

## Liverpool John Moores University

Title: Engineering Science 1  
Status: Definitive  
Code: **4503ENGICA** (119089)  
Version Start Date: 01-08-2018

Owning School/Faculty: Engineering  
Teaching School/Faculty: HICOM University College Sdn,Bhd

Team	Leader
Russell English	

**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
Practice	AS1		50	
Exam	AS2		50	2

### 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 Solve problems in Hydrostatics
- 3 Analyse problems of simple fluid flow.
- 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:

PRACTICE	1	2	3	4	5	6
EXAM	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.*

*Fluid Mechanics definitions, pressure, density, viscosity, stream lines and stream tubes etc.*

*Hydrostatics, manometry, forces of submerged surfaces, buoyancy.*

*Continuity of flow for compressible and incompressible fluids.*

*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.

<b>Course Material</b>	Book
<b>Author</b>	Hannah and Hillier
<b>Publishing Year</b>	1998
<b>Title</b>	Applied Mechanics
<b>Subtitle</b>	
<b>Edition</b>	2nd

<b>Publisher</b>	Longman
<b>ISBN</b>	9780582256323

<b>Course Material</b>	Book
<b>Author</b>	Popov E
<b>Publishing Year</b>	1998
<b>Title</b>	Engineering Mechanics of Solids
<b>Subtitle</b>	
<b>Edition</b>	2nd
<b>Publisher</b>	Prentice Hall
<b>ISBN</b>	9780137261598

<b>Course Material</b>	Book
<b>Author</b>	Douglas, JF; Gasiorek, JM; Swaffield, JA; Jack, LB
<b>Publishing Year</b>	2005
<b>Title</b>	Fluid Mechanics
<b>Subtitle</b>	
<b>Edition</b>	5th
<b>Publisher</b>	Prentice-Hall
<b>ISBN</b>	9780131292932

<b>Course Material</b>	Book
<b>Author</b>	Eastop, TD; McConkey, A
<b>Publishing Year</b>	1993
<b>Title</b>	Applied Thermodynamics for Engineering Technologists
<b>Subtitle</b>	
<b>Edition</b>	5th
<b>Publisher</b>	Longman
<b>ISBN</b>	9780470219829

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## Notes

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