ELECTRIC SYSTEM OPERATIONS 101

July 20-21, 2016
Embassy Suites Alexandria – Old Town
Washington, DC Area

EUCI is authorized by IACET to offer 1.1 CEUs for the course.

EUCI is authorized by CPE to offer 13 credits for this course.
OVERVIEW

This training program is designed for all persons working in, dealing with, or having special interest in the operations side of the electric utility industry. The course layout provides a basic understanding of electrical systems, how they operate from a utility perspective, and the associated terminology. The basic concepts of the design, construction, operation, and maintenance of electric utility equipment in transmission and distribution systems is covered. The primary functions of substations, transformers, circuit breakers, PT’s, CT’s, capacitors, reactors, relays, regulators, reclosers, sectionalizers, and critical backup equipment will be discussed. The course material will be a useful resource for future reference. The program is designed to stimulate dialogue among the attendees and instructor. This program differs from the Electric Utility Basics course in that the primary focus is the operations aspect of the utility.

The following key topics will be covered:

• Purpose and goals
• Overview of the transmission and distribution delivery systems
• Transmission structures and facilities
• Substations and their roles
• Substation equipment recognition and purpose
• Substation protection schemes and bus arrangements
• HVDC overhead and underground transmission and conversion facilities
• Reactive power, FACTS, power factor, and correction
• Underground and overhead distribution equipment
• Distribution protection schemes
• Network distribution systems
• Critical backup power systems
• Meters, primary metering, and demarcation points
• Customer owned service equipment
• Equipment status, control, and data transmission
• Safety when working near high voltage equipment

WHO SHOULD ATTEND

Anyone who needs an overview or a deeper understanding of transmission and distribution systems will benefit from this content.

LEARNING OUTCOMES

• Discuss the basic concepts and equipment used in transmission and distribution systems
• Identify substation equipment and understand its purpose
• Describe terms, components, and functions of transmission and distribution systems
• Review the components involved in system reliability, operations, and control
• Develop an overall understanding of system operations functions and integration of electric power from production to delivery
• Discuss the key differences between underground and overhead systems
# AGENDA

## Wednesday, July 20, 2016

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:30 – 1:00 p.m.</td>
<td>Registration</td>
</tr>
<tr>
<td>1:00 – 1:15 p.m.</td>
<td>Purpose and Goals</td>
</tr>
<tr>
<td>1:15 – 2:00 p.m.</td>
<td>History and Development of Power Plants</td>
</tr>
<tr>
<td></td>
<td>• Energy usage</td>
</tr>
<tr>
<td></td>
<td>• Generation plants through the years</td>
</tr>
<tr>
<td>2:00 – 2:30 p.m.</td>
<td>Electricity Basics</td>
</tr>
<tr>
<td></td>
<td>• Terms and definitions</td>
</tr>
<tr>
<td></td>
<td>• Voltage, current, resistance</td>
</tr>
<tr>
<td></td>
<td>• Watts, Kwh</td>
</tr>
<tr>
<td></td>
<td>• Prefixes</td>
</tr>
<tr>
<td></td>
<td>• Generator principles and generation basics</td>
</tr>
<tr>
<td>2:30 – 2:45 p.m.</td>
<td>Afternoon Break</td>
</tr>
<tr>
<td>2:45 – 4:00 p.m.</td>
<td>Transmission Systems</td>
</tr>
<tr>
<td></td>
<td>• Purpose and voltages</td>
</tr>
<tr>
<td></td>
<td>• Transformation</td>
</tr>
<tr>
<td></td>
<td>• Structures, considerations, and placement</td>
</tr>
<tr>
<td></td>
<td>• Overhead conductors and underground cables</td>
</tr>
<tr>
<td></td>
<td>• HVDC and conversion facilities</td>
</tr>
<tr>
<td>4:00 – 5:00 p.m.</td>
<td>Substations</td>
</tr>
<tr>
<td></td>
<td>• Role in the grid</td>
</tr>
<tr>
<td></td>
<td>• Equipment purpose, recognition and layout</td>
</tr>
<tr>
<td></td>
<td>• AIS vs GIS</td>
</tr>
<tr>
<td></td>
<td>• Bus configurations</td>
</tr>
<tr>
<td></td>
<td>• Intro to relays</td>
</tr>
</tbody>
</table>

## Thursday, July 21, 2016

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 – 8:30 a.m.</td>
<td>Continental Breakfast</td>
</tr>
<tr>
<td>8:30 – 10:30 a.m.</td>
<td>Substations (Continued)</td>
</tr>
<tr>
<td></td>
<td>• Relays and protection schemes</td>
</tr>
<tr>
<td></td>
<td>o Types of relays, purpose, and principles</td>
</tr>
<tr>
<td></td>
<td>o Protection schemes</td>
</tr>
<tr>
<td></td>
<td>o Electromechanical vs microprocessor relays</td>
</tr>
</tbody>
</table>
AGENDA

Thursday, July 21, 2016 (Continued)

