XCELERATE TRAINING INSTITUTE

your learning & development partner

ELECTRICAL ENGINEERING

Electrical Protection

DURATION	LANGUAGE	FORMAT
5 days	English	Classroom / Online

Upcoming dates

Dates	Venue	Format	Fee
22 – 26 Feb 2027	Live online	Online (live)	€1,200
2 – 6 Aug 2027	Live online	Online (live)	€1,200
6 – 10 Sep 2027	Dubai	Classroom	€3,600

Register or ask a question

Online: staging.x8ti.com/course/electrical-protection/

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Electrical Protection

Introduction

Power system protection structures are essential for establishing reliable electrical power systems. Expertise in power system protection is crucial for enhancing the reliability of electrical infrastructures. Inadequately designed protection systems can lead to major power failures and accidents with severe consequences. As electricity becomes increasingly important in our lives, such power failures can significantly impact society and the global economy.

With advancements in power protection technology and the rise of renewable energy sources, designing and operating power protection systems have become more complex. This course provides fundamental principles of power system protection and their application in various scenarios.

Learning Objectives

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

- Understand the construction and functions of instrument transformers.
- Describe various types of grounding systems and earthing fault protection.
- Identify practical solutions for selecting the appropriate electrical protection for specific scenarios.
- Design effective protection schemes.
- Comprehend the principles and selection of relays.

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:

- Increased productivity through reduced project acceptance, design, and commissioning time.
- Technical training and up-skilling to maximize workforce potential.
- A workforce with lower resistance to change due to enhanced understanding.
- Identifying opportunities for improvement through understanding current technologies.
- Networking with technology leaders and experienced professionals to learn from each other's experiences.
- Exposure to standard international procedures in electrical protection.
- Encouraging a proactive attitude towards new technologies within the workforce.

Benefits for You

Participants will gain:

- Understanding of different types of electrical faults and their causes.
- Recognition of various electrical protection devices such as fuses, circuit breakers, and relays in LV and MV systems.
- Knowledge of the impact and calculations of different short circuit currents.
- Understanding the operation and types of protection relays, including micro-logic, solid-state, and numerical relays.
- Ability to select and install appropriate relays for specific functions.
- Familiarity with common protection relays for switchboards, feeders, motors, and transformers.

Who Should Attend

This course is suitable for:

- Technical professionals in transmission or distribution networks
- Technical management professionals
- Electrical department heads
- Engineers and technicians from the electricity supply industry
- Engineers and technical personnel in power utilities or petrochemical plants
- Service professionals of large infrastructure projects
- Maintenance and operations technicians
- Engineering professionals from manufacturing companies
- Engineering professionals operating power and distribution transformers
- Professionals involved in commissioning or maintenance of protection systems

Course Outline

Introduction

- Introduction to power system protection
- Power system protection calculations
- Symmetrical component methods
- Use of software systems for fault calculations
- Protection technologies
- Instrument transformers
- Circuit breakers
- Protection of power transformers
- Protection with high renewable energy sources

Elements of Protection

- Distance protection
- Protection of HVDC networks
- Protection of power cables and lines

- Protection of substations
- Protection of motors
- Protection of generators
- Arc flash studies
- Frequency and voltage protection
- Special protection functions
- Wide arc protection
- Testing of power system protections
- Trends in power system protection

Types of Electrical Protection Devices and Faults

- Importance of electrical protection and control devices
- Types of electrical faults: Active, Incipient, Passive, Transient, Asymmetrical, Phase & Earth faults
- Characteristics of high voltage fuses for electrical protection
- Attributes of circuit breakers for electrical protection
- Microprocessor overcurrent relays
- Time, current, curves, and logic discrimination
- Hot and cold tripping curves
- LV switchboard protection against short circuits

Protection Functions and Instrument Transformers

- Power system architecture
- Protection functions
- Selective coordination
- Lockout and anti-pumping relays
- Sensors
- Current and voltage instrument transformers
- Types of relays
- Numerical relays and functions

Busbar, Transformer, and Motor Protection Systems

- Busbar protection
- Transformer protection
- Motor protection
- Capacitor protection
- Overhead line protection
- Types of related faults
- Relevant protection functions
- Protection device coordination

Simple Calculation of Short Circuit Currents

- Revision of simple formulae
- Short circuit MVA and fault current calculations

- Examples and case studies

System Earthing

- Solid, impedance, touch potentials
- Effects of electric shock
- Earth leakage protection

Grounding Systems and Earth Fault Protection

- Overcurrent protection for phase and earth faults
- Unit protection schemes
- Distance protection
- Protection of feeders against overload and short circuit
- Types of grounding systems
- Restricted earth fault protection
- Sensitive earth fault protection
- Protection against over-voltages

Methods of Commissioning Relays, Short Circuit Current Calculation, and Harmonics

- Commissioning of protective relays
- Calculation of short circuit current
- Fault topologies
- Short circuit current at the fault point
- Positive, negative, and zero sequence systems
- Triple harmonics effects and mitigation techniques

Practical Demonstrations and Sessions

- Including simple fault calculations and relay settings
- Coordination by time grading
- Problems in applying IDMT relays

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Registration Form

Electrical 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

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Open the course page