



## Electrical Power Systems for Non-Engineers Training Course



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## Introduction

This electrical power systems training for non-engineers course is meticulously designed for non-engineers who aim to grasp the fundamentals and operational aspects of electrical power systems. Start with the traditional methods of electricity generation and progress to the cornerstones of renewable energy electrical power generation.

Within the realm of transmitting and distributing electrical power, we delve into the pivotal roles of power transformers, circuit breakers, electric motors, and earthing systems. A particular emphasis is placed on safety and the risks associated with electricity, which are crucial in all electrical installations.

Understanding the basic single-line diagram is crucial for comprehending the power flow of electrical installations. The focus on Alternating Current AC systems will cover essential electrical units such as voltage, current, power, power factor, and frequency for both single-phase and three-phase systems. A robust maintenance culture, supported by standard testing and measuring instruments, is vital in ensuring the reliability and security of an electrical power system.

## Enhancing Electrical Power Systems Expertise

Electrical engineering power systems are a critical domain that requires continuous learning and adaptation. This electrical power systems training for non-engineers course extends an opportunity to those within electrical engineering basics to upskill their proficiency in power system engineering, preparing them for the complex and evolving demands of the industry. For a more immersive experience in electrical power system protection training, we recommend exploring a dedicated electrical power system training that delves into intricate safety and operational protocols.

## Targeted Groups

- Mechanical Engineers.
- Mechanical Engineering Technicians.
- Safety Officers.
- Civil Engineering Personnel.
- Administrative and Management Staff.

## Course Objectives

By the conclusion of this electrical power systems training course, participants will be proficient in:

- Understanding the generation, transmission, and distribution of electricity.
- Analyzing grounding systems and electrical safety.
- Assessing the risks associated with electric shocks and arc flash hazards.
- Comprehending electrical faults and the corresponding protective devices.
- Getting acquainted with pivotal electrical equipment such as transformers, motors, and circuit breakers.

## Targeted Competencies

At the end of this electrical power systems training for non-engineers course, the target competencies will be able to:

- Knowledge of the generation, transmission, and distribution of electricity.
- Understanding the various types of AC single-phase and three-phase network systems.
- Grasping the concept of power and power factor in an AC system.
- Acquiring insights into protection devices within an electrical installation.
- Awareness of electrical safety and the perils of electric shock.

## Course Content

### Unit 1: The AC Network and Electric Shock Hazards

- The foundation of generation, transmission, and distribution of electricity for both single-phase and three-phase.
- The diverse AC network configurations: star and delta.
- Understanding power essentials like voltage, current, impedance, and power factor.
- The vital importance of earthing systems within a network.
- Differentiating types of earthing systems and their applications.
- Deep dive into electrical safety and the hazards associated with electric shocks.

### Unit 2: Operation of Various Types of Electrical Protection Devices

- An array of fuses is suitable for low-voltage, medium-voltage, and high-voltage applications.
- The construction and operational principles behind Miniature Circuit Breakers MCB.
- The design and functionality of Molded Case Circuit Breakers MCCB.
- The mechanics of air circuit breakers and vacuum circuit breakers.
- SF6 circuit breakers.

### Unit 3: Distribution Power Transformers and AC Motors

- The constructional varieties and types of transformers alongside their functionalities.
- Functionalities of the transformer components.
- Cooling systems within transformers.
- The mechanisms of AC single-phase motors.
- Three-phase AC induction motors.
- A broad spectrum of starting methods for AC motors.

### Unit 4: The Interpretation and Use of Drawings

- The pivotal role played by electrical drawings in the industry.
- Deciphering symbols on a single-line diagram.
- The interpretative skills required for comprehending electrical drawings.
- Tracing a single-line diagram.
- The procedures involved in identifying components in a single-line diagram.
- Designing and manipulating single-line diagrams effectively.

## **Unit 5: The Use of Common Test Equipment and Maintenance**

- Tools like digital multimeters
- Insulation resistance testers.
- Recognizing the importance and consequent significance of proper maintenance.
- Deploying various strategies.
- Types of maintenance within an electrical installation.