

Electric Course Catalog



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Electric Library (01000 Substations)

ELEC–01011 Circuit Breaker Timing and Testing

MEA Certificate Numbers TNG –MEA11664
 KNT – MEA11663
 PEF – MEA11660

Continuing Education Unit (CEU) 0.1

Course Description

Within a substation, circuit breakers perform the important function of making and breaking circuits under normal and fault conditions. If circuit breakers are not functioning properly, severe equipment damage and personal injury can result.

Objectives

- Understand the function of substations and circuit breakers within an electric transmission and distribution system.
- Understand substation and electric safety procedures and requirements.
- Understand testing equipment and procedures for circuit breaker timing and testing.

ELEC–01012 Overhaul – Maintenance of Substation Circuit Breakers

MEA Certificate Numbers TNG –MEA11669
 KNT – MEA11668
 PEF – MEA11665, MEA11666, MEA11667, MEA11689

Continuing Education Unit (CEU) 0.1

Course Description

Oil circuit breakers are an important part of the power system and must be properly maintained. Although new technologies in circuit breakers exist, many systems and substations still use and maintain oil circuit breakers.

Objectives

- Describe safe practices for electric work.
- Understand the role of oil circuit breakers in the power system.
- Understand substation oil circuit breaker overhaul and maintenance guidelines.
- Understand types of oil circuit breaker failures.
- Recognize equipment and testing used in substation oil circuit breaker overhaul and maintenance.

ELEC–01013 Preparation of Oil Circuit Breaker for Service or Storage

MEA Certificate Numbers **TNG –MEA11674**
 KNT – MEA11673
 PEF – MEA11670, MEA11671, MEA11672, MEA11682

Continuing Education Unit (CEU) **0.1**

Course Description

Oil circuit breakers play a crucial role in the protection of power transmission and distribution equipment within a substation. Proper preparation and testing of oil circuit breakers must be performed before they are placed in service or storage.

Objectives

- Understand the functions of substations and oil circuit breakers.
- Understand oil circuit breaker types and components.
- Understand worker qualifications and safety requirements.
- Understand requirements for preparing oil circuit breakers for service or storage.
- Perform required testing on newly installed oil circuit breakers.

ELEC–01014 Inspections of Carrier & Communications: Wave Traps & Coupling Capacitors

MEA Certificate Numbers **TNG –MEA11703**
 KNT – MEA11702
 PEF – MEA11701

Continuing Education Unit (CEU) **0.1**

Course Description

Power line carrier systems send communication signals between substations and control centers. The carrier signals are placed onto high–voltage transmission lines using a coupling system. Wave traps and coupling capacitors are components of a coupling system and must be inspected on a regular basis to ensure that communication signals remain effective.

Objectives

- Identify and define the main components of a power line carrier system.
- Identify and define electric and substation safety practices.
- Understand visual inspection requirements.
- Perform common tests performed on coupling systems.

ELEC–01020 Substation Batteries & Battery Chargers – Install, Maintain and Troubleshoot

MEA Certificate Numbers **TNG –MEA11684**
 KNT – MEA11685
 PEF – MEA11683

Continuing Education Unit (CEU) **0.1**

Course Description

A substation battery is an important part of a substation control system. The battery enables the control system to supply power to critical control, monitoring, communication and protective devices

Objectives

- Understand substation and battery hazards and regulations.
- Understand the battery and its function in a DC system.
- Describe battery and charger components.
- Understand required battery and charger testing.
- Perform general steps for battery and charger installation and repair.

ELEC–01030 Substation Control Equipment

MEA Certificate Numbers **TNG –MEA11677**
 KNT – MEA11676
 PEF – MEA11675

Continuing Education Unit (CEU) **0.1**

Course Description

Substation control equipment is used to minimize disruption of electrical service and damage to equipment. Control equipment can be automatic or manual, and located locally in a substation or in a remote control center. This course provides an introduction to automatic control equipment located in a substation and the equipment used to interface the control equipment to the power distribution system. First, we look at substations in general. Then, we discuss substation control and interface equipment. Next, we look at some specific applications of substation control equipment. Finally, we talk about routine in–service inspections of substation control and interface equipment.

Objectives

- Explain why substation control and interface equipment is required.
- Identify substation control and interface equipment.
- State what substation control equipment is used to control voltage or a specific fault.
- List the steps for performing routine in–service inspections of substation control and interface equipment.

ELEC–01040 Substation Relay Maintenance

MEA Certificate Numbers **TNG –MEA11706**
 KNT – MEA11705
 PEF – MEA11704

Continuing Education Unit (CEU) **0.1**

Course Description

Substation relays work together with other equipment to detect and isolate equipment during abnormal conditions. Relays must be properly maintained to ensure that system protection is effective.

Objectives

- Identify and define the main substation relay construction types and protective techniques.
- Identify and perform electric and substation safety practices.
- List basic maintenance requirements for various relay types.
- Define maintenance requirements for relay settings, programmable logic and communication components.

ELEC–01050 Substation Capacitor Bank Testing

MEA Certificate Numbers **TNG –MEA11709**
 KNT – MEA11708
 PEF – MEA11707

Continuing Education Unit (CEU) **0.1**

Course Description

This course discusses procedures for testing substation capacitor banks.

Objectives

- Understand substation safety.
- Understand capacitors.
- Identify steps that must be performed before starting work.
- Understand the requirements for testing capacitors.
- Identify steps that must be performed after the job has been completed.

ELEC–01070 Substation Voltage Regulator Mechanism Overhaul

MEA Certificate Numbers **TNG –MEA11698**
 KNT – MEA11696
 PEF – MEA11697

Continuing Education Unit (CEU) **0.1**

Course Description

This course discusses the procedures and guidelines for correctly and safely overhauling a substation voltage regulator according to manufacturer instructions.

Objectives

- Understand general requirements for working with voltage regulators and control panels, including components and job safety.
- Identify steps that must be performed before starting work.
- Identify the steps required to perform the overhaul.

ELEC–01148 Substation Transformer Installation

MEA Certificate Numbers **TNG – MEA11712**
 KNT – MEA11711
 PEF – MEA11710

Continuing Education Unit (CEU) **0.1**

Course Description

Substations play a major role in the transmission and distribution of power across the country. At some substations, the voltage is increased for efficient transmission. At other substations, the voltage is decreased for easier distribution. Power transformers are used to perform this voltage transformation.

Objectives

- Understand transformer types, ratings and components.
- Understand transformer principles of operation.
- Display safe work practices during transport and installation.
- Understand installation locations, considerations and best practices.
- Understand inspection and test requirements and procedures.

ELEC–01149 Substation Transformer Phasing

MEA Certificate Numbers **TNG – MEA11715**
 KNT – MEA11714
 PEF – MEA11713

Continuing Education Unit (CEU) **0.1**

Course Description

This course provides an introduction to phasing three–phase substation power transformers. In this course, we first discuss substation power transformer basics. Next, we look at tasks you perform before starting to phase substation power transformers. Finally, we cover the tasks for phasing a three–phase substation power transformer.

Objectives

- Explain common transformer principles.
- List the tasks you must perform before and after entering the substation and control house.
- State the tasks you must perform when phasing a three-phase substation power transformer.

Note: This course covers phasing a three-phase substation power transformer. Phasing of single-phase transformers is covered in detail in ELEC-02020 Pole Mounted Transformer Basics.

ELEC-01150 Substation Transformer Maintenance

MEA Certificate Numbers **TNG – MEA11721**
 KNT – MEA11720
 PEF – MEA11717, MEA11718, MEA11719

Continuing Education Unit (CEU) **0.1**

Course Description

Substation power transformers play a major role in the transmission and distribution of power across the country, increasing or decreasing the voltage as required. Proper transformer maintenance not only extends the life of the transformer, it helps to prevent transformer failure.

Objectives

- Understand transformer types, ratings and components.
- Understand transformer principles of operation.
- Display safe work practices during transport and installation.
- Understand general maintenance requirements and procedures.

ELEC-01300 Substation Transformer Basics

MEA Certificate Numbers **TNG – MEA11723**
 KNT – MEA11722

Continuing Education Unit (CEU) **0.1**

Course Description

In the transmission and distribution of power, it is at the substation where much of the voltage transformation takes place. Substation transformers are used to change voltage from one level to another. Step-up transformers increase the voltage, while decreasing the current for easier transmission. Step-down transformers decrease the voltage, while increasing the current to meet distribution requirements. There are two different designs used in the construction of substation transformers: dry-type and liquid-filled.

Objectives

As it relates to liquid-filled transformers, upon completion of this course, you will:

- Understand the fundamentals of transformer operation.
- Understand liquid type transformer components and construction.
- Identify safety considerations when working near substation transformers.
- Understand general maintenance and testing requirements.

ELEC–01301 Substation Capacitors and Reactors

MEA Certificate Numbers **TNG – MEA11725**
 KNT – MEA11724

Continuing Education Unit (CEU) **0.1**

Course Description

One of the main functions for substation capacitors and reactors is to compensate for leading or lagging power factor. Power factor correction improves system efficiency, which results in reduced utility costs, the ability to handle additional load, and a reduction of load on system components.

Objectives

- Describe substation types, basic substation safety requirements, and power factor.
- Understand the basics of substation capacitors and reactors, including:
 - Basic operating principles
 - Hazards
 - Ratings
 - Classifications

ELEC–01302 Substations Safety (Basics)

MEA Certificate Numbers **TNG – MEA11346**
 KNT – MEA11345

Continuing Education Unit (CEU) **0.1**

Course Description

Substations are an important part of all electric utility transmission and distribution systems. In addition, they are a very big investment for their owners, and represent significant opportunity for injury when accessed by unauthorized personnel. This course highlights the importance of safety inspections, and provides practical advice on how to recognize unsafe conditions and remediation.

Objectives

- Provide a definition of a substation.
- Describe how the NESC Rules apply to substations.
- List typical problems that may be encountered during substation inspection.
- Explain how an effective inspection program can help ensure that substations are safe and secure.

ELEC–01307 Substation Transformer – Basics

MEA Certificate Numbers **TNG – MEA11727**
 KNT – MEA11726

Continuing Education Unit (CEU) **0.1**

Course Description

In the transmission and distribution of power, it is at the substation where much of the voltage transformation takes place. Substation transformers are used to change voltage from one level to another. Step–up transformers increase the voltage while decreasing the current for easier transmission. Step–down transformers decrease the voltage while increasing the current to meet distribution requirements.

