

# Open Learning Resources for the Power Industry

## Operating Combined Heat & Power & Combined Cycle Gas Turbine Systems

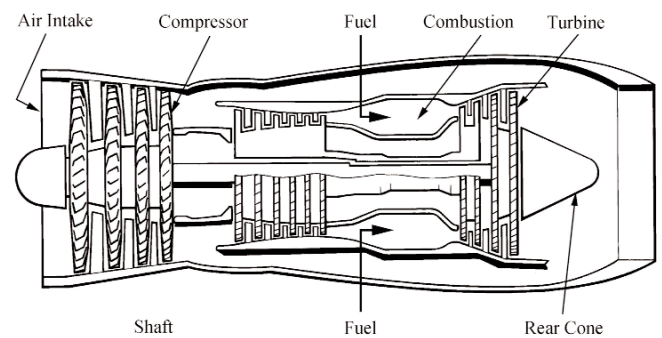
### How does the course work?

This **well established** open learning course, **developed by industry professionals**, is an essential resource for anyone working in CHP/CCGT stations.

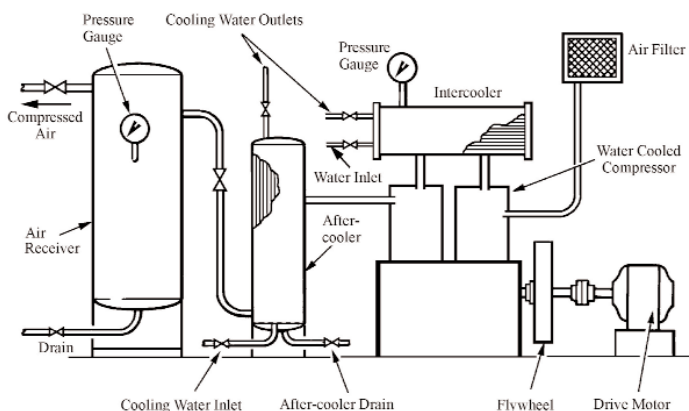
Covering the construction and operation of main and auxiliary plant used in CHP and CCGT, in addition to how to integrate processes between the two, the course uses open learning methods to allow the candidate to study at their own pace, **developing their knowledge** within a time frame that suits them.

The course examines the relationship between process needs and supplying electricity to the distribution network, as well as explaining the statutory requirements for CHP and CCGT operations, including health and safety.

Candidates work through the course, which is split into **easily identifiable sections**, answering in-text questions throughout and self-assessment questions at the end of each module, allowing them to assess their understanding of individual topic areas. Once they are satisfied that they can satisfy each point on the end of module checklist, they are ready to proceed to the **Tutor Marked Assignments**. Where possible, these are linked to the candidates' workplace experience; this enables the candidate to integrate their studies with their daily activities.



**This diagram from module 2, 'Gas Turbines' helps illustrate the points made in the text....**



**Detailed diagrams feature in the course text....**

### Who? What? How Long?



The course is suitable for operators in CHP or CHP stations and staff wishing to become operators. It is also suitable for candidates seeking the N/SVQ: Operating Electricity Generation Systems. The academic level of the course is equivalent to City & Guilds and N/SVQ level 2/3



The course consists of 10 integrated modules covering all aspects of both CHP and CCGT Systems



Candidates should aim to complete the course within 12-15 months

# What does the course cover?

## Module 1 - An Overview of CHP & CCGT

- An initial overview of Combined Heat & Power (CHP) and Combined Cycle Gas Turbine (CCGT)
- The reasons for the recent rapid growth of CHP & CCGT in the UK

## Module 2 – Gas Turbines (2 books)

- A basic theory and construction of the gas turbine
- The basic gas turbine cycle
- Safety characteristics for the operator
- Important safety indicators which can be identified in the operation
- Cooling systems in the gas turbine engine
- Lubrication systems within the gas turbine
- Starting arrangements of various types of gas turbines
- Fire control arrangements for gas turbines

## Module 3 – Internal Combustion Engines

- Basic theory and construction of the internal combustion engine
- Advantages of using internal combustion engines in CHP & CCGT plant

## Module 4 – Heat Recovery Steam Generators

- Basic principles of steam generation
- Components that make up a typical HRSG
- Supplementary and auxiliary firing
- The condensate and feed system
- Basic principles of HRSG operation

## Module 5 – Steam Turbines (2 books)

- Development of the steam turbine for power generation
- Principal components used in a steam turbine
- Controlling steam admission and extraction
- Role of the turbine governor
- Parameters for monitoring the condition of the turbine
- The function of the condenser
- The role of supporting systems
- Protective devices for steam turbines
- Start-up and loading of steam turbines

## Module 6 – Electrical Systems

- Basic principles of magnetism and electricity
- The operation of electric motors in CCGT and CHP
- The principle of the three-phase systems
- Auxiliary plant

## Module 7 – Auxiliary Plant Systems

- Auxiliary plant found on CCGT and CHP sites
- Fire protection systems
- Auxiliary boiler systems and demineralisation plant
- Use of air on sites and d.c. supplies
- Typical fuel metering and monitoring systems

## Module 8 – Water Treatment Systems

- Use of demineralised water
- Demineralisation plant for make-up and regeneration
- Health and Safety legislation for demineralisation plants

## Module 9 – Control & Instrumentation Systems

- Instrumentation found on CCGT and CHP sites
- Importance of recording plant operational data
- Plant data and control plant operations

## Module 10 - Operations

- Main responsibilities of the plant operator
- Day-to-day duties of a plant operator
- Preparing a plant for start-up
- Incident logging and reporting
- Abnormal operations
- Basic plant condition monitoring

**There are no formal entry requirements for the course.**

**On completion candidates will receive an industry recognised certificate detailing the modules completed and the marks obtained.**

## To Order

To enrol on this training course or for the latest prices, please see the 'Open Learning Courses for the Power Industry Enrolment/Order Form'.

Alternatively, contact Tyla Davis using the following details:

AFAQ-ETA  
Regus House  
Victory Way  
Admirals Park  
Crossways  
Dartford DA2 6QD  
Tel: +44 (0) 1322 303355  
Fax: +44 (0) 1322 303357  
E-mail: [tyla.davis@afaq-eta.com](mailto:tyla.davis@afaq-eta.com)



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