

# GENERATOR CONTROL AND PROTECTION (3 DAYS)

## Course Objectives

To give a thorough understanding of the theory behind the Design, Control and Protection systems associated with a modern Generator.

## Course Description

An essential course for those engineers/technicians involved with the operations and maintenance of Gas or Steam Turbine driven Generator systems this course focuses on the major components of a Generator, their design and operation. Attendees will learn how to read Generator reactive capability/performance curves and calculate various operational parameters. The course will also cover the main safety/protection systems associated with Generators and the principles/components of excitation and voltage regulation systems.

## Who Should Attend

This course is designed to give a thorough understanding of the Design, Control and Protection systems associated with a modern Generator. Therefore this course is targeted at technicians and engineers involved in the operation and troubleshooting of these complex devices. Operators requiring knowledge of Generator systems would also find this course beneficial as would Electrical Engineers desiring to advance their understanding of modern excitation, regulation and protection systems.

## Pre-Requisites

All Attendees should have a sound power generation and electrical background.

## Course Outcome

At the end of this course you will be able to understand the theoretical side of control and safety aspects of a generator.

### Day 1

- Generator Construction and Design
- Stator Construction and Design
- Rotor Construction and Design
- Generator Performance and Capability
- Reactive Capability Curves
- VEE Curves

### Day 2

- Excitation Systems
- Brushless Excitation Systems
- Static Excitation Systems
- Voltage Regulation
- Manual Regulation
- Automatic Regulation
- Over/Under Excitation Limits
- Power Factor Control
- Synchronising Systems
- Automatic/Manual Synchronising

### Day 3

- Protection Devices
- Switchgear
- Neutral Earthing
- Field Failure
- Negative Phase Sequence
- Voltage Restrained Over current
- Protective Devices
- Rotor Earth Fault
- Stator Earth Fault
- Additional Protection

## Course Review and Feedback