€TRAINING

Power Quality, Harmonics Mitigation & Reactive Power Management

30 June - 4 July 2024
Istanbul (Turkey)

Power Quality, Harmonics Mitigation & Reactive Power Management

REF: O2425 DATE: 30 June - 4 July 2024 Venue: Istanbul (Turkey) - Fee: 6375 Euro

Introduction:

Harmonics, reactive power, and power quality are crucial aspects of electrical systems, significantly impacting their efficiency, reliability, and performance. This comprehensive 5-day training course will delve into the fundamentals of power quality, harmonics mitigation, and reactive power management, equipping participants with the knowledge and skills to effectively address these critical issues.

Course Objectives:

- Comprehend the principles of power quality and its significance in electrical systems
- Identify and classify various types of power quality disturbances, including harmonics
- Analyze the causes and effects of harmonics on electrical equipment and systems
- Employ effective harmonics mitigation techniques to enhance power quality
- Implement strategies for reactive power management to improve system efficiency and stability

Targeted Audience:

This course is suitable for:

- Electrical engineers,
- Power system technicians,
- Facility managers
- Other professionals involved in the design, operation, and maintenance of electrical systems.

Course Outline:

Unit 1: Introduction to Power Quality

- Power Quality Fundamentals
    - Defining power quality and its importance
    - Electrical parameters and their impact on power quality
    - Power quality standards and regulations

- Common Power Quality Disturbances

- Voltage and frequency disturbances
- Transients and surges
- Harmonics and their causes

Unit 2: Harmonics Analysis and Mitigation

- Harmonics Generation and Propagation
  - Sources of harmonics in electrical systems
  - Harmonics propagation in power lines and transformers
- Harmonics Measurement and Analysis
  - Harmonic measuring instruments and techniques
  - Harmonic analysis using Fourier Transform
  - Assessing harmonic impact on electrical equipment
- Harmonics Mitigation Techniques
  - Passive filtering methods
  - Active filtering methods
  - Isolation transformers and harmonic suppressors

Unit 3: Reactive Power Management

- Reactive Power Fundamentals
  - Defining reactive power and its role in Power Systems
  - Effects of reactive power on system efficiency and stability
  - Power factor correction and its importance
- Reactive Power Compensation Techniques
  - Static VAR compensators SVCs
  - Switched capacitor banks
  - Synchronous condensers
- Reactive Power Management Strategies
  - Real-time reactive power monitoring and control
  - Reactive power optimization for energy efficiency
  - Grid stability enhancement through reactive power management

Unit 4: Case Studies and Applications

- Real-world examples of power quality issues and their solutions
  - Case studies of harmonic-related problems in industrial and commercial settings

- Case studies of reactive power management strategies in power distribution systems

- Hands-on exercises and simulations
  - Practical applications of harmonic measurement and analysis techniques
  - Simulation of reactive power compensation methods using software tools

Unit 5: Advanced Topics and Future Trends

- Emerging power quality challenges and solutions
  - Impact of renewable energy sources on power quality
  - Smart grid technologies for power quality management

- Power quality standards and regulations updates
  - Latest international standards and guidelines for power quality
  - Regulatory compliance and monitoring requirements

- Future trends in power quality research and development
  - Advanced harmonic mitigation technologies
  - Artificial intelligence applications for power quality monitoring and control