EET-1925: DIRECTED PRACTICE SUBSTATION UTILITY TECHNOLOGY II

Cuyahoga Community College

Viewing: EET-1925 : Directed Practice Substation Utility Technology II

Board of Trustees:
2009-06-26

Academic Term:
Fall 2018

Subject Code
EET - Electrical/Electronic Engineer

Course Number:
1925

Title:
Directed Practice Substation Utility Technology II

Catalog Description:
Second in a four part series providing the student with a broader skill set as well as enhanced knowledge and skill level necessary to safely assist in the performance of routine repairs on distribution and power transformers, bushings, circuit breakers, disconnect switches, control equipment and other de-energized electrical equipment used in the distribution of electrical energy.

Credit Hour(s):
4

Other Hour(s):
300

Other Hour Details:
Directed Practice: 20 hours per week (300 hours per semester)
Prerequisite(s): EET-1915 Directed Practice Substation Utility Technology I, and concurrent enrollment in ISET-1420 Applied Electricity II

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, OSHA and utility safety requirements.

Course Outcome(s):
Operate enhanced substation equipment and vehicles, plus apply electrical skills to equipment within the substation in accordance with approved practices and procedures.

Course Outcome(s):
Recognize OSHA and utility safety requirements in accordance with practices and procedures.

Methods of Evaluation:
1. Written exams
2. Demonstration on compliance with onsite safety rules and practices
3. Evaluation by faculty based upon site visitations and written and oral feedback provided by directed practice site supervisors.

Course Content Outline:

1. Safety
   a. CPR
   b. Personal Protective Equipment
   c. Minimum Approach Distance
   d. Rubber Protective Equipment
2. Theory
   a. Fundamentals of Protective Relays
   b. Identify and Interpret Construction Prints
   c. Series and Parallel Circuits
   d. Ohm's Law
   e. Series Circuits
   f. Parallel Circuits
   g. Series-Parallel Circuits
   h. AC Power
   i. Single-Phase and Three-Phase Systems
   j. Schematic Print Reading
   k. Fundamentals of Capacitor and Safe Handling Procedures
   l. Identify the Symbols and Functions of Substation Single-Line Diagram
   m. Read and Interpret a Single-Line Diagram
   n. Introduction to Switching and Tagging
   o. Interpret a Connection Diagram
3. Tools / Materials
   a. Assemble and Use Oxy-Acetylene Torch for Cutting
   b. Operate a Chain Saw
   c. Care and Maintenance of Ampact Tool
   d. Install and Remove Ampacts
   e. Use a Torque Wrench
   f. Use Taps, Dies and Screw Extractors
   g. Use of Compression Fittings
4. Vehicle
   a. Set up Platform Truck (PA)
   b. Set up a Platform Truck (NJ)
   c. Pre-Flight and Operate a Platform Truck
5. Equipment Operation
   a. Using Precision Measuring Instruments
   b. Operate a Three-Phase, Gang-Operated Switch with Rubber Gloves
   c. Practical use of Multimeters
   d. Set Up and Operate a Transformer Turns Ratio (TTR) Test Set
   e. Set Up and Operate a High-Resistance Tester (Meggar)
   f. Set Up and Operate a Capacitance (C) Meter
   g. Operator a Capacitor Tester (NJ)
   h. Test and Operate a Chance Multi-Range Voltage Detector
   i. Bend and Install PVC Conduit
   j. Operate a Circular Saw
   k. Operate a Sawzall
   l. Assemble and Use Gasket Cutter
   m. Operate a Manual Pipe Threader and Pipe Cutter
   n. Use a Manually Operated Pipe Bender
   o. Operate a Hydraulic Pipe Bender
6. Perform
   a. Identify, Record and Reset Relay Targets
   b. Barricading for Diagnostic Testing
   c. Basic Rigging
   d. Perform Maintenance on a Hook Stick Disconnect Switch
   e. Identify and Operate a No-Load Tap Selector Switch
   f. Set Up and Operate a Ductor (PA)

g. Set Up and Operate a Ductor (NJ)
h. Replace Capacitor Bank Can and Unit Fuse (NJ)
i. DC Troubleshooting
j. AC Troubleshooting
k. Lightning Arrester, Removal and Installation
l. Use a Hipot
m. Use a Hipot (NJ)
n. Use of and Installation of Personal Grounds
o. Identify Different Types of Transformer Oil Preservation Systems
p. Perform Maintenance on Substation Batteries

7. Substation Equipment
   a. Identify and Interpret Transformer Nameplates
   b. Identify Substation Equipment II

Resources

Kubela, Thomas. *Electricity 2, Devices, Circuits, Materials.* 8th ed. Clifton Park, NY: Delmar Publishing, 2007.

Cook, Nigel P. *Introductury 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.

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