

# € TRAINING

Power Quality, Harmonics Mitigation &  
Reactive Power Management



15 - 19 December 2024  
Amman (Jordan)  
ibis Amman



# Power Quality, Harmonics Mitigation & Reactive Power Management

REF: O2425 DATE: 15 - 19 December 2024 Venue: Amman (Jordan) - ibis Amman Fee: 4250 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