Prifysgol Wrecsam
Wrexham University

Module specification

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Module Code	ENG428
Module Title	Mechanical Science
Level	4
Credit value	20
Faculty	FAST
HECoS Code	100193
Cost Code	GAME
Pre-requisite module	L3 Mechanical Principles and Applications (or similar)

Programmes in which module to be offered

Programme title	Core/Optional/Standalone
HNC Mechanical Technology	Core

Breakdown of module hours

Learning and teaching hours	60 hrs
Placement tutor support hours	0 hrs
Supervised learning hours e.g. practical classes, workshops	0 hrs
Project supervision hours	0 hrs
Active learning and teaching hours total	**60 hrs**
Placement hours	0 hrs
Guided independent study hours	140 hrs
Module duration (Total hours)	**200 hrs**

Module aims

To understand the major mechanical and engineering science principles which underpin the design and operation of mechanical engineering systems.

Module Learning Outcomes

At the end of this module, students will be able to:

1	Investigate and analyse static, dynamic and fluid engineering systems theory.
2	Solve and analyse practical engineering situations.
3	Determine parameters within mechanical engineering systems.

Assessment

Indicative Assessment Tasks:

Assessment is 100% in-course. This section outlines the type of assessment task the student will be expected to complete as part of the module. More details will be made available in the relevant academic year module handbook.

Assessment 1: Outcomes 1, 2 will be assessed using an in-class test based on solving real life engineering problems.

Assessment 2: Outcome 3 will be assessed using an in-class test based on solving real life engineering problems.

Assessment number	Learning Outcomes to be met	Type of assessment	Duration/Word Count	Weighting (%)	Alternative assessment, if applicable
1	2,3	In-class test	1hr 30 mins	70%	
2	1	In-class test	1hr 30 mins	30%	

Derogations

None

Learning and Teaching Strategies

The module will be presented to students through a specified series of lectures assisted by notes via VLE platform. Lectures will deliver key concepts, ideas, theories and examples. Relevant videos and practical or demonstration laboratory work where possible will also be used to aid the learning process. Evaluation of learning will be as outlined above with report including a write up of practical work if possible. Assessments will ensure that the student has the opportunity to meet all of the stipulated learning outcomes

Welsh Elements

This module will be delivered through the medium of English; however, students have the option to submit their assessments in the medium of Welsh. While this module is not currently offered fully through Welsh, Welsh language support and guidance are available, and some learning materials or tutorial discussions may incorporate Welsh elements where appropriate.

Indicative Syllabus Outline

Statics

Compound Bars: force and temperature effects

Shear force and Bending Moment Diagrams: simply supported and cantilever beams.

Bending Equation: derivation and application, selection of beam from tables.

Torsion Equation: derivation and application.

Dynamics

Angular motion: equations of motion, relationships between linear and angular motion, moment of inertia, radius of gyration, flywheels, angular kinetic energy, raising and lowering of masses by drums, centripetal acceleration, balancing of rotating masses in one plane. Vibrations: simple harmonic motion, spring mass systems, pendulums, resonance, damping effects.

Fluids in Motion

Definitions: steady flow, incompressible liquid, friction, velocity flow rate, volumetric flow rate, mass flow rate.

Energy in liquids: continuity equation, Bernoulli's equation, viscosity, laminar and turbulent flow, Reynolds number, friction losses, Darcy equation, Moody diagram, Blasius formula.

Indicative Bibliography

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

Essential Reads:

Tooley M., Dingle L. (2020) Engineering Science: For Foundation Degree and Higher National. 2nded. Routledge

Other indicative reading:

Hannah J., Hillier M.J. (2007) Mechanical Engineering Science. Prentice Hall.

Administrative Information

For office use only	
Initial approval date	August 2016
With effect from date	September 2021
Date and details of revision	6 July 2021, revalidated. March 2025 AM2 to change assessment. 27/05/2026 Updated to new template during re-validation.
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