Objectives

There are two different designs used in the construction of substation transformers: dry–type and liquid–filled. As it relates to the dry type transformer, this course provides information on:

- Fundamentals of transformer operation.
- Dry type transformer components and construction.
- Safety considerations when working near substation transformers.
- General maintenance and testing requirements.

ELEC–01310 Circuit Breakers Basics

MEA Certificate Numbers **TNG – MEA11691**
 KNT – MEA11690

Continuing Education Unit (CEU) **0.1**

Course Description

Circuit breakers are used in the protection of substations and equipment. Circuit breakers are responsible for making or breaking current during normal circuit function, and when a fault or overload condition occurs. This course will give a basic overview of substation circuit breakers.

Objectives

- Understand the role of a substation within a power transmission and distribution system.
- Know how circuit breakers are used within a substation and how they function.
- Describe four main types of circuit breakers.
- Describe common circuit breaker components.

ELEC–01380 Substation Switches (Basics)

MEA Certificate Numbers **TNG – MEA11729**
 KNT – MEA11728

Continuing Education Unit (CEU) 0.1**Course Description**

This course discusses the basic application of switches within an electric power substation.

Objectives

- Understand the function of a substation in a transmission and distribution system.
- Define safe practices within a substation.
- Describe the function of switches within a substation.
- Identify common switch types and uses.

ELEC–01400 Substations: Theory and Applications – Equipment Recognition

MEA Certificate Numbers **TNG – MEA11349**
 KNT – MEA11348

Continuing Education Unit (CEU) 0.1**Course Description**

Substations are important links in all electric utility transmission and distribution systems. In addition, they are very big investments for their owners. However, there is also a significant risk of injury for anyone working inside the fence of a substation. That's why it's vital to know about the types of substations and their typical equipment before you ever step inside a substation fence.

Objectives

- Describe and recognize the typical pieces of equipment that may be found in a substation yard.
- Describe and recognize the typical pieces of equipment that may be found in a substation's control house.

ELEC–01401 Substations: Theory and Applications – Substation Awareness Inside Fence

MEA Certificate Numbers **TNG – MEA11352**
 KNT – MEA11351

Continuing Education Unit (CEU) 0.1**Course Description**

Substations are important parts of all electric utility transmission and distribution systems. In addition, they are a very big investment for their owners. However, there is a significant risk of injury for anyone working at a substation. That's why it's vital to know and follow all the rules and safety procedures for working inside the substation fence. This course highlights the importance of safety awareness inside the substation fence, and provides practical advice on how to recognize unsafe conditions and remediation.

Objectives

- Understand the basic types and risks of a substation.
- Determine OSHA and NESC regulations that apply to substations.

- Identify typical problems encountered during substation work.
- Recognize safe work procedures for workers.

ELEC–01402 Substation Maintenance

MEA Certificate Numbers **TNG – MEA11693**
 KNT – MEA11692

Continuing Education Unit (CEU) **0.1**

Course Description

This course provides an introduction to in–service maintenance of common substation equipment. The course addresses:

- The different maintenance philosophies commonly practiced and some common maintenance tests.
- Tasks to be performed prior to starting any maintenance activity.
- Maintenance tasks for common substation equipment.

Objectives

- Explain the two different maintenance philosophies.
- List common tests performed on substation equipment.
- State tasks that must be performed before starting any maintenance tasks.
- List the tasks for in service maintenance of common substation equipment.

ELEC–01403 Substation Troubleshooting

MEA Certificate Numbers **TNG – MEA11695**
 KNT – MEA11694

Continuing Education Unit (CEU) **0.1**

Course Description

This course discusses troubleshooting and common substation problems. We first discuss trouble detection and basic troubleshooting steps. Next, we look at tasks you perform before and after you enter the substation and control house. Then, we cover troubleshooting common substation troubles. Finally, we examine handling other substation situations such as fire, illegal access and cyber–crime.

Objectives

- List the basic troubleshooting steps.
- State the tasks you must perform before and after entering the substation and control house.
- List resolutions to common substation troubles such as no power, low and high voltage, fire and unauthorized entry.

Electric Library (02000 Overhead Systems & Components)

ELEC–02001 Climbing Basics – Wood Poles

MEA Certificate Numbers **TNG – MEA11542**
 KNT – MEA11541
 PEF – MEA11537

Continuing Education Unit (CEU) **0.1**

Course Description

This course provides an introduction to the basics of climbing wood poles. First, we will look at the equipment required for climbing wood poles and how that equipment is inspected and fitted. Next, we discuss tasks that you must perform before you climb a pole. Then, we cover the basic steps for climbing a pole using the freehand and belted methods. Finally, we list some basic maintenance that you should perform on climbing equipment.

Objectives

- Identify the equipment and clothing required for climbing wood poles.
- List the steps for inspecting, fitting, and maintaining pole climbing equipment.
- List the steps for inspecting for a wood pole prior to climbing.
- Describe the basic techniques of pole climbing using the free hand and belted methods.

ELEC–02002 Distribution Poles and Pole Equipment

MEA Certificate Numbers **TNG – MEA11544**
 KNT – MEA11543

Continuing Education Unit (CEU) **0.1**

Course Description

This course discusses distribution poles and pole equipment.

Objectives

- Understand types of distribution poles.
- Understand distribution pole equipment.
- Understand pole installation and maintenance, including inspection.
- Understand common pole setting tools.
- Understand personal protective equipment and work site safety.

ELEC–02004 Climbing Basics – Steel Poles and Lattice Towers

MEA Certificate Numbers **TNG – MEA11540**
 KNT – MEA11539
 PEF – MEA11538

Continuing Education Unit (CEU) **0.1**

Course Description

This course provides an introduction to the basics of climbing steel poles and lattice towers. First, we look at the equipment required for climbing steel poles and lattice towers, and how that equipment is inspected and fitted. Next, we discuss tasks that you must perform before you climb. Finally, we cover the basic steps for climbing.

Objectives

- Identify the equipment and clothing required for climbing steel poles and lattice towers.
- List the steps for inspecting and fitting climbing equipment.
- List the steps for inspecting steel poles and lattice towers prior to climbing.
- Describe basic steel pole and lattice tower climbing techniques.

ELEC–02010 Frame, Set, Install Anchors, and Guy Pole for De-energized Primary Distribution Circuit

MEA Certificate Numbers **TNG – MEA11355**
 KNT – MEA11354
 PEF – MEA11353, MEA11356

Continuing Education Unit (CEU) **0.1**

Course Description

This course discusses framing, setting, installing anchors, and guying poles for de-energized primary distribution circuits.

Objectives

Identify the necessary preparation steps and understand how to:

- Perform the necessary preparation steps.
- Frame and set a pole in a de-energized primary distribution circuit.
- Install anchors and guys on a pole in a de-energized primary distribution circuit.
- Identify and resolve abnormal operation conditions (AOC).

ELEC–02012 Conductor Stringing for New Construction Distribution Circuits

MEA Certificate Numbers TNG – MEA11358
 KNT – MEA11357
 PEF – MEA11356

Continuing Education Unit (CEU) 0.1

Course Description

This course discusses the tension method of conductor stringing for new construction distribution circuits.

Objectives

Understand how to:

- Perform the necessary preparation steps for pulling conductors.
- Pull and sag conductors.
- Complete the conductor connection at each structure.
- Identify and resolve abnormal operation conditions (AOC).
- Complete wrap up steps.

ELEC–02013 Install Pole–top Equipment on Energized Primary Distribution Circuits

MEA Certificate Numbers TNG – MEA11361
 KNT – MEA11360
 PEF – MEA11359, MEA11547

Continuing Education Unit (CEU) 0.1

Course Description

This course discusses the installation of the following pole top equipment on energized primary distribution circuits:

- Transformers
- Line capacitor banks
- Reclosers
- Voltage regulators

Objectives

- Understand the activities required to install transformers, line capacitor banks, reclosers, and voltage regulators.

ELEC–02015 Splicing and Tapping Overhead Conductors and Services

MEA Certificate Numbers TNG – MEA11550
 KNT – MEA11549
 PEF – MEA11548

Continuing Education Unit (CEU) 0.1**Course Description**

Splices and taps are designed to provide a low resistance electrical connection and minimize electrical stresses. Splicing is most often used to join two conductors end-to-end. When the length of wire is not sufficient to complete a job, a splice may be used to add a new length of wire. Also, when a section of wire is damaged, a splice may be used to replace the damaged section. Tapping is performed when a new cable must be attached to an existing cable.

Objectives

Understand how to:

- Perform splicing and tapping operations on energized overhead conductors.
- Use safe work practices.
- Identify required safety equipment.
- Understand how to properly use splicing and tapping equipment.
- Anticipate potentially hazardous situations.

ELEC-02020 Pole Mounted Transformer Basics

MEA Certificate Numbers **TNG – MEA11546**
 KNT – MEA11545

Continuing Education Unit (CEU) 0.1**Course Description**

The purpose of a transformer is to either step up or step down voltage in an alternating current system. A distribution transformer steps down voltage, reducing the higher primary voltage levels to the lower secondary voltage levels required by customers. Types of distribution transformers include: pole-type, pad-mounted, vault or network type, and submersible. This course covers pole-type distribution transformers.

Objectives

Gain a basic understanding of:

- Single phase and three phase power.
- General distribution transformer function.
- Single phase transformer selection and usage.
- Three phase transformer selection and usage

ELEC–02060 Remove Overhead Line Equipment on Energized Circuits

MEA Certificate Number TNG – MEA11370
 KNT – MEA11369
 PEF – MEA11368

Continuing Education Unit (CEU) 0.1

Course Description

This course discusses the procedures and guidelines for correctly and safely removing the following overhead line equipment: Transformers, voltage regulators, line reclosers and capacitor banks. Tasks performed before starting the job and when finishing the job are basically the same for all removals. These tasks are covered in module one. Tasks for removing overhead equipment vary, so those tasks are covered each in their own module.

Objectives

- Understand the activities required to safely remove transformers, voltage regulators, line reclosers and capacitor banks.

Notes:

- *For information on installing overhead (pole top) equipment, see the course: ELEC–02013 – Install Pole Top Equipment on Energized Primary Distribution Circuits.*
- *For information on overhead equipment, see the course: ELEC–02301 – Overhead Equipment Recognition.*

ELEC–02100 Routine Inspection of Overhead Distribution Line Equipment

MEA Certificate Number TNG – MEA11553
 KNT – MEA11552
 PEF – MEA11551

Continuing Education Unit (CEU) 0.1

Course Description

Routine inspection is a preventative measure designed to reduce circuit failures, minimize customer outages, reduce repair costs, and increase safety for workers, the general public, and the environment by proactively identifying failing components requiring repair/replacement. This course provides the procedures and guidelines for correctly and safely inspecting overhead distribution equipment, including transformers, voltage regulators, line reclosers, capacitor banks, and line switches.

