



Training Course:
Electrical Power System Fundamentals for Non-
Electrical Engineers

4 - 8 October 2026
Cairo (Egypt)

Training Course: Electrical Power System Fundamentals for Non-Electrical Engineers

Training Course code: EN236617 From: 4 - 8 October 2026 Venue: Cairo (Egypt) - Training Course Fees: 4410 € Euro

Introduction

Modern industrial, commercial, infrastructure, and utility operations depend heavily on reliable and safe electrical power systems. Professionals from non-electrical engineering disciplines are increasingly required to interact with electrical equipment, participate in multidisciplinary projects, evaluate technical information, coordinate with electrical specialists, and contribute to operational and maintenance decisions. A practical understanding of electrical power systems is therefore essential even when electrical engineering is not their primary discipline.

This training program, designed by Global Horizon Training Center, provides participants with a structured and accessible introduction to the fundamentals of electrical power systems without requiring an electrical engineering background. The program explains electrical concepts using straightforward engineering terminology and emphasizes how electricity is generated, transmitted, distributed, controlled, protected, and ultimately utilized.

Throughout the five-day program, participants will develop an understanding of basic electrical quantities, AC and three-phase systems, generation and grid architecture, transformers, substations, switchgear, motors, protection, grounding, power quality, and electrical safety. Particular emphasis is placed on understanding system relationships and recognizing equipment functions rather than performing advanced electrical design calculations.

Objectives

By the end of this training program, participants will be able to:

- Explain the fundamental principles and terminology of electrical engineering.
- Understand voltage, current, resistance, power, energy, frequency, and power factor.
- Distinguish between AC and DC electrical systems.
- Understand the principles of single-phase and three-phase electrical systems.
- Describe the complete electrical power chain from generation through transmission and distribution to the end user.
- Identify the major equipment used in electrical power systems and explain its function.
- Understand the operating principles and applications of transformers.
- Recognize the functions of substations, switchgear, circuit breakers, isolators, and protection devices.
- Understand the basic operating principles of AC motors and generators.
- Read and interpret basic electrical single-line diagrams and equipment symbols.
- Understand the fundamentals of electrical faults and protection systems.

- Explain the purpose and importance of grounding and earthing systems.
- Recognize common power-quality problems and their operational consequences.
- Understand electrical hazards and fundamental electrical safety principles.
- Communicate more effectively with electrical engineers, contractors, operators, and maintenance personnel.
- Participate more confidently in multidisciplinary projects involving electrical systems.

Course Methodology

The program uses a structured, concept-based methodology specifically suited to professionals without a formal electrical engineering background.

Technical concepts are introduced progressively, beginning with basic electrical principles and advancing toward complete power-system architecture and equipment. Complex electrical concepts are translated into clear engineering language and supported by diagrams, simplified calculations, equipment illustrations, and industrial examples.

The methodology includes:

- Instructor-led technical presentations.
- Simplified explanations of electrical principles.
- Electrical system and equipment diagrams.
- Interpretation of single-line diagrams.
- Short calculation examples for key electrical quantities.
- Industrial and utility-based examples.
- Equipment identification exercises.
- Case-based discussions of electrical faults and operational issues.
- Safety scenarios and hazard-recognition discussions.
- Question-and-answer and knowledge-review sessions.

Organizational Impact

Organizations whose non-electrical personnel develop a stronger understanding of electrical power systems can benefit from improved interdisciplinary coordination, operational awareness, and technical decision-making.

The program will contribute to:

- Improved communication between electrical and non-electrical engineering disciplines.
- Better understanding of electrical equipment and infrastructure across projects and facilities.
- Improved coordination between engineering, operations, maintenance, safety, and project teams.
- Greater awareness of electrical hazards and safe working practices.
- Improved interpretation of electrical terminology, drawings, and technical documentation.
- Better-informed technical and commercial decisions involving electrical equipment.
- Reduced misunderstandings during multidisciplinary engineering activities.
- Improved awareness of electrical reliability, protection, and power-quality issues.
- Stronger understanding of the relationship between electrical systems and overall plant or facility performance.
- Enhanced technical competence among personnel involved in electrical-related projects without an electrical engineering specialization.

Target Audience

This training program is suitable for professionals who work with or around electrical power systems but do not have a specialized electrical engineering background, including:

- Mechanical Engineers
- Civil Engineers
- Chemical Engineers
- Process Engineers
- Instrumentation and Control Personnel
- Project Engineers
- Project Managers
- Maintenance Engineers and Supervisors
- Operations Engineers and Supervisors
- Plant and Facility Engineers
- HSE and Safety Professionals
- Technical Managers

- Procurement and Contract Professionals involved in electrical projects
- Technical Sales Engineers
- Asset Management Personnel
- Reliability and Maintenance Personnel
- Engineering Coordinators
- Technical Support Personnel
- Other professionals requiring a fundamental understanding of electrical power systems

Course Outline

Day 1 - Electrical Fundamentals

- Basic electrical concepts: voltage, current, resistance, power, and energy
- Ohm's Law and fundamental electrical relationships
- AC and DC systems
- Single-phase and three-phase power
- Active, reactive, and apparent power
- Power factor fundamentals
- Basic electrical symbols and single-line diagrams

Day 2 - Power Generation, Transmission and Distribution

- Overview of electrical power generation
- Conventional and renewable generation sources
- Electrical generators and basic operating principles
- High-voltage transmission systems
- Electrical distribution networks
- Industrial power distribution systems
- Voltage levels, electrical loads, and system reliability

Day 3 - Transformers, Switchgear and Electrical Machines

- Transformer principles, types, and applications
- Transformer ratings, losses, and basic operation
- Electrical substations and major components
- Switchgear, circuit breakers, isolators, and fuses
- Current and voltage transformers
- AC motors and basic operating principles
- Motor starting methods and variable frequency drives VFDs

Day 4 - Protection, Grounding and Power Quality

- Common electrical faults and abnormal conditions
- Fundamentals of power system protection
- Protective relays and circuit breakers
- Overcurrent and earth-fault protection
- Grounding and earthing principles
- Power quality fundamentals
- Harmonics, voltage variations, and power factor issues

Day 5 - Electrical Safety and System Operation

- Electrical hazards and safe working principles
- Electric shock, arc-flash, and arc-blast awareness
- Electrical isolation and Lockout/Tagout LOTO
- Electrical equipment loading and operating conditions
- Reliability and basic maintenance considerations
- Understanding an industrial power system from source to load
- Interpretation of simplified single-line diagrams
- Course review and key learning outcomes

Registration form on the Training Course: Electrical Power System Fundamentals for Non-Electrical Engineers

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Complete & Mail or fax to Global Horizon Training Center (GHTC) at the address given below

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