Prifysgol Wrecsam
Wrexham University

Module specification

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Module Code	ENG506
Module Title	Mechanical Principles
Level	5
Credit value	10
Faculty	FAST
HECoS Code	100190
Cost Code	GAME
Pre-requisite module	None

Programmes in which module to be offered

Programme title	Core/Optional/Standalone
HNC Mechanical Technology	Core

Breakdown of module hours

Learning and teaching hours	30 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	**30 hrs**
Placement hours	0 hrs
Guided independent study hours	70 hrs
Module duration (Total hours)	**100 hrs**

Module aims

The aim of the module is to expand upon principles learned in Mechanical Science and to further develop engineering problem solving skills in practical engineering situations.

Module Learning Outcomes

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

1	Evaluate and analyse stress and loading effects on typical engineering systems.
2	Evaluate and analyse complex strain on typical engineering systems.
3	Investigate and verify the theory to solve complex dynamic problems on typical 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: Learning outcomes 1 and 2 will be assessed using an in-class test.

Assessment 2: Learning outcome 3 will be assessed using an in-class test based on a dynamics engineering based practical exercise.

Assessment number	Learning Outcomes to be met	Type of assessment	Duration/Word Count	Weighting (%)	Alternative assessment, if applicable
1	1,2	In-class test	1 hr 45 mins	70%	
2	3	In-class test	1 hr 45 mins	30%	

Derogations

None

Learning and Teaching Strategies

Theory will be delivered by a series of lectures underpinned with video/DVD support and practical or demonstration laboratory work where possible. 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

Stress and Strain

Elastic constants: Poisson's ratio, bulk modulus, relationships between elastic constants including Young's modulus and shear modulus.

Thin cylinders: hoop stress, longitudinal stress, efficiency of joints, volumetric strain.

Thick cylinders, Lame's equations for hoop stress, radial stress and longitudinal stress, cylinders subjected to internal and external pressure, stress distribution diagrams.

Complex stresses: complimentary shear stress, principal stress formulae, Mohr's stress circle.

Complex strains: relationship between principal stress and principal strain, Mohr's strain circle.

Loaded Beams

Beam slopes and deflections: double integration method for four standard cases, Macaulay's method for simply supported and cantilever beams subjected to point loads and uniformly distributed loads.

Dynamics

Velocity diagrams: relative velocities, application to practical mechanisms, power and torque.

Balancing of rotating systems: non-coplanar rotating masses, forces on bearings'.

Flywheels: energy fluctuation.

Power transmission

Belt drives: flat belts, tension and power transmission, angle of lap, v-belts.

Indicative Bibliography

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

Essential Reads:

Bird J., Ross C. (2019) Mechanical Engineering Principles. 4thed. Routledge

Other indicative reading:

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

Bolton,M. (2006) Mechanical Science.3rded. Blackwell

Tooley M., Dingle L. (2004) Higher National Engineering. 2nd ed. Newnes

Administrative Information

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