XCELERATE TRAINING INSTITUTE

your learning & development partner

ELECTRICAL ENGINEERING

Design, Maintenance of High, Medium and Low Voltage Switchgears (HV, MV & LV)

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	Cairo	Classroom	**€3,800**

Register or ask a question

Online: x8ti.com/course/design-maintenance-of-high-medium-and-low-voltage-sw…

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Design, Maintenance of High, Medium and Low Voltage Switchgears (HV, MV & LV)

Introduction

The design and maintenance of switchgear are crucial for the efficient supply and control of electrical power in utility distribution systems. With a wide variety of equipment used in low, medium, and high voltage switchgear, improper maintenance can lead to inefficiency and reliability issues. This course aims to educate participants on the latest developments in circuit breakers and the design and maintenance of switchgear across different voltage levels.

Learning Objectives

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

- Understand the components of different voltage switchgear.
- Detect and troubleshoot circuit breakers.
- Differentiate between various types of circuit breakers and industrial switchgear.
- Select appropriate specifications for circuit breakers and switchgear.
- Comprehend maintenance procedures for different voltage switchgear.
- Perform maintenance and testing procedures.
- Understand arc phenomena and circuit interruption.
- Apply safety precautions to switchgear equipment.

Training Methodology

This interactive 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 switchgear design and maintenance.
- Increased confidence in handling switchgear design and maintenance.
- Practical knowledge that provides a competitive edge.
- Conversation-based sessions for networking and learning from real-world examples.
- Collaborative sessions for practical application in individual roles.

Benefits for You

Participants will gain:

- Ability to carry out risk assessments for switchgear design and maintenance.
- Updated knowledge on the latest trends and technologies.
- Tailor-made academic training for technicians and equivalent workforce.
- Training, assessment, and certification by experts.
- Skills to identify, act on, and report issues with switchgear.
- Competence in performing test activities and site procedures.
- Knowledge of appropriate PPE tools and methods.
- Enhanced skills for further qualifications in switchgear design and maintenance.

Who Should Attend

This course is suitable for:

- Apprentice Electricians
- Journeyman Electricians
- Master Electricians
- Electrical Supervisors/Managers
- Lead Persons
- Area Supervisors
- Project Supervisors
- Project Estimators

Course Outline

Introduction

- Basic concepts of electrical engineering
- Three-phase review and per unit
- Voltage levels
- One-line and three-line diagrams
- Generation, transmission, substation, and distribution system layouts

Industrial Switchgear

- Fuses
- Auto-reclosers
- Automatic sectionalizing
- Circuit Breakers
- Isolator switches
- Load switches
- Relays
- Current transformers
- Voltage transformers

CB Design Specification Based on Short Circuit Current Level

- Per unit system
- Faults on power systems
- Transient phenomena in power systems
- Symmetrical component analysis of three-phase networks
- Network connection for various fault types
- Current and voltage distribution in systems due to faults
- Effect of systems on zero sequence quantities
- Computer programs for short circuit calculation

CB Design Specification Based on Arc Phenomena and Circuit Interruption

- Arc phenomena and maintenance
- Properties of arc
- Arc interruption theory
- Circuit breaker rating
- Circuit constants and conditions
- Conditions of severity
- Class A, B, and C transients
- Transmission line and switching transients
- Duties of switchgear

LV Circuit Breakers

- Low voltage current limiting circuit breakers
- High breaking capacity circuit breakers
- Insulated case circuit breakers
- Air circuit breakers
- Specifications for low voltage circuit breakers

Modern MV and HV Vacuum CB

- Advantages of vacuum interruption
- Vacuum contactors and interrupters
- Vacuum medium and arc stability
- Vacuum switch construction
- Applications of vacuum circuit breakers

Modern MV and HV SF6 CB Introduction

- Basic features of SF6 breakers
- Dielectric and quenching properties of SF6
- Construction and types of SF6 breakers
- Puffer type and single pressure systems
- Improvements in SF6 breakers for HV

Air Circuit Breakers

- Methods of increasing arc resistance
- Plan break, magnetic blow out, and arc splitter types
- Construction and operation
- Axial and blast air circuit breakers

Oil Circuit Breakers

- Arc rupture under oil
- Advantages and disadvantages of oil
- Plan break and arc control oil circuit breakers
- Minimum oil circuit breakers
- Construction and operation

DC Circuit Breakers

- Construction and methods of interruption
- Applications

Circuit Breaker Inspection, Maintenance, and Services

- Inspection procedures
- Daily, monthly, and annual inspections
- Disassembly, cleaning, tightening, and lubrication
- Testing equipment and procedures
- Direct and indirect testing
- Contact and insulation resistance tests
- Test reports

Circuit Breakers Control, Protection, and Testing

- Control and protection devices and wiring
- Testing classification and laboratories
- Description of a simple testing station

CB Troubleshooting

- Low insulation resistance
- Resistance between terminals
- Unequal contact wipe and travel in 3-pole

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Registration Form

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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: .....

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☐ 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