

2023 NEC Understanding Solar PV and Energy Storage Systems

Provider Information

Provider	Instructor	Email
Mike Holt Enterprises	Mike Holt	ceuonline@mikeholt.com

General Information

Course Description

The NEC rules governing Solar PV systems continue to evolve to keep up with the ever-changing Solar PV industry. This course is designed to give installers and electrical professionals an illustrated view of those rules that govern Solar PV installations. Not only does Mike review Articles 690 and 705 but he also reviews all of the NEC rules that lead up to an understanding of those rules as stated in the course outline.

Expectations and Goals

The format of the course is designed to encourage constant interaction with the student. Each course is set-up to provide students with a page of text or video presentation followed by a question that they must answer as they go through the material. This provides immediate application of the content learned. This format keeps students actively engaged in their learning through the entirety of the course.

In addition, all students give feedback on courses through surveys and we are able to continue to enhance the program based on this consistent feedback.

Student Interaction

Our online course provides the student with the ability to send questions about the course and content to Mike Holt and our CEU department 24 hours a day through our “Submit a Question” and “Report an Error” section. During normal business hours (8:30am to 5:00pm EST) all calls are answered by customer service and questions that are emailed to the department are always responded to and resolved within 2 hours during normal business hours. Questions that are emailed while the office is closed are addressed within 6-8 hours.

Course Materials

Required Materials

Students are required to have a computer and reliable internet connection to properly use our online courses. Our courses are optimized to perform on Firefox or Google Chrome.

Students are not required to purchase any additional training materials, such as textbooks.

Contact Us:

www.mikeholt.com/ceu | 888-632-2633 | ceuonline@mikeholt.com

Methods of Presentation

Text

The course utilizes text and full-color illustrations to help you visualize the change and safety requirements in practical use. You will review author's comments & analysis, cautions regarding possible conflict or confusing NEC requirements, tips on proper electrical installations, and warnings of dangers related to improper electrical installations.

Quiz Questions

Student comprehension is tested immediately with page or video level questions. They must pass these quizzes with a 75% or better to receive credit for this course.

Video

Optional course videos are provided throughout the program to help a student review the topic in depth if needed. The videos correspond with the course outline. Our videos showcase a dynamic classroom type training with Mike and his panel of experts dissecting the changes, their impact, and how they will translate and apply in the field. These videos allow for our instructors to clarify the meaning of the change and to provide an in-depth analysis of the background information.

Course Security

Affidavits

Students will be required to electronically sign the following affidavit when taking this online course:

I hereby certify that I am the person completing the following course (Name of Course) and that I will complete this course completely on my own. By entering my name below, I am ensuring I am the student who is enrolled in and completing this course

Course Timer

Our courses track all student progress and has a built-in timer. We require students to be engaged in the course for a minimum of 50 minutes per credit hour. Students will not be able to receive credit unless they have met the minimum time requirement for this course. Students can track their time remaining by viewing the course timer while they are logged into the course.

Student Computer

Students will not be allowed to be logged into multiple computers at once while completing our courses. Students will only be able to log into one computer to successfully take the course.

Inactivity Timer

Students will automatically be logged out of the course after 30 minutes of inactivity.

Facial Recognition

Students will be required to take a secured photo to validate their identity at the beginning of course, each time they log into the course, randomly throughout the course, and final at the end of the course. This photo will be stored on their account and validated through the

Contact Us:

www.mikeholt.com/ceu | 888-632-2633 | ceuonline@mikeholt.com

software API with each additional photo. Photo will be compared through the system to verify it is the student earning credit for the course.

Course Topics

Topics	Module Details
<p>Article 90—Introduction to the NEC</p> <ul style="list-style-type: none"> 90.1 Scope 90.2 Use and Application of the NEC 90.3 Code Arrangement 90.4 NEC Enforcement 90.5 Mandatory Requirements and Explanatory Material 90.7 Examination of Equipment for Safety 	<p>Estimated time: 20 minutes</p> <p>Format: Text & Questions</p>
<p>Article 110—General Requirements for Electrical Installations</p> <ul style="list-style-type: none"> 110.1 Scope 110.2 Approval of Conductors and Equipment 110.3 Use of Equipment 110.5 Conductor Material 110.6 Conductor Sizes 110.7 Wiring Integrity 110.8 Suitable Wiring Methods 110.9 Interrupting Rating of Overcurrent Protective Devices 110.10 Equipment Short-Circuit Current Rating 110.11 Deteriorating Agents 110.12 Mechanical Execution of Work 110.13 Mounting and Cooling of Equipment 110.14 Conductor Termination and Splicing 110.15 High-Leg Conductor Identification 110.16 Arc-Flash Hazard Warning Label, Other Than Dwelling Units 110.17 Servicing and Maintenance of Equipment 110.20 Reconditioned Equipment 110.21 Hazard Markings 110.22 Identification of Disconnecting Means 110.24 Available Fault Current Marking 110.25 Lockable Disconnecting Means 110.26 Spaces Around Electrical Equipment 110.27 Protection Against Physical Damage 110.28 NEMA Enclosure Types 	<p>Estimated Time Spent: 70 minutes</p> <p>Format: Text & Questions</p>
<p>Article 480—Stationary Standby Batteries</p> <ul style="list-style-type: none"> 480.1 Scope 	<p>Estimated Time Spent: 20 minutes</p>