Objectives

- Understanding routine inspection.
- Identifying requirements for working safely.
- Understanding the components of a routine inspection.

ELEC–02102 Live-Line Work

MEA Certificate Number TNG – MEA11556
 KNT – MEA11555
 PEF – MEA11554

Continuing Education Unit (CEU) 0.1

Course Description

Live work on energized circuits is often the preferred method for working on overhead systems, especially when operating revenues and system reliability are a priority, or when removing a circuit from service is not an acceptable option.

Objectives

- Understand general procedures and guidelines for correctly and safely setting up equipment for various energized overhead line tasks.
- Understand how to safely perform live-line tasks from an insulated bucket or platform.
- Identify hazardous conditions.

ELEC–02103 Glove and Hot Stick Use on Live overhead Distribution Lines

MEA Certificate Number TNG – MEA11559
 KNT – MEA11558
 PEF – MEA11557

Continuing Education Unit (CEU) 0.1

Course Description

Many tasks performed on overhead distribution lines, such as replacing insulators and crossarms, cutting line slack, installing armor rods, and phasing conductors, require the use of rubber gloves, rubber sleeves, and hot sticks.

Objectives

- Identifying scope of work.
- Selecting appropriate PPE, equipment, and tools.
- Obtaining required work authorizations and permissions.
- Understanding clearances.
- Implementing Work Zone Protection.
- Recognizing and protecting against potential hazards.

ELEC–02104 Overhead Systems General Troubleshooting

MEA Certificate Number TNG – MEA11561
 KNT – MEA11560

Continuing Education Unit (CEU) 0.1

Course Description

Since power requirements and electric usage varies among customers, system design and component selection must ensure that all customer needs are met. When a customer experiences a problem, it is essential that maintenance personnel be able to quickly identify the cause and correct the situation.

Objectives

- Identify standard components used in overhead distribution systems.
- Understand applicable codes and standards.
- Understand general troubleshooting process and procedures.
- Understand how to recognize and react to abnormal operating conditions.

ELEC–02105 Overhead Line Capacitor Bank Testing & Replacement

MEA Certificate Number **TNG – MEA11564**
 KNT – MEA11563
 PEF – MEA11562

Continuing Education Unit (CEU) **0.1**

Course Description

This course discusses procedures for testing and replacement of overhead line capacitor banks.

Objectives

- Understanding capacitors.
- Identifying steps that must be performed before starting work.
- Requirements for testing and replacement of capacitors.
- Identifying steps that must be performed after the job has been completed.

ELEC–02150 Street Lighting

MEA Certificate Number **TNG – MEA11364**
 KNT – MEA11363
 PEF – MEA11362

Continuing Education Unit (CEU) **0.1**

Course Description

This course discusses Street lighting and components of the typical street light.

Objectives

- Describe key street lighting components.
- Describe the types of street light lamps available.

- Operation of street light controls, circuit operations, and street installation.
- Describe the steps to troubleshoot common street light issues.
- Explain the five patterns of light distribution and the four different cut-off types of light distribution.

ELEC–02201 Pole Top Emergency Response

MEA Certificate Number **TNG – MEA11367**
 KNT – MEA11366
 PEF – MEA11365

Continuing Education Unit (CEU) **0.1**

Course Description

This course provides an introduction to the basics steps for performing a pole top or bucket truck rescue on an injured or ill line worker, and outlines the equipment required to perform a rescue and the basic steps for performing a pole top rescue. In addition, the steps for a bucket truck rescue are discussed.

Objectives

- Identify the equipment required for performing a pole top or bucket truck rescue.
- List the steps for performing a single person pole top rescue of an injured or ill line worker.
- List the steps for performing a single person bucket truck rescue of an injured or ill line worker.

ELEC–02204 Storm Work

MEA Certificate Number **TNG – MEA11566**
 KNT – MEA11565

Continuing Education Unit (CEU) **0.1**

Course Description

When a blackout occurs, power must be restored. Sometimes this means working during a storm. Each type of storm has its own dangers associated with it. Restoring power can be done safely, quickly, and efficiently if a storm plan is used.

Objectives

- Evaluating a storm plan.
- Describing storms and the areas in which they occur.
- Identifying the appropriate responses for the different types of storms.
- Responding to storm related outages.

ELEC–02301 Overhead Line Equipment Recognition

MEA Certificate Numbers **TNG – MEA11373**
 KNT – MEA11372

Continuing Education Unit (CEU) **0.1**

Course Description

Overhead distribution is main link to provide reliable service to the customer. Working with electrical equipment is inherently hazardous. Your safety is, in part, dependent on the ability to recognize and be aware of the equipment used in the system.

Objectives

Understanding safety requirements and describing and recognizing typical equipment, including components of:

- Distribution infrastructure
- Electrical control
- Protective equipment
- Additional equipment

ELEC–02302 Switches – Theory and Operations (Basics)

MEA Certificate Number **TNG – MEA11568**
 KNT – MEA11567

Continuing Education Unit (CEU) **0.1**

Course Description

Switches are used throughout electric distribution systems to enable, interrupt, or control current flow. Switches must be installed, operated, and repaired by qualified personnel in accordance with applicable regulations

Objectives

- Understand electric safety practices and qualified personnel requirements.
- Identify working hazards and how to establish safe work zones.
- Understand switch functions, types, and operation.
- Understand how to use hot sticks and load break tools to open and close switches.

ELEC–03011 Set Padmounted Equipment for Underground Distribution Systems

MEA Certificate Number **TNG – MEA11576**
 KNT – MEA11575
 PEF – MEA11574

Continuing Education Unit (CEU) **0.1**

Course Description

In an underground distribution system, electrical equipment is often mounted at ground level on a pad or basement (typically made of concrete or fiberglass). Qualified personnel must plan and carry out procedures to properly and safely set padmounted equipment on its pad or basement.

Objectives

Identify and understand:

- Worker qualifications and electrical safety practices.
- Types and functions of padmounted equipment.
- Safe vehicle and lifting operations.
- Understand how to properly set and ground padmounted equipment.

ELEC–03040 Pulling Primary Cable Underground

MEA Certificate Number **TNG – MEA11584**
 KNT – MEA11583
 PEF – MEA11578, MEA11579, MEA11580, MEA11581, MEA11582

Continuing Education Unit (CEU) **0.1**

Course Description

This course provides an introduction to the basic tasks performed when pulling cable into an underground primary distribution system. This course addresses:

- Where underground primary distribution systems are used and the basic components of an underground primary distribution system.
- Tasks that are performed before starting the cable pull.
- Steps for pulling the cable.
- Steps involved to finish the job.

Objectives

- Identify the components of an underground distribution system.
- List the steps for setting up an underground primary cable pull job.
- List the steps required to pull cable into an underground primary distribution system.
- List the steps for finishing the primary underground cable pull.

ELEC–03046 Direct Burying Primary and Secondary Cables

MEA Certificate Number **TNG – MEA11587**
 KNT – MEA11586
 PEF – MEA11585

Continuing Education Unit (CEU) **0.1**

Course Description

This course provides an introduction to the basic tasks performed when installing underground primary and secondary distribution cables using the direct buried method. The course addresses:

- Where underground distribution systems are used and the basic components of an underground distribution system.
- The basic tasks performed before starting the cable installation.
- The steps for installing the cable using the trenching and plowing methods.
- What is done to finish the job.

Objectives

- Identify the components of an underground distribution system.
- List the steps for setting up a direct buried underground primary and secondary cable installation job.
- List the steps required to direct bury cable using the trenching and plowing methods.
- List the steps for finishing a direct buried cable installation job.

ELEC–03047 Splicing – Terminating New Underground Cable

MEA Certificate Number **TNG – MEA11590**
 KNT – MEA11589
 PEF – MEA11591, MEA11592

Continuing Education Unit (CEU) **0.1**

Course Description

When an underground cable fails or is added to an existing system, it must be spliced or terminated. It is important to understand the basic concepts of splicing and terminating plastic insulated cable.

Objectives

- Underground distribution and safety basics.
- Underground conductors.
- Basics of splicing and terminating plastic cable.

ELEC–03048 Splicing New Underground Primary Cable – Non-Lead

MEA Certificate Number **TNG – MEA11594**
 KNT – MEA11593
 PEF – MEA11595, 11596, 11597, 11598

Continuing Education Unit (CEU) **0.1**

Course Description

Splices are a critical component of distribution systems. Because improper cable splicing is a major cause for cable failures, it is crucial to understand and follow proper cable splicing procedures.

Objectives

- Understand the basics of splicing.
- Identify steps that must be performed before starting work.
- Understand the steps required for splicing.
- Identify steps that must be performed after the job has been completed.

ELEC–03049 Terminating New Underground Primary Cable

MEA Certificate Number **TNG – MEA11602**
 KNT – MEA11601
 PEF – MEA11600

Continuing Education Unit (CEU) **0.1**

Course Description

When underground cables need to be connected to transformers, switchgear, or overhead lines, they must be terminated. This course discusses the procedure for terminating non-lead cable in an underground system.

Objectives

- Describe the basic components of cable terminating.
- Discuss safety requirements.
- Recognize activities and safe work procedures performed before job begins.
- Describe the cable terminating process.
- Recognize steps required upon job completion.

ELEC–03060 Underground Conductors: Repair or Replacing

MEA Certificate Number **TNG – MEA11604**
 KNT – MEA11603

Continuing Education Unit (CEU) **0.1**

Course Description

When an underground cable fails, it must be repaired or replaced. It is important to understand the basic concepts of repairing and replacing cable.

Objectives

- Understand underground distribution and safety basics.
- Be familiar with underground conductors.
- Basics of cable repair and replacement.

ELEC–03061 Splicing Lead Sheathed Cable

MEA Certificate Number **TNG – MEA11607**
 KNT – MEA11606
 PEF – MEA11605, MEA11608, MEA11609, MEA11610

Continuing Education Unit (CEU) **0.1**

Course Description

Lead sheathed cables were the first underground cable, and many are still in service today. It is important to be familiar with that type of cable and how to splice it.

Objectives

- Understand splicing safety regulations.
- Identify typical components.
- Describe splicing procedures.

ELEC–03062 Terminating Lead Sheathed Cable

MEA Certificate Number **TNG – MEA11615**
 KNT – MEA11614
 PEF – MEA11611

Continuing Education Unit (CEU) **0.1**

Course Description

When underground cables need to be connected to transformers, switchgear, or overhead lines, they must be terminated. This course discusses the procedure for terminating lead sheathed cable in an underground system.

