



Consulting and Training | Reach New Heights

Course Name

Power Quality, Earthing and Bonding

Sector Name

Electrical Engineering

Document Type

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Power Quality, Earthing and Bonding

Course Introduction

Power Quality

The increasing use of equipment sensitive to power system disturbances and the related economic aspects, the increasing awareness of power quality issues, and deregulation have created a need for understanding the causes of these problems and the ways to solve them. The course covers the Power quality issues, power frequency disturbances, electrical transients, and earthing systems in electrical power systems.

The course concerns the sources of distortion (loads) and the interaction between those and the propagation of the distortion in the power system. Effects on the power system are also indicated. Harmonics, their effects on the electric power system, and how to overcome them are highlighted.

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Target Audience

- ✓ Electrical power generation systems and distribution engineers in utilities and industrial plants
- ✓ Managers of private electricity producers and large power consumers
- ✓ Substation engineers
- ✓ Consulting engineers
- ✓ Manufacturers of power equipment technicians and technologists
- ✓ Other technical personnel involved in the design, operation, and maintenance of high/medium voltage substations
- ✓ Operations technicians
- ✓ Electrical maintenance technicians and supervisors

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Power Quality, Earthing and Bonding

Learning Objectives

- ✓ Power Quality definitions and issues in the electrical Power System.
- ✓ Voltage sag, voltage swing, and power frequency disturbances
- ✓ Earthing methods, Bonding, and static electricity effects on power quality
- ✓ Harmonics In Electrical Power Systems
- ✓ Power factor correction and Electromagnetic interference and their consequences on power quality
- ✓ Power quality improvement using Distributed Generators in distribution systems.
- ✓ Measuring and Solving Power Quality Problems

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Course Outline

✓ DAY 01

Introduction to Power Quality

- ✓ Definition of Power Quality
- ✓ Power Quality Progression
- ✓ Power Quality Terminology
- ✓ Power Quality Issues
- ✓ Susceptibility Criteria
- ✓ Responsibilities of the Suppliers and Users of Electrical Power
- ✓ Power Quality Standards

Power Frequency Disturbance

- ✓ Common Power Frequency Disturbances
- ✓ Cures for Low-Frequency Disturbances
- ✓ Voltage Tolerance Criteria

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Course Outline

✓ Day 02

Electrical Transients

- ✓ Transient System Model
- ✓ Examples of Transient Models and Their Response
- ✓ Power System Transient Model
- ✓ Types and Causes of Transients

Harmonics

- ✓ Definition of Harmonics
- ✓ Harmonic Number
- ✓ Odd and Even Order Harmonics
- ✓ Harmonic Phase Rotation and Phase Angle Relationship
- ✓ Causes of Voltage and Current Harmonics
- ✓ Individual and Total Harmonic Distortion
- ✓ Harmonic Signatures (Fluorescent Lighting, Adjustable Speed Drives, Personal Computer, and Monitor)
- ✓ Effect of Harmonics on Power System Devices (Transformers, AC Motors, Capacitor Banks, Cables, Busways, Protective Devices)
- ✓ Guidelines for Harmonic Voltage and Current Limitation
- ✓ Harmonic Current Mitigation(Equipment Design, Harmonic Current Cancellation, Harmonic Filters)

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Course Outline

✓ Day 03

Grounding and Bonding

- ✓ Shock and Fire Hazards
- ✓ National Electrical Code Grounding Requirements
- ✓ Essentials of a Grounded System
- ✓ Ground Electrodes
- ✓ Earth Resistance Tests
- ✓ Earth-Ground Grid Systems (Ground Rods, Plates, Ground Ring)
- ✓ Power Ground System
- ✓ Signal Reference Ground
- ✓ Signal Reference Ground Methods
- ✓ Single-Point and Multipoint Grounding

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Course Outline

✓ Day 04

Power Factor

- ✓ Active and Reactive Power
- ✓ Displacement and True Power Factor
- ✓ Power Factor Improvement
- ✓ Power Factor Correction
- ✓ Power Factor Penalty
- ✓ Other Advantages of Power Factor Correction
- ✓ Voltage Rise Due to Capacitance
- ✓ Application of Synchronous Condensers
- ✓ Static VAR Compensators

Electromagnetic Interference

- ✓ Frequency Classification
- ✓ Electrical Fields
- ✓ Magnetic Fields
- ✓ Power Frequency Fields
- ✓ High-Frequency Interference
- ✓ Electromagnetic Interference Susceptibility
- ✓ EMI Mitigation
- ✓ Cable Shielding to Minimize Electromagnetic Interference
- ✓ Health Concerns of Electromagnetic Interference

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Course Outline

✓ Day 05

Static Electricity

- ✓ Tribo-electricity
- ✓ Static Voltage Buildup Criteria
- ✓ Static Model
- ✓ Static Control
- ✓ Static Control Floors
- ✓ Humidity Control
- ✓ Ion Compensation
- ✓ Static-Preventative Casters
- ✓ Static Floor Requirements
- ✓ Measurement of Static Voltages
- ✓ Discharge of Static Potentials

Improvement of Power Quality using Distributed Generators in Distribution Networks

- ✓ Measuring and Solving Power Quality Problems
- ✓ Power Quality Measurement Devices
- ✓ Power Quality Measurements
- ✓ Number of Test Locations
- ✓ Test Duration
- ✓ Instrument Setup

✓ Instrument Setup Guidelines

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Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
Oct. 4, 2026	Oct. 8, 2026	5 days	4250.00 \$	KSA , Riyadh
Dec. 28, 2026	Jan. 1, 2027	5 days	4950.00 \$	Turkey , Antalya
June 29, 2026	July 3, 2026	5 days	4250.00 \$	UAE , Dubai
March 14, 2027	March 18, 2027	5 days	4250.00 \$	KSA , Riyadh

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