



Consulting and Training | Reach New Heights

Course Name

Circuit Breakers & Switchgear Maintenance and Troubleshooting

Sector Name

Electrical Engineering

Document Type

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Circuit Breakers & Switchgear Maintenance and Troubleshooting

Course Introduction

Circuit Breakers

This Switchgear Electrical Circuit Breakers - Maintenance training course will discuss Application, Installation, 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.

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Target Audience

- ✓ Electrical Design Engineer
- ✓ Electrical Engineer
- ✓ Electrical Project Engineer
- ✓ Electronics-research engineer

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Learning Objectives

- ✓ List the voltage convention classifications used in this course.
- ✓ Describe Switchgear Construction.
- ✓ Describe a Ground Fault Relay System.
- ✓ Describe the three basic types of Low and medium-voltage circuit breaker contacts.
- ✓ Describe the molded case Circuit Breaker

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Course Outline

✓ DAY 01

Module (01) Introduction Of Switchgears Principles And Applications

- ✓ Safety & Electricity safety roles
- ✓ What Is Electricity?
- ✓ Electrical Hazards
- ✓ Effects of Electric Current On the Human Body
- ✓ Energized Work
- ✓ Electrical Accidents & Personal Protective Equipment
- ✓ General Introduction
- ✓ Basic Components of an Electric Power System
- ✓ Types of Substations (Transmission and Distribution)
- ✓ Switchgear Drawings
- ✓ Switchgear Ratings
- ✓ Difference Between Switchgear & Switchboards
- ✓ Types of HV Isolators, Switches, and Circuit Breakers
- ✓ Distribution Layout and Configuration
- ✓ Distribution System Configuration:
 - ✓ Radial
 - ✓ Loop (ring)
 - ✓ Network
 - ✓ Primary Selective
 - ✓ Standard Device Function Numbers
 - ✓ Substation Equipment
 - ✓ Major elements of the distribution system

- ✓ Switchgear Factory Testing
- ✓ Short Circuit Current Estimation

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Course Outline

✓ Day 02

Module (02) Circuit Breaker Overview

- ✓ Purpose/application
- ✓ Principle of Switchgear
- ✓ Location of Switchgear, Sub-Station Equipment
- ✓ Types of Switchgears - LV metal clad switchgear and Motor Control Centers (MCC)
- ✓ Low-voltage circuit Breakers classification, rated quantities, types of releases, and tests.
- ✓ Circuit Breaker Construction
- ✓ Circuit Breaker Operation
- ✓ Circuit Breaker Control
- ✓ Modern (LV - MV - HV) Switchgear
- ✓ Personnel and Equipment Safety Factors

Module (03) Circuit Breaker Maintenance

- ✓ Function of Circuit Breakers
- ✓ Arc Phenomena and Circuit Interruption
- ✓ EHV Gas Insulated Switchgear
- ✓ Modern Vacuum Distribution Switchgear
- ✓ Modern SF6 Distribution Switchgear
- ✓ Other Types of Circuit Breakers
- ✓ Air Circuit Breakers

- ✓ Oil Circuit Breakers
- ✓ Synchronies Circuit Breakers
- ✓ Dc Circuit Breakers
- ✓ Maintenance frequencies
- ✓ Inspection
- ✓ Testing
- ✓ Interpreting test results
- ✓ Troubleshooting and repair

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Course Outline

✓ Day 03

Module (04) Sf6 Circuit Breakers

- ✓ SF6 - Gas Properties.
- ✓ SF6 - Metal enclosed Switchgear.
- ✓ SF6 - Apparatus and Components.
- ✓ SF6 - Circuit Breakers.
- ✓ Insulation Coordination and Overvoltage Protection.
- ✓ Handling, Maintenance, Inspection, and Testing.
- ✓ General Design Considerations.
- ✓ SF6 Testing
- ✓ Troubleshooting

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Course Outline

✓ Day 04

Module (07) Switchgear Maintenance

- ✓ Operation of Switchgear Devices
- ✓ Preventive Maintenance
- ✓ Testing
- ✓ Corrective Maintenance

Module (08) Circuit Breaker Maintenance, Care & Testing

- ✓ Mechanical Inspections
- ✓ Contact Resistance Tests
- ✓ Insulation Resistance Tests
- ✓ Insulating Gas and Oil Analysis
- ✓ Travel Analysis

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Course Outline

✓ Day 05

Module (09) Equipment Related To Switchgears

- ✓ Transformer Construction
- ✓ Tank
- ✓ Core, Coils, Types, and Ratings
- ✓ Bushings
- ✓ Tap Changers
- ✓ Factory Testing
- ✓ Dry, Oil and Liquid Filled Types
- ✓ Auxiliary Equipment
- ✓ Gas Relays
- ✓ Fans and Pumps
- ✓ Gauges
- ✓ Tap Changer Controls
- ✓ Failure Causes
- ✓ Detailed analysis of several case histories
- ✓ Lightning
- ✓ Oil Decay
- ✓ Component Failures
- ✓ Internal Faults
- ✓ External Faults
- ✓ Testing Practices & Standards
- ✓ Oil Analysis
- ✓ Electrical Testing

- ✓ Insulation Resistance and Polarization Index Tests
- ✓ Turns Ratio, Excitation Current, and Polarity Testing
- ✓ Capacitance and Power Factor Testing
- ✓ Winding Resistance Tests

Module (10) Batteries And Chargers

- ✓ Types of station batteries
- ✓ Batteries Constriction
- ✓ Lead Acid Batteries Advantages and Disadvantages
- ✓ Maintenance
- ✓ Inspection
- ✓ Testing

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Confirmed Sessions

FROM	TO	DURATION	FEE	LOCATION
Aug. 24, 2026	Aug. 28, 2026	5 days	4250.00 \$	UAE , Abu Dhabi
Nov. 29, 2026	Dec. 3, 2026	5 days	4250.00 \$	Oman , Muscat
March 15, 2027	March 19, 2027	5 days	5950.00 \$	Switzerland , Interlaken
June 29, 2026	July 3, 2026	5 days	4250.00 \$	UAE , Abu Dhabi
Dec. 14, 2026	Dec. 18, 2026	5 days	4950.00 \$	Singapore , Singapore

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