



*Training Course:
Advanced Power Transmission Systems*

*19 - 30 January 2025
Alexandria (Egypt)*

Training Course: Advanced Power Transmission Systems

Training Course code: EN235129 From: 19 - 30 January 2025 Venue: Alexandria (Egypt) - Training Course Fees: 7585 € Euro

Introduction:

Welcome to the Advanced Power Transmission Systems training program, brought to you by Global Horizon Training Center. In this comprehensive course, we delve into the intricate world of power transmission systems, exploring advanced concepts and technologies that drive modern industries. This program is designed to equip participants with a deep understanding of power transmission, enabling them to excel in their roles and contribute to the evolving landscape of energy distribution.

Objectives:

- Provide a comprehensive overview of power transmission systems and their significance in various industries.
- Explore advanced concepts related to power transmission, including high-voltage systems, renewable energy integration, and smart grid technologies.
- Equip participants with the knowledge to analyze, design, and troubleshoot complex power transmission systems.
- Foster an understanding of the environmental and economic implications of different power transmission strategies.
- Promote safety awareness and best practices in working with advanced power transmission systems.

Methodology:

This training program adopts a blended learning approach, combining theoretical knowledge with practical applications. Participants will engage in:

- Instructor-led lectures and presentations
- Interactive discussions and case studies
- Hands-on simulations and practical exercises
- Site visits to operational power transmission facilities
- Group projects to encourage collaboration and problem-solving

Target Audience:

This program is designed for professionals, engineers, and individuals working or aspiring to work in the fields of electrical engineering, energy management, power systems operation, and related industries. It is suitable for those seeking to enhance their expertise in advanced power transmission systems and stay updated with the latest industry trends.

Outlines:

Day 1:

Foundations of Power Transmission Systems

- Introduction to the training program and its objectives.
- Importance of power transmission systems in energy distribution.
- Overview of different types of power transmission systems: overhead lines, underground cables, and more.
- Basics of voltage levels and their significance in power transmission.
- Components of a transmission network: substations, transformers, switchgear.
- Safety protocols, regulations, and best practices in power transmission.

Day 2:

High-Voltage Transmission Systems

- Understanding high-voltage transmission and its advantages.
- Factors influencing the choice of voltage levels.
- Transmission line design considerations: impedance, capacitance, inductance.
- Optimization techniques for minimizing power losses in transmission lines.
- Insulation materials and techniques for high-voltage applications.
- Overcoming challenges in high-voltage transmission: corona effect, line sag, etc.

Day 3:

Renewable Energy Integration

- Exploring the integration of renewable energy sources into the transmission grid.
- Challenges posed by variable and intermittent generation.
- Grid codes and requirements for connecting renewable sources.
- Energy storage solutions: batteries, pumped hydro, compressed air.
- Case studies of successful renewable integration projects.
- Role of power electronics in managing power quality from renewables.

Day 4:

Smart Grids and Automation

- Introduction to smart grids and their significance in modern power transmission.
- Components of a smart grid: advanced sensors, communication systems, control centers.
- Automation in power transmission: SCADA systems, remote control, real-time monitoring.
- Demand response programs and load management for grid optimization.
- Importance of data analytics in predicting and managing demand.
- Cybersecurity considerations in smart power systems.

Day 5:

HVDC Transmission Systems

- Exploring High-Voltage Direct Current HVDC transmission technology.
- Advantages of HVDC over HVAC high-voltage alternating current.
- Different HVDC configurations: point-to-point, multi-terminal, back-to-back.
- Conversion methods: line-commutated converters LCC, and voltage-source converters VSC.
- Applications of HVDC in long-distance transmission and interconnecting grids.

Day 6:

Flexible AC Transmission Systems FACTS

- Understanding the role of Flexible AC Transmission Systems FACTS devices.
- Types of FACTS devices: SVC, STATCOM, UPFC, TCSC.
- Enhancing grid stability and power quality through FACTS.
- Real-time control of transmission parameters using FACTS.
- Case studies showcasing the impact of FACTS on grid performance.

Day 7:

Transmission Line Modeling and Simulation

- Introduction to transmission line modeling and simulation.
- Mathematical models for transmission line analysis.
- Simulation tools and software: PSCAD, MATLAB, EMTP-RV.
- Analyzing transient and steady-state behavior of transmission lines.
- Case study: simulating faults and disturbances in transmission systems.

Day 8:

Grid Resilience and Reliability

- Understanding grid resilience and its importance in power transmission.
- Identifying potential vulnerabilities and risks in transmission systems.
- Strategies for enhancing grid reliability: redundancy, contingency planning.
- Role of microgrids and distributed energy resources in grid resilience.
- Case studies of grid resilience in the face of natural disasters and cyberattacks.

Day 9:

Environmental and Economic Considerations

- Analyzing the environmental impacts of different transmission technologies.
- Life cycle assessment LCA of power transmission systems.
- Cost-benefit analysis of transmission system upgrades.
- Regulatory frameworks and policies influencing power transmission decisions.
- Integrating environmental and economic factors in decision-making.

Day 10:

Future Trends and Innovations

- Exploring emerging technologies in power transmission.
- High-temperature superconductors and their potential applications.
- Grid modernization using AI, machine learning, and predictive analytics.
- Sustainable and innovative materials for transmission infrastructure.
- Role of power transmission in enabling electric vehicle EV charging networks.

Registration form on the Training Course: Advanced Power Transmission Systems

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

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