EET-2925: DIRECTED PRACTICE SUBSTATION UTILITY TECHNOLOGY IV

Cuyahoga Community College

Viewing: EET-2925 : Directed Practice Substation Utility Technology IV

Board of Trustees:
2009-06-26

Academic Term:
Fall 2018

Subject Code
EET - Electrical/Electronic Engineer

Course Number:
2925

Title:
Directed Practice Substation 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 on site (300 hours per semester)

Requisites

Prerequisite and Corequisite
EET-2915 Directed Practice Substation Utility Technology III and concurrent enrollment in ISET-2200 Industrial Motor Controls.

Outcomes

Course Outcome(s):
Assist in the performance of maintenance and testing electrical substation and switch yards in accordance with approved practices and procedures.

Objective(s):
1. Working with a crew and utilizing substation schematics, troubleshoot and repair various substation equipment.
2. Working with a crew, perform maintenance on batteries, breakers and transformers.
3. Working with a crew, utilize various test equipment to perform maintenance on breakers, transformers, and generators.
4. Working with a crew, perform maintenance and trobulsehooting techniques on substation breakers.
5. Work on energized equipment and de-energized equipment in a supervised or unsupervised capacity while applying advanced knowledge in the operation of substation equipment in accordance with approved practices and procedures.
6. Working with a crew, demonstrate the ability to safely perform high level maintenance in electrical substations.
7. Explain and demonstrate the uses of the various tools.
8. Identify sources related to stored energy devices and explain proper procedures for working with these devices.
9. Be certified to operate specific powered industrial truck(s).

Course Outcome(s):

Recognize OSHA and utility safety requirements in accordance with practices and procedures.

Objective(s):

1. Discuss relevant safety procedures associated with various tools.
2. Locate or request a Material Safety Data Sheet (MSDS).
3. Identify sections of an MSDS to gain understanding of hazards, cautions, etc.

Methods of Evaluation:

1. Completion of relevant industry paperwork
2. Industry required certification exam(s)
3. Demonstration of skills
4. Demonstration of compliance with onsite policies
5. Evaluation by faculty based upon site visitations and written and oral feedback provided by directed practice site supervisors.

Course Content Outline:

1. Safety
   a. Hazard Communication
   b. Powered Industrial Trucks
   c. Stored Energy Devices
   d. Live Line Tools
2. Theory
   a. AC Troubleshooting Review
   b. DC Troubleshooting Review
   c. Identify and Interpret the Use of Circuit Breaker Alarms and
   d. Introduction to Motor Operates Air Brake Switch
   e. Introduction to Electronic Recloser Controls
   f. Introduction to Sectionalizer
3. Perform
   a. Perform Maintenance of a OCB Mechanism
   b. Calibrate Temperature Gages
   c. Read and Interpret Circuit Breaker SF6 Gas Pressure Chart and Fill Breaker with SF6 Gas
   d. Setup a Battery Cart (NJ Only)
   e. Assemble a “Chance” Phasing Set
   f. Perform Energized Primary Work with Rubber Gloves
   g. Set Up and Use an SF6 RTU
   h. Adjust Pressure Switches
4. Operate
   a. Use The Portable Transformer Combustible Gas Detector
   b. Check, Setup and Run a Three Phase Generator
   c. Operate a SF6 Gas Recovery Cart
   d. Substation Equipment
   e. Test, Operate a Substation AC Transfer Switch (Swap Over)
   f. Maintenance on a G.E. Air Circuit Breaker Type AM_13.8KV
   g. Maintenance of a Hydraulic Operated Mechanism
   h. Introduction to Oil/Vacuum Machine
   i. Restoring a Power Transformer to Service
   j. Introduction to Line Capacitor Controls
   k. Calibration of Line Capacitor Controls
   l. Introduction to Timing an Oil Circuit Breaker
   m. Timing an Oil Circuit Breaker
   n. Switching Procedure for Motor Mechanisms
   o. Introduction and Maintenance on a Vacuum Breaker
   p. Potential Transformer Testing
   q. Recloser Maintenance

r. Sectionalizer Preventative Maintenance
s. Installing and Operation of a Regulator

Resources

Boylestad R. and Nashelsky, L. *Electronic Devices and Circuit Theory.* 11th. Upper Saddle, NJ: Prentice Hall, 2007.

Rockis, Gary. *Solid State Fundamentals.* 3rd. Homewood, IL: American Technical Publishers, 2003.

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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