

Scandinavian Academy
Training Center

Mobile | 00966536473335 : Mobile | 00966112695229 : Phone : 00966552365295
Email | info.en@scandinavianacademy.co Web site:https://scandinavianacademy.co/en :
Riyadh - Al Khaleej District - Sheikh Abdul Aziz Bin Abdul Rahman Bin Bishr Street - 13223 - Office No. 5 | P.O.BOX : 13224

Course: Substation Operation and Maintenance Techniques

Code	City	hotel	Start	End	price	Language - Hours
EE-646SA	Al Khobar	Hotel Meeting	2027-01-31	2027-02-04	12950 SR	En - 25

Course Introduction:

Electrical Substation maintenance is a key component of any substation owner`s electrical maintenance program. It has been well documented those failures in key procedures such as racking mechanisms, meters, relays and busses are among the most common source of unplanned outages. Electrical transmission, distribution and switching substations generally have switching, protection and control equipment and one or more transformers. Our electrical substation maintenance course focuses on maintenance and testing of switchgear, circuit breakers, batteries and protective relays. This course will cover the maintenance and testing requirements for common substation devices, including power transformers, oil, air and vacuum circuit breakers, switchgear, ground grid systems, batteries, chargers and insulating liquids. This course focuses on what to do, when to do it and how to interpret the results from testing and maintenance

Course Objectives:

On successful completion of this course, participants will:

- Know substation types, applications, components and safety procedures
- Learn maintenance and testing methods for medium-voltage circuit breakers
- Understand how to perform insulation resistance, contact resistance on air, oil and vacuum breakers, and tank loss index on oil circuit breaker and vacuum bottle integrity tests on vacuum breaker
- Understand switchgear arrangement, torque requirements, insulation systems and

maintenance intervals
- Know how to perform switchgear inspection and maintenance in lab
- Know battery types, applications, systems, and components
- Perform battery maintenance and testing in lab

Who Should Attend?

- Utility and Industrial Electrical Engineers and Engineering Technicians
- Transmission planning engineers
- Distribution planning engineers
- Substation Design Engineers
- Consulting Electrical Engineers
- Substation network management engineers
- Substation maintenance and construction engineers & technologists

Course Outline:

DAY ONE

- Substation Overview
- Purpose of a Substation
- Components of a Power System
- Types of Substations
- Substation Switching Configurations
- Distribution Substation Configurations
- Substation Components
- Metering in Substations
- Relaying in Substations
- Switchgear Maintenance and Testing
- Arrangement of Components
- Maintenance Intervals
- Maintaining the Insulation System

- Maintaining Auxiliary Components
- Torque Requirement for Switchgear Assemblies
- Electrical Testing of Switchgear

DAY TWO

- Circuit Breaker Fundamentals
- Circuit Breaker Functions
- Ratings
- Principles of Arc Interruption
- Breaker Insulation Media
- Insulation Requirements
- Circuit Breaker Controls
- Methods of Operation
- Electrically Operated Mechanisms

DAY THREE

- Circuit Breaker Maintenance and Testing
- Overall Maintenance
- Electrical Testing
- High-Potential Testing (Hi-Pot)
- Principles of Power Factor Testing
- Operation and Timing Tests
- Storage Batteries
- Systems and Components
- Applications
- Battery Types

DAY FOUR

- Battery Maintenance and Testing
- Battery In-Service Operation

- Temperature and Battery Life
- Battery Safety Factors
- Safety Hazards
- Safety Equipment
- Safety Precautions
- Battery Inspections
- Corrective Actions
- Equalizing Charge (Lead-Acid Only)
- Battery Measurement Techniques

DAY FIVE

- Overview of Protective Relays
- Classification of Relays
- Protective Zones
- Fundamentals of Electromechanical Design
- Relay Construction
- Time Characteristics
- Protective Relay Maintenance and Testing
- Mechanical and Visual Inspections
- Preventive Maintenance Testing
- Acceptance Testing
- Testing Techniques
- General Tests
- Relays in Substations

The Scandinavian Academy for Training Center adopts the latest scientific and professional methodologies in training and human resource development, aiming to enhance the efficiency of individuals and organizations. Training programs are delivered through a comprehensive approach that includes:

- Theoretical lectures supported by PowerPoint presentations and visual materials (videos and short films).
- Scientific evaluation of participants before and after the program to measure progress and knowledge acquisition.
- Brainstorming sessions and practical role-playing to simulate real-life scenarios.
- Case studies tailored to align with the training content and participants work nature.
- Assessment tests conducted at the end of the program to evaluate the achievement of training objectives.

Each participant receives the training material (both theoretical and practical) in printed form and saved on a CD or flash drive. Detailed reports, including attendance records, final results, and overall program evaluations, are also provided.

Training materials are prepared professionally by a team of experts and specialists in various fields. At the end of the program, participants are awarded a professional attendance certificate, signed and accredited by the Scandinavian Academy for Training Center.

Program Timings: 9:00 AM to 2:00 PM

The program includes:

- A daily buffet provided during the sessions to ensure participants comfort.
- A closing ceremony on the final day to distribute certificates and celebrate participants achievements.
- **Note: All prices are exclusive of 15% Value Added Tax (VAT).**

Our Success Partners

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المملكة العربية السعودية - الرياض - حي الخليج - شارع الشيخ عبد العزيز بن عبد الرحمن بن بشر - 13223 - مكتب رقم 5
Riyadh - Al Khaleej District - Sheikh Abdul Aziz Bin Abdul Rahman Bin Bishr Street - 13223 - Office No. 5