10:30 – 10:45 a.m.  Morning Break

10:30 – 12:00 p.m.  Reactive Power
  • VARS, power factor, and correction
  • Capacitors and inductors
  • FACTS

12:00 – 1:00 p.m.  Group Luncheon

1:00 - 2:45 p.m.   Distribution
  • Distribution substations and equipment
  • Overhead systems and equipment
  • Distribution circuit protective schemes and coordination

2:45 – 3:00 p.m.   Afternoon Break

3:00 – 3:30 p.m.   Distribution (Continued)
  • Underground systems and equipment
  • Network systems and equipment
  • Meters, primary metering, and demarcation lines
  • Customer owned service equipment

3:30 – 5:00 p.m.   Operations and control
  • Equipment status, control, and data transmission
  • SCADA and EMS
  • Operations Centers
  • Critical backup power systems

INSTRUCTOR

David Haley / Power Division Supervisor III / Tacoma Power

David Haley began working with electrical power systems in 1991 and has worked in the electric utility industry for the past 16 years. He currently serves on the management team for the Transmission & Distribution section of Tacoma Power. Dave has experience working with generation, transmission, distribution, system operations, asset management, customer service, and system planning. This experience has given him a variety of perspectives on the business of energy distribution, and a comprehensive knowledge of power system operations, design, and planning, as well as regulatory compliance issues. His experience as an instructor and trainer over the past ten years has helped him develop a teaching style that captivates audiences while breaking down complex subjects into easily understood explanations.
ELECTRIC SYSTEM OPERATIONS 101
July 20-21, 2016
Washington, DC Area

INSTRUCTIONAL METHODS

PowerPoint presentations and classroom discussion will be used for all learning outcomes in this course.

PROCEEDINGS

The proceedings of the course will be published, and one copy will be distributed to each registrant at the course.

REQUIREMENTS FOR SUCCESSFUL COMPLETION OF PROGRAM

Participants must sign in/out each day and be in attendance for the entirety of the course to be eligible for continuing education credit.

CREDITS

EUCI has been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET). In obtaining this accreditation, the (organization name) has demonstrated that it complies with the ANSI/IACET Standard which is recognized internationally as a standard of good practice. As a result of their Authorized Provider status, EUCI is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standard.

EUCI is authorized by IACET to offer 1.1 CEUs for the course.

EUCI is registered with the National Association of State Boards of Accountancy (NASBA) as a sponsor of continuing professional education on the National Registry of CPE Sponsors. State boards of accountancy have final authority on the acceptance of individual courses for CPE credit. Complaints regarding registered sponsors may be submitted to the National Registry of CPE Sponsors through its website: www.learningmarket.org.

Upon successful completion of this event, program participants interested in receiving CPE credits will receive a certificate of completion. EUCI is authorized by CPE to offer 13 credits for this program.

Program Level - Beginner
Delivery Method: Group-Live
Advanced Preparation: None

EVENT LOCATION

A room block has been reserved at the Embassy Suites Alexandria – Old Town, 1900 Diagonal Rd, Alexandria, VA 22314, for the nights of July 18-20, 2016. Room rates are $177, plus applicable tax. Call 1-703-684-5900 for reservations and mention the EUCI program to get the group rate. The cutoff date to receive the group rate is June 18, 2016, but as there are a limited number of rooms available at this rate, the room block may close sooner. Please make your reservations early.

REGISTER 3 SEND 4TH FREE

Any organization wishing to send multiple attendees to these conferences may send 1 FREE for every 3 delegates registered. Please note that all registrations must be made at the same time to qualify.
PLEASE REGISTER THE FOLLOWING


☐ ELECTRIC SYSTEM OPERATIONS 101 COURSE ONLY, JULY 20-21, 2016: US $1395
EARLY BIRD ON OR BEFORE JULY 1, 2016: US $1195

How did you hear about this event? (direct e-mail, colleague, speaker(s), etc.)

Print Name | Job Title

Company

What name do you prefer on your name badge?

Address

City | State/Province | Zip/Postal Code | Country

Telephone | Email

List any dietary or accessibility needs here

CREDIT CARD

Name on Card | Account Number

Billing Address | Billing City | Billing State

Billing Zip Code/Postal Code | Exp. Date | Security Code (last 3 digits on the back of Visa and MC or 4 digits on front of AmEx)

OR Enclosed is a check for $___________________ to cover ________________ registrations.

Substitutions & Cancellations
Your registration may be transferred to a member of your organization up to 24 hours in advance of the event. Cancellations must be received on or before June 17, 2016 in order to be refunded and will be subject to a US $195.00 processing fee per registrant. No refunds will be made after this date. Cancellations received after this date will create a credit of the tuition (less processing fee) good toward any other EUCI event. This credit will be good for six months from the cancellation date. In the event of non-attendance, all registration fees will be forfeited. In case of conference cancellation, EUCI’s liability is limited to refund of the event registration fee only. For more information regarding administrative policies, such as complaints and refunds, please contact our offices at 303-770-8800.

EUCI reserves the right to alter this program without prior notice.