



SCANDINAVIAN ACADEMY
Training and Development

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Course: Reactive Power Management and Power Factor Correction

Code	City	Hotel	Start	End	Price	Language - Hours
EE-640	Frankfurt (Germany)	Hotel Meeting	2027-04-26	2027-04-30	5950 €	En - 25

Course Introduction:

Reactive power management and power factor correction are critical aspects of electrical power systems that enhance efficiency, reduce losses, and optimize energy consumption. Proper control of reactive power ensures voltage stability, minimizes transmission losses, and improves overall system reliability. This training program equips participants with the knowledge and skills to analyze, manage, and optimize reactive power and power factor correction strategies in industrial and utility-scale electrical networks.

Through theoretical instruction, hands-on exercises, and real-world case studies, attendees will develop expertise in the design, operation, and maintenance of power factor correction systems and reactive power compensation solutions.

Course Objectives:

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

- Understand the principles of reactive power and its impact on power systems.
- Implement power factor correction techniques to enhance energy efficiency.
- Design and size capacitor banks and other reactive power compensation devices.
- Analyze power quality issues related to reactive power and harmonics.
- Optimize industrial and utility power factor correction strategies.
- Ensure compliance with energy regulations and power quality standards.



Target Audience:

- Electrical Engineers and Technicians
- Power System Operators and Utility Professionals
- Industrial Energy Managers and Facility Engineers
- Power Quality and Reliability Engineers
- Consultants and Project Managers in the Power Sector

Course Content:

Fundamentals of Reactive Power and Power Factor

- Definition and significance of reactive power in AC systems
- Relationship between active, reactive, and apparent power
- Effects of poor power factor on electrical networks
- Causes of reactive power imbalance and power factor degradation
- Introduction to power factor correction techniques
- Regulatory and financial benefits of power factor improvement

Reactive Power Compensation Techniques

- Types of reactive power compensation (passive vs. active)
- Fixed and automatic capacitor banks
- Synchronous condensers and STATCOM applications
- Impact of capacitor switching on power quality
- Voltage stability and reactive power support
- Case study: Industrial application of power factor correction

Power Factor Correction Equipment and Sizing

- Selection criteria for power factor correction devices
- Capacitor bank sizing calculations and placement strategies
- Harmonic distortion and resonance considerations



- Integration of power factor correction with energy management systems
- Impact of distributed generation on reactive power compensation
- Workshop: Practical design and implementation of power factor correction

Power Quality, Harmonics, and System Performance

- Power quality parameters affected by reactive power
- Harmonic generation and mitigation techniques
- Effects of non-linear loads on power factor correction
- Filtering solutions for harmonic suppression
- Power factor correction in renewable energy systems
- Case study: Power factor correction in industrial and commercial facilities

Monitoring, Control, and Compliance in Reactive Power Management

- Real-time monitoring and SCADA integration
- Smart grid technologies for reactive power management
- Economic and operational benefits of optimized power factor
- Compliance with IEC, IEEE, and national power quality standards
- Advanced control techniques using AI and automation



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 will receive comprehensive training materials, including theoretical content, practical exercises, and supporting resources, provided in both printed and digital formats. 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.