

EET-1915: DIRECTED PRACTICE SUBSTATION UTILITY TECHNOLOGY I

Cuyahoga Community College

Viewing: EET-1915 : Directed Practice Substation Utility Technology I

Board of Trustees:

2009-06-26

Academic Term:

Fall 2018

Subject Code

EET - Electrical/Electronic Engineer

Course Number:

1915

Title:

Directed Practice Substation Utility Technology I

Catalog Description:

Supervised practical applications of electrical substation worker job duties in a setting under direct supervision of FirstEnergy personnel. Emphasis on safety practices and regulations, using substation vehicles and equipment, and procedures and tasks related to use and maintenance of an electrical substation

Credit Hour(s):

4

Other Hour(s):

300

Other Hour Details:

Directed Practice: 20 hours per week (300 hours per semester)

Prerequisite: Concurrent enrollment in ISET-1410 Applied Electricity I, and departmental approval: admission to Electrical Utility Technology Program

Outcomes**Course Outcome(s):**

Assist in the performance of maintenance and testing in electrical substation and switch yards in accordance with approved practices and procedures.

Course Outcome(s):

Recognize OSHA and utility safety requirements.

Methods of Evaluation:

1. Written exams
2. Demonstration of compliance with safety rules & practices
3. Evaluation by faculty based upon site visitations and written and oral evaluations provided by directed practice site supervisors

Course Content Outline:

1. Safety
 - a. First Aid
 - b. Bloodborne Pathogens
 - c. Flame Retardant Apparel
 - d. Fall Protection
 - e. Rigging

2. General
 - a. Course Introduction
 - b. Accident Prevention Handbook
 - c. Housekeeping
 - d. Maintain a First Aid Kit (unit 24)
 - e. Inspect a Fire Extinguisher
3. Theory
 - a. Basic Electricity – Where Does Electricity Come From
 - b. Basic Electricity – Basic Electricity Quantities
 - c. Basic Electricity – Series and Parallel Circuits
 - d. Basic Electricity – Electromagnetism
 - e. Basic Electricity – Inductance and Inductors
 - f. Basic Electricity – Capacitance and Capacitors
 - g. D.C. Fundamentals – Ohm’s Law
 - h. D.C. Fundamentals – Series Circuits
 - i. D.C. Fundamentals – Parallel Circuits
 - j. D.C. Fundamentals – Series – Parallel Circuits
 - k. D.C. Fundamentals – Short-Cut Methods
 - l. D.C. Fundamentals – Troubleshooting D.C. Circuits
 - m. A.C. Fundamentals – Alternating Current
 - n. A.C. Fundamentals – Inductance
 - o. A.C. Fundamentals – Capacitance
 - p. A.C. Fundamentals – A.C. Power
 - q. A.C. Fundamentals – Single Phase and Three Phase Systems
 - r. Temperature Conversion, Fahrenheit, and Centigrade
 - s. Job Briefing (Tailboard Conference)
4. Perform
 - a. Procedure for Syringe Oil Sample
 - b. Tie Seven Basic Knots
 - c. Inspect Protective Equipment
 - d. Roll Up Wire By Hand
 - e. PCB Vial / Bottle Oil Samples
 - f. Operate Pneumatic and Hand Fish Tape
 - g. Use Various Gases and Regulators
 - h. Identify, Setup and Use of Oil Filters
 - i. Setup and Use Oil Test Set
 - j. Practical Use of Analog Meter
 - k. Work Area Protection – Substation
 - l. Refusing a Cutout
 - m. Use an Oxygen Tester
 - n. Assemble and Use a Cylinder
 - o. Cadweld
5. Substation Equipment
 - a. Identify Various Electrical Measuring & Test Instruments
 - b. Identify Substation Equipment I (Transformer, Circuit Breaker, Etc.)
 - c. Identify Insulators
 - d. Identify Disconnect Switches
 - e. Glossary of Abbreviations
 - f. Read and Study a Substation Master Ground Plan
 - g. Identify Substation Construction Materials – Bus Assembly Components
 - h. Identify and Assemble Substation Fuse Units
 - i. Identify Different Colored Indication Lights in Substations
 - j. Identify Various High Voltage Testers
 - k. Identify Ground Rods and Equipment
 - l. Introduction to Grounding (Personnel Protection)
6. Climbing

- a. Use of Body Belt
 - b. Steel Structure Climbing Certification
 - c. Structure Rescue
7. Tools / Materials
- a. Identify Substation Hand Tools
 - b. Identify Substation Construction Hand Tools
 - c. Identify Wire Conductors and Controls Cable
 - d. Identify Pressure Hoses and Fittings
 - e. Synthetic Web Slings, Identification, Usage and Safety
 - f. Identify Substation Construction Power Tools
 - g. Identify Solderless Connectors and Solderless Connector Crimping Tools
 - h. Identify and Use Cutters (Bolts and Cable)
 - i. Identify PVC Conduit, Conduit Fittings and Related Materials
 - j. Identify Commonly Used Nuts, Bolts and Washers
 - k. Identify Pipe Fittings and Quick Couplers
 - l. Shackles
8. Equipment Operation
- a. Communicate With a Mobile Radio
 - b. Test Run a Portable Generator
 - c. Use of Ladders
 - d. Use of Hammer Drill
 - e. Pull Out and Cut Wire
 - f. Connect Electrical Extension Cords for Equipment and Tool Power Supply
 - g. Use a Lifting Hoist
 - h. Band Saw Use
 - i. Drill Press Setup and Use
 - j. Assemble and Operate Hypress Crimping Tools (Manual & Electric Power Units)
 - k. Use and Impact Wrench
 - l. Use a Soldering Gun
 - m. Use a Hand Line
 - n. Use a Sander / Grinder
 - o. Use Electric Drills
9. Vehicle
- a. Hand Signals to Direct a Vehicle
 - b. Mobile Crane Hand Signals
 - c. Interpret a Crane Capacity Chart
 - d. Disabled Vehicle Procedure
 - e. Loading and Securing Substation Equipment and Materials
 - f. Connect Truck to Trailer and Operate
 - g. Operate a Truck-Mounted Winch and Auxiliary Capstan
 - h. Operate and Test Holding Valves on a Boom Truck
 - i. Setup a Bucket Truck
 - j. Jump Starting a Vehicle
 - k. Pre-Flight a Bucket Truck
 - l. Setup and Operate Bucket Truck – Hand Signals
 - m. Bucket Rescue From Ground Controls

Resources

Dagostino, Frank and Joseph Wujek. *Mechanical and Electrical Systems in construction and Architecture*. 4th ed. Upper Saddle River, NJ: Prentice Hall, 2005.

Herman, Stephen. *Delmar's Standard Textbook of Electricity*. 3rd ed. Clifton Park, NY: Delmar Publishing, 2004.

Cook, Nigel P. *Introductory DC/AC Electronics*. 6th ed. Prentice-Hall, 2005.

Paynter, Robert T. *Electronics Technology Fundamentals: Electron Flow Version*. 3rd ed. Upper Saddle River, N.J. : Pearson Prentice Hall, 2009.

Grob, Bernard. *Basic Electronics*. 10th ed. Dubuque, IA : McGraw-Hill/Higher Education, 2007.

Herman, Stephen L. *Delmar's Standard Textbook of Electricity*. 4th ed. Clifton Park, NY : Delmar Cengage Learning, 2009.

Maloney, Timothy J. *Electricity Fundamental Concepts and Applications*. Delmar Publishers Inc., 1992.

Resources Other

1. Company training materials.

Top of page

Key: 1647