XCELERATE TRAINING INSTITUTE

your learning & development partner

ELECTRICAL ENGINEERING

Electrical Power System Engineering Design, Analysis, Fault Limiting, PFC, Harmonic Controls & Protection

DURATION	LANGUAGE	FORMAT
5 days	English	Classroom / Online

Upcoming dates

Dates	Venue	Format	Fee
14 – 18 Jun 2027	Live online	Online (live)	€1,200
19 – 23 Jul 2027	Cairo	Classroom	€4,800
20 – 24 Dec 2027	Live online	Online (live)	€1,200

Register or ask a question

Online: x8ti.com/course/electrical-power-system-engineering-design-analysis-…

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Electrical Power System Engineering Design, Analysis, Fault Limiting, PFC, Harmonic Controls & Protection

Introduction

This Electrical Power System Engineering course covers critical topics such as Power System Design, Short Circuit Analysis, Coordination Studies, Power Factor, and Power System Harmonic Analysis. It addresses all aspects of industrial power generation and distribution systems, including system planning, equipment selection, grounding, harmonic control, and ensuring compliance with electrical code requirements. The program also includes numerous in-class examples and hands-on problems to enhance the learning experience.

Learning Objectives

Upon completing this course by Xcelerate Training Course, participants will be able to:

- Understand power system design and analysis.
- Evaluate harmonics and design harmonic filters.
- Implement coordination lessons and curves.
- Select and size power system components.
- Conduct short circuit studies.
- Design electrical power systems more efficiently.
- Calculate overcurrent device settings.

Training Methodology

This interactive training program includes:

- Lectures
- Worksheets
- Technical Articles
- Seminars & Presentations
- Group Discussions
- Assignments
- Case Studies
- Functional Exercises Following the ‘Do-Review-Learn-Apply’ model.

Benefits for Your Organisation

Organizations can benefit from:

- Gaining experienced and skilled professionals to manage electrical power systems effectively.
- Staying ahead with a comprehensive design overview of electrical power systems.
- Gaining a competitive advantage with more efficient system designs.
- Increasing employee satisfaction through professional development opportunities.
- Training employees to prevent issues related to electrical power systems.

- Tailoring course content to meet the specific needs of the organization.

Benefits for You

Participants will gain:

- An appreciation of related engineering disciplines such as civil, structural, and data communications.
- Increased exposure to the design of electrical power systems.
- In-depth knowledge of electrical transmission and distribution equipment.
- A theoretical background in electrical engineering and enhanced numerical and computer skills.
- Experience in operating, maintaining, and troubleshooting substation equipment.

Who Should Attend

This course is ideal for:

- Electrical engineers
- Power system engineers
- Design engineers
- Technicians
- Planners
- Consultants
- Managers
- System operators
- Individuals involved in the design of substations
- Contractors executing electrical HV substation projects
- Electrical commissioning engineers
- Engineers associated with power distribution or power generation plants
- Utility engineers dealing with power transmission and distribution systems

Course Outline

Power System Design

- Introduction to Electrical Power System Design
- Primary Selective Systems
- Electrical Safety Considerations
- Economic Considerations of Design
- Delta vs. Wye Configurations
- Radial Distribution Systems
- Networks
- Electrical Codes and Standards
- Double Ended Substation
- Loop System
- Selecting the Appropriate Voltage

- Voltage Drop Calculations

Calculations

- Appliance Loads
- General Lighting Load Calculations
- Receptacles Load Calculations
- National Electrical Code Article 220 Requirements
- Demand Factors
- Continuous vs. Non-Continuous
- Panel Schedules

Conductors, Panelboards & Switchboards

- Conductor Selection
- Conduit Sizing
- Insulation Type
- Bus Bracing
- Series Ratings
- Correction Factors
- Series Rated vs. Fully Rated Panels
- Switchboard Bus Ratings
- Breaker and Fuse Selection
- Temperature Considerations
- Neutral and Ground Conductors

Design & Case Studies

- Small Industrial Switchboard Circuit Design
- Lighting Design
- Lighting Layout
- Zonal Cavity Lighting Calculations
- Case Studies

Transformers

- Types of Transformers
- Cast Coil Designs
- Sizing and Protecting Transformers
- Insulation Characteristics
- Transformer Protection

Motor Circuits, Locations, Switches & Power Supplies

- Locked Rotor and Overload Protection
- Insulation Class / Service Factor
- Motor Tables
- Grounding Electrode System Requirements

- Equipment Grounding Conductor Selection
- Power Quality Issues
- Sizing of Feeders
- Motor Short Circuit Protection
- Designing Motor Circuits
- Hazardous/Classified Locations
- Explosion Proof Equipment
- Intrinsically Safe Circuits
- Size and Ratings of Transfer Switches
- Heat Loss
- Compatibility with Generators
- Designing a Transformer Circuit
- Uninterruptible Power Supplies (UPS)
- UPS Types and Operation

Short Circuit Analysis

- Introduction to Short Circuit Analysis
- Interrupting and Withstand Ratings
- Data Requirements
- Available Utility Short Circuit Current
- Short Circuit Study
- Conductor Impedance

Conductor Impedance and Short Circuit Calculations

- Determining the Source Impedance
- Conductor Calculation Worksheets
- Calculating the Conductor Impedance
- Conductor Impedance Tables
- Short Circuit Calculations with Conductor Impedance

Transformer Impedance and Short Circuit Calculations

- Transformer Testing and Percent Impedance
- X/R Ratio
- Using Percent Impedance for Short Circuit Calculations
- Transformer Calculation Worksheets
- Short Circuit Calculations with Transformer Impedance
- Determining the Source Impedance in Percent
- Infinite Bus Calculations

Motor Contribution

- Impact of Motor Contribution on Short Circuit Current
- Multipliers for Motor Contribution
- Theory of Motor Short Circuit Contribution

- Sub-Transient Reactance
- Consideration of Motor Contribution – Case Study

Device Interrupting & Series Ratings

- Circuit Breaker and Fuse Interrupting Ratings

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Registration Form

Electrical Power System Engineering Design, Analysis, Fault Limiting, PFC, Harmonic Controls & Protection

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

Duration: 5 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): .....

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

Email: .....

Payment

☐ Please invoice me ☐ Please invoice my company

Signature: ..... Date: .....

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Email this form
info@x8ti.com

Register online
Open the course page