XCELERATE TRAINING INSTITUTE

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ELECTRICAL ENGINEERING

Power Quality, Harmonics Mitigation and Reactive Power Management Training Course

DURATION	LANGUAGE	FORMAT
10 days	**English**	**Classroom / Online**

Upcoming dates

Dates	Venue	Format	Fee
22 Feb – 5 Mar 2027	Live online	Online (live)	**€1,800**
2 – 13 Aug 2027	Live online	Online (live)	**€1,800**
6 – 17 Sep 2027	Dubai	Classroom	**€7,200**

Register or ask a question

Online: x8ti.com/course/power-quality-harmonics-mitigation-and-reactive-powe…

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Power Quality, Harmonics Mitigation and Reactive Power Management Training Course

Introduction

This course by Xcelerate Training Institute delves into the detailed study of nonlinear loads, power waveform analysis, harmonics mitigation techniques, voltage symmetry, and power harmonic issues. Understanding these concepts is essential for ensuring power quality and stability in electrical systems.

Learning Objectives

Upon completing this course, participants will be able to:

- Understand the influence of power fault clearing on current and voltage stability.
- Analyze the various components of alternating current and their impact on power quality.
- Use and calculate reliability indices.
- Evaluate the effects of voltage fluctuations on electrical devices.
- Understand terms related to power quality and reliability.
- Interpret and understand different power quality incidents.
- Use various harmonics mitigation methods.
- Understand the criteria for harmonic mitigation and filtering.

Training Methodology

This course will be delivered by esteemed industry professionals using diverse and unique learning techniques to ensure maximum understanding, retention, and knowledge application. The course includes theoretical lessons, practical exercises, group activities, projects, case studies, and role-plays to encourage two-way participation.

Benefits for Your Organisation

Organizations can benefit from:

- Safe operation of equipment and installations.
- Reduced maintenance costs from power disruptions.
- Effective grounding and bonding managed by trained professionals.
- Regular training on harmonic concepts and power quality management techniques.
- Improved power harmonics analysis and power quality assurance.
- Compliance with regulations and necessary legislation.
- Familiarization with the destructive effects of power harmonics on electrical equipment.
- Structured approach and understanding of power quality issues by trained professionals.

Benefits for You

Participants will gain:

- Comprehensive understanding of power quality analysis.

- Knowledge of voltage control and frequency control techniques.
- Advanced analytical and strategic skills to evaluate and secure power systems.
- Awareness of new and improved methods for handling voltage and frequency disturbances.
- Confidence and knowledge to train others on power quality issues.
- Better awareness of how heavy-duty machinery affects power quality.

Who Should Attend

This course is ideal for:

- Professionals involved in designing, planning, maintenance, and commissioning of power systems.
- Design Engineers to incorporate power harmonics handling devices and techniques into designs.
- Planning Engineers to plan for harmonics mitigation and power quality assurance.
- Project Managers responsible for implementing power systems.
- Employees directly involved with power quality control and harmonics mitigation.
- System Operators ensuring harmonics are mitigated in a power system.
- Managers responsible for power quality and harmonics mitigation.

Course Outline

Transient Voltage Excursions

- Voltage sags
- Voltage abnormalities and mitigation methods
- Load imbalance
- Voltage symmetry
- Voltage flicker
- Motor starting
- Capacitor switching
- Ferro resonance
- Lightning grounding
- Lightning shielding

Quality Overview

- Voltage disturbance
- Frequency disturbance
- Power factor improvement
- Power factor compensation
- Voltage distortion
- Power quality evaluation
- Limitations of power system parameters
- Electrical power factor

Power Quality Issues

- Understanding power quality

- Power quality determination
- Drawing the ITI curve
- Causes of power disruptions
- Causes of voltage sags
- Ensuring reliable power quality

Power System Reliability

- Types of UPS (Uninterruptible Power Supply)
- Power system automation
- Power system redundancy
- Managing power interruptions
- Handling equipment failure
- Ensuring power system reliability

Effects of Fault Clearing

- Fault clearing processes
- Fuse-blowing philosophy
- Fuse saving techniques
- Reclosing
- Interpreting reliability indicators
- IEEE reliability indices

Power Harmonics

- Harmonics mitigation techniques
- Harmonic analysis and control
- Tolerance of power systems to harmonics
- Impact of harmonics on power networks and devices
- Harmonic filters
- Harmonics and distortions relationship
- Linear versus nonlinear loads
- K-factor transformers
- AC power and power factor

Steady-State Voltage, Insulation, and Arresters

- Insulation systems
- Selection of arresters
- Effects of steady-state current and voltage on normal load system operation
- Basic impulse level
- Insulation testing
- Load changers and voltage regulators

Grounding Systems and Surge Protection

- Lightning

- Surge arrestors
- Impedance grounding
- Causes of surges
- Bonding grounding systems
- Mitigation of surges
- Solidly grounded systems
- Resistance grounding
- Transient overvoltage
- Power system grounding techniques
- Mitigation of surges

Power Quality

- Loads that reduce power quality
- Series power filters (active)
- Power quality compensators
- Series compensation: DVR (active)
- Hybrid power filters (active)
- Power filters (passive)
- Active shunt compensation: DSTATCOM
- Power quality standards and monitoring
- AC-DC converters affecting power quality
- Improved power quality converters
- Shunt power filters (active)

Voltage Quality

- Definition of voltage interference
- Transients
- Effects of voltage fluctuations
- Short-term and long-term variation durations and their impact on power lines
- Symmetrical imbalances
- Improving supply network balance
- Limiting imbalance recommendations
- Imbalance indicators
- Causes of imbalance
- Sources of reactive power
- Calculating bank capacitors
- Advantages of power factor improvement
- System characteristic response

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Registration Form

Power Quality, Harmonics Mitigation and Reactive Power Management Training Course

Preferred dates: ..... Venue or online: .....

Duration: 10 days Language: .....

Please complete and email this form to us, or register online. We confirm your place and send the invoice within one working day.

Delegate information

Full name (Mr / Ms / Dr / Eng): .....

Position: ..... Telephone / mobile: .....

Official email: ..... Personal email: .....

Company information

Company name: .....

Address: .....

City / country: ..... VAT / tax number: .....

Person responsible for training & development

Full name (Mr / Ms / Dr / Eng): .....

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