XCELERATE TRAINING INSTITUTE

your learning & development partner

ELECTRICAL ENGINEERING

Grounding Systems Design & Application Training Course

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

Upcoming dates

Dates	Venue	Format	Fee
22 Feb – 5 Mar 2027	Live online	Online (live)	**€1,800**
2 – 13 Aug 2027	Live online	Online (live)	**€1,800**
6 – 17 Sep 2027	Madrid	Classroom	**€5,700**

Register or ask a question

Online: staging.x8ti.com/course/grounding-systems-design-application-trainin…

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Grounding Systems Design & Application Training Course

Introduction

Grounding is a critical aspect of safety in power systems and power transmission. A well-designed grounding system is essential for redirecting surge currents from various sources to the soil, ensuring electrical equipment and users are protected from electrical noise. Improper grounding systems can cause significant harm to consumers and connected equipment.

It is crucial for electrical professionals and field technicians to understand the concepts, tools, and principles that make grounding systems effective. Learning about grounding systems also helps mitigate risks associated with electrical equipment not being enclosed at ground potential, preventing financial losses due to network failures.

Learning Objectives

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

- Understand all concepts related to grounding system design and application.
- Develop market-ready grounding design skills for field application.
- Learn techniques and methods used in grounding electrical systems and devices.
- Implement lightning and surge protection.
- Analyze and calculate required grounding systems for power substations and networks.
- Evaluate risks and develop mitigation techniques for power systems.
- Conduct soil testing and layer classification.
- Select earthing rods and determine their quality.
- Examine substations to ensure safety guidelines are followed.

Training Methodology

Training will be conducted by industry-trusted professionals with expertise in grounding design. The course includes both practical and theoretical lessons, emphasizing understanding to gain work-ready skills. Training materials include PowerPoint slides, well-prepared PDF notes, and case studies. Participants are encouraged to engage with facilitators and participate in two-way learning. Illustrations, system analysis, training videos, and role-playing may be used where appropriate. The course follows the Do–Review–Learn–Apply Model developed by Xcelerate Training Institute.

Benefits for Your Organisation

Organizations can benefit from:

- A solid understanding of grounding concepts and methods, including equipotential bonding.
- Developing effective substation earthing and device protection approaches.
- Familiarity with soil resistivity testing and evaluation.
- Selection of grounding electrodes.

- Knowledge of power surges, harmonics, oscillations, and power swings.
- Skills to identify power hazards and implement safety measures.
- Understanding the need for grounding system design and its application.

Benefits for You

Participants will gain:

- Knowledge of power system grounding and quality determination.
- Understanding of various grounding techniques and methods.
- Skills for handling power system hazards and protection.
- Techniques for lightning protection and overcurrent avoidance.
- Market-ready skills for career advancement.
- Knowledge of grounding design objectives and configurations.
- Step-by-step approach to designing grounding systems.
- Understanding of power hazard issues and mitigation methods.
- Ability to ensure proper grounding design to avoid power hazards.
- Enhanced skills to handle different scenarios and assume higher responsibilities in safety and system protection.

Who Should Attend

This course is ideal for:

- Electrical Engineers involved in installation designs.
- Electrical Technicians providing installation guidance.
- Power System Operators ensuring safety.
- Planning Engineers managing power protection alternatives and material selection.
- Planning Managers making critical decisions.
- Instrumentation Engineers.
- Asset Engineers.
- Commissioning Engineers.
- Asset Managers.
- Design Engineers.
- Investors.
- Power vendors ensuring compliance.
- Anyone interested in protecting substations, power lines, and electrical devices.

Course Outline

Importance of Grounding Systems

- Ground electrodes
- Impact of lightning on power networks and devices
- Types of electrical faults

- Arcing in power systems
- Bonding
- Power noise avoidance
- Elimination of static charges by grounding
- Surge protection
- Power lines and lightning relation
- Spark energy and ignition hazard
- Evaluating and handling static charges
- Lightning strike management
- Grounding design fundamentals
- Static charge buildup
- Soil resistivity analysis
- Consequences of power faults

Grounding Systems

- TT Systems
- TN Systems
- TN-C Systems
- Protection devices
- Thermal reaction due to resistance
- Shock hazard
- Solidly grounded systems
- Resistance Grounding Systems with NER utilization
- Impedance Grounding with Neutral Reactor use
- Touch potential
- Surge protection using grounding systems
- TN-S System
- TN-S-C Systems
- Earth fault protection
- Metal enclosure for grounding
- Step potential
- Induced voltage handling
- EMI suppression
- Ungrounded systems

Grounding Protection Methods/Techniques

- Types of circuit breakers
- IDMT O/C & E/F protection
- Overcurrent protection
- Overvoltage protection
- Earth fault protection

- Per unit measure
- Sequence networks
- Protection criteria
- Fuse utilization
- Relay systems
- Transformer protection
- Measuring transformers

Lightning Protection

- Electrostatic
- UPS usage
- Capacitive coupling
- Electrical noise categorization
- Equipotential bonding
- Power system surges

Risk Mitigation

- Electrical noise handling
- Grounding loop mitigation
- Electrical harmonics handling
- Lightning arrestor installation
- Surge arrestors
- Electrical principles for surge handling
- Shielded transformer isolation
- Grounding loops as a source of electrical noise

Effective Grounding Systems

- Ground fault current handling
- HV substation and lines grounding
- LV and MV substation and lines grounding
- Outdoor HV substation grounding
- Soil resistivity evaluation and calculations
- Lightning probability
- Lightning incidence management
- Lightning risk mitigation
- Design considerations for effective grounding
- Transferred current and voltage

Analysis and Evaluation

- Grounding system approach
- Chemical corrosion of grounding rods
- Earthing rod resistance measurement
- Multiple earthing rod utilization

- Parallel grounding
- Single rod resistance
- Soil resistance analysis and measuring techniques
- Interpreting soil resistance results
- Soil resistance concerning grounding

Resistivity of Surface Materials

- Concrete
- Crusher granite
- Washed granite
- Washed limestone
- Asphalt
- Wet organic soils
- Dry organic soils
- Sand and gravel
- Shale
- Bentonite
- Clay
- Slate

Grounding System Design

- Data collection techniques for grounding systems
- Data analysis methods
- Noise discharge management
- Using grounding systems for human safety

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Registration Form

Grounding Systems Design & Application 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: .....

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City / country: ..... VAT / tax number: .....

Person responsible for training & development

Full name (Mr / Ms / Dr / Eng): .....

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