

CCGT Plant Systems & Operations

Duration: 10 Days

Format: Classroom based training with worked examples, case studies and plant operating scenarios via simulator.

Assessment: Open-Book Examination, 70% pass mark required

Course Handout Provided

Course Overview

This intensive ten-day programme has been developed for engineers, operators, technicians and maintenance personnel working within Combined Cycle Gas Turbine (CCGT) power stations.

The course provides delegates with a comprehensive understanding of how a modern CCGT power station operates, from receiving a dispatch instruction from the National Energy System Operator (NESO) through to exporting electricity onto the National Grid.

Rather than studying individual plant systems in isolation, delegates develop a complete understanding of how the electrical, mechanical and process systems interact during normal operation, plant start-up, shutdown and fault conditions.

The programme combines engineering theory with practical operational experience and is suitable for both new entrants and experienced personnel wishing to broaden their understanding of CCGT plant operation.

Course Structure

Module 1: Electrical Generation & Distribution (Days 1–2)

Understanding the electrical systems responsible for generation, transmission and auxiliary supplies within a modern CCGT power station.

Topics include:

- UK Electricity Market & NESO
- Generator Principles
- Excitation Systems
- Generator Circuit Breakers
- Isolated Phase Busduct
- Station Transformers
- Unit Transformers
- HV & LV Switchgear
- SFC / SEE / SSD Systems
- UPS Systems
- Emergency Diesel Generators
- Synchronisation
- Electrical Protection
- Electrical Monitoring & DCS

Module 2: Gas Turbine Systems (Days 3–4)

Comprehensive overview of industrial gas turbine design, operation and auxiliary systems.

Topics include:

- Brayton Cycle
- Gas Turbine Design
- Air Intake Systems
- Compressor
- Combustion System
- Fuel Gas System
- Fuel Gas Heating
- Lift Oil
- Turning Gear
- Exhaust System
- CEMS
- Start-up & Shutdown Sequences
- Gas Turbine Monitoring
- Lubrication System

Module 3: Steam Turbine Systems (Days 5–6)

Understanding steam turbine operation and associated auxiliary systems.

Topics include:

- Rankine Cycle
- Steam Turbine Design
- HP/IP/LP Turbine
- Main Steam & Governor Valves
- Lubrication System
- Control Oil
- Jacking Oil
- Gland Steam
- Condenser
- Vacuum System
- Drainage System
- Steam Turbine Start-up & Shutdown

Module 4: Water & Steam Cycle (Days 7–8)

Understanding water treatment and steam generation throughout the complete steam cycle.

Topics include:

- Water Chemistry
- Demineralised Water
- Condensate System
- Condensate Polishing
- Feedwater System
- Deaerator
- HRSG Design
- HP/IP/LP Systems
- Economisers & Evaporators
- Superheaters
- Auxiliary Steam
- CW System & Cooling Towers
- ACC Systems
- CCCW System

Module 5: Balance of Plant & Plant Operations (Days 9–10)

Developing an understanding of plant support systems and day-to-day station operation.

Topics include:

- Instrumentation
- Sampling and Chemical Dosing Systems
- Water Systems
- Blowdown Systems
- Fire Systems
- Gas Detection
- KKS Coding
- Distributed Control System
- Plant Monitoring
- Plant Efficiency
- Operational Troubleshooting
- Plant Start-up Philosophy
- Plant Shutdown Philosophy
- Final Review

Who Should Attend

- Engineers, technicians, operators and supervisors responsible for the operation, maintenance or commissioning of Combined Cycle Gas Turbine (CCGT) power stations.
- Personnel seeking a structured understanding of the electrical, mechanical and process systems that comprise a modern CCGT generating station.
- Graduate engineers, apprentices and new entrants to the power generation industry developing their knowledge of CCGT plant systems and operations.
- Experienced personnel transitioning into CCGT generation from other industrial or power generation sectors.

For questions or follow-up, please contact:

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