

Module specification

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Refer to the module guidance notes for completion of each section of the specification.

Module code	ENG456
Module title	Plant Equipment Fundamentals
Level	4
Credit value	20
Faculty	FAST
Module Leader	Dr Fatima Mansour
HECoS Code	100184
Cost Code	GAME

Programmes in which module to be offered

Programme title	Is the module core or option for this programme
HNC Mechanical Technology	Option

Pre-requisites

L3 Applications of Mechanical Systems in Engineering (or similar).

Breakdown of module hours

Learning and teaching hours	60 hrs
Placement tutor support	0 hrs
Supervised learning e.g. practical classes, workshops	0 hrs
Project supervision (level 6 projects and dissertation modules only)	0 hrs
Total active learning and teaching hours	60 hrs
Placement / work based learning	0 hrs
Guided independent study	140 hrs
Module duration (total hours)	200 hrs

For office use only	
Initial approval date	June 2016
With effect from date	September 2021

Date and details of revision	6 July 2021, revalidated
Version number	Version 2

Module aims

The module aims to develop a deeper understanding of the plant and equipment the students encounter within their industrial environments.

Module Learning Outcomes - at the end of this module, students will be able to:

1	Relate engineering science principles to the equipment in use.
2	Make informed suggestions about the viability of the developments relating to their industry, evidencing familiarity with technological developments in applicable plant equipment.
3	Develop a deeper knowledge and understanding of the electrical and or mechanical attributes of the equipment in use.

Assessment

Indicative Assessment Tasks:

Assessment is 100% in-course.

Assessment 1: The assignment would likely involve research into a particular emerging technology and how this could be implemented in the student's place of work, whilst considering the practicalities of the implementation and financial aspects (2500 words).

Assessment 2: A case study should be undertaken, either relating to a particular piece of equipment, e.g., pump, or a process system where the student can examine and appraise the reasoning behind decisions, based upon the principles learnt (1500 words).

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	2, 3	Report	60%
2	1	Case Study	40%

Derogations

n/a

Learning and Teaching Strategies

Lectures - presentation of theory, facts, and concepts to convey critical information. Interaction or active learning should be implemented to develop an understanding of principles and concepts and stimulate discussion.

Directed Private Study – This will allow the student to gain a breadth of knowledge through wide ranging investigative studies. The student should be able to analyse the information, form opinions and produce documentation in a clear and concise format. It should enable the student to acquire detailed knowledge about the given topics, thus giving depth to the learning process.

Indicative Syllabus Outline

- Control Valves: Characteristics and applications.
- Flow Control Valve Categorisation: Globe, diaphragm, rotary, cylinder.
- Turbines: types, principles, and applications.
- Pumps: types, principles, and characteristics, including pipe friction and suspended solids.
- Power Transmission: belt/chain drives, bearings plain/thrust/roller, couplings flexible/elastomeric/ CV joints, gearing/speed reduction, torque converters.
- Lubrication & cooling systems (broad ranging topic to be contextualised towards students' industrial environments/equipment).
- Electric motor principles: Magnetic field flux and force, efficiency, loading, torque, operating temperature, and cooling methods.
- Electric motor types: Stepper, Servo, DC, AC single phase (various), Three phase.
- Electric Drives/Invertors: Types, basic principles, applications, control methods.
- Steam Boilers and devices: Efficiency and combustion, feed tanks and level control, Pressurised de-aerators, Steam accumulators heat exchangers.

Indicative Bibliography:

Please note the essential reads and other indicative reading are subject to annual review and update.

Essential Reads

Lieberman, N.P. & Liberman, E.T. (2014) *Working Guide to Process Equipment*, 4th ed. McGraw-Hill

Other indicative reading

S. Moran, (2015) *An Applied Guide to Process and Plant Design*, Butterworth-Heinemann

Employability skills – the Glyndŵr Graduate

Each module and programme is designed to cover core Glyndŵr Graduate Attributes with the aim that each Graduate will leave Glyndŵr having achieved key employability skills as

part of their study. The following attributes will be covered within this module either through the content or as part of the assessment. The programme is designed to cover all attributes and each module may cover different areas. [Click here to read more about the Glyndwr Graduate attributes](#)

Core Attributes

Engaged
Enterprising
Creative
Ethical

Key Attitudes

Commitment
Resilience
Confidence
Adaptability

Practical Skillsets

Digital Fluency
Organisation
Critical Thinking
Communication