

ELECTRICAL ENERGY ESSENTIALS (REF:OTSEEE001)

Course Introduction

Electrical energy essentials training course gives the fundamentals of constructing electrical power network from its generation to its distribution, the primary functions of power system components, the aspects of regulation, de-regulation, trading, safety and environment of the electrical energy industry and finally the principle involve in operation of interconnected power systems, economic considerations for interchanging power between systems, control methods, and reliability considerations.

Course Objectives

By the end of this course, trainee will be able to gain the following:

- Define electricity, AC and DC and main electrical equipment
- Identify electrical drawings & documentation and electrical standards
- Identify power generation and transmission lines systems
- Gain the basic knowledge in electrical power engineering
- The Generation of Electric Energy
- Thermal power plants,
- Nuclear power plants
- Renewable energy,
- The synchronous machine
- Define the importance and functions of substations such as substation equipment, transformers, circuit breakers, lightning arresters, reactors, protection relays
- Be familiar with different distribution systems, transformer connections, Dual systems , earthing systems and underground service
- Define power consumption and power system protection
- Identify electrical safety and maintain personal protection
- Energy Management Systems
- Load flow or power flow computation

Course Outline

Day 1

- 1- Introduction to power system analysis
- General characteristics of power system
- AC- DC systems
- Balanced three phase systems
- Voltage Levels
- Power in single phase circuit
- Linear and nonlinear loads
- Active and reactive power
- Power factor and improvements
- Power in three phase systems

Day 2

- 2- The Generation of Electric Power
- Thermal power plants
- Wind power plants
- Hydropower plants
- The Synchronous machines

Day 3

- 3- The Transmission of Electric Power
- Transmission and Distribution Systems
- Substations and main equipment
- Protection of Transmission and Distribution
- Power Transformer



Day 4

- 4- The Utilization of Electric Power
- Types of loads
- Classification of grid users
- Residential Loads
- Commercials and Industrial Loads
- Electric Railways

Day 5

- 5- Energy Management Systems
- Load Flow or Power flow consumption
- Optimal power flow
- State Estimator