Objectives

- Describe the basic component of cable terminating.
- Discuss safety requirements.
- Recognize activities and safe work procedures performed before job begins.
- Describe the cable terminating process.
- Recognize steps required upon job completion.

ELEC–03101 Pad Mount Switchgear Maintenance

MEA Certificate Number TNG – MEA11613
 KNT – MEA11612
 PEF – MEA11842

Continuing Education Unit (CEU) 0.1

Course Description

Pad mount switchgear is used to stop, start, or control the flow of power in an electrical transmission or distribution system. Pad mount switchgear must be properly maintained by qualified personnel in order to function safely and effectively.

Objectives

- Understand the hazards associated with pad mount switchgear maintenance.
- Understand the safety qualifications and regulations for personnel and equipment.
- Identify the methods to properly de-energize and lock-out equipment.
- Understand how to inspect switchgear components.
- Understand how to repair faulty or improperly adjusted switchgear components.

ELEC–03105 Underground Line Capacitor Bank Testing

MEA Certificate Number TNG – MEA11623
 KNT – MEA11622
 PEF – MEA11621

Continuing Education Unit (CEU) 0.1

Course Description

This course discusses procedures for testing of underground line capacitor banks. .

Objectives

- Understand capacitors.
- Identify steps that must be performed before starting work.

- Understand requirements for testing padmount capacitor banks.
- Identify steps that must be performed after the job has been completed.

ELEC–03106 Troubleshooting and Fault Locating Underground Cables

MEA Certificate Number **TNG – MEA11625**
 KNT – MEA11624
 PEF – MEA11686

Continuing Education Unit (CEU) **0.1**

Course Description

Outages due to weather, accidents, and foreign object contact are common causes of faults on overhead electric power circuits. These incidents can be avoided by using underground systems, however, other problems can occur that cause faults and accompanying outages for underground electric system customers. Faults on underground cable are often caused by insulation failure, moisture in the cable, corrosion on exposed metal, improper cable installation, incorrect splice or termination installation, lightning, gophers, and excavation dig-ins. After a fault has occurred, it is important to find the fault quickly so that electric service can be restored to customers that have lost power, and to isolate and repair the faulted cable.

Objectives

- Identify types and causes of faults in underground power system cables.
- Understand guidelines for troubleshooting and inspecting power system cables when a fault occurs.
- Understand methods for locating, sectionalizing, and isolating faulted underground power system cables.
- Identify equipment used to locate and pinpoint cable faults.

ELEC–03200 Underground Safety During Excavation

MEA Certificate Number **TNG – MEA11627**
 KNT – MEA11626

Continuing Education Unit (CEU) **0.1**

Course Description

This course discusses underground safety during excavation.

Objectives

- Define Best Practices.
- Understand precautions to ensure safety and prevent damage.
- Understand One–Call System and how it works.
- Understand OSHA Standards.
- Understand Backfill, Composition and Restoration requirements.

ELEC–03201 Working in Enclosed and Confined Space

MEA Certificate Number TNG – MEA11629
 KNT – MEA11628

Continuing Education Unit (CEU) 0.1

Course Description

Electric utility workers are often required to perform work within a closed or confined space. Workers must be aware of the serious dangers associated with confined space entry, and adhere to all applicable safety regulations and procedures.

Objectives

- Identify a closed or confined space and the requirements for electric and confined space workers.
- Understand a permit–required confined space and permit requirements.
- Understand the atmospheric and physical hazards involved in closed or confined space work.
- Identify methods for controlling confined space hazards.
- Understand requirements for rescue personnel.

ELEC–03300 Underground Systems Theory Basics

MEA Certificate Number TNG – MEA11631
 KNT – MEA11630

Continuing Education Unit (CEU) 0.1

Course Description

Underground electrical transmission and distribution systems are often installed when safety, space, or appearance are a concern. Although they are often more costly to install, underground systems offer many considerable benefits when compared with overhead lines. Many utilities and municipalities choose to install underground systems.

Objectives

- Identify and understand the types of underground networks and systems.
- Understand the basic theory and configuration of underground systems.
- Identify and understand the equipment and components of an underground system.

ELEC–03301 Transformer Basics – Underground Distribution

MEA Certificate Number **TNG – MEA11633**
 KNT – MEA11632

Continuing Education Unit (CEU) **0.1**

Course Description

The purpose of a transformer is to either step up or step down voltage in an alternating current system. A distribution transformer steps down voltage, reducing the higher primary voltage levels to the lower secondary voltage levels required by customers. Types of distribution transformers include: pole-type, pad-mounted, submersible (below ground) and vault or network type. This course covers pad-mounted and submersible transformers used for underground power distribution.

Objectives

Understand:

- Single phase and three phase power.
- General distribution transformer function.
- Key components and common connections.
- General safety precautions and testing procedures.
- Recognize and know how to react to abnormal operating conditions.

ELEC–03302 Underground Equipment Recognition

MEA Certificate Number **TNG – MEA11635**
 KNT – MEA11634

Continuing Education Unit (CEU) **0.1**

Course Description

Underground residential distribution is mainly used in urban areas where space is limited. This system is one of the main ways to provide safe and reliable service to the customer. Working with electrical equipment is inherently hazardous. Your safety is, in part, dependent on the ability to recognize and be aware of the equipment used in the system.

NOTE: This course does not comprehensively cover all types of line construction equipment. It is important to be personally aware of the differences in your company's construction standards and materials, as well as terminology.

Objectives

- Understand underground distribution systems.
- Identify safety requirements associated with URD systems.
- Describe and recognize typical equipment, including components of underground distribution infrastructure, padmount equipment, etc.

ELEC-03303 Underground Systems Awareness – New Employee

MEA Certificate Number **TNG – MEA11637**
 KNT – MEA11636

Continuing Education Unit (CEU) **0.1**

Course Description

The national power grid, which supplies our country with electric power, feeds that power through a network of overhead and underground lines. The various transmission systems play an essential role in safely transporting electric power across the country. Underground and overhead distribution systems deliver that power to individual customers. This course focuses primarily on underground distribution systems.

In supporting this effort, utilities provide real-time monitoring, control, and relay protection systems for the transmission and distribution circuits. In the event of a fault on a distribution line, automatic sectionalizing can isolate the problems section and maintain service to other customers on the non-faulted sections of the line. Maintenance and repair personnel must be properly trained and qualified to perform the tasks required to ensure continued and safe operation of all underground systems.

Objectives

- Understand basic layouts of underground distribution systems.
- Identify underground distribution system components and equipment.
- Describe safety measures involved in working with underground systems.

Electric Library (04000 Services, Secondaries)

ELEC–04040 Secondary Connections Basics

MEA Certificate Number **TNG – MEA11758**
 KNT – MEA11757
 PEF – MEA11756

Continuing Education Unit (CEU) 0.1

Course Description

Within an electric transmission and distribution system, secondary connections are used in the portion of the system that lies between the primary feeders and the utilization equipment.

Objectives

- Learn the definition and purpose of secondary connections.
- Know the hazards associated with high and low-voltage systems.
- Understand the safety requirements for work on secondary connections.
- List the components of a secondary connection; conductors, insulation, connectors, and splicing material.

ELEC–04041 Phasing Services Together

MEA Certificate Number **TNG – MEA11826**
 KNT – MEA11829

Continuing Education Unit (CEU) 0.1

Course Description

This course provides an introduction to phasing (paralleling) services together. In this course, we first review the different types of secondary systems and discuss phasing terminology. Next, we look at some connectors, test equipment, and tools you use when phasing and checking phase sequence (rotation). Then, we cover the tasks you perform before you start a phasing project. Finally, we discuss the steps you perform when phasing services together and checking phase sequencing.

Objectives

- Recognize the different secondary systems.
- Identify connectors, test equipment, and tools used when phasing or checking phase sequence.
- Define common phasing terms.
- State the tasks you perform before starting a phasing project.
- List the steps you perform when phasing services together and checking phase sequencing.

ELEC–04042 Phasing Banks Together and Separating Phased Banks

MEA Certificate Number TNG – MEA11755
 KNT – MEA11754
 PEF – MEA11753

Continuing Education Unit (CEU) 0.1

Course Description

This course provides an introduction to phasing (paralleling) and separating primary distribution transformers and transformer banks. In this course, we first review transformer fundamentals. Next, we cover the tasks you perform before you start a phasing project. Then, we discuss the steps you complete when phasing transformers and banks. Finally, we discuss the steps you perform when separating phased transformers and banks.

Objectives

- Explain transformer fundamentals.
- State the tasks you perform before starting a phasing project.
- List the steps you perform when phasing transformers and transformer banks.
- List the steps you perform when separating transformers and transformer banks.

The following courses provide additional information on primary distribution transformers:

- *ELEC–02020 Pole Mounted Transformer Basics (Covers wiring banks in many different delta and wye configurations.)*
- *ELEC–02013 Install Pole Top Equipment on Energized Primary Distribution Circuits*
- *ELEC–02060 Remove Overhead Line Equipment on Energized Circuits*

ELEC–04044 Locating Grounded Leg on Delta Secondary

MEA Certificate Number TNG – MEA11827
 KNT – MEA11830

Continuing Education Unit (CEU) 0.1

Course Description

This course provides an introduction to locating the grounded leg on delta secondary systems. In this course, we first review how three-phase primary distribution transformers and transformer banks are connected to provide either delta or wye secondary service. Next, we cover the tasks you perform before you start to locate the grounded leg. Finally, we discuss the steps you perform to locate a grounded leg on both center tapped and corner grounded delta secondary systems.

Objectives

- Explain the differences between delta and wye secondary systems.
- State the tasks you perform before you start to locate the grounded leg.
- List the steps you perform when locating the grounded leg on a:
 - Center tapped delta secondary system.
 - Corner grounded delta secondary system.

Note: This course only covers locating the grounded leg on delta secondary systems. For detailed information on how to connect primary distribution transformers to provide delta and wye secondary service, refer to ELEC–02020 Pole Mounted Transformer Basics.

ELEC–04045 Locating Power Grounds on Low Voltage Systems

MEA Certificate Number **TNG – MEA11751**
 KNT – MEA11750
 PEF – MEA11752

Continuing Education Unit (CEU) **0.1**

Course Description

Locating power grounds on a low-voltage system is crucial for the safety of personnel and system equipment. Grounding requirements, materials, configurations, and location will depend on company policies and procedures, system function, and applicable regulations.