Contact Us:

www.mikeholt.com/ceu | 888-632-2633 | ceuonline@mikeholt.com

Topics	Module Details
480.4 Battery and Cell Terminations 480.9 Battery Support Systems 480.10 Battery Locations 480.12 Battery Interconnections	Format: Text & Questions
Article 625—Electric Vehicle Power Transfer System 625.1 Scope 625.6 Listed 625.40 Electric Vehicle Branch Circuit 625.41 Overcurrent Protection 625.42 Load 625.43 Disconnecting Means 625.48 Interactive Equipment 625.49 Island Mode 625.52 Ventilation 625.54 GFCI 625.101 Grounding 625.102 Installation	Estimated Time Spent: 40 minutes Format: Text & Questions
Article 690—Solar Photovoltaic (PV) Systems 690.1 Scope 690.4 General Requirements 690.6 Alternating-Current Modules 690.7 Maximum PV System Direct-Current Circuit Voltage 690.8 Circuit Current and Conductor Sizing 690.9 Overcurrent Protection 690.11 Arc-Fault Circuit Protection 690.12 Rapid Shutdown—PV Circuits on Building 690.13 PV System Disconnect 690.15 PV Equipment Disconnect/Isolating Device 690.31 Wiring Methods and Materials 690.32 Component Interconnections 690.33 Connectors (Mating) 690.34 Access to Boxes 690.41 PV System DC Circuit Grounding and Protection 690.43 Equipment Grounding Conductor 690.45 Size of Equipment Grounding Conductors 690.47 Grounding Electrode System 690.56 Identification of Power Sources 690.59 Connection to Other Power Sources	Estimated Time Spent: 70 minutes Format: Text & Questions

Contact Us:

www.mikeholt.com/ceu | 888-632-2633 | ceuonline@mikeholt.com

Topics	Module Details
<p>Article 691—Large-Scale Photovoltaic (PV) Electric Supply Stations</p> <ul style="list-style-type: none"> 691.1 Scope 691.4 Special Requirements for Large-Scale PV Electric Supply Stations 691.5 Equipment 691.6 Engineered Design 691.7 Conformance of Construction to Engineered Design 691.8 Direct-Current Operating Voltage 691.9 Disconnect for Isolating Photovoltaic Equipment 691.10 Fire Mitigation 691.11 Fence Bonding and Grounding 	<p>Estimated Time Spent: 30 minutes</p> <p>Format: Text & Questions</p>
<p>Article 702—Optional Standby Systems</p> <ul style="list-style-type: none"> 702.1 Scope 702.4 Capacity and Rating 702.5 Interconnection Equipment or Transfer Equipment 702.7 Signs 702.10 Wiring 702.12 Outdoor Generators 	<p>Estimated Time Spent: 20 minutes</p> <p>Format: Text & Questions</p>
<p>Article 705—Interconnected Electric Power Production Sources</p> <ul style="list-style-type: none"> 705.1 Scope 705.6 Equipment Approval 705.8 System Installation 705.10 Identification of Parallel Power Production Sources 705.11 Service Connection 705.12 Load-Side Source Connection 705.13 Energy Management Systems 705.20 Power Production Source Disconnect 705.25 Wiring Methods 705.28 Output Current and Circuit Sizing 705.30 Overcurrent Protection 705.32 Ground-Fault Protection 705.40 Loss of Primary Source 705.45 Unbalanced Interconnections 705.50 Microgrid System Operation 705.60 Connections to the Primary Source 705.70 Microgrid Interconnect Devices (MID) 705.76 Microgrid Control System (MCS) 	<p>Estimated Time Spent: 60 minutes</p> <p>Format: Text & Questions</p>
<p>Article 706—Energy Storage Systems</p> <ul style="list-style-type: none"> 706.1 Scope 	<p>Estimated Time Spent: 30 minutes</p>

Contact Us:

www.mikeholt.com/ceu | 888-632-2633 | ceuonline@mikeholt.com

Topics	Module Details
706.3 Qualified Personnel 706.4 System Nameplate Requirements 706.5 Listing 706.6 Multiple Systems 706.7 Commissioning and Maintenance 706.15 Disconnect 706.16 ESS in Parallel with Other Sources of Power 706.20 General Installation Requirements 706.30 Circuit Current Rating 706.31 Overcurrent Protection	Format: Text & Questions
Article 710—Stand-Alone Systems 710.1 Scope 710.6 Equipment Approval 710.10 Identification of Power Sources 710.12 Stand-Alone Inverter Input Circuit Current 710.15 Wiring	Estimated Time Spent: 20 minutes Format: Text & Questions
Article 750—Energy Management Systems 750.1 Scope 750.6 Listing 750.20 Alternate Power Sources 750.30 Load Management 750.50 Directory	Estimated Time Spent: 20 minutes Format: Text & Questions

