EET-2920: DIRECTED PRACTICE ELECTRICAL UTILITY TECHNOLOGY IV

Cuyahoga Community College

Viewing: EET-2920 : Directed Practice Electrical Utility Technology IV

Board of Trustees:
2015-06-25

Academic Term:
Fall 2018

Subject Code
EET - Electrical/Electronic Engineer

Course Number:
2920

Title:
Directed Practice Electrical Utility Technology IV

Catalog Description:
Fourth in a four part series providing the student with the knowledge and skills to work safely and competently in a supervised or unsupervised capacity. The fourth series is the culmination of prior courses with the introduction of advanced knowledge and skills related to Motor Operates Air Brake Switch, electronic recloser controls, SF6 gas breakers, ACB maintenance, OCB timing and travel tests, calibration of various substation equipment, PT testing, phasing, switching procedures and the performance of energized primary work.

Credit Hour(s):
4

Other Hour(s):
300

Other Hour Details:
Directed Practice: 20 hours per week at site (300 hours per semester)

Requisites

Prerequisite and Corequisite
EET-2910 Directed Practice Electrical Utility Technology III.

Outcomes

Course Outcome(s):
Installing, repairing and or/replacing transformers, switches, fuses, reclosers, conducters and other devices and equipment.

Essential Learning Outcome Mapping:
Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):
1. Demonstrate hotline tool maintenance tasks in accordance with industry safety rules and work procedures.
2. Correctly identify and state the use of each of the 26 various types of hot-line tools.
3. Install both conductor covers and spiral conductor covers off the pole.
4. Install and operate the recloser using both the manual and electronic control.
5. Identify the PT and CT Transformers and explain how each are wired on a pre-wired three-phase primary metering installation.
6. Test circuits to be de-enerbiaed, clean all grounding connection points, ground all three phases, and remove grounds of a transmission circuit.
7. Demonstrate switching lines out an din for a section of 115k V line at the substation.

Course Outcome(s):

Patrolling lines and inspecting poles, transformers, reclosers and other electrical devices and equipment.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):

1. Demonstrate the steps to ground a transmission circuit, including testing the ciruit, cleaning all gorunding connection points, grounding all three phases, and removing grounds.
2. Check that a line regulator is correctly installed on a pole with an energized conductor in accordance with electrical industry procedures.
3. Operate a Line Regulator to raise and/or lower voltage.
4. Demontrate proper operation, battery voltage test and peform the daily calibration of the MSA-Passport LFL-02-CO Alarm for combustible gas, oxygen, carbon monozide and hydrogen sulfide.
5. Climb the backside of a transmission structure, traverse across the crossarm to the othr pole, climb down over the corssarm and descend to the ground.

Course Outcome(s):

Perform enclosed space rescues, tower rescue, bucket rescues, self rescues, and Pole Top rescue in accordance with OSHA and electrical industry procedures.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):

1. Evaluate an enclosed space rescue situation and demonstrate the appropriate procedures to follow to perform the rescue.
2. Install and use all fall protective equipment for vertical and horizontal ascent and descent.
3. Demonstrate proper fee climbing on steel towers.
4. Demonstrate tower rescues utilizing three different methods.
5. Given a bucket truck with a victim in the working area, evaluate the situation, call for help and operate ground controls of the bucket truck to bring victim to ground level.
6. Demonstrate utilizing the rescue blocks attached to the boom to bring a victim from the bucket to the ground.
7. Demonstrate self-rescue procedures from a bucket truck stranded in the elevated position, utilizing a hand line, an emergency lowering device and a direction altering device.

Course Outcome(s):

Follow appropriate OSHA and electrical industry safety procedures when dealing with hazardous chemicals.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):

1. Identify and name various personal protective equipment (PPE) and other safety equipment required when dealing with Material Safety Data Sheet (MSDS) materials.
2. Identify and read MSDS labels and data sheets.
3. Determine proper first aid for treating exposure to chemicals and understand the necessary steps when dealing with spills and leaks of hazardous chemicals.

Course Outcome(s):

Operate various electrical industry commercial equipment including backhoes, ditch witch trenchers, powered industrial truck operation, and hydraulic single reel trailers.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):

1. Operate a backhoe to open and back fill a trench 10 feet in length and 36 inches in depth and move machine forward using backhoe.

2. Load and secure a backhoe onto a transport trailer.
3. Operate a ditch witch trencher to open and backfill a trench 40 feet in length and a minimum of 24 inches deep.
4. Operate a powered industrial truck (also called a forklift or towmotor) to load, transport, and unload a transformer and material pallet.
5. Load and secure a digger truck onto a hydraulic single reel trailer.
6. Operate a Sauber Wire Trailer (model 1520 1555) Puller/Tensioner and demonstrate ability to load a reel of wire on the tensioner.

Methods of Evaluation:

1. Industry reuired certification exam(s).
2. Observation of site policies
3. Evaluation by facuty based upon site visitations and written and oral feedback provided by directed practice site supervisors.

Course Content Outline:

1. Hotline Tool Maintenance
   a. Accident Prevention Handbook Practices
   b. Electrical Industry preferred work procedures
   c. Identification of hot-line tools
   d. Use of hot-line tools
2. Spiral conductor cover installation
   a. 34.5 kv Spiral conductor cover installation procedures
   b. 46 kV conductor cover installation procedures
3. Recloser Installation & Electronic Control
   a. Recloser installation requirements
   b. Manual control operation
   c. Electronic control operation
4. Wiring of Primary Metering
   a. PT Transformer wiring
   b. CT Transformer wiring
5. Line Regulator Operation
   a. verifying correct installation according to diagrams
   b. Raising voltage
   c. Lowering voltage
6. CO Alarm Operation
   a. MSA-Passport LFL-02-CO Alarm
   b. MSA-Five Star Passport LFL-02-CO Alarm
   c. Baterry voltage testing
   d. Daily instrument calibration
      i. Combustible gas
      ii. Oxygen
      iii. Carbon monoxide
      iv. Hydrogen sulfide
7. Enclosed Space Rescue
   a. Air testing and monitoring
   b. manhole guard installation
   c. Ventilator and hose set up
   d. Tripod set up
   e. Recovery system
   f. Protective equipment
8. Bucket Truck Rescue
   a. Evaluating situation
   b. Operating ground controls
   c. Attaching rescue blocks to the boom
   d. Fastening Emergency Lowering Device (ELD) to the boom
   e. Attaching Direction Altering Device (DAD) to bucket
9. Tower Rescue
   a. Fall protection system
   b. Safety practices
   c. Identifying hazards

   d. Inspecting equipment
   e. Vertical ascent/descent
   f. Horizontal ascent/descent
   g. Free climbing on steel towers
10. Hazardous chemicals
   a. OSHA regulations
   b. Electrical industry procedures
   c. Personal Protective Equipment
   d. Material Safety Data Sheets
   e. First aid for chemical exposure
   f. Procedures for spills and leaks of hazardous chemicals
11. Equipment Operation
   a. Backhpe
   b. Ditch witch Trenchers
   c. Powered Industial truck (i.e. forklift/towmotor)
   d. Loading equipment onto transport trailers
      i. Sauber Wire Trailer
      ii. Puller/Tensioner

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Resources

Boylestad R Nashelsky, L. *Electronic Devices and Circuit Theory.* 11th ed. Upper Saddle, NJ:, 2013.

Herman, Stephen L. *Alternating Current Fundaments.* Clifton Park, NY: Delmar Publishing, 2007.

National Fire Protection Association. *National Electric Code.* 2014 ed. Boston, National Fire Protection Association, 2014.

Resources Other

A. Company training materials.

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