Liverpool John Moores University

Title:	Engineering Principles
Status:	Definitive
Code:	**5511ALAM** (120778)
Version Start Date:	01-08-2016
Owning School/Faculty:	Maritime and Mechanical Engineering
Teaching School/Faculty:	Malaysian Maritime Academy

Team	Leader
Geraint Phylip-Jones	Y

Academic Level:	FHEQ5	**Credit Value:**	24	**Total Delivered Hours:**	83
Total Learning Hours:	240	**Private Study:**	157		

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	Portfolio	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.
Fourier series for functions of any period. Harmonics.
Numerical solution of ODE's.
Euler's method and application of software.
Introduction to vector calculus.
Divergence, gradient and curl and their physical meanings and applications.
Z transforms.

Learning Activities

A combination of lectures, tutorial and practical sessions.

Notes

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