



Apprenticeship Training Program

Year Three



Syllabus

Year Three

TOPICS: Motors, Controls, & Industrial Wiring

CONTACT HOURS: 164.5

PREREQUISITES: None

INSTRUCTOR NAME:

INSTRUCTOR CONTACT INFORMATION:

START DATE:

END DATE:

Description: This training year focuses on common industrial applications, methods, and requirements. While motors and controls are the major focus area, hazardous locations and special applications are also introduced.

Upon Successful completion students should be able to;

- Read prints on industrial and hazardous locations
- Perform work correctly from blueprints
- Wire controls circuits from schematics
- Discuss the basic principles of motors and controls
- Identify variable frequency drives and programmable logic controllers
- Connect various two and three wire control circuits
- Show an understanding of control circuit components and their operation
- Define harmonics and explain their effects on electrical systems
- Demonstrate proper leadership skills

Textbooks

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

Understanding the NEC Volume 2. Leesburg: Mike Holt Enterprises, Inc, ISBN 978-1-932685-34-3, 2008

Understanding the NEC Volume 2 Workbook. Leesburg: Mike Holt Enterprises, Inc, ISBN 978-1-932685-46-6, 2008

Understanding the NEC Requirements for Grounding versus Bonding. Leesburg: Mike Holt Enterprises, Inc, ISBN 1-932685-37-5, 2008

Understanding the NEC Requirements for Limited Energy and Communication Systems. Leesburg: Mike Holt Enterprises, Inc, ISBN 978-1-932685-38-1

Business Management Skills Workbook. Leesburg: Mike Holt Enterprises, Inc, ISBN 1-932685-25-1, 2007

Basic Motor Controls. Leesburg: Mike Holt Enterprises, Inc, ISBN 978-1-932685-32-9, 2009

Power Quality. Leesburg: Mike Holt Enterprises, Inc, ISBN 978-1-932685-00-0, 2009

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
 - Power Quality
 - Flexible Cords
 - Fixture Wires
 - Switches
 - Receptacles
 - Switchboards
 - Panelboards
 - Luminaires
 - Low Voltage Lighting Systems
 - Appliances
 - Fixed Electric Space Heaters
 - Motors
 - Motor Circuits
 - Controllers
 - Air Conditioning
 - Transformers
 - Grounding versus Bonding
 - CPR
 - Hazardous Locations
 - Garages
 - Fuel Dispensing
 - Healthcare
 - Assembly
 - Mobile
 - Manufactured
 - Temporary
- Electric Signs
 - Manufactured Wiring Systems
 - Office Furnishings
 - Elevators
 - Vehicle Chargers
 - Welders
 - Audio
 - TI Equipment
 - Swimming Pools
 - Emergency
 - Standby Systems
 - Remote Control
 - Signaling
 - Power Limited Circuits
 - Fire Alarm
 - Limited Energy
 - Communications
 - Industrial Locations
 - Hazardous Locations
 - Intro to Motor Controls
 - Motor Controls
 - Schematics
 - Reversing Controls
 - Multiple Motors

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 	Orientation	N/A	<hr/> <hr/> <hr/> <hr/> <hr/>
Orientation <i>Orientation</i>	2	<ul style="list-style-type: none"> • Orientation 	Orientation	N/A	<hr/> <hr/> <hr/> <hr/> <hr/>
Orientation <i>Orientation</i>	3.5	<ul style="list-style-type: none"> • Orientation 	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 <p>Demonstrate the proper use of applicable PPE for a given application</p>	<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 <p>Demonstrate the proper use of applicable PPE for a given application</p>	<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 <p>Demonstrate the proper use of applicable PPE for a given application</p>	<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>Power Quality <i>Introduction</i> Unit 1</p>	<p>8</p>	<ul style="list-style-type: none"> Cover this section as a review of electrical theory 	<ul style="list-style-type: none"> Demonstrate a strong understanding of electrical theory after covering this review material 	<ul style="list-style-type: none"> Text <i>Power Quality</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>Power Quality <i>Electrical Theory</i> Unit 2</p>	<p>9</p>	<ul style="list-style-type: none"> Cover this section as a review of electrical theory 	<ul style="list-style-type: none"> Demonstrate a strong understanding of electrical theory after covering this review material 	<ul style="list-style-type: none"> Text <i>Power Quality</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>Power Quality <i>Alternating Current</i> Unit 3</p>	<p>10.5</p>	<ul style="list-style-type: none"> Cover this section as a review of electrical theory 	<ul style="list-style-type: none"> Demonstrate a strong understanding of electrical theory after covering this review material 	<ul style="list-style-type: none"> Text <i>Power Quality</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
Power Quality <i>Neutral Conductor</i> Unit 4	11.5	<ul style="list-style-type: none"> Cover the chapter and discuss material Go over practice questions in class to ensure students understanding of the material 	<ul style="list-style-type: none"> Show familiarity with the material covered in the section Demonstrate an ability to apply the knowledge learned to real life scenarios 	<ul style="list-style-type: none"> Text <i>Power Quality</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
Power Quality <i>Harmonics</i> Unit 5	12.5	<ul style="list-style-type: none"> Cover the chapter and discuss material Go over practice questions in class to ensure students understanding of the material 	<ul style="list-style-type: none"> Show familiarity with the material covered in the section Demonstrate an ability to apply the knowledge learned to real life scenarios 	<ul style="list-style-type: none"> Text <i>Power Quality</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
Power Quality <i>Voltage Disturbances</i> Unit 6	14	<ul style="list-style-type: none"> Cover the chapter and discuss material Go over practice questions in class to ensure students understanding of the material 	<ul style="list-style-type: none"> Show familiarity with the material covered in the section Demonstrate an ability to apply the knowledge learned to real life scenarios 	<ul style="list-style-type: none"> Text <i>Power Quality</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
Power Quality <i>Voltage Window</i> Unit 7	15	<ul style="list-style-type: none"> Cover the chapter and discuss material Go over practice questions in class to ensure students understanding of the material 	<ul style="list-style-type: none"> Show familiarity with the material covered in the section Demonstrate an ability to apply the knowledge learned to real life scenarios 	<ul style="list-style-type: none"> Text <i>Power Quality</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
Power Quality <i>Electrical Noise</i> Unit 8	16	<ul style="list-style-type: none"> Cover the chapter and discuss material Go over practice questions in class to ensure students understanding of the material 	<ul style="list-style-type: none"> Show familiarity with the material covered in the section Demonstrate an ability to apply the knowledge learned to real life scenarios 	<ul style="list-style-type: none"> Text <i>Power Quality</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
Power Quality <i>Power Quality Issues</i> Unit 10	17.5	<ul style="list-style-type: none"> Cover the chapter and discuss material Go over practice questions in class to ensure students understanding of the material 	<ul style="list-style-type: none"> Show familiarity with the material covered in the section Demonstrate an ability to apply the knowledge learned to real life scenarios 	<ul style="list-style-type: none"> Text <i>Power Quality</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
The National Electrical Code <i>Flexible Cords & Cables</i> Article 400	18.5	<ul style="list-style-type: none"> Go over ampacities for flexible cords and cables Discuss the uses permitted and not permitted Show types of flexible cords and cables listed in Table 400.4 Demonstrate the proper use of strain reliefs and discuss common types 	<ul style="list-style-type: none"> List the applications permitted when utilizing flexible cables and cords Reference the table for ampacities and be familiar with adjustments Perform a proper installation using strain relief supports for cables and cords 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 400-450</i> Video <i>Equipment for General Use</i> 	
The National Electrical Code <i>Fixture Wires</i> Article 402	19.5	<ul style="list-style-type: none"> Go over ampacities for flexible cords and cables Discuss the uses permitted and not permitted Cover polarity and neutral terminal identification 	<ul style="list-style-type: none"> Select appropriate size fixture wire for given ampacities List acceptable uses of fixture wires 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 400-450</i> Video <i>Equipment for General Use</i> 	
The National Electrical Code <i>Wiring & Protection Branch Circuits 2</i> Review & Quiz	21	<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, 400-450</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
The National Electrical Code <i>Switches</i> Article 404	22	<ul style="list-style-type: none"> Discuss switch connections for 3 and 4 way switching Identify damp and wet locations in respect to installation requirements for switches Cover switching breakers and switch ratings and markings 	<ul style="list-style-type: none"> Demonstrate the proper switch connections for 3 and 4 way switches and position them correctly Properly mount snap switches Explain acceptable methods for grounding switch plates 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 400-450</i> Video <i>Equipment for General Use</i> 	
The National Electrical Code <i>Receptacles</i> Article 406	23	<ul style="list-style-type: none"> Discuss receptacle ratings and types Explain the several acceptable replacement methods for non-grounding type receptacles Cover attachment plugs and cord connectors in respect to exposed or energized parts 	<ul style="list-style-type: none"> Properly mount and wire receptacles Select proper size receptacles for given installations Identify in use type receptacle covers for wet locations 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 400-450</i> Video <i>Equipment for General Use</i> 	
The National Electrical Code <i>Switches & Receptacles</i> Review & Quiz	24.5	<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, 400-450</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>Switchboards & Panelboards</i></p> <p>Article 408</p>	<p>25.5</p>	<ul style="list-style-type: none"> Go over phase arrangement in respect to “high leg” systems Discuss the requirements for panel directories Cover overcurrent protection requirements 	<ul style="list-style-type: none"> Select the proper location to terminate the high leg in a panelboard Identify the proper location of protection for panelboards 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 400-450</i> Video <i>Equipment for General Use</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Switchboards & Panelboards</i></p> <p>Article 408</p>	<p>26.5</p>	<ul style="list-style-type: none"> Cover requirements for panelboards in damp and wet locations Discuss neutral conductor terminations Give a detailed explanation of the maximum number of overcurrent devices permitted in a panelboard 	<ul style="list-style-type: none"> List types of enclosures suitable for installing panelboards in damp and wet locations Demonstrate proper termination of conductors in panelboards Give the proper percent fill for panelboards used as raceways and for splices 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 400-450</i> Video <i>Equipment for General Use</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Switchboards & Panelboards</i></p> <p>Review & Quiz</p>	<p>28</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, 400-450</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>Luminaires</i></p> <p>Article 410</p>	<p>29</p>	<ul style="list-style-type: none"> • Cover definition associated with luminaires • Discuss fixtures installed near combustibles • Demonstrate proper support of luminaires • Explain wiring and grounding of luminaires 	<ul style="list-style-type: none"> • Show an understanding of the requirements associated with the wiring and supporting of luminaires as well as acceptable types for given locations 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 400-450</i> • Video <i>Equipment for General Use</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Lighting Systems Operating at 30V or Less</i></p> <p>Article 411</p>	<p>30</p>	<ul style="list-style-type: none"> • Use some time here to wrap up previous article if necessary • State the definition of a low voltage lighting system • Cover locations and secondary circuits 	<ul style="list-style-type: none"> • Explain low voltage systems as defined by the National Electrical Code and their uses 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 400-450</i> • Video <i>Equipment for General Use</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Luminaires and Low Voltage Lighting</i></p> <p>Review & Quiz</p>	<p>31.5</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, 400-450</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>Appliances</i></p> <p>Article</p>	<p>32.5</p>	<ul style="list-style-type: none"> Cover branch circuit ratings and overcurrent protection Go over permitted uses of flexible cords for appliances Discuss proper appliance disconnecting means and types 	<ul style="list-style-type: none"> Determine branch circuit ratings for various appliances Select equipment to properly assemble cord-and-plug connections for appliances Determine appropriate disconnecting means for various appliances 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 400-450</i> Video <i>Equipment for General Use</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Fixed Electric Space Heating Equipment</i></p> <p>Article 424</p>	<p>33.5</p>	<ul style="list-style-type: none"> Cover branch circuit ratings, overcurrent protection, and disconnects Explain requirements for heating conductors installed in concrete and other masonry floors 	<ul style="list-style-type: none"> Determine branch circuit rating and conductor size for these loads Recognize requirements for space heating conductors installed in masonry floors 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 400-450</i> Video <i>Equipment for General Use</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Appliances & Fixed Electric Space Heating Equipment</i></p> <p>Review & Quiz</p>	<p>35</p>	<ul style="list-style-type: none"> Take this time to review the articles Direct students to take the article quizzes online 	<ul style="list-style-type: none"> Successfully pass the article quizzes 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, 400-450</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
1 st Quarter Review	36	<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 	N/A	<ul style="list-style-type: none"> All quarter material used 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
1 st Quarter Review	37	<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	38.5	<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/>

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	39.5	<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/> <hr/> <hr/>
1 st Quarter Final Examination	40.5	<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/> <hr/> <hr/>
1 st Quarter Final Examination	42	<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/> <hr/> <hr/>

Section/Topic	Hour	Teaching Outline <i>Instructor should:</i>	Learning Objectives <i>Students should be able to:</i>	Text / Resources	Notes
The National Electrical Code <i>Motors, Motor Circuits, & Controllers</i> Article 430	43	<ul style="list-style-type: none"> Cover motor nameplate information Explain conductor sizing Explain overload protection & how to rate overload protection <p>Explain overcurrent protection of a motor branch circuit and how to rate this protection</p>	<ul style="list-style-type: none"> Competently calculate minimum conductor required, maximum overload protection rating, and maximum branch-circuit OCPD rating for motor branch-circuits 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 400-450</i> Video <i>Equipment for General Use</i> 	
The National Electrical Code <i>Motors, Motor Circuits, & Controllers</i> Article 430	44	<ul style="list-style-type: none"> Explain the rating of overcurrent protection for motor feeders Cover protection of motor control circuits & the ratings of motor controllers Cover the requirements of disconnecting means Explain the navigation of relevant tables 	<ul style="list-style-type: none"> Competently calculate maximum OCPD for motor feeders Reference relevant FLC tables for motors when given necessary nameplate information 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 400-450</i> Video <i>Equipment for General Use</i> 	
The National Electrical Code <i>Motors, Motor Circuits, & Controllers</i> Review & Quiz	45.5	<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, 400-450</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>Air Conditioning</i></p> <p>Article 440</p>	46.5	<ul style="list-style-type: none"> Cover ampacity & ratings Cover requirements of disconnecting means Explain the determination of overcurrent protection Explain the determination of conductor size Cover the requirements for “room air-conditioners” 	<ul style="list-style-type: none"> Exhibit adequacy in referencing Article 440 for information on OCPD rating and conductor sizing Determine the minimum equipment necessary for air conditioning equipment 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 400-450</i> Video <i>Equipment for General Use</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Transformers</i></p> <p>Article 450</p>	47.5	<ul style="list-style-type: none"> Explain the determination of overcurrent protection Discuss the requirements for ventilation Discuss marking requirements & accessibility of transformers 	<ul style="list-style-type: none"> Show adequacy in referencing information in Article 450 Exhibit competence in calculation of overcurrent protection for transformers 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 1 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 400-450</i> Video <i>Equipment for General Use</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Air Conditioning & Transformers</i></p> <p>Review & Quiz</p>	49	<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, 400-450</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>Grounding versus Bonding</p> <p><i>Video</i></p> <p>422 Part 1</p>	<p>50</p>	<ul style="list-style-type: none"> • Show part one of the video series on “Grounding vs. Bonding” • Teach these sections with the presentations if desired • Discuss topics contained in today’s video section 	<ul style="list-style-type: none"> • Exhibit a strong understanding of grounding and bonding principles and practices • 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC requirements for Grounding versus Bonding</i> • Video <i>Grounding vs. Bonding Part 1</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Grounding versus Bonding</p> <p><i>Video</i></p> <p>Part 1</p>	<p>51</p>	<ul style="list-style-type: none"> • Show part one of the video series on “Grounding vs. Bonding” • Teach these sections with the presentations if desired • Discuss topics contained in today’s video section 	<ul style="list-style-type: none"> • Exhibit a strong understanding of grounding and bonding principles and practices • 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC requirements for Grounding versus Bonding</i> • Video <i>Grounding vs. Bonding Part 1</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Grounding versus Bonding</p> <p><i>Video</i></p> <p>Part 1</p>	<p>52.5</p>	<ul style="list-style-type: none"> • Show part one of the video series on “Grounding vs. Bonding” • Teach these sections with the presentations if desired • Discuss topics contained in today’s video section 	<ul style="list-style-type: none"> • Exhibit a strong understanding of grounding and bonding principles and practices • 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC requirements for Grounding versus Bonding</i> • Video <i>Grounding vs. Bonding Part 1</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>Grounding versus Bonding</p> <p><i>Video</i></p> <p>Part 2</p>	<p>53.5</p>	<ul style="list-style-type: none"> • Show part one of the video series on “Grounding vs. Bonding” • Teach these sections with the presentations if desired • Discuss topics contained in today’s video section 	<ul style="list-style-type: none"> • Exhibit a strong understanding of grounding and bonding principles and practices 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC requirements for Grounding versus Bonding</i> • Video <i>Grounding vs. Bonding Part 1</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Grounding versus Bonding</p> <p><i>Video</i></p> <p>Part 2</p>	<p>54.5</p>	<ul style="list-style-type: none"> • Show part one of the video series on “Grounding vs. Bonding” • Teach these sections with the presentations if desired • Discuss topics contained in today’s video section 	<ul style="list-style-type: none"> • Exhibit a strong understanding of grounding and bonding principles and practices 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC requirements for Grounding versus Bonding</i> • Video <i>Grounding vs. Bonding Part 1</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Grounding versus Bonding</p> <p><i>Video</i></p> <p>Part 2</p>	<p>56</p>	<ul style="list-style-type: none"> • Show part one of the video series on “Grounding vs. Bonding” • Teach these sections with the presentations if desired • Discuss topics contained in today’s video section 	<ul style="list-style-type: none"> • Exhibit a strong understanding of grounding and bonding principles and practices • 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC requirements for Grounding versus Bonding</i> • Video <i>Grounding vs. Bonding Part 1</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>Grounding versus