XCELERATE TRAINING INSTITUTE

your learning & development partner

ELECTRICAL ENGINEERING

Electric Power System Planning and Reliability Calculation

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

Upcoming dates

Dates	Venue	Format	Fee
1 – 5 Mar 2027	Live online	Online (live)	**€1,200**
13 – 17 Sep 2027	Live online	Online (live)	**€1,200**
11 – 15 Oct 2027	Kuala Lumpur	Classroom	**€4,800**

Register or ask a question

Online: staging.x8ti.com/course/electric-power-system-planning-and-reliabili…

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Electric Power System Planning and Reliability Calculation

Introduction

Utility customers today demand higher reliability and lower costs, a trend that will continue for decades. Strategic planning techniques help meet these demands while positioning power systems to adapt to future requirements. Understanding power system protection is crucial for enhancing reliability. With advancements in protection and communication technology and the rise of renewable energy sources, designing and implementing power system protection has become more challenging. This course covers the fundamentals of power system planning and reliability calculation, providing proven methods to benefit both utilities and their customers.

Learning Objectives

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

- Gain in-depth knowledge of power system planning and economics.
- Recognize optimal transmission capacity.
- Understand the nature of planning in the electricity sector and the hierarchy of planning models.
- Employ various electricity pricing approaches.
- Define the economic operation of power systems and apply planning methods.
- Determine value-based transmission expansion by quantifying transmission value.
- Articulate power-flow problems and techniques for power-flow studies.
- Carry out demand-side management as a strategic option in utility planning.
- Discuss the deregulation of electrical utilities and its approaches.

Training Methodology

This collaborative training program includes:

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

Benefits for Your Organisation

Organizations can benefit from:

- An all-inclusive overview of electric power system planning and reliability calculation.
- Increased confidence in handling power system planning and reliability.
- Practical knowledge that provides a competitive edge.
- Support for technical committees and boards in creating and updating standards.
- Facilitated discussions with government organizations on relevant regulations.

Benefits for You

Participants will gain:

- Ability to keep up with the latest developments in power system planning and reliability.
- Tailor-made academic training for technicians and equivalent workforce.
- Training, assessment, and certification by experts.
- Skills to identify, act on, and report issues with power system planning and reliability.
- Competence in performing test activities and site procedures.
- Knowledge of appropriate PPE tools and methods.
- Enhanced skills for further qualifications in power system planning and reliability.

Who Should Attend

This course is suitable for:

- Engineers and technicians new to the electric utility industry
- Intermediate-level engineers, professional electrical engineers, and technicians dealing with distribution planning and design
- Professionals involved in improving distribution system reliability
- Utility engineers and consultants conducting load forecasts and studies
- Engineers assessing the performance of power distribution systems

Course Outline

The Electrical Power System

- The Planning Cycle
- Load Flow Studies
- Stability Analysis
- Short Circuit Studies

System Operations

- Load Forecasting
- Simulated System Operation
- Generation, Transmission, and Distribution Planning
- System Reliability
- Protection Coordination

Power System Protection

- Introduction to Power Systems
- Introduction to Power System Protection
- Power System and Protection Calculations
- Symmetrical Component Methods

Software Programs and Technologies

- Use of Software Applications for Fault Calculations

- Protection Technologies
- Instrument Transformers
- Circuit Breakers

Protection of Various Equipment

- Protection of Power Transformers
- Distance Protection
- Protection of HVDC Networks
- Protection of Power Cables and Lines
- Protection of Substations
- Protection of Motors
- Protection of Generators

Protection Functions & Testing

- Arc Flash Studies
- Frequency and Voltage Protection
- Special Protection Functions
- Wide-Area Protection
- Testing of Power System Protection
- Trends in Power System Protection
- Relay Setting Management
- Failure Investigations

Advanced Planning Design & Engineering

- Power System Planning and Advanced Applications
- Power Systems Design
- Power Engineering
- System Safety Engineering

Strategic Planning for Industries

- Power Markets, Energy Economics, and Strategic Planning
- Emerging Generation Technologies
- Dynamic/Static Loads
- Synchronous/Induction Motors
- Synchronous/Induction Generators

Different Elements for Planning & Protection

- Solar Generation
- Wind Generation
- Energy Storage Units
- Power Factor Concept
- High Voltage Direct Current System (HVDC)
- Multi-Terminal HVDC System

- Converter Circuits

Power & Frequency Control

- Concept of Harmonics and Filters
- Active Power and Frequency Control
- Primary Droop Control
- Reactive Power and Voltage Control
- Static VAR Compensation
- Synchronous Condensers
- Synchronous Machine Fundamentals

Power Dynamics & Distribution

- Power System Dynamics
- Distribution Systems Planning and Engineering
- Substation/Distribution Automation
- Smart Grid
- Fundamentals of Renewable Energy Systems
- Distributed Energy Resources, Microgrids
- Grid Resiliency, Energy Storage, and Electric Vehicles

System Stability, Protection & Distribution

- Power System Stability
- Distributed Generation Interconnection Studies
- Distribution Construction Work Plan
- Distribution Long Range Plan
- Distribution Loss Reduction
- Distribution Sectionalizing and System Protection

Transmission of Power Systems

- Transmission Power Flow
- Transmission Reactive Compensation
- Transmission Stability
- Transmission System Impact

Voltage Analysis

- Extra High Voltage Engineering
- Power System Stability
- Surge Phenomena in Power Systems
- Computer Methods in Power System Analysis
- Linear Control Systems

System Reliability

- Value of Service Studies and System Reliability
- Line Design

- Rate and Cost of Service Analysis
- Key Account Profitability Analysis

Electrical Power Quality

- Electric Power Quality
- Safety, Reliability, and Service Quality
- Strategic Planning Issues
- Industry Restructuring
- Reliability Indexing and Benchmarking

Communication Systems

- Substation Automation
- Distribution Automation
- System Integration for Utilities

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Registration Form

Electric Power System Planning and Reliability Calculation

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: .....

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