection of physical damage • Explain minimum cover requirements <p>protection against corrosion and deterioration</p>	<ul style="list-style-type: none"> • Reference articles pertaining to permitted conductors and protection from damage • Determine proper cover required for a given installation 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 300-320</i> • Video <i>Wiring Methods 1</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code <i>Wiring Methods 1</i> Article 300.7 – 300.11</p>	<p>82.5</p>	<ul style="list-style-type: none"> • Go over raceways exposed to different temperatures • Cover electrical continuity requirements <p>Demonstrate proper securing and supporting</p>	<ul style="list-style-type: none"> • Explain the requirement to provide a seal to prevent the circulation of warm air for raceways exposed to different temperatures • Show proper methods of maintaining electrical continuity • Define securing and supporting 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 300-320</i> • Video <i>Wiring Methods 1</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code <i>Wiring Methods 1</i> Article 300.13 – 300.15</p>	<p>84</p>	<ul style="list-style-type: none"> • Cover splices and pigtails • Explain the purpose for a minimum length of free conductors <p>Discuss where boxes and conduit bodies are required</p>	<ul style="list-style-type: none"> • Demonstrate proper length of free working conductor in boxes • Identify locations where boxes are required and list other permissions in lieu of boxes 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 300-320</i> • Video <i>Wiring Methods 1</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>The National Electrical Code</p> <p><i>Wiring Methods 2</i></p> <p>Article 300.17 – 300.20</p>	85	<ul style="list-style-type: none"> • Introduce raceway fill requirements • Cover proper methods of inserting conductors in raceways • Go over induced currents in ferrous metal enclosures and raceways 	<ul style="list-style-type: none"> • Demonstrate proper methods for installing conductors in raceways • Explain the principles regarding induced currents in metal raceways and enclosures 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 300-320</i> • Video <i>Wiring Methods 1</i> 	
<p>The National Electrical Code</p> <p><i>Wiring Methods 2</i></p> <p>Article 300.21 – 300.23</p>	86	<ul style="list-style-type: none"> • Discuss article pertaining to the spread of fire or products of combustion • Explain wiring in ducts, plenums, and other air-handling spaces 	<ul style="list-style-type: none"> • Explain proper patching techniques to limit the spread of fire • List acceptable wiring methods installed in ducts and plenums as well as spaces used for environmental air 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 300-320</i> • Video <i>Wiring Methods 1</i> 	
<p>The National Electrical Code</p> <p><i>Wiring Methods 2</i></p> <p>Review & Quiz</p>	87.5	<ul style="list-style-type: none"> • Take this time to review the article • Direct students to take the article quiz online 	<ul style="list-style-type: none"> • Successfully pass the article exam within the program completion requirements 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 300-320</i> • Service Mike Holt's Online Testing Service 	

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>The National Electrical Code</p> <p><i>Conductors for General Wiring</i></p> <p>Article 310.1 – 310.12</p>	<p>88.5</p>	<ul style="list-style-type: none"> List the requirements for conductors installed in parallel including minimum size Identify locations and corrosive conditions affecting conductor selection Discuss insulation temperature limitations Go over methods of conductor identification 	<ul style="list-style-type: none"> Perform a parallel installation properly Explain acceptable methods of conductor identification 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 300-320</i> Video <i>Wiring Methods 1</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Conductors for General Wiring</i></p> <p>Article 310.13 – 310.15</p>	<p>89.5</p>	<p>Discuss:</p> <ul style="list-style-type: none"> Conductor construction Conductor Ampacity Adjustment Factors Correction Factors 	<ul style="list-style-type: none"> Utilize Table 310.13 to select conductors for given installations 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 300-320</i> Video <i>Wiring Methods 1</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Conductors for General Wiring</i></p> <p>Review & Quiz</p>	<p>91</p>	<ul style="list-style-type: none"> Take this time to review the article Direct students to take the article quiz online 	<ul style="list-style-type: none"> Successfully pass the article exam within the program requirements 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 300-320</i> Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>The National Electrical Code</p> <p><i>Cabinets, Cutout Boxes, and Meter Socket Enclosures</i></p> <p>Article 312.1 – 312.4</p>	<p>92</p>	<ul style="list-style-type: none"> Cover installation in damp or wet locations Discuss requirements for enclosures installed in walls List methods to properly repair gaps around enclosures 	<ul style="list-style-type: none"> Demonstrate proper installation methods of cabinets and other types of enclosures 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 300-320</i> Video <i>Wiring Methods 1</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Cabinets, Cutout Boxes, and Meter Socket Enclosures</i></p> <p>Article 312.5 – 312.8</p>	<p>93</p>	<ul style="list-style-type: none"> Go over conductor protection from abrasion when entering an enclosure Cover permissions to used as raceways or for splices 	<ul style="list-style-type: none"> Explain how and under what conditions enclosures can be used as raceways or for splices 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 300-320</i> Video <i>Wiring Methods 1</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Cabinets, Cutout Boxes, and Meter Socket Enclosures</i></p> <p>Review & Quiz</p>	<p>94.5</p>	<ul style="list-style-type: none"> Take this time to review the article Direct students to take the article quiz online 	<ul style="list-style-type: none"> Successfully pass the article exam within the program completion requirements 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 300-320</i> Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>The National Electrical Code</p> <p><i>Outlet, Device, Pull, and Junction Boxes; Conduit Bodies; and Handhole Enclosures</i></p> <p>Article 314.1 – 314.16</p>	<p>95.5</p>	<ul style="list-style-type: none"> • Discuss nonmetallic and metallic boxes as well as short radius conduit bodies • Cover installations in damp or wet locations • Introduce box fill calculations 	<ul style="list-style-type: none"> • Identify the differences between nonmetallic and metallic boxes as well as installation requirements associated with them 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 300-320</i> • Video <i>Wiring Methods 1</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Outlet, Device, Pull, and Junction Boxes; Conduit Bodies; and Handhole Enclosures</i></p> <p>Article 314.17 – 314.30</p>	<p>96.5</p>	<ul style="list-style-type: none"> • Go over conductors entering boxes or conduit bodies • Demonstrate how to install boxes recessed in walls or ceilings • Show proper support of boxes and conduit bodies • Introduce pull box calculations 	<ul style="list-style-type: none"> • Properly select correct size pull boxes for given raceway sizes and pull type 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 300-320</i> • Video <i>Wiring Methods 1</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Cabinets, Cutout Boxes, and Meter Socket Enclosures</i></p> <p>Review & Quiz</p>	<p>98</p>	<ul style="list-style-type: none"> • Take this time to review the article • Direct students to take the article quiz online 	<ul style="list-style-type: none"> • Successfully pass the article exam within the program completion requirements 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 300-320</i> • Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>The National Electrical Code</p> <p><i>Nonmetallic-Sheathed Cable</i></p> <p>Article 334</p>	<p>99</p>	<p>Cover Sections on:</p> <ul style="list-style-type: none"> • Uses Permitted and Not Permitted • Securing and Supporting • Conductor Ampacity • Construction specifications 	<ul style="list-style-type: none"> • List the uses permitted and not permitted for the wiring method • State the securing and supporting intervals or other requirement • Explain any ampacity or bend requirements • Describe the construction specification 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 330-392</i> • Video <i>Wiring Methods 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Service Entrance Cable</i></p> <p>Article 338</p>	<p>100</p>	<p>Cover Sections on:</p> <ul style="list-style-type: none"> • Uses Permitted and Not Permitted • Securing and Supporting • Conductor Ampacity • Construction specifications 	<ul style="list-style-type: none"> • List the uses permitted and not permitted for the wiring method • State the securing and supporting intervals or other requirement • Explain any ampacity or bend requirements • Describe the construction specification 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 330-392</i> • Video <i>Wiring Methods 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Nonmetallic-Sheathed Cable & Service Entrance Cable</i></p> <p>Review & Quiz</p>	<p>101.5</p>	<ul style="list-style-type: none"> • Take