Objectives:

Identify:

- The purpose and importance of grounding components on a low voltage system.
- Electric hazards and worker qualifications for working on or near energized lines or equipment.
- The requirements and materials used; including grounding wire, electrodes, and connectors.
- The location of grounding components on pole–mounted and padmounted equipment in a low–voltage system.

ELEC–04046 Troubleshooting Secondaries

MEA Certificate Number **TNG – MEA11828**
 KNT – MEA11831

Continuing Education Unit (CEU) **0.1**

Course Description

This course provides an introduction to troubleshooting secondaries. In this course, we first review the different types of secondary systems and troubleshooting process. Next, we examine test equipment you use when troubleshooting secondaries. Then, we discuss tasks you must complete prior to starting a troubleshooting job. Finally, we take a look at troubleshooting an open phase, open neutral, and grounded phase.

Objectives

- Recognize different secondary systems.
- List the basic troubleshooting steps.
- State the tasks you must complete before starting a troubleshooting job.
- Identify test equipment you use to troubleshoot secondaries.
- Explain the how to troubleshoot the following using a voltmeter and ohmmeter:
 - Open phase
 - Open neutral
 - Grounded phase

Electric Library (05000 Metering)

ELEC–05010 Single Phase Metering Self Contained Socket Base–Basics

MEA Certificate Number TNG – MEA11376
 KNT – MEA11375
 PEF – MEA11380, MEA11381, MEA11385, MEA11386, MEA11387, MEA11388,
 MEA11389, MEA11390, MEA11391, MEA11392, MEA11393, MEA11394

Continuing Education Unit (CEU) 0.1

Course Description

This course covers a variety of tasks associated with single phase 2–wire 120V and 3–wire 120/240V socket style meters.

Objectives

Understand how to:

- Install an A-base adaptor.
- Install a socket-type meter.
- Turn on the meter to provide service.
- Exchange the meter.
- Turn off the meter to discontinue service.
- Remove the meter.

ELEC–05011 Single Phase Metering Self Contained A–Base–Basics

MEA Certificate Number TNG – MEA11379
 KNT – MEA11378
 PEF – MEA11380, MEA11381, MEA11382, MEA11383, MEA11384, MEA11388,
 MEA11389, MEA11390, MEA11391, MEA11392, MEA11393, MEA11394

Continuing Education Unit (CEU) 0.1

Course Description

This course covers a variety of tasks associated with single phase 2–wire 120V and 3–wire 120/240V A–base style meters.

Objectives

Understand how to:

- Replace an A–base meter with an A–base adaptor.
- Turn on the meter to provide service.
- Exchange the A–base meter for a socket style meter.
- Turn off the meter to discontinue service.
- Removing the meter.

ELEC–05020 Single Phase Metering Transformer Rated – Socket or A–Base – Basics

MEA Certificate Number TNG – MEA11399
 KNT – MEA11398
 PEF – MEA11400, MEA11406, MEA11407, MEA11403

Continuing Education Unit (CEU) 0.1

Course Description

When the voltage and current levels being metered are above the level where it is safe or practical to use standard metering equipment, instrument transformers are used to isolate the high voltage or high current from the meter. The reduced level can then be measured by instrument rated meters, and a multiplier determines the actual energy consumption.

Objectives

- Understand the procedures and guidelines for meter installation.
- Understand the required safety equipment and precautions.
- Recognize problems and react to abnormal conditions.

ELEC–05030 Three Phase Metering Self Contained Socket Base – Basics

MEA Certificate Number TNG – MEA11410
 KNT – MEA11409
 PEF – MEA11417, MEA11418, MEA11419, MEA11428, MEA11679, MEA11680,
 MEA11681

Continuing Education Unit (CEU) 0.1

Course Description

Self-contained electric meters are used to measure the full customer load when the customer's load does not exceed 200 amps. Specially designed self–contained meters may be used for up to 400 amp service.

Objectives

- Understand procedures and guidelines for installing three phase self-contained meters.
- Understand required safety equipment and standard safety precautions.
- Recognize and react to abnormal operating conditions.

ELEC–05031 Three Phase Metering Self Contained A–Base

MEA Certificate Number TNG – MEA11413
 KNT – MEA11412
 PEF – MEA11414, MEA11418, MEA11428, MEA11678, MEA11680, MEA11681

Continuing Education Unit (CEU) 0.1

Course Description

Prior to 1930, all meters were made with screw-type terminals located in the base beneath the meter. These bottom-connected style meters are known as A-base meters. Self-contained A-base style electric meters were often used when the customer's load was not going to exceed 200 amps; the meter is designed to measure the full customer load. There are also specially designed self-contained meters that may be used for services up to 400 amps.

Objectives

Understand procedures and guidelines for inspection and maintenance of three phase self-contained A-base meters.

- Procedures and guidelines for inspection and maintenance of three phase self-contained A-base meters.
- Required safety equipment and standard safety precautions.
- Recognize and react to Abnormal Operating Conditions.

ELEC-05040 Three Phase Metering Transformer Rated Meters

MEA Certificate Number **TNG – MEA11422**
 KNT – MEA11421
 PEF – MEA11423, MEA11424, MEA11425, MEA11426, MEA11427, MEA11428,
 MEA11429

Continuing Education Unit (CEU) **0.1**

Course Description

When the voltage and current levels being metered are above the level where it is safe or practical to use standard metering equipment, instrument transformers are used to isolate and lower the high voltage and high current from the meter. The reduced levels are then measured by transformer-rated meters, and a multiplier is used with the meter reading to calculate the actual energy consumption.

Objectives

- Understand procedures and guidelines for transformer-rated meter installation for three phase service.
- Understand required safety equipment and standard safety precautions.
- Recognize problems and react to abnormal conditions.

ELEC-05050 Instrument Transformers – Current and Potential Transformers for Electric Metering – Basics

MEA Certificate Number **TNG – MEA11432**
 KNT – MEA11431
 PEF – MEA11433

Continuing Education Unit (CEU) **0.1**

Course Description

There are basically two types of instrument transformers that may be used in a transformer rated meter installation: current transformers (CTs) and potential transformers (PTs). Instrument transformers are used in conjunction with transformer rated meters. The transformers function to decrease the input current or voltage to the meter. The transformer rated meter is able to measure the customer's energy usage even though it is not exposed to the full load.

Objectives

- Understand current and potential instrument transformer characteristics, components, terms, and applications.
- Understand typical instrument transformer configurations for electric metering.
- Understand instrument transformer installation for single and three-phase metering.
- Understand instrument transformer safety.

ELEC–05101 Metering Diversion and Theft of Service

MEA Certificate Number **TNG – MEA11436**
 KNT – MEA11435
 PEF – MEA11434

Continuing Education Unit (CEU) **0.1**

Course Description

Loss of revenue as a result of theft is a serious problem for electric utility companies. Customers can be very creative in their attempts to prevent correct measurement of energy consumption.

Objectives

- Understand hazards associated with tampering and theft.
- Understand anti–tampering mechanisms.
- Understand common methods of meter tampering and energy diversion.
- Detect common forms of tampering and diversion.
- Recognize and react to abnormal operating conditions.

ELEC–05102 Investigate Voltage Problems Single Phase Metering

MEA Certificate Number **TNG – MEA11439**
 KNT – MEA11438
 PEF – MEA11394

Continuing Education Unit (CEU) **0.1**

Course Description

Although it is normal for electric service voltage levels to vary slightly within prescribed limits, customers may experience electric problems with regard to the continuity or quality of the voltage. Problems may include levels

that are either too high or too low, flickering lights, or the absence of voltage on only a portion of electric circuits. These problems can occur as a result of loose connections, faulty wiring, or a faulty meter. To ensure quality electric service to the customer, utility personnel must be able to properly identify and correct voltage problems that may occur.

Objectives

Understand how to:

- Investigate common voltage problems with single phase meters.
- Determine solutions to metering/voltage problems.
- Perform inspection and testing procedures.
- Recognize potential hazards.
- Follow required safety procedures.

ELEC-05104 Investigate High Bill Complaints – Single Phase Metering

MEA Certificate Number **TNG – MEA11442**
 KNT – MEA11441
 PEF – MEA11390

Continuing Education Unit (CEU) **0.1**

Course Description

Electric meters, often called revenue meters, are used to measure the total amount of energy consumed by a customer over a period of time. The accuracy of the measurement is important, because the information is used for the purpose of billing the customer. Occasionally, customers may call the utility company to complain about a high bill. Utility personnel will need to determine if the reason for a higher than normal bill is due to increased energy usage or an error in measuring usage.

Objectives

- Procedures for responding to high bill complaints for single phase 2- or 3-wire, socket or A-base meter installations.
- Basic meter operations and meter reading.
- The effects of appliance usage on energy consumption.
- Performing accuracy testing and meter maintenance.

ELEC–05106 Investigate High Bill Complaints – Three Phase Metering

MEA Certificate Number TNG – MEA11445
 KNT – MEA11444
 PEF – MEA11428

Continuing Education Unit (CEU) 0.1

Course Description

Electric meters, often called revenue meters, are used to measure the total amount of energy consumed by a customer over a period of time. The accuracy of the measurement is important, because the information is used for the purpose of billing the customer. Occasionally, customers may call the utility company to complain about a high bill. Utility personnel will need to determine if the reason for a higher than normal bill is due to increased energy usage, an error in the meter reading, or an inaccurate meter.

Objectives

- Understand procedures for responding to high bill complaints for three phase self-contained, transformer rated, socket or A-base meter installations.
- Basic meter operations and meter reading.
- The effects of equipment usage, equipment additions, and changes in weather on energy consumption.
- Perform accuracy testing and meter maintenance.

ELEC–05300 Meters & Metering Applications Fundamentals

MEA Certificate Number TNG – MEA11448
 KNT – MEA11447

Continuing Education Unit (CEU) 0.1

Course Description

Utilities provide electric service to customers, and then bill customers for the amount of electric energy used. Energy consumption is measured through the use of an electric meter installed at the customer's location.

Objectives

Understand:

- Electric power distribution.
- Transforming and metering electricity.
- Standard metering equipment.

ELEC–05301 Electro–Mechanical Meters Maintenance – Repair and Adjustment

MEA Certificate Number **TNG – MEA11451**
 KNT – MEA11450
 PEF – MEA11449

Continuing Education Unit (CEU) **0.1**

Course Description

Personnel may be required to perform maintenance or repair on electric meters in the field.

Objectives

Understand how to:

- Safely maintain, repair and adjust electromechanical meters.
- Select and use appropriate tools and equipment.
- Identify meters that are not within accuracy limits.
- Recognize and respond to potential problems.