Important Disclaimer

The estimated time spent is based on data collected from thousands of students completing our apprenticeship and CEU programs and additionally supported by educational organizations calculations for average for students reading technical material. Based on our data and research, we've determined students spend on average 2-6 minutes per page and question. Reference:

<https://catalog.shepherd.edu/mime/media/12/913/SU+Credit+Hour+Policy+Appendix+B.pdf>

Contact Us:

www.mikeholt.com/ceu | 888-632-2633 | ceonline@mikeholt.com



Mike Holt Biography

Educator

Mike has taught over 1,000 classes on over 40 different electrical related subjects to over 20,000 students. He is committed to the electrical industry and is recognized as one of America's most knowledgeable and dynamic Electrical Educators. He has touched the lives of many thousands with his dynamic and animated teaching style, which is relaxed, direct and fun. Perhaps Mike's best quality is his ability to motivate his students to become successful. Mike draws on his experience to help him develop training programs that the electrician understands and enjoys. His extensive use of illustration in all of his training programs makes learning fun. His ability to take the intimidation out of learning is reflected in the success rate of his students. His development of educational products that are interesting as well as technically correct has brought his name to become synonymous with quality education. His dedication to electrical training is the result of his own struggles as an electrician looking for a program that would help him succeed in this challenging industry.

Author

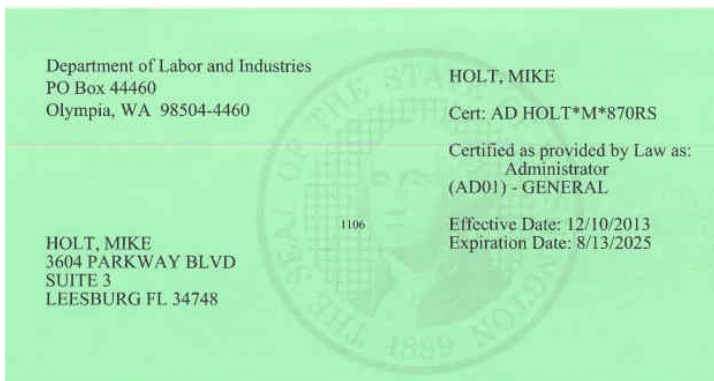
Mike Holt is a well-respected author and developer of software, books and video training programs. He has developed nearly 50 different electrical home-study training and business management programs which have been in use since 1978 by electrical apprenticeship training programs, contractors, inspectors, electricians, engineers and plant personnel. Mike has worked his way up the trade from Apprentice Electrician, Journeyman Electrician, Master Electrician, Electrical Inspector, Electrical Contractor, Electrical Designer and developer of training programs for the electrical industry. He was formerly a contributing Editor to Electrical Construction and Maintenance Magazine (EC&M) and Construction Editor to Electrical Design and Installation Magazine (EDI). His articles have been seen in CEE News, Electrical Contractor (EC) International Association of Electrical Inspectors (IAEI News), The Electrical Distributor (TED) and Power Quality Magazine (PQ).

Industry Expert

Mike has devoted his career to studying and understanding the National Electrical Code. His research and background has not only made Mike an expert, but it has earned him the respect of his peers. Mike teaches seminars throughout the United States and abroad, for individuals, organizations such as NECA, IAEI, IBEW and ICBO, and Fortune 500 companies such as IBM, Boeing, Motorola, and AT&T. He has been an active member of the International Association of Electrical Inspectors, National Board of Electrical Examiners, National Fire Protection Association, National Association of Licensing Boards, Florida Association of Electrical Contractors, and the Electrical Council of Florida. Mike Attended the University of Miami's Masters in Business Administration, MBA program.

Mike's courses are approved in over 32 states for online and home-study courses, and approved for live classes in over 18 states

Current Licenses



Washington Holt*M*870RS Exp:8/13/2025



North Carolina L.25602 Exp: 03/21/2024

CERTIFICATE OF COMPLETION

Mike Holt Enterprises hereby certifies that

Sample Student

Student State License Number

has successfully completed the

Title of Course (T)

January 1, 2023



MikeHolt.com | 888.632.2633

A handwritten signature in black ink that reads "Mike Holt". The signature is written over a horizontal line.

Charles "Mike" Holt, Sr.
Certified Instructor

Final Score:
Course Hours:
Certificate No.:
Course Approval No.:
State Provider No.: