Liverpool John Moores University

Title:	ENGINEERING SCIENCE 1
Status:	Definitive
Code:	**4002ME** (115878)
Version Start Date:	01-08-2016
Owning School/Faculty:	Maritime and Mechanical Engineering
Teaching School/Faculty:	Maritime and Mechanical Engineering

Team	Leader
Russell English	Y

Academic Level:	FHEQ4	**Credit Value:**	20	**Total Delivered Hours:**	76
Total Learning Hours:	200	**Private Study:**	124		

Delivery Options
Course typically offered: Semester 1

Component	Contact Hours
Lecture	44
Practical	8
Tutorial	22

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Examination	50	2
Test	AS2	Laboratory and Tutorial Workbook, maple TA	50	

Aims

To introduce the essential principles of engineering science.

Learning Outcomes

After completing the module the student should be able to:

1	Analyse heat and work transfers during thermodynamic processes involving gases in open and closed systems.
2	Analyse thermodynamic processes involving vapours in closed and open systems
3	Evaluate the properties of mixtures of gases.
4	Use principles of equilibrium to analyse rigid body and static force systems.
5	Apply the concepts of stress and strain to simple engineering problems
6	Apply the principles of kinematics and dynamics to problems of motion.

Learning Outcomes of Assessments

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

EXAM	1	2	3	4	5	6
Laboratory and Tutorial Workbo	1	2	3	4	5	6

Outline Syllabus

Thermodynamic definitions, state, process, path, cycle, temperature, heat and work transfers, intensive, extensive properties.
First Law, NFEE, SFEE, internal energy, enthalpy.
Modeling and properties of perfect gases, real gases.
Properties of vapours, use of tabulated data, charts etc.
Properties of mixtures, Gibbs-Dalton laws etc
Statics of rigid bodies, static equilibrium, concurrent forces, non-concurrent forces, vector representation of forces, torques and moments.
Kinematics of rigid bodies. Linear and angular motion with uniform acceleration. Graphical representation and interpretation of kinematic data. Application to simple non-linear motion.
Dynamics of rigid bodies. Newton's laws of motion and their application to simple mechanical systems including linear and rotational motion.
Deformation of materials. Concept of stress and strain, direct and shear stress, simple thermal stress, compatibility, stress-strain relationships for simple material types. (Young's Modulus etc) Safety factors and stress concentrations

Learning Activities

A combination of Laboratories, Tutorials and Lectures.

Notes

This module is designed to provide an introduction to Engineering science which incorporates the subjects of Mechanics, Materials, Thermodynamics and Fluid Mechanics.