Electric Library (07000 Distribution Systems)

ELEC–07201 Network Systems Distribution: Maintain and Troubleshoot

MEA Certificate Number **TNG – MEA11758**
 KNT – MEA11757

Continuing Education Unit (CEU) **0.1**

Course Description

This course provides an introduction to maintaining and troubleshooting secondary network distribution systems. In this course we first discuss secondary network distribution systems and their supporting equipment. Then, we take a look at test equipment you use when troubleshooting secondary networks. Next, we discuss tasks you must complete prior to starting a troubleshooting job, and basic de-energizing and re-energizing steps. Then, we cover maintenance of secondary network system equipment. Finally, we take a look at the seven steps of the troubleshooting process and troubleshooting an open phase, open neutral and grounded phase in a three-phase secondary service.

Objectives

- List the equipment used in a secondary network system.
- Identify electric distribution power flow through the distribution system.
- State the tasks you must complete before starting a maintenance or troubleshooting job.
- List the tasks for maintenance of common secondary network system equipment.
- Know the seven basic troubleshooting steps.
- Explain how to troubleshoot the following using a voltmeter and ohmmeter:
 - Open phase
 - Open neutral
 - Grounded phase

ELEC–07300 Electrical Power: Distribution Systems – General – Basics

MEA Certificate Number **TNG – MEA11832**
 KNT – MEA11833

Continuing Education Unit (CEU) **0.1**

Course Description

Power distribution systems are one component of the power grid used to safely and efficiently deliver power to customers. Distribution systems may be simple or complex, but learning the basics of the system will help provide insight into how distribution systems work. This course discusses basics of electrical power distribution systems.

Objectives

- Summarize electric distribution systems basics.
- Identify electric distribution power flow through the distribution system.

ELEC-07301 Electrical Power: Distribution Systems – Overhead – Basics

MEA Certificate Number **TNG – MEA11834**
 KNT – MEA11835

Continuing Education Unit (CEU) **0.1**

Course Description

Overhead power distribution systems are one component of the power grid used to safely and efficiently deliver power to customers. These systems may be simple or complex, but learning the basics of the system will help provide insight into how overhead distribution systems work. This course discusses basics of overhead electrical power distribution systems.

Objectives

- Summarize electric distribution systems basics.
- Understand common overhead distribution equipment and functions.
- Identify electric distribution power flow through the overhead distribution system.
- Understand general overhead distribution layouts.

ELEC-07302 Electrical Power: Distribution Systems – Underground – Basics

MEA Certificate Number **TNG – MEA11836**
 KNT – MEA11837

Continuing Education Unit (CEU) **0.1**

Course Description

Underground power distribution systems are one component of the power grid used to safely and efficiently deliver power to customers. These systems may be simple or complex, but learning the basics of the system will help provide insight into how underground distribution systems work. This course discusses the basics of underground electrical power distribution systems.

Objectives

- Summarize the basics of electric distribution systems.
- List common underground distribution equipment and functions.
- Understand electric distribution power flow through the underground distribution system.
- Identify general underground distribution layouts.

ELEC–07303 Electrical Power: Distribution Systems – Secondary Network Systems

MEA Certificate Number **TNG – MEA11838**
 KNT – MEA11839

Continuing Education Unit (CEU) **0.1**

Course Description

Service reliability is an important requirement of an electric distribution system, especially in business districts and large cities. The secondary network is the most common method used to ensure this reliability.

Objectives

Identify:

- The function of secondary network systems
- Basic types of secondary networks
- Secondary network components
- Secondary network design requirements

ELEC–07304 Distribution Automation

MEA Certificate Number **TNG – MEA11840**
 KNT – MEA11841

Continuing Education Unit (CEU) **0.1**

Course Description

Modern communications systems and advanced equipment have made it possible to apply Automated Distribution (DA) to many electrical power distribution systems.

Objectives

Understand:

- The basic requirements of a DA system.
- The benefits of a DA system.
- Various functions and applications of a DA system.
- Example configurations and functions of a DA system.
- Basic requirements for DA safety, security, testing, and maintenance.

Electric Library (08000 Electric Utilities Fundamentals)

ELEC–08300 Utility Basics

MEA Certificate Number **TNG – MEA11526**
 KNT – MEA11525

Continuing Education Unit (CEU) **0.1**

Course Description

This course reviews the characteristics of natural gas and electricity.

Objectives

- Identifying natural gas characteristics.
- Describing the natural gas distribution process and safety concerns.
- Identifying electricity characteristics.
- Describing the electricity distribution process and safety concerns.

ELEC–08301 Energy Industry Dynamics

MEA Certificate Number **TNG – MEA11528**
 KNT – MEA11527

Continuing Education Unit (CEU) **0.1**

Course Description

The goal of this course, Energy Industry Dynamics, is to provide the participant with a view of the energy industry from a business perspective.

Objectives

- Describe the energy industry historical milestones.
- Identify the dynamics of the energy industry.
- Identify how energy companies generate revenues.
- Identify industry and company challenges.
- Respond to customer billing questions.

ELEC–08302 Electric Power

MEA Certificate Number **TNG – MEA11530**
 KNT – MEA11529

Continuing Education Unit (CEU) **0.1**

Course Description

Electric power has become an indispensable energy source in every modern country across the world. Electric power is used to run homes, businesses, and industry. Although electricity occurs in nature, the electric power used for energy must be generated from other energy sources and transmitted to consumers through distribution lines.

Objectives

Understand:

- The science of electricity.
- How electrical power is generated.
- The distribution of electrical power.
- The effects of electric current on the human body.

ELEC–08303 Protecting Our Wetlands

MEA Certificate Number **TNG – MEA11532**
 KNT – MEA11531

Continuing Education Unit (CEU) **0.1**

Course Description

Wetlands and waterways are valuable to humans, animals, and the environment. Wetlands and waterways support life forms that are the basis of the food chain. These important resources also provide routes for transportation and opportunities for recreation and education.

Objectives

Understand:

- The definition of wetlands and waterways.
- The importance and functions of wetlands and waterways.
- Damage prevention.
- Wetland and waterway regulations and legislation.
- Permit requirements and usage.

Electric Library (09000 Electricity & Electrical Components)

ELEC–09001 Battery Systems

MEA Certificate Number **TNG – MEA11844**
 KNT – MEA11843

Continuing Education Unit (CEU) **0.1**

Course Description

A battery is an important part of a control system. The battery enables the control system to supply power to critical control, monitoring, communication, and protective devices.

Objectives

Identify:

- Battery hazards and regulations
- The battery and its function in a DC system
- Battery and charger components
- Required battery and charger testing

ELEC–09010 Transformer Theory

MEA Certificate Number **TNG – MEA11846**
 KNT – MEA11845

Continuing Education Unit (CEU) **0.1**

Course Description

Transformers are responsible for stepping power up or down so that it can be safely and efficiently sent many miles throughout the electric distribution system; from power generation to the consumer. In this course we first discuss the role of transformers in an electric distribution system. Then we seek to understand transformer principals of operation. Next we learn the basic components of the different types of transformers. And finally, we familiarize ourselves with the requirements of the location and mounting of transformers.

Objectives

Understand:

- The role of transformers in an electric distribution system.
- Understand transformer principles of operation.
- The basic components of pole-mounted, substation, and underground distribution transformers.
- Transformer mounting, location, and configuration requirements.

ELEC–09011 Line Reclosers and Sectionalizers

MEA Certificate Number **TNG – MEA11731**
 KNT – MEA11730

Continuing Education Unit (CEU) **0.1**

Course Description

Within an electric distribution system, line reclosers and sectionalizers help provide maximum continuity and reliability. Reclosers detect and interrupt faults, and reclose to restore service after a temporary fault. If a fault is permanent, the recloser will lock open. Sectionalizers work in conjunction with reclosers to isolate faulted circuits.

Objectives

Understand:

- Recloser construction and usage.
- Sectionalizer construction and usage.
- Recloser and sectionalizer types.
- Methods for equipment mounting.
- Maintenance and documentation requirements.

ELEC–09014 Circuit Switches

MEA Certificate Number **TNG – MEA11848**
 KNT – MEA11847

Continuing Education Unit (CEU) **0.1**

Course Description

Within an electric distribution system, line reclosers and sectionalizers help provide maximum continuity and reliability. Reclosers detect and interrupt faults, and reclose to restore service after a temporary fault. If a fault is permanent, the recloser will lock open. Sectionalizers work in conjunction with reclosers to isolate faulted circuits.

Objectives

Identify:

- Recloser construction and usage.
- Sectionalizer construction and usage.
- Recloser and sectionalizer types
- Methods for equipment mounting
- Maintenance and documentation requirements

ELEC–09015 Arresters

MEA Certificate Number **TNG – MEA11850**
 KNT – MEA11849

Continuing Education Unit (CEU) **0.1**

Course Description

Within an electric power system, arresters are used to protect equipment from overvoltages that can be caused by lightning strikes or system events, such as switching.

Objectives

Identify:

- The purpose and function of arresters within an electric power system.
- The basic operating principles of common arrester types.
- Construction of some common arrester types.
- The location and application of arresters.
- The criteria used for arrester selection.

ELEC–09016 Capacitors

MEA Certificate Number **TNG – MEA11851**
 KNT – MEA11852

Continuing Education Unit (CEU) **0.1**

Course Description

Providing efficient and reliable power is one of the most difficult tasks a utility faces. One way to achieve this goal is with the use of capacitors.

Objectives

Understand:

- Basics of capacitors.

ELEC–09017 Relays

MEA Certificate Number **TNG – MEA11733**
 KNT – MEA11732

Continuing Education Unit (CEU) **0.1**

Course Description

Relays work together with other equipment to detect and isolate equipment during abnormal conditions in an electric power system. When relays are properly applied, they protect equipment and personnel.

Objectives

Understand:

- The importance of relays within an electric power system.
- How relays are designed and constructed to respond to faults.
- Different relay types and protective schemes.
- Primary and back-up relays.
- Testing and documentation requirements.

ELEC–09018 Voltage Regulators

MEA Certificate Number **TNG – MEA11854**

KNT – MEA11853

Continuing Education Unit (CEU) **0.1**

Course Description

Voltage regulators are used within an electric distribution system to maintain voltage within a specific range. This ensures that the proper voltage is supplied to customers.

Objectives

Identify and Define:

- Voltage regulators and their importance in an electric power system.
- Single-phase and three-phase voltage regulators.
- Common locations for voltage regulators within a distribution system.
- The basic components of a voltage regulator.