Bonding</p> <p><i>Video</i></p> <p>Part 3</p>	<p>57</p>	<ul style="list-style-type: none"> Show part two of the video series on "Grounding vs. Bonding" Teach these sections with the presentations if desired Discuss topics contained in today's video section 	<ul style="list-style-type: none"> Exhibit a strong understanding of grounding and bonding principles and practices 	<ul style="list-style-type: none"> Text <i>Understanding the NEC requirements for Grounding versus Bonding</i> Video <i>Grounding vs. Bonding Part 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Grounding versus Bonding</p> <p><i>Video</i></p> <p>Part 3</p>	<p>58</p>	<ul style="list-style-type: none"> Show part two of the video series on "Grounding vs. Bonding" Teach these sections with the presentations if desired Discuss topics contained in today's video section 	<ul style="list-style-type: none"> Exhibit a strong understanding of grounding and bonding principles and practices 	<ul style="list-style-type: none"> Text <i>Understanding the NEC requirements for Grounding versus Bonding</i> Video <i>Grounding vs. Bonding Part 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Grounding versus Bonding</p> <p><i>Video</i></p> <p>Part 3</p>	<p>59.5</p>	<ul style="list-style-type: none"> Show part two of the video series on "Grounding vs. Bonding" Teach these sections with the presentations if desired Discuss topics contained in today's video section 	<ul style="list-style-type: none"> Exhibit a strong understanding of grounding and bonding principles and practices 	<ul style="list-style-type: none"> Text <i>Understanding the NEC requirements for Grounding versus Bonding</i> Video <i>Grounding vs. Bonding Part 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>Grounding versus Bonding</p> <p><i>Video</i></p> <p>Part 4</p>	<p>60.5</p>	<ul style="list-style-type: none"> • Show part two of the video series on “Grounding vs. Bonding” • Teach these sections with the presentations if desired • Discuss topics contained in today’s video section 	<ul style="list-style-type: none"> • Exhibit a strong understanding of grounding and bonding principles and practices • 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC requirements for Grounding versus Bonding</i> • Video <i>Grounding vs. Bonding Part 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Grounding versus Bonding</p> <p><i>Video</i></p> <p>Part 4</p>	<p>61.5</p>	<ul style="list-style-type: none"> • Show part two of the video series on “Grounding vs. Bonding” • Teach these sections with the presentations if desired • Discuss topics contained in today’s video section 	<ul style="list-style-type: none"> • Exhibit a strong understanding of grounding and bonding principles and practices • 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC requirements for Grounding versus Bonding</i> • Video <i>Grounding vs. Bonding Part 2</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Grounding versus Bonding</p> <p><i>Video</i></p> <p>Part 4</p>	<p>63</p>	<ul style="list-style-type: none"> • Show part two of the video series on “Grounding vs. Bonding” • Teach these sections with the presentations if desired • Discuss topics contained in today’s video section 	<ul style="list-style-type: none"> • Exhibit a strong understanding of grounding and bonding principles and practices • 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC requirements for Grounding versus Bonding</i> • Video <i>Grounding vs. Bonding Part 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
First Aid CPR	64	<ul style="list-style-type: none"> • CPR 	<ul style="list-style-type: none"> • CPR 	N/A	<hr/> <hr/> <hr/> <hr/> <hr/>
First Aid CPR	65	CPR	<ul style="list-style-type: none"> • CPR 	N/A	<hr/> <hr/> <hr/> <hr/> <hr/>
First Aid CPR	66.5	<ul style="list-style-type: none"> • CPR 	<ul style="list-style-type: none"> • CPR 	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
Leadership 1	67.5	<ul style="list-style-type: none"> Identify and go over sections from the text to help students gain an understanding of what it takes to be a successful leader no matter what their role may be for a company 	<ul style="list-style-type: none"> Grasp concepts on what it takes to be a leader and an overall good team player 	<ul style="list-style-type: none"> Text <i>Business Management Skills Workbook</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
Leadership 1	68.5	<ul style="list-style-type: none"> Identify and go over sections from the text to help students gain an understanding of what it takes to be a successful leader no matter what their role may be for a company 	<ul style="list-style-type: none"> Grasp concepts on what it takes to be a leader and an overall good team player 	<ul style="list-style-type: none"> Text <i>Business Management Skills Workbook</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
Leadership 1	70	<ul style="list-style-type: none"> Identify and go over sections from the text to help students gain an understanding of what it takes to be a successful leader no matter what their role may be for a company 	<ul style="list-style-type: none"> Grasp concepts on what it takes to be a leader and an overall good team player 	<ul style="list-style-type: none"> Text <i>Business Management Skills Workbook</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
Leadership 2	71	<ul style="list-style-type: none"> Identify and go over sections from the text to help students gain an understanding of what it takes to be a successful leader no matter what their role may be for a company 	<ul style="list-style-type: none"> Grasp concepts on what it takes to be a leader and an overall good team player 	<ul style="list-style-type: none"> Text <i>Business Management Skills Workbook</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
Leadership 2	72	<ul style="list-style-type: none"> Identify and go over sections from the text to help students gain an understanding of what it takes to be a successful leader no matter what their role may be for a company 	<ul style="list-style-type: none"> Grasp concepts on what it takes to be a leader and an overall good team player 	<ul style="list-style-type: none"> Text <i>Business Management Skills Workbook</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
Leadership 2	73.5	<ul style="list-style-type: none"> Identify and go over sections from the text to help students gain an understanding of what it takes to be a successful leader no matter what their role may be for a company 	<ul style="list-style-type: none"> Grasp concepts on what it takes to be a leader and an overall good team player 	<ul style="list-style-type: none"> Text <i>Business Management Skills Workbook</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
2 nd Quarter Review	74.5	<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/>
2 nd Quarter Review	75.5	<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/>
2 nd Quarter Review	77	<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/>

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	78	<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 	<ul style="list-style-type: none"> • Not an open book exam 	<hr/> <hr/> <hr/> <hr/> <hr/>
2 nd Quarter Final Examination	79	<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 	<ul style="list-style-type: none"> • Not an open book exam 	<hr/> <hr/> <hr/> <hr/> <hr/>
2 nd Quarter Final Examination	80.5	<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 	<ul style="list-style-type: none"> • 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
<p>The National Electrical Code</p> <p><i>Hazardous, Class I, Class II & Class III Locations</i></p> <p>Article 500 & 501</p>	<p>81.5</p>	<ul style="list-style-type: none"> • Explain the classification system of hazardous locations • Discuss the equipment associated with these locations • Define and clarify Class I, II, & III, Division I and II locations <p>Cover the wiring and equipment provisions for Class I locations</p>	<ul style="list-style-type: none"> • Exhibit adequate skills in classification and recognition of existing occupancies • Exhibit adequate skills in equipment selection and installation requirements 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 2 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 500-590</i> • Video <i>Special Occupancies</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Garages & Fuel Dispensing</i></p> <p>Article 502 & 503</p>	<p>82.5</p>	<ul style="list-style-type: none"> • Cover wiring & equipment within hazardous locations • Discuss sealing, special equipment & GFCI protected receptacles • Discuss underground wiring and raceway seals • Discuss maintenance and service of dispensing equipment 	<ul style="list-style-type: none"> • Exhibit adequate skills in classification and recognition of existing motor fuel dispensing facilities • Exhibit adequate skills in equipment selection for underground wiring and raceway seals 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 2 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 500-590</i> • Video <i>Special Occupancies</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Hazardous Locations, Garages, & Fuel Dispensing</i></p> <p>Review & Quiz</p>	<p>84</p>	<ul style="list-style-type: none"> • Take this time to review the articles <p>Direct students to take the article quizzes online</p>	<ul style="list-style-type: none"> • Successfully pass the article quizzes within the program completion requirements 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 2 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 500-590</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>Healthcare Facilities & Assembly Occupancies</i></p> <p>Article 517 & 518</p>	<p>85</p>	<ul style="list-style-type: none"> • Explain the general classifications • Discuss wiring methods • Cover grounding in patient care areas • Discuss essential electrical systems for hospitals 	<ul style="list-style-type: none"> • Recognize requirements for equipment in patient care areas and the essential electrical systems for hospitals • Recognize and be familiar with the requirements for assembly occupancies 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 2 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 500-590</i> • Video <i>Special Occupancies</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Mobile Homes, Manufactured Homes, Mobile Home Parks, & Temporary Installations</i></p> <p>Article 550 & 590</p>	<p>86</p>	<ul style="list-style-type: none"> • Discuss required electrical equipment for these occupancies • Explain the requirements for services and determination of feeders • Cover the listing of decorative lighting • Cover GFCI protection for personnel 	<ul style="list-style-type: none"> • Determine the minimum feeder necessary for the service • Be familiar with the requirements of temporary installations • Recognize the listing of decorative lighting 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 2 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 500-590</i> • Video <i>Special Occupancies</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Healthcare & Assembly</i></p> <p>Review & Quizzes</p>	<p>87.5</p>	<ul style="list-style-type: none"> • Take this time to review these articles • Direct students to take the article quizzes online 	<ul style="list-style-type: none"> • Successfully pass the article quizzes within the program completion requirements 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 2 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 500-590</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>Electric Signs & Manufactured Wiring Systems</i></p> <p>Article 600 & 604</p>	<p>88.5</p>	<ul style="list-style-type: none"> Cover listings, markings, branch-circuit requirements, disconnects, and grounding and bonding for signs Explain construction and securing and supporting for manufactured wiring systems 	<ul style="list-style-type: none"> Determine branch-circuit ratings Determine necessary equipment and install such equipment Adequately construct such systems in compliance with the requirements of relevant code article subsections 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 2 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 600-702</i> Video <i>Special Equipment</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Office Furnishings, Elevators, Dumb Waiters, Escalators, Moving Walks, Platform Lifts, & Stairway Chair Lifts</i></p> <p>Article 605 & 620</p>	<p>89.5</p>	<ul style="list-style-type: none"> Explain the installation and NEC requirements of equipment Cover disconnecting means and control Cover machine rooms, control rooms, machinery spaces, and control spaces 	<ul style="list-style-type: none"> Adequately reference Articles 605 and 620 Be familiar with provisions and installations of these types of equipment 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 2 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 600-702</i> Video <i>Special Equipment</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Electric Signs, Manufactured Wiring Systems, Office Furnishings & Elevators</i></p> <p>Review & Quizzes</p>	<p>91</p>	<ul style="list-style-type: none"> Take this time to review the articles Direct students to take the article quizzes online 	<ul style="list-style-type: none"> Successfully pass the article exams within the program completion requirements 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 2 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 600-702</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>Electrical Vehicle Charging System</i></p> <p>Article 625</p>	<p>92</p>	<ul style="list-style-type: none"> Cover the scope and definitions of the article Discuss wiring methods Explain and discuss equipment construction Cover control and overcurrent protection Cover provisions for location of equipment 	<ul style="list-style-type: none"> Adequately reference Article 625 Be familiar with provisions and installations of this type of equipment 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 2 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 600-702</i> Video <i>Special Equipment</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Electric Welders</i></p> <p>Article 630</p>	<p>93</p>	<ul style="list-style-type: none"> Cover the ampacity of supply conductors for welders Cover OCPD for welders and for conductors Cover the provisions for welding cable 	<ul style="list-style-type: none"> Adequately reference Article 630 Be familiar with provisions and installations of this type of equipment 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 2 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 600-702</i> Video <i>Special Equipment</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Vehicle Chargers & Welders</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 2 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 600-702</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>Audio Signal Processing, Amplification, & Reproduction Equipment</i></p> <p>Article 640</p>	95.5	<ul style="list-style-type: none"> Cover the protection of electrical equipment Explain the mechanical execution of work Cover wiring methods and grounding and bonding Cover permanent audio system installations 	<ul style="list-style-type: none"> Adequately reference Article 640 Be familiar with provisions and installations of this type of equipment 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 2 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 600-702</i> Video <i>Special Equipment</i> 	
<p>The National Electrical Code</p> <p><i>Information Technology Equipment</i></p> <p>Article 645</p>	96.5	<ul style="list-style-type: none"> Cover the scope and definitions of the article Cover supply circuits and interconnecting cables Explain cables not in IT room Cover disconnecting means provisions Cover EGCs 	<ul style="list-style-type: none"> Adequately reference Article 645 Be familiar with provisions and installations of this type of equipment 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 2 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 600-702</i> Video <i>Special Equipment</i> 	
<p>The National Electrical Code</p> <p><i>Audio & IT Equipment</i></p> <p>Review & Quiz</p>	98	<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 2 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 600-702</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
The National Electrical Code <i>Swimming Pools</i> Article 680.1-680.25	99	<ul style="list-style-type: none"> Cover cord-and-plug equipment Cover locations for underground wiring Cover lighting, receptacles, equipment, and underwater luminaires Cover feeders 	<ul style="list-style-type: none"> Adequately reference Article 680, Parts I, II, and III Be familiar with provisions and installations of this type of equipment 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 2 & The NEC 2008</i> Presentation <i>UNEC Vol 2, 600-702</i> Video <i>Special Equipment</i> 	
The National Electrical Code <i>Swimming Pools</i> Article 680.26-680.34	100	<ul style="list-style-type: none"> Cover equipotential bonding Cover pumps Cover GFCI protected receptacles and receptacle locations 	<ul style="list-style-type: none"> Adequately reference Article 680, Parts I, II, and III Be familiar with provisions and installations of this type of equipment 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 2 & The NEC 2008</i> Presentation <i>UNEC Vol 2, 600-702</i> Video <i>Special Equipment</i> 	
Article 680 <i>Swimming Pools</i> Review & Quiz	101.5	<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 2 & The NEC 2008</i> Presentation <i>UNEC Vol 2, 600-702</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>Emergency Systems</i></p> <p>Article 700</p>	102.5	<ul style="list-style-type: none"> • Cover the general requirements • Cover circuit wiring • Cover requirements for sources of power • Cover circuits for lighting and power • Cover overcurrent protection 	<ul style="list-style-type: none"> • Adequately reference Article 700 • Be familiar with provisions and installations of this type of equipment 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 2 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 600-702</i> • Video <i>Special Equipment</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Legally Required Standby Systems & Optional Standby Systems</i></p> <p>Article 701 & 702</p>	103.5	<ul style="list-style-type: none"> • Cover the general requirements • Cover circuit wiring • Cover requirements for sources of power • Cover overcurrent protection 	<ul style="list-style-type: none"> • Adequately reference Articles 701 and 702 • Be familiar with provisions and installations of this type of equipment 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 2 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 600-702</i> • Video <i>Special Equipment</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Emergency & Standby Systems</i></p> <p>Review & Quiz</p>	105	<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 2 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 600-702</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
The National Electrical Code <i>Remote Control, Signaling, & Power Limited Circuits</i> Article 725.1 - 725.51	106	<ul style="list-style-type: none"> Cover the general requirements Cover class I circuit requirements 	<ul style="list-style-type: none"> Adequately reference Article 725, Parts I and II Be familiar with provisions and installations of this type of equipment 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 2 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 725-820</i> Video <i>Special Conditions</i> 	
The National Electrical Code <i>Remote Control, Signaling, & Power Limited Circuits</i> Article 725.121 – 725.179	107	<ul style="list-style-type: none"> Cover class II and III circuit requirements Cover listing requirements 	<ul style="list-style-type: none"> Adequately reference Articles 725, Parts III and IV Be familiar with provisions and installations of this type of equipment 	<ul style="list-style-type: none"> Text <i>Understanding the NEC Volume 2 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 725-820</i> Video <i>Special Conditions</i> 	
The National Electrical Code <i>Remote Control, Signaling, & Power Limited Circuits</i> Review & Quiz	108.5	<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 2 & The NEC 2008</i> Presentation <i>UNEC Vol 1, 725-820</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
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><i>Fire Alarm Systems & Communications Circuits</i></p> <p>Article 800</p>	<p>116.5</p>	<ul style="list-style-type: none"> • Cover fire alarm circuits • Cover power limited fire alarm circuits • Cover outside cables and those entering buildings • Cover grounding methods • Cover installation methods within buildings and listing requirements 	<ul style="list-style-type: none"> • Adequately reference Article 760, Parts I and II • Adequately reference Article 800 • Be familiar with provisions and installations of these types of equipment 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 2 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 725-820</i> • Video <i>Special Conditions</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Radio and Television Equipment & Community Antenna, Television, and Radio Distribution Systems</i></p> <p>Article 810 & 820</p>	<p>117.5</p>	<ul style="list-style-type: none"> • Cover general requirements • Cover receiving equipment and antenna systems • Cover amateur transmitting and receiving stations • Cover outside coaxial cables and those entering buildings • Cover protection and grounding • Cover installation methods within buildings and listing 	<ul style="list-style-type: none"> • Adequately reference Articles 810 and 820 • Be familiar with provisions and installations of this type of equipment 	<ul style="list-style-type: none"> • Text <i>Understanding the NEC Volume 2 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 725-820</i> • Video <i>Special Conditions</i> 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>The National Electrical Code</p> <p><i>Limited Energy & Communications</i></p> <p>Review & Quiz</p>	<p>119</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 2 & The NEC 2008</i> • Presentation <i>UNEC Vol 1, 725-820</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
Blueprint Reading <i>Industrial Locations</i> Chapter 5 Pages 153 - 163	<p>120</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/>
Blueprint Reading <i>Industrial Locations</i> Chapter 5 Pages 164 - 190	<p>121</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/>
Blueprint Reading <i>Industrial Locations</i> Review & Quiz	<p>122.5</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/>

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>Hazardous Locations</i> Chapter 6 Pages 197 - 206</p>	<p>123.5</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/> <hr/>
<p>Blueprint Reading <i>Hazardous Locations</i> Chapter 6 Pages 207 - 217</p>	<p>124.5</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/> <hr/>
<p>Blueprint Reading <i>Hazardous Locations</i> Review & Quiz</p>	<p>126</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/> <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>Review</i> Chapter 7 Review & Exam</p>	<p>127</p>	<p>Take this time to review the Chapters</p>	<ul style="list-style-type: none"> Reinforce concepts learned in prior lessons in preparation for the chapter final exam 	<ul style="list-style-type: none"> Text <i>Printreading Based on the 2008 NEC</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>Blueprint Reading <i>Review</i> Chapter 7 Review & Exam</p>	<p>128</p>	<ul style="list-style-type: none"> Take this time to review the Chapters 	<ul style="list-style-type: none"> Reinforce concepts learned in prior lessons in preparation for the chapter final exam 	<ul style="list-style-type: none"> Text <i>Printreading Based on the 2008 NEC</i> 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>Blueprint Reading <i>Final Exam</i> Chapter 7 Review & Exam</p>	<p>129.5</p>	<ul style="list-style-type: none"> Give the Printreading Final Exam 	<ul style="list-style-type: none"> Successfully pass the Final Exam within the program 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>Chapter 1 Unit 1 – 2</p> <p><i>Basic Principles of Motor Controls & Definitions, Abbreviations, and Symbols</i></p> <p>Section 1.1 – 2.3</p>	<p>130.5</p>	<ul style="list-style-type: none"> • Introduce motor control terminology and cover the basics of motor controls • Identify common abbreviations and terms for devices and discuss common symbols 	<ul style="list-style-type: none"> • Understand common language, symbols, and abbreviations associated with motors and motor control 	<ul style="list-style-type: none"> • Text <i>Understanding Basic Motor Controls</i> • Presentation <i>Basic Motor Controls</i> • Video <i>Understanding Basic Motor Controls 1</i> • Additional Resources NEETS Module 5 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Chapter 1 Unit 3</p> <p><i>Common Control Equipment, Devices, and Symbols</i></p> <p>Section 3.1 – 3.18</p>	<p>131.5</p>	<ul style="list-style-type: none"> • List, define, and explain the operation of common control equipment and devices 	<ul style="list-style-type: none"> • Identify components and explain their function and operation 	<ul style="list-style-type: none"> • Text <i>Understanding Basic Motor Controls</i> • Presentation <i>Basic Motor Controls</i> • Video <i>Understanding Basic Motor Controls 1</i> • Additional Resources NEETS Module 5 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Chapter 1</p> <p><i>Introduction to Motor Controls</i></p> <p>Review & Quiz</p>	<p>133</p>	<ul style="list-style-type: none"> • Take this time to review the unit using the unit summary • Direct students to take the article 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>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>Chapter 2 Unit 4 – 5</p> <p><i>Components of control Circuit Schematics & Magnetic Control</i></p> <p>Section 4.1 – 5.6</p>	<p>134</p>	<ul style="list-style-type: none"> Cover sections on schematics for simple and complex devices Discuss magnetic control parts and operation 	<ul style="list-style-type: none"> List common components of schematics Explain the purpose of various components associated with magnetic control 	<ul style="list-style-type: none"> Text <i>Understanding Basic Motor Controls</i> Presentation <i>Basic Motor Controls</i> Video <i>Understanding Basic Motor Controls 1</i> Additional Resources NEETS Module 5 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>Chapter 2 Unit 6 – 7</p> <p><i>Magnetic Motor Starters & Basic Control Circuits</i></p> <p>Section 6.1 – 7.5</p>	<p>135</p>	<ul style="list-style-type: none"> Introduce motor starters, overloads, auxiliary contacts, and accessory devices Cover sections on 2 and 3 wire control circuits 	<ul style="list-style-type: none"> Properly wire 2 and 3 wire circuits from schematics 	<ul style="list-style-type: none"> Text <i>Understanding Basic Motor Controls</i> Presentation <i>Basic Motor Controls</i> Video <i>Understanding Basic Motor Controls 1</i> Additional Resources NEETS Module 5 	<hr/> <hr/> <hr/> <hr/> <hr/>
<p>Chapter 2 Unit 8</p> <p><i>Overcurrent Protection for Control Circuits</i></p> <p>Section 8.1 – 8.5</p>	<p>136.5</p>	<ul style="list-style-type: none"> Explain overcurrent protection for control circuits Compare common and separate control protection Go over control transformer protection 	<ul style="list-style-type: none"> Demonstrate proper protection for control circuits and transformers 	<ul style="list-style-type: none"> Text <i>Understanding Basic Motor Controls</i> Presentation <i>Basic Motor Controls</i> Video <i>Understanding Basic Motor Controls 1</i> Additional Resources NEETS Module 5 	<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 2 Unit 9 <i>Indicator (Pilot) Lights and Illuminated Pushbuttons</i> Section 9.1 – 9.3	137.5	<ul style="list-style-type: none"> • Introduce indicator lights • List common applications where these devices are used • Go over illuminated pushbuttons 	<ul style="list-style-type: none"> • Identify circuit locations that would likely employ the use of indicator lights 	<ul style="list-style-type: none"> • Text <i>Understanding Basic Motor Controls</i> • Presentation <i>Basic Motor Controls</i> • Video <i>Understanding Basic Motor Controls 1</i> • Additional Resources NEETS Module 5 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
Chapter 2 Unit 10 <i>Selector Switches and Truth Tables</i> Section 10.1 – 10.4	138.5	<ul style="list-style-type: none"> • Discuss multi-position selector switches and their functions • Cover truth tables 	<ul style="list-style-type: none"> • Properly connect a 2 and 3 position selector switch 	<ul style="list-style-type: none"> • Text <i>Understanding Basic Motor Controls</i> • Presentation <i>Basic Motor Controls</i> • Video <i>Understanding Basic Motor Controls 1</i> • Additional Resources NEETS Module 5 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
Chapter 2 <i>Motor Controls & Schematics</i> Review & Quiz	140	<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>Understanding Basic Motor Controls</i> • Presentation <i>Basic Motor Controls</i> • Video <i>Understanding Basic Motor Controls 1</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>Chapter 3 Unit 11</p> <p><i>Reversing Controls for Three Phase Motors</i></p> <p>Section 11.1 – 11.3</p>	<p>141</p>	<ul style="list-style-type: none"> Introduce the reversing of motors and the components utilized to accomplish it <p>Discuss interlocking devices</p>	<ul style="list-style-type: none"> Explain the principles on which motors can be reversed in direction 	<ul style="list-style-type: none"> Text <i>Understanding Basic Motor Controls</i> Presentation <i>Basic Motor Controls</i> Video <i>Understanding Basic Motor Controls 2</i> Additional Resources NEETS Module 5 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Chapter 3 Unit 11</p> <p><i>Reversing Controls for Three Phase Motors</i></p> <p>Section 11.4 – 11.7</p>	<p>142</p>	<p>Demonstrate several wiring techniques related to reversing</p>	<ul style="list-style-type: none"> Properly wire a reversing starter or explain how it would be accomplished with given components 	<ul style="list-style-type: none"> Text <i>Understanding Basic Motor Controls</i> Presentation <i>Basic Motor Controls</i> Video <i>Understanding Basic Motor Controls 2</i> Additional Resources NEETS Module 5 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Chapter 3 Unit 12</p> <p><i>Reversing Controls with Indicator (Pilot) Lights for Three Phase Motors</i></p> <p>Section 12.1 – 12.2</p>	<p>143.5</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>Understanding Basic Motor Controls</i> Presentation <i>Basic Motor Controls</i> Video <i>Understanding Basic Motor Controls 2</i> Additional Resources NEETS Module 5 	<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>Chapter 3 Unit 13</p> <p><i>Reversing Controls with Limit Switches for Three Phase Motors</i></p> <p>Section 13.1 – 13.4</p>	<p>144.5</p>	<ul style="list-style-type: none"> Cover section pertaining to the use of indicator lights with reversing controls 	<ul style="list-style-type: none"> Connect indicator lights to reversing controls 	<ul style="list-style-type: none"> Text <i>Understanding Basic Motor Controls</i> Presentation <i>Basic Motor Controls</i> Video <i>Understanding Basic Motor Controls 2</i> Additional Resources NEETS Module 5 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Chapter 3 Unit 14</p> <p><i>Reversing Single Phase Motors</i></p> <p>Section 14.1 – 14.3</p>	<p>145.5</p>	<ul style="list-style-type: none"> Explain how to reverse single phase motors List some common single phase motor types 	<ul style="list-style-type: none"> Demonstrate an understanding of reversing single phase motors 	<ul style="list-style-type: none"> Text <i>Understanding Basic Motor Controls</i> Presentation <i>Basic Motor Controls</i> Video <i>Understanding Basic Motor Controls 2</i> Additional Resources NEETS Module 5 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>Chapter 3</p> <p><i>Reversing Controls</i></p> <p>Review & Quiz</p>	<p>147</p>	<ul style="list-style-type: none"> Take this time to review the unit using the unit summary Direct students to take the article 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>Understanding Basic Motor Controls</i> Presentation <i>Basic Motor Controls</i> Video <i>Understanding Basic Motor Controls 2</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 4 Unit 15 <i>Sequencing Controls</i> Section 15.1 – 15.2	148	<ul style="list-style-type: none"> Cover section on sequencing multiple motors 	<ul style="list-style-type: none"> Exhibit an understanding of motor sequencing and its related controls 	<ul style="list-style-type: none"> Text <i>Understanding Basic Motor Controls</i> Presentation <i>Basic Motor Controls</i> Video <i>Understanding Basic Motor Controls 2</i> Additional Resources NEETS Module 5 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
Chapter 4 Unit 16 <i>Master Stop Function</i> Section 16.1 – 16.3	149	<ul style="list-style-type: none"> Cover section on the master stop function 	<ul style="list-style-type: none"> Properly configure a circuit utilizing a master stop 	<ul style="list-style-type: none"> Text <i>Understanding Basic Motor Controls</i> Presentation <i>Basic Motor Controls</i> Video <i>Understanding Basic Motor Controls 2</i> Additional Resources NEETS Module 5 	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
Chapter 4 <i>Controls for Multiple Motors</i> Review & Quiz	150.5	<ul style="list-style-type: none"> Take this time to review the unit using the unit summary Direct students to take the article 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>Understanding Basic Motor Controls</i> Presentation <i>Basic Motor Controls</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
Practical Application <i>Industrial Wiring Motor Control Circuits</i>	<p>151.5</p>	<ul style="list-style-type: none"> Show students common equipment, devices, and symbols 	<ul style="list-style-type: none"> Demonstrate proficiency regarding use of proper tools for equipment installation Recognize equipment from drawing symbols 	<ul style="list-style-type: none"> Discussion Demonstration Practical Applications 	<hr/> <hr/> <hr/> <hr/> <hr/>
Practical Application <i>Industrial Wiring Motor Control Circuits</i>	<p>152.5</p>	<ul style="list-style-type: none"> Build control circuits according to operational plans created by the instructor and students 	<ul style="list-style-type: none"> Demonstrate proficiency in logical design of control circuits 	<ul style="list-style-type: none"> Discussion Demonstration Practical Applications 	<hr/> <hr/> <hr/> <hr/> <hr/>
Practical Application <i>Industrial Wiring Motor Control Circuits</i>	<p>154</p>	<ul style="list-style-type: none"> assist students in building practical control circuits 	<ul style="list-style-type: none"> Demonstrate proficiency selecting proper materials for installations 	<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/> <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/> <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/> <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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 	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 	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 	All semester material used	<hr/> <hr/> <hr/> <hr/> <hr/>