



Electrical Engineering

# Generator Operation and Protection

## Course Introduction

---

The course is intended to provide electric engineers with collective and recent knowledge about generators excitors including: ordering specifications, operation, analysis, maintenance, testing and protection.

A generator is subjected to electrical stresses imposed on the insulation of the machine, mechanical forces acting on the various parts of the machine, and temperature rises. These are the main factors which make protection necessary for the generator or alternator. Even when properly used, a machine in its perfect running condition does not only maintain its specified rated performance for many years, but it does also repeatedly withstand certain excess of over load. Hence, preventive measures must be taken against overloads and abnormal conditions of the machine so that it can serve safely. Despite of sound, efficient design, construction, operation, and preventive means of protection, the risk of that fault cannot be completely eliminated from any machine.

The devices used in generator protection, ensure the fault, made dead as quickly as possible. It is imperative need to install some protective system to protect the expensive elements of the generator from different types of faults which are likely to occur sooner or later.

## Target Audience

---

- Electrical Controls Engineer
- Electrical Design Engineer
- Electrical Engineer
- Electrical Project Engineer

# Learning Objectives

---

- Learn and understand generator operations
- Gain knowledge on ordering specifications
- Learn skills in generator analysis
- Gain knowledge on generator maintenance
- Gain new skills in generator testing and protection
- Experience both theoretical and practical aspects and will be enhanced with computer software in appropriate sections

## Course Outline

---

### • DAY 01

#### **Module (01) Generator Operation**

- 1.1 Correct Phasing
- 1.2 Load Capacity
- 1.3 Protection
- 1.4 Earthing
- 1.5 Installation
- 1.6 Parallel Operation Synchronizing
- 1.7 Documentation

### • Day 02

#### **Module (02) Voltage Control and Voltage Restraint**

- 2.1 Design
- 2.2 Function and Application

- 2.3 Operating Principles
- 2.4 Testing and Calibration
- 2.5 Restricted Earth Leakage

• **Day 03**

**Module (03) Frequency Control**

- 3.1 Relays Design and Construction
- 3.2 Function and Application Operations
- 3.3 Testing

• **Day 04**

**Module (04) Relays & Protection**

- 4.1 Differential
- 4.2 Reverse Power
- 4.3 Negative Sequence
- 4.4 Loss of Field
- 4.5 Frequency
- 4.6 Voltage Control
- 4.7 Over Current Control
- 4.8 Over Speed
- 4.9 Relay Settings

• **Day 05**

**Module (05) Maintenance**

- 5.1 Safety Audits
- 5.2 Safe Working Practice
- 5.3 Procedures
- 5.4 Vibration
- 5.5 Diagnostics

# Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
April 21, 2025	April 25, 2025	5 days	4250.00 \$	UAE - Dubai
Aug. 4, 2025	None	None days	4250.00 \$	UAE - Dubai
Dec. 29, 2025	Jan. 2, 2026	5 days	5950.00 \$	USA - Texas