this time to review the article • Direct students to take the article quiz online 	<ul style="list-style-type: none"> • Successfully pass the article exam within the program completion requirements 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 330-392</i> • Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>The National Electrical Code</p> <p><i>UF Cable</i></p> <p>Article 340</p>	<p>102.5</p>	<p>Cover Sections on:</p> <ul style="list-style-type: none"> • Uses Permitted and Not Permitted • Securing and Supporting • Conductor Ampacity • Construction specifications 	<ul style="list-style-type: none"> • List the uses permitted and not permitted for the wiring method • State the securing and supporting intervals or other requirement • Explain any ampacity or bend requirements • Describe the construction specification 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 330-392</i> • Video <i>Wiring Methods 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>RNC</i></p> <p>Article 352</p>	<p>103.5</p>	<p>Cover Sections on:</p> <ul style="list-style-type: none"> • Uses Permitted and Not Permitted • Securing and Supporting • Conductor Ampacity • Construction specifications 	<ul style="list-style-type: none"> • List the uses permitted and not permitted for the wiring method • State the securing and supporting intervals or other requirement • Explain any ampacity or bend requirements • Describe the construction specification 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 330-392</i> • Video <i>Wiring Methods 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>UF Cable & RNC</i></p> <p>Review & Quiz</p>	<p>105</p>	<ul style="list-style-type: none"> • Take this time to review the article • Direct students to take the article quiz online 	<ul style="list-style-type: none"> • Successfully pass the article exam within the program completion requirements 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 330-392</i> • Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>The National Electrical Code <i>AC Cable</i> Article 320</p>	<p>106</p>	<p>Cover Sections on:</p> <ul style="list-style-type: none"> • Uses Permitted and Not Permitted • Securing and Supporting • Conductor Ampacity • Construction specifications 	<ul style="list-style-type: none"> • List the uses permitted and not permitted for the wiring method • State the securing and supporting intervals or other requirement • Explain any ampacity or bend requirements • Describe the construction specification 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 320-392</i> • Video <i>Wiring Methods 320-392</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code <i>MC & MI Cable</i> Article 330 & 332</p>	<p>107</p>	<p>Cover Sections on:</p> <ul style="list-style-type: none"> • Uses Permitted and Not Permitted • Securing and Supporting • Conductor Ampacity • Construction specifications 	<ul style="list-style-type: none"> • List the uses permitted and not permitted for the wiring method • State the securing and supporting intervals or other requirement • Explain any ampacity or bend requirements • Describe the construction specification 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 320-392</i> • Video <i>Wiring Methods 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code <i>Metallic Cables</i> Review & Quiz</p>	<p>108.5</p>	<ul style="list-style-type: none"> • Take this time to review the articles • Direct students to take the article quiz online 	<ul style="list-style-type: none"> • Successfully pass the article exam within the program completion requirements 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 320-392</i> • Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
3 rd Quarter Review	109.5	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> All quarter material used 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
3 rd Quarter Review	110.5	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> All quarter material used 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
3 rd Quarter Review	112	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> All quarter material used 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
3 rd Quarter Final Examination	113	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Successfully pass the 3rd quarter final exam within the program completion requirements 	Not an open book exam	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
3 rd Quarter Final Examination	114	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Successfully pass the 3rd quarter final exam within the program completion requirements 	Not an open book exam	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
