

-SQA-SCOTTISH QUALIFICATIONS AUTHORITY

**Hanover House
24 Douglas Street
GLASGOW G2 7NG**

NATIONAL CERTIFICATE MODULE DESCRIPTOR

-Module Number- 0064551 -Session-1986-87

-Superclass- XH

-Title- STEAM TURBINES (x 1/2)

-DESCRIPTION-

Type and Purpose A specialist module (1/2) which enables the student to acquire a knowledge of the principles involved in the operation, construction and application of steam turbines.

Preferred Entry Level 04410 Engineering Systems 1: Machines and Mechanisms.

Learning Outcomes The student should:

1. know the principles of operation of steam turbines;
2. know the functions and constructional details of steam turbine systems, sub-systems and components;
3. interpret systems diagrams and general arrangement drawings;
4. know the principles of operation, and the function, of control and safety devices.

Content/ Context Principles of energy conversion in steam turbines.
Distinction between impulse and reaction turbines.
Pressure compounding; velocity compounding; common combinations of pressure and velocity compounding.
Layouts of turbine systems, i.e. tandem-compound and cross-compound, etc.

Functions and features of components: blades, nozzles, diaphragms, casings, rotors, journal bearings, glands, expansion arrangements, drains. Steam supply, gland sealing, LO systems: function of system components and operation under various load conditions.

Function and general design features of condensers.

Function and reasons for fitting governors, overspeed trips, relief valves, low LO pressure cut-outs, rotor axial displacement cut-outs. Reduction gearing lay-outs: single, double, parallel and epicyclic.

Flexible couplings.

Suggested
Learning and
Teaching
Approaches

Classwork should be supplemented where possible by industrial visits, films, slides and models.

Students should be encouraged to discuss problems, exchange ideas and assist each other.

A systems diagram should be developed for at least one of the turbine systems studied.

Terminology should be presented in context throughout the module.

Assessment
Procedures

All learning outcomes must be validly assessed.

The student must be informed of the tasks which contribute to summative assessment. Any unsatisfactory aspects of performance should, if possible, be discussed with the student as and when they arise.

Acceptable performance in the module will be satisfactory achievement of the performance criteria specified for each learning outcome.

The following abbreviations are used below:

LO Learning Outcome
IA Instrument of Assessment
PC Performance Criteria

LO1 IA Written short answer exercise.

PC The student satisfactorily describes:

(a) the principles of energy conversion;

(b) the energy conversion process;

in a steam turbine.

- LO2 IA Incomplete worksheet and short answer &3 questions.
- PC The student correctly:
- LO2 (a) annotates a layout drawing to show constructional features, components and sub-assemblies;
- (b) states the function of specified elements;
- LO3 (c) interprets systems diagrams to determine inputs/outputs and functions of systems and sub systems;
- (d) interprets symbols and conventions.
- LO4 IA Written short answer exercise.
- PC The student describes correctly the principles of operation and function of devices and systems used for:
- (a) control;
- (b) safety.