MERCURY

1-Week Mini Master in Power, Electricity, and Industry Infrastructure Course

14 – 18 March 2027
Cairo (Egypt)



Dubai - UAE: +971 4 450 5697
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1-Week Mini Master in Power, Electricity, and Industry Infrastructure Course

Ref: 9071_302003 **Date:** 14 – 18 March 2027 **Location:** Cairo (Egypt) **Fees:** 4000 Euro

Introduction:

This electrical power and industrial infrastructure training course encompasses the three major aspects of all electrical installation networks worldwide.

The electrical power and industrial infrastructure course provides participants with a clear and comprehensive understanding of the principles, characteristics, construction, and selection of power transmission, electricity distribution, and cutting-edge digital industry infrastructure.

As the thermal energy mode of electric power generation is increasingly being supplanted by green and clean energy, predominantly from solar and wind sources, the industry is witnessing a dynamic shift in power transmission methods.

The smart grid and microgrid technologies represent the latest trends in electricity distribution networks. These grids increasingly utilize intelligent sensors imbued with artificial intelligence capabilities to manage electricity distribution efficiently.

Substantial progress has been made in industry infrastructure, as electrical equipment is designed to minimize carbon footprints and significantly reduce global warming potential. With the proliferation of digital substations as core infrastructure components, there is a heavy reliance on Internet of Things IoT technologies.

This electrical power and industrial infrastructure course participants will also understand the rapid emergence of smart digital transformers and the adoption of environmentally friendly ester oil as a substitute for mineral oil in transformers to enhance safety.

Targeted Groups:

- Electrical Power Engineers.
- Maintenance Technicians.
- Electrical Supervisors.
- Engineering Professionals.
- Managers of the electrical engineering department.

Course Objectives:

By the end of this electrical power and industrial infrastructure course, participants will be able to:

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- Differentiate between the various types of power generation, including renewable sources.
- Understand the significance of power components: active, reactive, and apparent power.
- Appreciate the advantages of renewable energy.
- Describe the components of smart grids and microgrids.
- Acknowledge the value of digital industry infrastructure.

Targeted Competencies:

By the end of this electrical power and industrial infrastructure course, participants will be able to:

- Comparison of Thermal Power Generation vs. Clean and Green Power Generation.
- Design and characteristics of solar and wind power generation.
- Features and benefits of smart grids and microgrids.
- Energy storage options and integrating renewable energy sources.
- Understanding digital substations and their components.
- Knowledge of digital industry equipment used in infrastructure.

Course Content:

Unit 1: Overview of Conventional Power Generation and Renewables:

- Fundamentals of Thermal Power Generation.
- Characteristics of Nuclear Power Generation.
- Transition to Renewable Energy Generation.
- Solar Power Characteristics and Photovoltaic Cells.
- Components and Operations of Wind Turbine Power Generation.
- Geothermal and Hydroelectric Power Generation.

Unit 2: Flexible AC Transmission Systems and the Significance of Power Components:

- Understanding the Generator Capability Curve.
- The Impact of Power Factor and the Importance of Reactive Power.
- Advantages of Flexible AC Transmission Systems FACTS.
- Instrument Transformers for Accurate Power Measurement.
- Common Power Quality Problems and Solutions.
- The Issue of Triple Harmonics and Mitigation Techniques.

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Unit 3: Smart Grid Transitions and Distributed Energy Resources:

- Characteristics and Design of Smart Grids.
- Optimization Strategies for Smart Grids.
- The Convergence of Smart Grids and Artificial Intelligence AI.
- Function and Advantages of Microgrids.
- Renewable Energy Integration Techniques.
- Solutions for Energy Storage in Renewable Systems.

Unit 4: Advancements in Smart Transformer Construction and Characteristics, Digital Substation:

- Key Features of Smart Transformers.
- Implementation of Smart Transformers in Distribution Systems.
- Benefits and Features of Digital Transformers.
- The Integral Role of Digital Transformers in Power Grids.
- Modern Digital Substation Architectures.
- Integrating Digital Substations with Renewable Energy Systems.

Unit 5: Mitigating Global Warming Potential Through Carbon Footprint Reduction in Infrastructure Equipment:

- Specifications, Characteristics, and Performance of Natural Esters.
- Utilizing Natural Ester-based Oils in Power Transformers.
- Alternatives to SF6 in Gas-Insulated Transformers.
- Developing Eco-friendly Gas Insulated Substations.
- Innovations in New Vacuum Clear Air Switchgears.

Conclusion:

This intensive 1-week Mini Master in Power, Electricity, and Industry Infrastructure has comprehensively explored electrical power systems and industrial infrastructure development.

Throughout this electrical power and industrial infrastructure course, we've delved into the critical aspects of industrial infrastructure, understanding its meaning and significance within the broader context of the energy infrastructure industry.

This electrical power and industrial infrastructure training has equipped participants with essential knowledge of the electrical power industry, covering topics ranging from the fundamentals of electrical power systems to the complexities of industrial electric power production.

By obtaining an electrical power certificate through this course, attendees are well-prepared to navigate the dynamic landscape of the infrastructure industry and gain insights into the nuances of power and energy in electrical systems.

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Furthermore, this electrical power and industrial infrastructure program has facilitated a deeper understanding of the electric power and energy industry, fostering insights crucial for effective industry analysis and strategic decision-making.

As participants conclude this electrical power and industrial infrastructure course, they emerge with enhanced expertise and a robust foundation for meaningfully contributing to the evolving energy, electricity, and power sectors.