3 rd Quarter Final Examination	115.5	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Successfully pass the 3rd quarter final exam within the program completion requirements 	Not an open book exam	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>The National Electrical Code</p> <p>FMC</p> <p>Article 348</p>	<p>116.5</p>	<p>Cover Sections on:</p> <ul style="list-style-type: none"> • Uses Permitted and Not Permitted • Securing and Supporting • Conductor Ampacity • Construction specifications 	<ul style="list-style-type: none"> • List the uses permitted and not permitted for the wiring method • State the securing and supporting intervals or other requirement • Explain any ampacity or bend requirements • Describe the construction specification 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 320-392</i> • Video <i>Wiring Methods 320-392</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p>LFMC & LFNC</p> <p>Article 350 & 356</p>	<p>117.5</p>	<p>Cover Sections on:</p> <ul style="list-style-type: none"> • Uses Permitted and Not Permitted • Securing and Supporting • Conductor Ampacity • Construction specifications 	<ul style="list-style-type: none"> • List the uses permitted and not permitted for the wiring method • State the securing and supporting intervals or other requirement • Explain any ampacity or bend requirements • Describe the construction specification 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 320-392</i> • Video <i>Wiring Methods 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p>Flexible Raceways</p> <p>Review & Quiz</p>	<p>119</p>	<ul style="list-style-type: none"> • Take this time to review the articles • Direct students to take the article quiz online 	<ul style="list-style-type: none"> • Successfully pass the article exam within the program completion requirements 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 320-392</i> • Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>The National Electrical Code</p> <p>EMT</p> <p>Article 358</p>	<p>120</p>	<p>Cover Sections on:</p> <ul style="list-style-type: none"> • Uses Permitted and Not Permitted • Securing and Supporting • Conductor Ampacity • Construction specifications 	<ul style="list-style-type: none"> • List the uses permitted and not permitted for the wiring method • State the securing and supporting intervals or other requirement • Explain any ampacity or bend requirements • Describe the construction specification 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 320-392</i> • Video <i>Wiring Methods 320-392</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p>IMC & RMC</p> <p>Article 342 & 344</p>	<p>121</p>	<p>Cover Sections on:</p> <ul style="list-style-type: none"> • Uses Permitted and Not Permitted • Securing and Supporting • Conductor Ampacity • Construction specifications 	<ul style="list-style-type: none"> • List the uses permitted and not permitted for the wiring method • State the securing and supporting intervals or other requirement • Explain any ampacity or bend requirements • Describe the construction specification 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 320-392</i> • Video <i>Wiring Methods 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p>Metal Conduit</p> <p>Review & Quiz</p>	<p>122.5</p>	<ul style="list-style-type: none"> • Take this time to review the articles • Direct students to take the article quiz online 	<ul style="list-style-type: none"> • Successfully pass the article exam within the program completion requirements 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 320-392</i> • Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>The National Electrical Code <i>Metal Wireways</i> Article 376</p>	<p>123.5</p>	<p>Cover Sections on:</p> <ul style="list-style-type: none"> • Uses Permitted and Not Permitted • Securing and Supporting • Conductor Ampacity • Construction specifications 	<ul style="list-style-type: none"> • List the uses permitted and not permitted for the wiring method • State the securing and supporting intervals or other requirement • Explain any ampacity or bend requirements • Describe the construction specification 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 320-392</i> • Video <i>Wiring Methods 320-392</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code <i>Nonmetallic Wireways</i> Article 378</p>	<p>124.5</p>	<p>Cover Sections on:</p> <ul style="list-style-type: none"> • Uses Permitted and Not Permitted • Securing and Supporting • Conductor Ampacity • Construction specifications 	<ul style="list-style-type: none"> • List the uses permitted and not permitted for the wiring method • State the securing and supporting intervals or other requirement • Explain any ampacity or bend requirements • Describe the construction specification 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 320-392</i> • Video <i>Wiring Methods 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code <i>Wireways</i> Review & Quiz</p>	<p>126</p>	<ul style="list-style-type: none"> • Direct students to take the article quiz online 	<ul style="list-style-type: none"> • Successfully pass the general requirements exam within the program completion requirements 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 320-392</i> • Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>The National Electrical Code</p> <p><i>Surface Metal Raceways</i></p> <p>Article 386</p>	<p>127</p>	<p>Cover Sections on:</p> <ul style="list-style-type: none"> • Uses Permitted and Not Permitted • Securing and Supporting • Conductor Ampacity • Construction specifications 	<ul style="list-style-type: none"> • List the uses permitted and not permitted for the wiring method • State the securing and supporting intervals or other requirement • Explain any ampacity or bend requirements • Describe the construction specification 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 320-392</i> • Video <i>Wiring Methods 320-392</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Surface Nonmetallic Raceways</i></p> <p>Article 388</p>	<p>128</p>	<p>Cover Sections on:</p> <ul style="list-style-type: none"> • Uses Permitted and Not Permitted • Securing and Supporting • Conductor Ampacity • Construction specifications 	<ul style="list-style-type: none"> • List the uses permitted and not permitted for the wiring method • State the securing and supporting intervals or other requirement • Explain any ampacity or bend requirements • Describe the construction specification 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 320-392</i> • Video <i>Wiring Methods 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Surface Raceways</i></p> <p>Review & Quiz</p>	<p>129.5</p>	<ul style="list-style-type: none"> • Take this time to review the article • Direct students to take the article quiz online 	<ul style="list-style-type: none"> • Successfully pass the article quiz within the program completion requirements 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 320-392</i> • Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>The National Electrical Code</p> <p><i>Multioutlet Assemblies</i></p> <p>Article 380</p>	<p>130.5</p>	<p>Cover Sections on:</p> <ul style="list-style-type: none"> • Uses Permitted and Not Permitted • Securing and Supporting • Conductor Ampacity • Construction specifications 	<ul style="list-style-type: none"> • List the uses permitted and not permitted for the wiring method • State the securing and supporting intervals or other requirement • Explain any ampacity or bend requirements • Describe the construction specification 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 320-392</i> • Video <i>Wiring Methods 320-392</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Cable Trays</i></p> <p>Article 392</p>	<p>131.5</p>	<p>Cover Sections on:</p> <ul style="list-style-type: none"> • Uses Permitted and Not Permitted • Securing and Supporting • Conductor Ampacity • Construction specifications 	<ul style="list-style-type: none"> • List the uses permitted and not permitted for the wiring method • State the securing and supporting intervals or other requirement • Explain any ampacity or bend requirements • Describe the construction specification 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 320-392</i> • Video <i>Wiring Methods 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Multioutlet Assemblies & Cable Trays</i></p> <p>Review & Quiz</p>	<p>133</p>	<ul style="list-style-type: none"> • Take this time to review the article • Direct students to take the article quiz online 	<ul style="list-style-type: none"> • Successfully pass the article quiz within the program completion requirements 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 320-392</i> • Service Mike Holt's Online Testing Service 	<hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>Blueprint Reading <i>Print-Reading Multifamily Dwellings</i> Chapter 3 Pages 79 - 88</p>	<p>134</p>	<p>Cover sections on:</p> <ul style="list-style-type: none"> • Floor Plans • Elevations • Details 	<ul style="list-style-type: none"> • Take measurements based on drawing scales • Decipher drawing scales when dimensions are given 	<ul style="list-style-type: none"> • Text <i>Printreading Based on the 2008 NEC</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>Blueprint Reading <i>Print-Reading Multifamily Dwellings</i> Chapter 3 Pages 89 - 100</p>	<p>135</p>	<p>Cover sections on:</p> <ul style="list-style-type: none"> • Device Details • Equipment Details • Written Description 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Text <i>Printreading Based on the 2008 NEC</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>Blueprint Reading <i>Print-Reading Multifamily Dwellings</i> Chapter 3 Review & Quiz</p>	<p>136.5</p>	<ul style="list-style-type: none"> • Take this time to review the chapter • Direct students to take the chapter quiz 	<ul style="list-style-type: none"> • Successfully pass the chapter exam within the program completion requirements 	<ul style="list-style-type: none"> • Text <i>Printreading Based on the 2008 NEC</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>Blueprint Reading <i>Commercial Locations</i> Chapter 4 Pages 109 - 126</p>	<p>137.5</p>	<p>Explain:</p> <ul style="list-style-type: none"> • Excerpts from specifications • Electrical Plans • Floor Plans 	<ul style="list-style-type: none"> • Take measurements based on drawing scales • Decipher drawing scales when dimensions are given 	<ul style="list-style-type: none"> • Text <i>Printreading Based on the 2008 NEC</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Blueprint Reading <i>Commercial Locations</i> Chapter 4 Pages 127 - 144</p>	<p>138.5</p>	<p>Explain:</p> <ul style="list-style-type: none"> • Plan details • Layouts • "As-Builts" 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Text <i>Printreading Based on the 2008 NEC</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Blueprint Reading <i>Commercial Locations</i> Review & Quiz</p>	<p>140</p>	<ul style="list-style-type: none"> • Take this time to review the unit • Direct students to take the unit quiz 	<ul style="list-style-type: none"> • Successfully pass the unit exam within the program completion requirements 	<ul style="list-style-type: none"> • Text <i>Printreading Based on the 2008 NEC</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
<p>Practical Application 1</p> <p><i>Commercial Wiring Cable & Conduit Fitting Assembly</i></p>	<p>141</p>	<ul style="list-style-type: none"> Show students various cable and conduit connectors and couplings and how to install them 	<ul style="list-style-type: none"> Demonstrate proficiency selecting proper fittings and installing them 	<ul style="list-style-type: none"> Discussion Demonstration Practical Applications 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>Practical Application 1</p> <p><i>Commercial Wiring Cable & Conduit Fitting Assembly</i></p>	<p>142</p>	<ul style="list-style-type: none"> Show students various cable and conduit connectors and couplings and how to install them 	<ul style="list-style-type: none"> Demonstrate proficiency selecting proper fittings and installing them 	<ul style="list-style-type: none"> Discussion Demonstration Practical Applications 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>Practical Application 1</p> <p><i>Commercial Wiring Cable & Conduit Fitting Assembly</i></p>	<p>143.5</p>	<ul style="list-style-type: none"> Show students various cable and conduit connectors and couplings and how to install them 	<ul style="list-style-type: none"> Demonstrate proficiency selecting proper fittings and installing them 	<ul style="list-style-type: none"> Discussion Demonstration Practical Applications 	<hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
Practical Application 2 <i>Commercial Wiring Conduit Bending 1</i>	144.5	<ul style="list-style-type: none"> Instruct students on the proper methods of bending a basic 90/stub 	<ul style="list-style-type: none"> Demonstrate the ability to make basic conduit bends 	<ul style="list-style-type: none"> Discussion Demonstration Practical Applications 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
Practical Application 2 <i>Commercial Wiring Conduit Bending 1</i>	145.5	<ul style="list-style-type: none"> Instruct students on the proper methods of bending a basic 90/stub 	<ul style="list-style-type: none"> Demonstrate the ability to make basic conduit bends 	<ul style="list-style-type: none"> Discussion Demonstration Practical Applications 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
Practical Application 2 <i>Commercial Wiring Conduit Bending 1</i>	147	<ul style="list-style-type: none"> Instruct students on the proper methods of bending a basic 90/stub 	<ul style="list-style-type: none"> Demonstrate the ability to make basic conduit bends 	<ul style="list-style-type: none"> Discussion Demonstration Practical Applications 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
Practical Application 3 <i>Commercial Wiring Conduit Bending 2</i>	<p>148</p>	<ul style="list-style-type: none"> Instruct students on the proper methods of bending back to backs, offsets, and saddles 	<ul style="list-style-type: none"> Demonstrate the ability to make advanced conduit bends 	<ul style="list-style-type: none"> Discussion Demonstration Practical Applications 	<hr/> <hr/> <hr/> <hr/>
