# Training Program:

## Power Generation Operations

# Introduction:

The aim of this course is to provide engineers technician, and new entrants to the Power Generation and Oil & Gas sectors, the core skills to enable them to make an immediate impact within these essential industries.

This course will equip the candidates with the necessary technical knowledge and competence. They will have a clear understanding of the methods of Power Generation and possess key skills that can be used within this field.

The candidates will gain the maximum knowledge and that this will increase their effectiveness and understanding.

During the course the candidates will become familiar with a wide and diverse range of equipment across the array of trades and disciplines within this sector.

Throughout the course a focus on health and safety in the workplace will be emphasized to ensure that the candidates adopt the same safe practice within industry employment as they do on the course. In addition to this the candidates will be able to identify the roles and responsibilities of the personnel operating within a Power Plant, demonstrate an understanding of the design and operation of a Power Plant and competently undertake diagnostic checks and fault diagnosis.

# Who Should Attend?

Electrical Engineers, Power Generation Engineers, Mechanical Maintenance Personnel, Power System Protection Engineers, Gas turbine newcomers and more experienced persons who desire an overview of the many available gas turbine technologies, Process Control Engineers & Personnel, Electrical and Instrumentation

Technicians & Design Engineers, Maintenance Technicians & Supervisors, Plant Operators & Technicians, Oil & Gas Industry Personnel

## Course Objectives:

**By the end of this course delegates will be able to:**

- Be able to understand the main safety requirements of working in a Power Plant
- Be able to explain the various methods of Power Generation
- Be able to explain the function of the major components of a Fossil Fuel Power Plant (Steam Turbine, Gas Turbine, Diesel)
- Be able to explain the operational requirements of a Power Plant
- Be able to understand and explain the terminology associated with a Power Plant
- Be able to explain the function of the main parts of the relevant prime mover including method of generation, systems, generator etc.
- Be able to identify the roles and responsibilities of the personnel operating within a Power Plant environment

## Course Outline

**Power Plant Health and Safety**

- Permit to Work Systems
- Electrical Safety and Isolation
- Responsible Persons

- Steam Safety
- Chemical Safety

**Introduction to Power Plant**

- Basic Thermodynamics
- Basics of a Grid System
- Basic Thermal Plant

**Methods of Power Generation**

- Gas Turbines
- Combined Cycle Gas Turbine (CCGT) Plant

**Reading Piping Schematics for Various Types of Power Plant**

- Terminology Methods
- Reading Schematic Diagrams

**Gas Turbine Maintenance**

- Theory of Operation
- Major Components
- Maintenance Requirements

**Steam Turbine Maintenance**

- Theory of Operation

- Major Components
- Maintenance Requirement

**Instrumentation as used on Power Plants**

- Pressure
- Temperature
- Level and Flow Measurement
- Transmitter Types and Applications
- Instrument Loops and Schematics

**Operations of Gas Turbines**

- Starting Sequences
- Operations using the Industry Standard Simulator
- Monitoring Screens
- Alarms

**Gas Turbine Control/Protection Requirements**

- Speed Control and Droop
- Temperature Control

**Generator Systems**

- Overview of Electrical Systems
- Generator Construction and Operation

- Excitation Systems
- Generator Capability

**Transformers**

- Transformer Theory
- Types of transformer

**Motors**

- AC and DC Motors
- Motor Control Centres

**Power Plant Performance**

- Efficiency, Why Efficiency is Important within Power Generation
- Calculating Efficiency and Power Output against Rated Design
- Performance Improvement and Improvement Technology

**Balance of Plant**

- Feedwater and Cooling Water Systems
- Condensers
- Fuel Systems and Fuel Treatment

# Accreditation:

**BTS** attendance certificate will be issued to all attendees completing a minimum of 80% of the total course duration.