Global Horizon
TRAINING CENTER

Training Course:
Electrical Training Program

14 - 18 December 2025
Istanbul (Turkey)
DoubleTree by Hilton Istanbul Esentepe

Training Course:
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Training Course code: EN236111 From: 14 - 18 December 2025 Venue: Istanbul (Turkey) - DoubleTree by Hilton Istanbul Esentepe Training Course Fees: 6500 Euro

Introduction

In an era of increasing demand for electrical reliability, energy efficiency, and safe operations, professionals working in modern facilities must understand the full scope of Electrical & Instrumentation E&I systems and High Voltage HV infrastructure. This training program, designed by Global Horizon Training Center, focuses on bridging E&I with HV operations, providing engineers and technical personnel with essential skills to manage, maintain, and troubleshoot critical electrical systems in industrial, oil & gas, utility, and infrastructure environments.

Program Objectives

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

1. Apply the principles and best practices of E&I and HV systems.
2. Interpret single-line diagrams, instrumentation loop drawings, and protection schemes.
3. Conduct diagnostics and testing on HV equipment and E&I devices.
4. Understand safety requirements including LOTO, arc-flash protection, and grounding.
5. Integrate instrumentation systems with SCADA and digital communication protocols e.g., IEC 61850.
6. Develop and implement preventive maintenance and commissioning plans.

Course Methodology

- Instructor-led technical lectures using real-world case examples.
- Practical demonstrations and simulations using software and sample schematics.
- Hands-on group activities to interpret diagrams and troubleshoot systems.
- Interactive discussions and Q&A sessions to apply concepts to participants work environments.
- Daily knowledge checks and recap exercises to reinforce learning.

Organizational Impact

Organizations will benefit through:

- Improved operational safety and system reliability.
- Minimized downtime through advanced troubleshooting capabilities.
- Increased compliance with international electrical standards and codes.
- Stronger cross-functional collaboration between electrical and instrumentation teams.
- More effective project delivery through integrated commissioning and testing skills.

Target Audience

- Electrical and instrumentation engineers and supervisors.
- Maintenance and operations professionals in utilities, oil & gas, and process plants.
- HV technicians and substation operators.
- Project and commissioning engineers.
- Facility and plant engineers involved in energy and power distribution.

Course Outline

Day 1 - Fundamentals of Electrical & Instrumentation Systems

Main Topics:

- Overview of E&I roles in industrial and infrastructure systems.
- Electrical parameters: voltage, current, resistance, power, and energy.
- Instrumentation signal types: analog 4-20 mA, 0-10V and digital modbus, Profibus.
- Control systems overview: PLC, DCS, and SCADA.
- Field devices: sensors, transmitters, control valves, actuators.
- Wiring, shielding, and grounding for signal integrity.

Activities:

- Interpret an instrumentation loop diagram.
- Demonstration: Calibrate a pressure transmitter 4-20 mA.
- Group exercise: Identify signal paths between field device and control room.

Day 2 - High Voltage HV System Architecture and Equipment

Main Topics:

- Generation to distribution: HV overview 11kV, 33kV, 132kV, 400kV.
- Transformers: core types, vector groups, tap changers, cooling methods.
- HV switchgear: air-insulated vs. gas-insulated AIS vs. GIS.
- Substation layouts: main bus, incoming/outgoing feeders.
- Circuit breakers, disconnectors, and earthing switches.
- Insulation coordination and dielectric stress analysis.

Activities:

- Workshop: Reading and analyzing single-line diagrams SLDs.
- Case study: Root cause of insulation failure in a 132kV transformer.

Day 3 - Protection, Control & SCADA Integration

Main Topics:

- Protection principles: overcurrent, earth fault, differential, distance.
- CTs and VTs: selection, accuracy classes, polarity, testing.
- Protective relays: electromechanical, digital, numerical.
- Introduction to SCADA and RTUs.
- IEC 61850 basics: logical nodes, GOOSE messaging, substation automation.

Activities:

- Simulation: Set and test a digital overcurrent relay.
- Hands-on: Configure SCADA data mapping from relay inputs.
- Group task: Design protection settings for a feeder and transformer.

Day 4 - HV Safety, Testing & Maintenance Procedures

Main Topics:

- HV safety protocols: LOTO, safe clearance, isolation, arc-flash analysis.
- Arc-flash PPE and boundary calculations NFPA 70E.
- HV testing:
    - Insulation resistance IR and polarization index PI.
    - Tan-Delta and partial discharge testing.
    - Contact resistance and circuit breaker timing.
- Maintenance strategies: preventive, predictive, and condition-based.

Activities:

- Demonstration: Perform insulation resistance test using IR tester.
- Workshop: Develop a preventive maintenance checklist for HV switchgear.
- Case analysis: Arc-flash incident and safety failure investigation.

Day 5 - Commissioning, Troubleshooting & System Optimization

Main Topics:

- Commissioning process: FAT vs. SAT, energization protocols.
- Start-up checklists and HV energization sequences.
- Troubleshooting techniques for E&I and HV failures.
- Power quality management: harmonics, flicker, voltage dips.

- System optimization: energy efficiency and reliability improvement.

Activities:

- Capstone group exercise: Investigate and resolve a simulated fault combining HV trip and instrumentation signal failure.
- Course review and final Q&A.
- Develop individual action plans for applying learning to participants organizations.

Registration form on the Training Course: Electrical Training Program

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

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- ☐ Please find enclosed a cheque made payable to Global Horizon
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