Practical Application 3 <i>Commercial Wiring Conduit Bending 2</i>	<p>149</p>	<ul style="list-style-type: none"> Instruct students on the proper methods of bending back to backs, offsets, and saddles 	<ul style="list-style-type: none"> Demonstrate the ability to make advanced conduit bends 	<ul style="list-style-type: none"> Discussion Demonstration Practical Applications 	<hr/> <hr/> <hr/> <hr/>
Practical Application 3 <i>Commercial Wiring Conduit Bending 2</i>	<p>150.5</p>	<ul style="list-style-type: none"> Instruct students on the proper methods of bending back to backs, offsets, and saddles 	<ul style="list-style-type: none"> Demonstrate the ability to make advanced conduit bends 	<ul style="list-style-type: none"> Discussion Demonstration Practical Applications 	<hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
Practical Application 4 <i>Commercial Wiring Conduit Bending 3 & Conductor Installation</i>	<p>151.5</p>	<ul style="list-style-type: none"> Instruct students on the proper methods of bending multiple conduits symmetrically Show the students how to properly installed cable and conductors in conduits and other raceways 	<ul style="list-style-type: none"> Demonstrate the ability to make advanced conduit bends Perform wire pulls of various sizes 	<ul style="list-style-type: none"> Discussion Demonstration Practical Applications 	<hr/> <hr/> <hr/> <hr/> <hr/>
Practical Application 4 <i>Commercial Wiring Conduit Bending 3 & Conductor Installation</i>	<p>152.5</p>	<ul style="list-style-type: none"> Instruct students on the proper methods of bending multiple conduits symmetrically Show the students how to properly installed cable and conductors in conduits and other raceways 	<ul style="list-style-type: none"> Demonstrate the ability to make advanced conduit bends Perform wire pulls of various sizes 	<ul style="list-style-type: none"> Discussion Demonstration Practical Applications 	<hr/> <hr/> <hr/> <hr/> <hr/>
Practical Application 4 <i>Commercial Wiring Conduit Bending 3 & Conductor Installation</i>	<p>154</p>	<ul style="list-style-type: none"> Instruct students on the proper methods of bending multiple conduits symmetrically Show the students how to properly installed cable and conductors in conduits and other raceways 	<ul style="list-style-type: none"> Demonstrate the ability to make advanced conduit bends Perform wire pulls of various sizes 	<ul style="list-style-type: none"> Discussion Demonstration Practical Applications 	<hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
4 th Quarter Review	155	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> All semester material used 	<hr/> <hr/> <hr/> <hr/> <hr/>
4 th Quarter Review	156	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> All semester material used 	<hr/> <hr/> <hr/> <hr/> <hr/>
4 th Quarter Review	157.5	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> All semester material used 	<hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
4 th Quarter Final Examination	158.5	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Successfully pass the 4th quarter final exam within the program completion requirements 	Not an open book exam	<hr/> <hr/> <hr/> <hr/> <hr/>
4 th Quarter Final Examination	159.5	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Successfully pass the 4th quarter final exam within the program completion requirements 	Not an open book exam	<hr/> <hr/> <hr/> <hr/> <hr/>
4 th Quarter Final Examination	161	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Successfully pass the 4th quarter final exam within the program completion requirements 	Not an open book exam	<hr/> <hr/> <hr/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
4 th Quarter Examination Review	162	<ul style="list-style-type: none"> • Handout graded exams • Go over the exam questions and answers • Collect the exams and file them in accordance to school policy 	<ul style="list-style-type: none"> • Identify questions they answered incorrectly and where the mistakes were made • Review deficient areas 	<ul style="list-style-type: none"> • All semester material used 	<hr/> <hr/> <hr/> <hr/> <hr/>
4 th Quarter Examination Review	163	<ul style="list-style-type: none"> • Handout graded exams • Go over the exam questions and answers • Collect the exams and file them in accordance to school policy 	<ul style="list-style-type: none"> • Identify questions they answered incorrectly and where the mistakes were made • Review deficient areas 	<ul style="list-style-type: none"> • All semester material used 	<hr/> <hr/> <hr/> <hr/> <hr/>
4 th Quarter Examination Review	164.5	<ul style="list-style-type: none"> • Handout graded exams • Go over the exam questions and answers • Collect the exams and file them in accordance to school policy 	<ul style="list-style-type: none"> • Identify questions they answered incorrectly and where the mistakes were made • Review deficient areas 	<ul style="list-style-type: none"> • All semester material used 	<hr/> <hr/> <hr/> <hr/> <hr/>