Liverpool John Moores University

Title:	Engineering Principles
Status:	Definitive
Code:	**5521ALAM** (123815)
Version Start Date:	01-08-2019
Owning School/Faculty:	Engineering
Teaching School/Faculty:	Malaysian Maritime Academy

Team	Leader
Geraint Phylip-Jones	Y

Academic Level:	FHEQ5	**Credit Value:**	20	**Total Delivered Hours:**	83
Total Learning Hours:	200	**Private Study:**	117		

Delivery Options
Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	60
Tutorial	20

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Examination	50	3
Portfolio	AS2	A portfolio of formative and summative assessment.	50	

Aims

To provide a comprehensive academic base in engineering principles. The module focuses elements of fluid mechanics, applied mechanics and mathematics.

Learning Outcomes

After completing the module the student should be able to:

1	Analyse behaviour of I-D flow for incompressible and compressible fluids.
2	Analyse and model static and dynamical behaviour of systems with one-degree-of-freedom by applying the notions of stiffness, damping, natural frequency, rate of decay.
3	Use a range of mathematical functions in solution of engineering problems.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Examination	1	2	3
Portfolio	1	2	3

Outline Syllabus

1 Laminar and turbulent pipe flow, friction and minor losses in pipes and pipe networks.
Pumps and pump characteristic curves.
Descriptive treatment of real fluid flow.
1-D compressible flow. Mach no, isentropic flow, stagnation conditions, use of tables, flow
through nozzles (choked conditions and critical pressure ratio).
2 Failure Modes ,yield criteria, application of Rankine, Tresca and Von-Mises theories to
components under bending and torsional loading conditions.
Application to brittle and ductile materials. Elastic instability.
Critical buckling loads. Use of Euler, Rankine-Gordon and Perry-Robertson methods.
Fatigue. S-N curves and endurance limit. Factors affecting the endurance limit and their application. Effects of non-zero mean stress.
3 Dynamics. Vibration 1 General planar motion. Two-dimensional kinematics and dynamics
of rigid bodies.
Free vibration of undamped/damped systems.
Harmonic motion/Damped motion.
Response of one and two degree-of-freedom systems to harmonic excitations.
4 Eigenvalues and modes.
Frequency response function. Vibration isolation. Vibration transmission. Practical examples: Suspension systems, Vibration absorbers.
5 Introduction to CFD, Transport equations, governing equations, grid formation and analysis.
6 Introduction to FEM, fundamental concepts, solution of simple one dimensional boundary value problems.

Learning Activities

A combination of lectures and tutorial sessions.

Notes

This module will provide a good grounding for professional sea going students.