

Module Title:	Engineering Science
Language of Instruction:	English
Credits:	10
NFQ Level:	6
Module Delivered In	No Programmes
Teaching & Learning Strategies:	Lectures Laboratory Practicals Private study
Module Aim:	The aim of this module is to introducing the student to the fundamental principles involved in Engineering Science and its applications.

Learning Outcomes	
<i>On successful completion of this module the learner should be able to:</i>	
LO1	Have a knowledge and understanding of units, and their use in understanding and applying the scientific laws of motion in relation to forces and be able to determine the resultant and equilibrant of a group of forces.
LO2	Have an understanding of the components of a force and be able to calculate the vertical and horizontal components of a force and a knowledge and understanding how forces effect forces & bending moments on a beam,
LO3	Have a knowledge and understanding of stress-strain and elasticity.
LO4	Understand & describe the basic scientific laws of fluids at rest (i.e. static pressure, buoyancy, hydrostatic forces on immersed surfaces etc. - performing tests and interpreting results) and apply the basic scientific laws of fluids at rest.
LO5	have a basic knowledge and understanding of chemistry and biology

Pre-requisite learning	
Module Recommendations <i>This is prior learning (or a practical skill) that is recommended before enrolment in this module.</i>	
No recommendations listed	
Incompatible Modules <i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module.</i>	
No incompatible modules listed	
Co-requisite Modules	
No Co-requisite modules listed	
Requirements <i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.</i>	
No requirements listed	

Module Content & Assessment

Indicative Content
(1) Units (2hours) (a) The International System of Units: mass, length, time, density, relative density, force, weight and unit weight.
(2) Motion (8 hours lectures, 4 hours practical) (a) Motion, displacement, velocity, speed, acceleration, (b) Newton's laws of motion, (c) Equations of motion,
(3) Forces (12 hours lectures, 4 hours practical) (a) Resultant of a system of forces, (b) Parallelogram law, (c) Equilibrium, (d) Triangle of forces, (e) Polygon of forces, (f) Resolution of forces.
(4) Moments (8 hours lectures, 2 hours practical) (a) Moment of a force, (b) Beam Reactions (c) Point Loads (d) Uniform Distributed Loads
(5) Shear and Bending Moment Diagrams (8 hours lecturers) (a) Shear and bending moment diagrams (b) Point and uniform distributed force loading
(6) Properties of a Section (8hours lecturers, 2 hours practical) (a) Centroid and Centre of gravity (b) Moment of Inertia
(7) Friction (4 hours lectures, 2 hours practicals) (a) Laws of dry friction, (b) Limiting friction, (c) Friction on horizontal and inclined planes, (d) Angle of friction and the total reaction.
(8) Stress and Strain (4 hours lectures, 2 hours practicals) (a) Direct stress and strain, (b) Hooke's law, (c) Modulus of elasticity.
(9) Fluids in Equilibrium (8 hours lectures, 2 hours practicals) (a) Density, capillary action, surface tension (b) Measurement of Pressure (c) Hydrostatic Forces on Surface (d) Buoyancy
(10) Chemistry (3 hours lectures, 2 hours practical) (a) pH (b) Periodic Table of Elements (c) Nitrogen Compounds - Nitrates, Ammonia (d) Hardness - Lime (e) Conductivity
(11) Biology (3 hours lectures, 2hours practical) (a) Flora – Trees, plants (b) Fauna – mammals, fish (c) Micro-biology– pathogens, algae, protozoa
Typical Laboratory Experiments (20 hours) 1. Experiments on Newton's Laws of Motion 2. Triangle of forces 3. Polygon of forces 4. Principle of moments 5. Centre of gravity 6. Stress and strain 7. Friction 8. Buoyancy 9. Centre of Pressure 10. Water properties Lab – pH, solubility, conductivity, dissolved Oxygen 11. Biology Lab – microscopes (Timber, thin sections)

Assessment Breakdown	%
Continuous Assessment	20.00%
Project	10.00%
Practical	10.00%
End of Module Formal Examination	60.00%

Continuous Assessment				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Other	No Description	1,2,3	20.00	n/a

Project				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Project	No Description		10.00	Sem 1 End

Practical				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	No Description	1,4,5	10.00	Sem 1 End

End of Module Formal Examination				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	No Description	1,2,3,4,5	60.00	End-of-Semester

Module Workload

Workload: Full Time		
<i>Workload Type</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	30 Weeks per Stage	1.00
Laboratory	30 Weeks per Stage	1.00
Practicals	30 Weeks per Stage	1.00
Estimated Learner Hours	30 Weeks per Stage	1.17
Total Hours		125.00

