EET-2915: DIRECTED PRACTICE SUBSTATION UTILITY TECHNOLOGY III

Cuyahoga Community College

Viewing: EET-2915 : Directed Practice Substation Utility Technology III

Board of Trustees:
2009-06-26

Academic Term:
Fall 2018

Subject Code
EET - Electrical/Electronic Engineer

Course Number:
2915

Title:
Directed Practice Substation Utility Technology III

Catalog Description:
Third in a four part series providing the student with the advanced knowledge and skills necessary to safely work in a supervised capacity on energized equipment and in an unsupervised capacity on de-energized equipment employed in the production and distribution of electrical energy. This course also introduces the student to power transformer testing, troubleshooting, alarm systems, circuit breaker troubleshooting, reclosers and sectionalizers, OCB maintenance and voltage regulators.

Credit Hour(s):
4

Other Hour(s):
300

Other Hour Details:
Directed Practice: 20 hours per week at site (300 hours per semester)
Prerequisite(s): EET-1925 Directed Practice Substation Utility Technology II and concurrent enrollment in ISET-2240 Applied National Electric Code

Outcomes

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

Objective(s):
1. Work in a supervised capacity on energized equipment and in an unsupervised capacity on de-energized equipment while applying advanced knowledge in the operation of substation equipment in accordance with approved practices covered in class.
2. Identify the steps associated with a pre-job briefing and be able to properly complete the documentation.
3. Safely demonstrate steel structure climb and rescue.
4. Read company and manufacturer prints to perform repair and maintenance of substation breaker mechanisms.
5. Perform various tasks associated with the maintenance and repair of breakers, transformers, and regulators.
6. Perform maintenance on various substation equipment, such as transformers, station batteries, and breakers.

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

Objective(s):
1. Identify the need for work area protection as well as explain the proper equipment needed for a variety of work situations.
2. Identify various types of fire, methods of extinquishing, and demonstrate proper use of a fire extinquisher.
3. Identify situtations associated with the application of temporary protective guards and be able to explain the proper steps that are required.
4. Identify and demonstrate safe housekeeping standards.

Methods of Evaluation:

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

Course Content Outline:

1. Safety
   a. Fire Safety / Extinguisher
   b. Temporary Protective Grounds
   c. Housekeeping
   d. Work Area Protection
   e. Pre-Job Briefing
2. General
   a. Climbing Re-Certification
   b. Structure Rescue
3. Theory
   a. Interpret a Manufacturer's Print (Wiring & Schematic)
   b. Identify and Interpret a Westinghouse Control Diagram
   c. Print Reading II
   d. 34.5 Substation Structure and Steel Drawings
   e. How Recloser, Sectionalizers and Fuses Work Together
   f. Schematic Print Reading Review
   g. Substation Equipment
   h. Remove and Install Fans on Transformer
   i. Perform the Maintenance Procedure of a Single Tank Oil Circuit Breaker
   j. Circuit Breaker Troubleshooting
   k. Transformer Alarm Troubleshooting
   l. Introduction to Line Voltage Regulators
   m. Substation Inspection
   n. 14 Pressure Components
4. Operate
   a. Assemble, Connect and Operate a Vacuum Pump
   b. Assemble, Connect and Read a Vacuum Pump
   c. Setup and Use Battery Impedance Test Equipment
5. Perform
   a. Setup and Use a Shaw Dew Point Meter
   b. Interpret a Manufacturers Motor Wiring Diagram
   c. Wire In and Test Run an AC Motor
   d. Replace Outer Tube (fiberglass), Vacuum Tube Assembly and Flipper Arm Driver
   e. Identify and Interpret the Use of Transformer Alarms and Protective Devices
   f. Perform Maintenance on Substation Battery Charger
   g. Set and Operate Transformer Load Tap Changer
   h. Setup and Use the Programmable OC Controller (Model OCPC) for Hipotronics Oil Test Set
   i. Padmount Testing and Troubleshooting
   j. Test a Current Transformer (Ratio and Polarity)
   k. Compressor Maintenance
6. Emergency Generator Maintenance

Resources

Herman, Stephen. *Electrical Transformers and Rotating Machines.* 2nd. Clifton Park, NY: Delmar Publishing, 2002.

Herrick, Robert. *DC/AC Circuits and Electronics.* 2nd. Clifton Park, NY: Thompson Learning, 2002.

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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