



Electrical Engineering

Electrical Switchgear Inspection, Maintenance & Repair

Course Introduction

Electrical Circuit Breakers

This five-days Training course will discuss Application, Installation, Operation, Maintenance and Testing issues related to Low-, Medium- and High-Voltage Switchgear and Electrical Circuit Breakers. The course will provide the delegates with a solid understanding of switchgear theory and standards. The course will also make delegates aware of issues concerning the proper application, installation and maintenance of these types of equipment with a strong emphasis on safety. The course will cover a wide range of material starting from the basics and moving on to more complex issues.

This course provides an overview of Power System Design and Theory, focusing on the Power Distribution Electrical Circuit Breakers used in common Utility, Industrial, Commercial and Institutional applications. Basic electrical circuit breaker construction, electrical safety, and common circuit breaker maintenance techniques are the major components of this course.

There is considerable interest among people who operate and maintain Electrical Power Systems in a wide range of topics relating to equipment maintenance and testing. This is because condition and reliability are directly related to maintenance and testing. To obtain maximum life from electrical equipment, maintain its reliability, and minimize repair cost, it is necessary to serve and test it periodically to predict condition.

Target Audience

- Power-distribution engineer
- Controls design engineer

Learning Objectives

- List the Voltage Convention Classifications used in this course
- Specifications of Switchgear Components
- Switchgear Selections & Ratings
- Describe the types of Circuit Breaker
- The calculation of Fault Currents
- Selection of the appropriate Type of Switchgear
- Maintenance Policies Switchgear Testing & Failure Analysis
- Safe Working Practices
- Describe Switchgear Construction
- Describe a Ground Fault Relay System

Course Outline

• DAY 01

Module (01) Electricity Components Overview

- 1.1 Introduction
- 1.2 Electricity Safety Roles
- 1.3 Factors affecting Substation Expansion
- 1.4 Types of Substation (Transmission/Distribution)
- 1.5 Transformers
- 1.6 HV Isolators
- 1.7 Switches
- 1.8 Circuit Breakers
- 1.9 Protection Relays
- 1.10 Instrumentation and Control Devices

• Day 02

Module (02) Distribution System Configuration

- 2.1 Radial
- 2.2 Loop (Ring)
- 2.3 Network
- 2.4 Primary Selective
- 2.5 Standard Device Function Numbers

Module (03) Electrical Switchgears

- 3.1 Principles of Switchgear
- 3.2 Location of Switchgears, Sub-station Equipment
- 3.3 Types of Switchgears
 - 3.3.1 Low Voltage Metal Clad Switchgears
 - 3.3.2 Motor Control Centers (MCC)
- 3.4 Low Voltage Circuit Breakers Classification, Rated Quantities, Types of Releases and tests.
- 3.5 Contactors, Contractors Starters for motors, tests on Contactors.

• Day 03

Module (04) Types & Design of Circuit Breakers

- 4.1 Air Circuit Breakers
- 4.2 Blast Air Circuit Breakers
- 4.3 Oil Circuit Breakers
- 4.4 Minimum Oil Circuit Breakers
- 4.5 SF6 Circuit Breakers
- 4.6 Vacuum Interrupter
- 4.7 Insulated Metal Clad
- 4.8 Loading of CB by Capacitive Loads

- 4.9 Loading of CB by inductive Loads
- 4.10 Examples of CB (Applications)

• **Day 04**

Module (05) Maintenance of Switchgears

- 5.1 Requirements for Maintenance
- 5.2 ARC Phenomena and Circuit Interruption
- 5.3 EHV Gas Insulated Switchgear
- 5.4 Modern Vacuum Distribution Switchgear
- 5.5 Modern SF6 Distribution Switchgears
- 5.6 Maintenance Frequencies
- 5.7 Inspection and Testing
- 5.8 Maintenance Activities
 - 5.8.1 Air Blast CB
 - 5.8.2 Oil CB
 - 5.8.3 SF6 CB
 - 5.8.4 Vacuum CB
- 5.9 Documentation & Record

Module (06) Testing of Circuit Breakers

- 6.1 Testing of CB according to IEC
- 6.2 Type Tests
- 6.3 Routine Tests
- 6.4 Installation Tests
- 6.5 Maintenance Test
- 6.6 Factory Test

• **Day 05**

Module (07) CB Rating & Protective Relays

- 7.1 Types of Protective Relays
- 7.2 Functions of Protective Relays

- 7.3 Protection against Failure of CB Operation
- 7.4 Surge Protection
- 7.5 Breaking & Making Capacities of CB
- 7.6 Short Circuit Calculations

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
June 16, 2025	June 20, 2025	5 days	4250.00 \$	UAE - Abu Dhabi
Sept. 22, 2025	Sept. 26, 2025	5 days	4250.00 \$	UAE - Dubai
Dec. 22, 2025	Dec. 26, 2025	5 days	4250.00 \$	UAE - Dubai