

# GULF INSTITUTE



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# 5-Day Mini MBA in Power, Electricity and Industry Infrastructure

## INTRODUCTION

- This 5-Day Mini MBA In Power Electricity and Industry Infrastructure training seminar encompasses the three major aspects in all electrical installation network worldwide. This training seminar has been designed to provide a clear and perfect understanding of the principles, characteristics, construction and selection of power transmission, distribution of electricity and the state of the art digital industry infrastructure. Thermal energy mode of electric power generation is now gradually superseded by green and clean energy predominantly by solar and wind power hence provide power transmission.
- The smart grid and micro grids are current trends in the electricity distribution networks. Intelligent sensors with artificial intelligence capabilities are incorporated into these grids for distribution of electricity. The industry infrastructure has made significant progress by incorporating electrical equipment that will reduce carbon footprint and subsequently reduce the global warming potential substantially. Digital substations are mushrooming as efficient infrastructure components and equipment has great reliance in the internet of things (IoT) technologies. Smart digital transformers are emerging rapidly with the onset of industry infrastructure digitalization. The retro filling of new ester oil as substitute for mineral oil in transformers are fast gaining prominence as it increases the safety of transformer installations. Robotics are incorporated with the new state of the art smart transformers.

### This training seminar will highlight:

- Thermal power generation verses clean and green power generation
- Design and characteristics of solar and wind power generation
- Features of smart grids and micro grids
- Energy storage and interconnecting renewable energy.
- Construction and components of digital substations
- Digital industry equipment of industry infrastructure

## OBJECTIVES

### By the end of this training seminar, participants will learn to:

- Differentiate the various types of power generation including renewables
- Understand the various importance of power component namely the active power, reactive power and apparent power
- Appreciate the merits and importance of renewable energy
- Understand and describe the smart grids and micro grids
- Recognise the importance of digital industry infrastructure

## TRAINING METHODOLOGY

- This Electrical Engineering training course will ensure that participants will receive a thorough training on the subjects covered by the seminar outline with the instructor utilising a variety of proven adult learning teaching and facilitation techniques. Each seminar participant will receive a copy of the comprehensive seminar notes. The presenter will outline and discuss the topics using computer displays, videos and power point presentation.
- The seminar is designed to have an interactive format to maximize delegate participation. Questions and answers are encouraged throughout and at the daily sessions. Needs-Based case-studies and examples will be discussed in problem solving workshop sessions. This gives participants the opportunity to discuss with other delegates and the presenter their specific problems and appropriate solutions.

## ORGANISATIONAL IMPACT

- Technical training and up-skilling to improve and realise the full potential of a competent workforce
- Productivity increase through state of the art technologies and digitalisation
- Identification for opportunities in the implantation of green and clean energy
- Networking of personnel with technology leaders and other engineers
- Attitude change of workforce, as continuous follow up of new technologies and their up taking could otherwise create workforce with high resistance to change due to lack of understanding
- Ensure safety practices are adhered when carrying out electrical installation activities

## PERSONAL IMPACT

On successful completion of this training seminar, delegate will be able to understand:

- Operation and characteristics of renewable energy power generation
- Identify the merits of solar and wind power energies
- Appreciate the merits of smart and micro grids
- Be exposed to the new energy storage systems and grid interconnections
- Recognize the introduction of digital substation

## WHO SHOULD ATTEND?

This training seminar is suitable to a wide range of professionals but will greatly benefit:

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

## Course Outline

### Overview of Conventional Power Generation and Renewables

- Fundamentals of Thermal Power Generation
- Characteristics of Nuclear Power Generation
- Shift to Renewable Energy Generation
- Characteristics of Solar Power and Photo Voltaic Cells
- Wind Turbines Power Generation Components and Operations
- Geothermal and Hydro Power Generation

### Flexible AC Transmission Systems and Significance of Active Power, Reactive Power and Apparent Power

- The Generator Capability Curve
- Impact of Power Factor and Importance of Reactive Power
- Merits of Flexible AC Transmission System (FACTS)
- Instrument Transformers for Power Measurement
- Common Power Quality Issues
- The Triplen Harmonics Effects and Mitigation Techniques

### Smart Grid Transitions and Distributed Energy Resources

- Characteristics and Architecture of Smart Grids
- Smart Grid Optimization
- Role of Smart Grids and Artificial Intelligence (AI)
- Operations and Merits of Microgrids
- Renewable Energy Integration
- Energy Storage for Renewables

### Smart Transformer Constructional and Characteristics, Digital Substation

- Characteristics of a Smart Transformer
- Smart Transformer for Distribution System
- Digital Transformer Characteristics and Merits
- Role of Digital Transformers in the Grid
- Digital Substation Architecture
- Merits of Digital Substation Integration and Renewable Energy

## Global Warming Potential and Carbon Footprint Reduction Infrastructure Equipment

- Natural Esters Specifications, Characteristics and Performance
- Power Transformers with Natural Ester based Oils
- Gas Insulated Transformer with SF6 Slternative
- Eco-friendly Gas Insulated Substation
- New Vacuum Clear Air Switchgears
- Wrap-up Session, Questions and Answers

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