Electric Library (10000 Tools & Equipment)

ELEC–10100 Hot–line Tool Cleaning

MEA Certificate Number **TNG – MEA11639**
 KNT – MEA11638

Continuing Education Unit (CEU) **0.1**

Course Description

Live work on energized circuits is often the preferred method for working on transmission and distribution systems. A significant portion of live-line work is performed using hot-sticks. This course provides an overview of the construction and types of hot-sticks, and describes the general procedures and guidelines for maintaining hot-line tools.

Objectives

Upon completion of this course you will be familiar with hot-stick construction and types, and be able to describe the general procedures and guidelines for maintaining hot-line tools, including:

- Storage
- Inspection
- Cleaning
- Testing

ELEC–10101 Test Equipment

MEA Certificate Number **TNG – MEA11858**
 KNT – MEA11857

Continuing Education Unit (CEU) **0.1**

Course Description

In an electric power system, test equipment is used to take various electrical measurements. These measurements allow personnel to monitor power flow throughout the system's components. Personnel performing electrical measurements must understand the equipment they are using and applicable safety standards

Objectives

Identify:

- Safety and personnel requirements for working on or near electrical equipment.
- Measurement types and their importance.
- Voltage, current, resistance, and Ohm's law.
- Various meters, phasing sticks, hi-pot testers, meggers, and thermal imaging.

ELEC–10102 Hand Tools General I

MEA Certificate Number **TNG – MEA11641**
 KNT – MEA11640

Continuing Education Unit (CEU) **0.1**

Course Description

Hand tools are designed to perform numerous tasks at job sites. Each tool is designed for a specific purpose and should be used accordingly.

Objectives

Understand:

- The importance of proper tool usage and care.
- Hand tool guidelines and precautions.
- Hand tools used in carrying, cutting, and digging.
- Other common hand tools.

ELEC–10103 Hand Tools General II

MEA Certificate Number **TNG – MEA11643**
 KNT – MEA11642

Continuing Education Unit (CEU) **0.1**

Course Description

This course discusses hand tools.

Objectives

- Understand general guidelines for hand tool use.
- Understand guidelines for the use of wire grips.
- Understand how to use rigging components for moving and hoisting.
- Understand how to determine weight loads on lifting equipment.

ELEC–10104 Underground Tools and Equipment I

MEA Certificate Number **TNG – MEA11645**
 KNT – MEA11644

Continuing Education Unit (CEU) **0.1**

Course Description

Constructing electric power cables underground has become a popular option in urban areas due to its aesthetic appearance. With its growing popularity, it is important to be familiar with the tools and equipment used in underground cable construction.

Objectives

Understand the underground cable construction process and understand the use of:

- Trenching equipment.
- Duct preparation equipment.
- Manhole preparation equipment.
- Cable pulling and splicing equipment.

ELEC–10105 Underground Tools and Equipment II

MEA Certificate Number **TNG – MEA11647**
 KNT – MEA11646

Continuing Education Unit (CEU) **0.1**

Course Description

Constructing distribution power lines can be dangerous. This course discusses OSHA's regulations regarding safety and tool use, as well as the variety of protective equipment that is used.

Objectives

- OSHA's rules regarding overhead distribution line construction.
- Identify personal protective equipment and electrical protective equipment.
- Perform general maintenance and care of hand tools, hydraulic tools, and derrick trucks.

ELEC–10106 Overhead Distribution Line Construction Tools and Equipment

MEA Certificate Number **TNG – MEA11649**
 KNT – MEA11648

Continuing Education Unit (CEU) **0.1**

Course Description

This course reviews the various tools and equipment used in construction overhead distribution lines.

Objectives

Understand how to:

- Dig holes for poles.
- Set poles into pole-holes.
- Climb poles.
- Lift equipment for installation.
- String, sag, and combine conductors.

ELEC–10107 Overhead Distribution Line Construction Safety

MEA Certificate Number **TNG – MEA11651**
 KNT – MEA11650

Continuing Education Unit (CEU) **0.1**

Course Description

Constructing distribution power lines can be dangerous. This course discusses OSHA's regulations regarding safety and tool use, as well as the variety of protective equipment used by lineman.

Objectives

Understand:

- OSHA's rules regarding overhead distribution line construction.
- Personal protective equipment and electrical protective equipment.
- General maintenance and care of hand tools, hydraulic tools, and derrick trucks.

ELEC–10108 Power Tools – General

MEA Certificate Number **TNG – MEA11688**
 KNT – MEA11687

Continuing Education Unit (CEU) **0.1**

Course Description

Line workers use power tools to improve speed and efficiency while on the job. While utilities generally provide the power tools for the job, line workers are expected to have their essential hand tools and equipment with them to assist in using power tools.

Objectives

Understand:

- Line worker's essential hand tools, equipment, and accessories.
- Common electric power tools used for various jobs.
- Dangers of power tools and how to prevent hazards.

ELEC–10109 Hydro–Activated Tools – General

MEA Certificate Number **TNG – MEA11737**
 KNT – MEA11736

Continuing Education Unit (CEU) **0.1**

Course Description

Hydro-activated tools use pressure to create energy. This includes hydraulic (liquid pressure) tools and pneumatic (air pressure) tools.

Objectives

Understand:

- Hydraulic and pneumatic energy process.
- Hydraulic and pneumatic tool safety tips.
- Common hydraulic power tools.
- Common pneumatic power tools.

Electric Library (11000 General Safety Curriculum)

ELEC–11000 Introduction to OSHA Standards

MEA Certificate Number **TNG – MEA11453**
 KNT – MEA11452

Continuing Education Unit (CEU) **0.1**

Course Description

For over 35 years, the Occupational Safety & Health Administration (OSHA) has been responsible for assuring safe and healthful conditions for working men and women. Standards created by the agency have successfully reduced injuries, illnesses, and deaths in the workplace.

Objectives

- Provide a brief overview of the purpose and history of OSHA.
- Describe how OSHA determines and sets standards.
- List reasons for OSHA inspections and describe inspection procedures.
- Explain requirements for correcting violations.

ELEC–11001 First Aid

MEA Certificate Number **TNG – MEA11455**
 KNT – MEA11454

Continuing Education Unit (CEU) **0.1**

Course Description

Unfortunately, no matter how safe we work there is the possibility that accidents will happen. This course introduces you to the first aid procedures for treating bleeding, shock, burns & scalds, electric shock, head & spinal injuries, fractures, poisoning, and environmental emergencies.

Objectives

- State why the rescuer needs to work safely.
- Evaluate wounds.
- Describe treatments for the types of wounds.
- Identify symptoms.

ELEC–11002 Fire Extinguisher Safety

MEA Certificate Numbers **TNG – MEA11457**
 KNT – MEA11456

Continuing Education Unit (CEU) **0.1**

ELEC–11005 Blood Borne Pathogens

MEA Certificate Number **TNG – MEA11463**
 KNT – MEA11462

Continuing Education Unit (CEU) **0.1**

Course Description

During the course of work, employees may come into contact with blood borne pathogens that can cause serious, even fatal illnesses. This course is designed to provide the knowledge and training necessary to protect employees from these organisms.

Objectives

- List three diseases transmitted through contact through contact with blood.
- Understand methods to prevent exposure and the concept of universal precautions.
- Describe emergency procedures and steps to take when an exposure incident occurs.

ELEC–11006 Radio Frequency Awareness

MEA Certificate Number **TNG –MEA11465**
 KNT – MEA11464

Continuing Education Unit (CEU) **0.1**

Course Description

Many products make use of some form of electromagnetic energy. One type of electromagnetic energy that is of increasing importance is radio frequency or (RF) energy, including radio waves and microwaves, which is used for providing telecommunications, broadcast, and other services. Heightened awareness of the expanding use of RF technology has led some people to speculate that "electromagnetic pollution" is causing significant risks to human health from environmental RF electromagnetic fields.

Objectives

- Describe the difference between ionizing and non-ionizing radiation.
- List the potential health effects of Radio frequency radiation exposure.
- Identify different types of transmitters and what they are used for.
- Recognize Radio frequency signage and describe what each individual sign means.

ELEC–11008 Worksite Protection – Traffic Control

MEA Certificate Number **TNG – MEA11467**
 KNT – MEA11466

Continuing Education Unit (CEU) **0.1**

Course Description

Utility worksites have unique traffic control challenges. The worksite can pose safety hazards to pedestrians and motorists, and vehicular traffic can pose safety hazards to utility workers. Temporary Traffic Control (TTC) devices can be used to safely and efficiently reroute motorists, bicyclists and pedestrians around a worksite, thus protecting equipment and reducing the risk of workers being struck by vehicular traffic. Implementing traffic control measures within the boundaries of the work area will also ensure a safe work zone.

Objectives

Understand:

- Risks faced by utility workers.
- Define worksite zones.
- Prevent back over accidents.
- Define easements and rights-of-way.
- Requirements for nighttime operations.

ELEC–11009 Lockout and Tagout

MEA Certificate Number **TNG – MEA11469**
 KNT – MEA11468
 PEF – MEA11470

Continuing Education Unit (CEU) **0.1**

Course Description

This course covers the Lockout/Tagout (LOTO) procedures for clearing electrical energy sources which are used exclusively for purposes of distribution lines and equipment, transferring and releasing clearances, and re-energizing lines.

Objectives

- Identify procedures for de-energizing distribution lines and equipment.
- Identify procedures for transferring an electric clearance.
- Identify procedures for releasing an electrical clearance and re-energizing distribution lines and equipment.

ELEC–11010 Clearances

MEA Certificate Number **TNG – MEA11473**
 KNT – MEA11472
 PEF – MEA11471

Continuing Education Unit (CEU) **0.1**

Course Description

National Electrical Safety Code (NESC) Rules 230–234 regarding clearances are explained in basic terms.

Objectives

- Understand the use of sag charts.
- List basic clearances.

ELEC–11011 Vehicle & Equipment Operating Safety – Line, Bucket Trucks

MEA Certificate Number **TNG – MEA11476**
 KNT – MEA11475
 PEF – MEA11474

Continuing Education Unit (CEU) **0.1**

Course Description

This course discusses the inspection and safe operation of various aerial lift trucks in and around easements. The aerial lift trucks that will be discussed are bucket trucks, boom trucks, and digger derricks. This course also covers recognition of related hazards and safe operating practices of operating and working near aerial lift trucks at the work site.

Objectives

- Identify key components of a bucket truck, boom truck, and digger derrick.
- Recognize the potential hazards associated with operating and working near a lift truck.
- Perform pre-operating, operating, walk around, work site and PPE inspections.
- Safe operating practices of a bucket truck, boom truck, and digger derrick.

