XCELERATE TRAINING INSTITUTE

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ELECTRICAL ENGINEERING

Power System Blackouts and Restoration Training Course

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

Upcoming dates

Dates	Venue	Format	Fee
12 – 23 Apr 2027	Live online	Online (live)	**€1,800**
18 – 29 Oct 2027	Live online	Online (live)	**€1,800**
15 – 26 Nov 2027	Geneva	Classroom	**€5,700**

Register or ask a question

Online: x8ti.com/course/power-system-blackouts-and-restoration-training-cour…

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Power System Blackouts and Restoration Training Course

Introduction

General blackouts occur due to inadequate infrastructure investment, poor planning, lack of incident management, and failure to evaluate power system voltage requirements and operational conditions correctly. The reliability of power distribution systems is crucial to prevent power outages. The consequences of power outages can be severe, impacting essential services like hospitals, causing loss of income, and creating intolerable power quality issues.

Today, power systems operate with low-security thresholds due to deregulation of the electricity market, increased load consumption, and challenges in building new transmission lines and large power plants. This increases the vulnerability of power systems and the likelihood of large blackouts, as evidenced by various incidents in the past.

Learning Objectives

Upon completing this Power System Blackouts and Restoration course by Xcelerate Training Institute, participants will be able to:

- Analyze power quality.
- Gain comprehensive knowledge of power system blackouts and prevention.
- Identify blackout concerns and review recent incidents and lessons learned.
- List methods to improve power quality.
- Identify instability mechanisms and analyze the effects of cold inrush currents on blackouts.
- Discuss concepts when examining power quality and interruption issues.
- Assess potential risks of power outages.
- Understand how power outages start and cascade.
- Apply procedures to ensure power continuity.
- Recognize the role of induction motors in triggering blackouts.
- Implement blackout preventive measures and monitoring and control processes.
- Use a structured approach to system restoration planning with tools, guidelines, and procedures.
- Consider various planning techniques for power blackouts.
- Explore the use of SMART technology.

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:

- Gaining knowledge of current practices to ensure reliable power supplies.
- Understanding how blackouts occur and how to mitigate them.
- Reducing the negative impact on customers facing power outages.
- Preparing contingency plans for power quality issues and potential power outages.

Benefits for You

Participants will gain:

- New practices to ensure power quality and reliability.
- Understanding of power quality issues such as blackouts and poor-quality power.
- Awareness of late-breaking developments in power system blackouts and restoration.
- Access to a tailor-made academic program for technicians or equivalent workforce.

Who Should Attend

This course is ideal for:

- Generation and transmission planners
- Protection engineers
- Electrical construction engineers
- Power system analysts and engineers
- ISO/RTO technical staff
- Commissioning Supervisors
- Economic and management consultants
- Operations supervisors
- Power developers and marketers
- Power exchange personnel
- Regulatory staff

Course Outline

Overview of Blackout Concerns

- Overview of blackout causes
- Blackouts, causes, and lessons learned
- Self-organizing criticality and the edge of chaos
- Causes of blackout
- Instability and transient issues
- Instability mechanisms and transients
- Cold inrush current effects on blackouts
- Role of induction motors in triggering blackouts

Stability Control

- Angle stability control
- Voltage stability control
- Power system analysis
- Blackout preventive measures
- Blackout prevention analysis
- VAR compensation
- Voltage stability
- Reactive capability limitation of synchronous machines
- Optimizing generator reactive power resources

Blackout Preventive Measures

- Wide-area monitoring and control
- General and network voltage control
- Compliance with reliability standards
- Load voltage stabilization
- Static VAR compensators
- Voltage stabilizers
- AGC implementation
- Role of HVDC systems in system stability

Restoration Overview

- Power system restoration - first task force report
- Analytical tools for power system restoration - conceptual design
- System operations challenge
- Protection relay issues during restoration
- Overvoltage control during restoration
- Power system restoration issues
- Asymmetry issues in power system restoration
- Steam plant start-up and control in system restoration
- Heuristic approaches to distribution system restoration

Special Considerations in System Restoration

- Power system restoration - second task force report
- System restoration and black start capabilities
- Tie line utilization during power system restoration
- Using HVDC links in power system restoration

New Approaches in Power System Restoration

- Knowledge-based systems
- Real-time considerations
- Power system restoration with an expert system

- Expert system requirements for power system restoration
- Algorithm for service restoration in distribution systems

Blackout and Restoration Training

- Development of a large-scale dispatcher training simulator and results
- Dispatcher training simulators - lessons learned
- An advanced transportable operator training simulator
- Restoration simulator prepares operators for major blackouts
- Bulk power system restoration training techniques
- Evaluating a restoration tool using an operator training simulator

System Restoration Design

- Policies for restoration of a power system
- Analytical tool requirements for power system restoration
- Role of interactive control
- Development of a system restoration plan
- Deploying the plan
- Power system restoration planning
- Estimating restoration duration

Operator's View and Supporting Tools

- Graphic displays and human factors engineering
- Human error reduction techniques
- Risk management software

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Registration Form

Power System Blackouts and Restoration 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): .....

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

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Open the course page