SCANDINAVIAN ACADEMY

Training and Development

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Course: Electrical distribution network, operation and control

Code	City	Hotel	Start	End	Price	Language - Hours
EE-563	Munich (Germany)	Hotel Meeting Room	2026-05-25	2026-06-05	9450 €	En - 50

Course Introduction:

Electrical distribution networks are a crucial part of modern infrastructure, ensuring the efficient and reliable delivery of electrical power to industrial, commercial, and residential consumers. Effective operation and control of these networks require knowledge of grid systems, automation, protection strategies, and regulatory compliance. This 10-day intensive training program provides participants with an in-depth understanding of power distribution systems, network operation, load management, fault detection, and advanced control strategies.

Through a combination of theoretical instruction, hands-on exercises, and case studies, attendees will develop the expertise required to manage and optimize electrical distribution networks for enhanced reliability and efficiency.

Course Objectives:

By the end of this course, participants will be able to:

- Understand the structure and components of electrical distribution networks.
- Operate and control power distribution systems effectively.
- Implement best practices for network stability, load management, and efficiency.
- Apply protection schemes and fault detection techniques.
- Utilize automation and smart grid technologies in modern power distribution.
- Ensure compliance with industry regulations and safety standards.

Target Audience:

- Electrical Engineers and Technicians
- Power System Operators and Supervisors
- Distribution Network Planners and Managers
- Grid Control Center Personnel
- Substation and Maintenance Engineers
- Energy Regulators and Utility Professionals

Course Outline

Day 1: Fundamentals of Electrical Distribution Networks

- Overview of power distribution systems
- Components of distribution networks (substations, transformers, feeders)
- Voltage levels and network classifications (LV, MV, HV)
- Key challenges in electrical distribution

Day 2: Network Planning and Load Flow Analysis

- Load forecasting and demand-side management
- Power flow analysis techniques
- Network expansion and system reinforcement strategies
- Case study: Optimizing a distribution network layout

Day 3: Protection Systems in Distribution Networks

- Fault types and their impact on distribution systems
- Overcurrent, earth fault, and differential protection
- Coordination of protective devices (relays, circuit breakers, fuses)
- Hands-on session: Protection relay setting calculations

Day 4: Automation and Smart Grid Technologies

- Introduction to smart grids and distributed energy resources
- SCADA systems for remote monitoring and control
- Integration of renewable energy sources into distribution networks
- Case study: Smart grid implementation in modern cities

Day 5: Network Operation and Control Strategies

- Voltage regulation and reactive power management
- Load shedding and peak demand control
- Network contingency planning and restoration
- Practical exercise: Simulating a power outage response

Day 6: Fault Detection, Isolation, and Service Restoration (FDIR)

- Fault location techniques and analysis
- Automatic reconfiguration and self-healing grids
- Real-time monitoring and predictive maintenance
- Workshop: Identifying and troubleshooting distribution faults

Day 7: Power Quality and Reliability Assessment

- Power quality parameters (harmonics, flicker, voltage sags)
- Impact of poor power quality on consumers
- Techniques for improving distribution network reliability
- Case study: Power quality improvement in industrial facilities

Day 8: Distribution Network Safety and Regulatory Compliance

- Electrical safety standards and operational guidelines
- Grid code compliance and regulatory frameworks
- Risk management in power distribution

- Workshop: Conducting a safety audit of a distribution network

Day 9: Energy Efficiency and Loss Reduction in Distribution Networks

- Identifying and mitigating technical and non-technical losses
- Energy conservation techniques in power distribution
- Cost-benefit analysis of efficiency improvement measures
- Case study: Implementing loss reduction strategies

Day 10: Final Assessment and Practical Evaluation

- Review of key concepts and best practices
- Group project: Developing an optimized distribution network strategy
- Mock assessment on fault detection and grid operation

The Scandinavian Academy for Training and Development 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 and Development.

Program Timings:

- 9:00 AM to 2:00 PM in Arab cities.
- 10:00 AM to 3:00 PM in European and Asian cities.

The program includes:

- A daily Coffee Break provided during the sessions to ensure participants comfort.