ELEC–11013 Ferroresonance

MEA Certificate Number **TNG – MEA11856**
 KNT – MEA11855

Continuing Education Unit (CEU) **0.1**

Course Description

Ferroresonance is a highly dangerous electrical phenomenon which can occur when working with ferromagnetic or iron-core transformers and the lines attached to them. 3

Objectives

- What ferroresonance is.
- How ferroresonance can be identified.
- How ferroresonance occurs.

ELEC–11100 Personal Protective Equipment

MEA Certificate Numbers **TNG – MEA11478**
 KNT – MEA11477

Continuing Education Unit (CEU) **0.1**

Course Description

The public's health, welfare, and safety depends on reliable and continuous electrical service. This continuous need makes it impossible to always de-energize circuits for performing maintenance or repair damage to equipment, making a powerline worker's environment hazardous and potentially fatal. Due to the dangers associated with live line electrical work, linemen should wear and carry appropriate personal protective equipment (PPE) for each type of job. This course covers the proper application of personal protective equipment (PPE) by electrical workers.

Objectives

- Correctly identify the importance of correct usage of personal protective equipment for electrical workers.
- Correctly identify fall protection equipment as required by OSHA for electrical workers.
- Correctly identify the typical insulating safety tools and equipment, and their characteristics and uses as required by OSHA.

ELEC–11101 Personal Protective Grounding – General Requirements

MEA Certificate Number **TNG – MEA11481**
 KNT – MEA11480
 PEF – MEA11479

Continuing Education Unit (CEU) **0.1**

Course Description

This course introduces personal protective grounding. Personal protective grounding is used to create safe working environments for utility employees working either with overhead distribution or transmission circuits and wires, or with underground circuits and cables.

Objectives

Understand:

- Hazards encountered when working with overhead or underground circuits.
- Dangers of step and touch potential.
- General steps for installing personal protective grounds.
- Understand how to inspect and test equipment used in setting up personal protective grounds.

ELEC–11102 Personal Protective Grounding: Overhead Circuits

MEA Certificate Number TNG – MEA11484
 KNT – MEA11483
 PEF – MEA11482

Continuing Education Unit (CEU) 0.1

Course Description

Personal protective grounding is used to create safe working environments for utility employees working either with overhead distribution or transmission circuits and wires, or with underground circuits and cables.

Objectives

- Understand the hazards encountered when working with overhead circuits.
- Understand the importance of grounding and establishing equipotential zones.
- Identify the steps for installing personal protective grounds for several overhead distribution circuit scenarios.
- Identify the steps for installing personal protective grounds for several overhead transmission circuit scenarios.

ELEC–11103 Personal Protective Grounding: Underground Circuits

MEA Certificate Number TNG – MEA11487
 KNT – MEA11486
 PEF – MEA11485

Continuing Education Unit (CEU) 0.1

Course Description

Personal protective grounding is used to create safe working environments for utility employees working either with overhead distribution or transmission circuits and wires, or with underground circuits and cables.

Objectives

- Understand hazards encountered when working with underground circuits.
- Understand the importance of grounding and establishing equipotential zones.
- Identify steps for installing personal protective grounds for several underground circuit scenarios.
- Identify special considerations for setting up personal protective grounds for underground circuits.

ELEC–11104 Arc Flash

MEA Certificate Number **TNG – MEA11490**
 KNT – MEA11489
 PEF – MEA11488

Continuing Education Unit (CEU) **0.1**

Course Description

This course describes ARC Flash and associated safety requirements.

Objectives

- Describe what Arc Flash is.
- Identify the basic characteristics of Arc Flash.
- Analyze and evaluate Arc Flash situations.
- Identify Arc Flash clothing and equipment requirements.

ELEC–11106 Electric Safety

MEA Certificate Number **TNG – MEA11492**
 KNT – MEA11491

Continuing Education Unit (CEU) **0.1**

Course Description

On a daily basis, regardless of industry or occupation, most workers are exposed to electrical energy. It is important to be aware of the hazards that may exist as a result of exposure to or contact with even a small amount of electrical current. Most people would not be as cautious around a broken light bulb as they would a fallen power line; however, even a broken light bulb has the potential to cause severe injury or death.

Objectives

- Understand dangers associated with electricity.
- Understand potential hazards associated with the distribution and use of electrical power.
- Understand appropriate safety precautions to take in the event of an electrical hazard.
- Understand safe working practices when working around electric equipment.
- Recognize and react to abnormal operating conditions.

ELEC–11107 Working On or Near Energized Parts

MEA Certificate Number **TNG – MEA11495**
 KNT – MEA11494
 PEF – MEA11493

Continuing Education Unit (CEU) **0.1**

Course Description

A power line worker's environment can be hazardous and potentially fatal. Before a task or operation is conducted, electrical workers are responsible for correctly assessing the potential severity of injury hazards relative to the work that is being performed and the tools that are being used.

Objectives

Understand:

- Planning and training for electrical workers.
- Safe working standards when working on or near energized parts.
- Items to be covered in a job plan.

ELEC–11201 Locating Underground Distribution Circuits and Services

MEA Certificate Number **TNG – MEA11498**
 KNT – MEA11497
 PEF – MEA11496

Continuing Education Unit (CEU) **0.1**

Course Description

Correctly locating underground circuits and services is essential to preventing damage during excavation activities.

Objectives

- Perform an operational check of the cable route tracing equipment.
- Verify the scope of the locate request.
- Visually inspect the locate area.
- Locate and mark the facility(ies).
- Recognize and respond appropriately to Abnormal Operating Conditions.

ELEC–11202 Backfeed

MEA Certificate Number **TNG – MEA11501**
 KNT – MEA11500
 PEF – MEA11499

Continuing Education Unit (CEU) **0.1**

Course Description

When power lines are down or a circuit is opened for repair, lines between the generating facility and the open usually remain energized. You expect the lines between the open and end users to be de-energized, but that is not always the case. Unintentional re-energizing of power lines from sources on the consumer side of an open may cause electricity to backfeed – flow opposite to its usual direction. This poses serious risks to utility workers. If there is a transformer between the remote source and the open, backfeed through the transformer may cause normal transmission or distribution voltages to be present on lines you think are dead. It is crucial that you understand the causes of unintentional re-energizing and backfeed, and how to protect yourself from these hazards.

Objectives

- Recognize common causes and risks of unintentional re-energizing and backfeed.
- State the risks associated with unintentional re-energizing and backfeed.
- Avoid backfeed hazards.
- Identify possible causes of backfeed.
- Identify causes of backfeed in electric metering.

ELEC–11203 Railroad Right of Way Worker Safety

MEA Certificate Number **TNG – MEA11503**
 KNT – MEA11502

Continuing Education Unit (CEU) **0.1**

Course Description

Occasionally, workers are required to work on or near a railroad right-of-way (ROW). To keep yourself and your co-workers safe, you need to understand rail hazards and follow safety procedures when performing ROW work.

Objectives

Understand:

- Terms and special employee roles related to railroad ROW work.
- Procedures for working on railroad ROW.
- Safety precautions for railroad ROW work.
- Recognize and react to emergency situations.

Electric Library (12000 General Support)

ELEC–12101 Prints, Diagrams

MEA Certificate Number **TNG – MEA11505**
 KNT – MEA11504

Continuing Education Unit (CEU) **0.1**

Course Description

This course discusses graphic documents used in the Utility industry.

Objectives

- The different types of graphic documents used.
- Where each type of document is used.
- Advantages and limitations of various documents.
- How to managing graphic documents.
- Document problems.

ELEC–12105 Conducting Effective Tailgate Sessions

MEA Certificate Number **TNG – MEA11507**
 KNT – MEA11506

Continuing Education Unit (CEU) **0.1**

Course Description

Working safely should be the expectation of every Leadman and crew member. Holding Tailgate meetings and using the T.A.I.L.G.A.T.E. meeting form is one of the "tools" the Leadman and crew members can use to hold a job briefing.

Objectives

- Describe an effective Tailgate meeting.
- Identify items that should be discussed at a Tailgate meeting.
- Complete a Tailgate form.

ELEC–12106 Customer Contact – General Utility

MEA Certificate Number **TNG – MEA11508**
 KNT – MEA11509

Continuing Education Unit (CEU) **0.1**

weaknesses of different rope materials and types of rope construction. Successful use of ropes will also depend on correct usage of knots and splices.

Objectives

Understand:

- The features and benefits of synthetic rope.
- The features and benefits of natural fiber rope.
- Rope fabrication methods.
- Common knot tying methods.
- Common splicing methods.

ELEC–12110 Tree Trimming

MEA Certificate Number **TNG – MEA11517**
 KNT – MEA11516

Continuing Education Unit (CEU) **0.1**

Course Description

Tree trimming is a necessary activity to ensure the safety of customers, electrical workers, and to prevent service interruption. Tree trimming personnel face many hazards and must thoroughly understand the necessary safety precautions and procedures.

Objectives

- Identifying trees and branches located within ideal utility clearances.
- Performing tree trimming procedures using natural pruning methods.
- Working safely near electrical conductors.

ELEC–12601 Fatigue Awareness & Mitigation for System Operators

MEA Certificate Number **TNG – MEA11659**
 KNT – MEA11658

Continuing Education Unit (CEU) **0.1**

Course Description

Alertness is the optimum state of the brain that enables us to make conscious decisions. Fatigue has a proven detrimental effect on alertness. When alertness is affected by fatigue, our decision-making, response time, judgment, and hand-eye coordination can be significantly impaired. There are many factors that induce fatigue in system operators. This course addresses these factors, their effects on operations, and how to minimize them.

Objectives

- Recognize worker fatigue.

- Identify the effects of fatigue.
- Apply good practices for fatigue mitigation.

ELEC–12611 Fatigue Awareness & Mitigation for System Operators: Management Strategies

MEA Certificate Number **TNG – MEA11657**
 KNT – MEA11656

Continuing Education Unit (CEU) **0.1**

Course Description

Alertness is the optimum state of the brain that enables us to make conscious decisions. Fatigue has a proven detrimental effect on alertness. When alertness is affected by fatigue, our decision-making, response time, judgment, and hand-eye coordination can be significantly impaired. There are many factors that induce fatigue in system operators. This course will assist supervisors and management in recognizing these factors, how to assess the level of operator fatigue and determine appropriate control measures, as well as provide them with tools to help operators manage and mitigate fatigue.

Objectives

- Recognize worker fatigue.
- Identify the effects of fatigue.
- Apply good practices for fatigue mitigation.