

Module Details	
Module Title	Mechanics and Materials
Module Code	BIC3010-A
Academic Year	2022/3
Credits	10
School	UoB International College
FHEQ Level	RQF Level 3

Contact Hours	
Type	Hours
Directed Study	50
Lectures	50

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Semester 2
BDA	University of Bradford / Semester 3

Module Aims
This module provides both the strong foundation in mathematical skills and the physics knowledge related to materials which will enable students to be successful as they proceed further with their first degree studies in engineering, computer science or the physical sciences.

Outline Syllabus
Vectors: Introduction; Cartesian components and position vectors
Forces and Equilibrium: Mathematical models; the action of forces; resultant forces; resolution into components; a particle in equilibrium
Newton's Laws of Motion: Newton's Laws; Applications; Connected particles; Related accelerations
Work, Energy and Power: Work and kinetic energy; Conservation of mechanical energy; Work done by a variable force; Power
Friction - Hooke's Law; The Law of friction; Motion on a rough surface; Equilibrium on a rough surface; Angle of friction; Hooke's Law
Materials - Strength of solids; Elastic behaviour; Structure of solids; Fluids; Non-viscous flow; Viscous flow; Surfaces
Heat and Gases - Temperature; Heat capacities; Thermal coefficient; Thermal conduction; Thermal radiation; Ideal gases; Thermodynamics of ideal gases; Real gases; Vapours; Entropy and equilibrium

Learning Outcomes	
Outcome Number	Description
1	Explain how mathematical models can be used to investigate physical events.
2	Distinguish between scalar and vector quantities giving physical examples.
3	Apply the relationships between distance and time for linear motion and evaluate simple problems of relative motion.
4	Apply Newton's Laws of Motion.
5	Describe the relationships between work, energy and power and apply to problems in context.
6	Justify suitable materials, based on their structure and properties, to solve engineering problems.

Learning, Teaching and Assessment Strategy
Delivery is in small classes with a strong focus on interactivity between staff and students. The delivery model involves instruction to the whole class but the focus moves during the term towards students individually or in groups working on problems using methods and techniques taught by the tutor and with the tutor adopting the role of guide and facilitator in supporting the students in their work. Formative assessment will be in the form of several short-term assignments that will be set to give students a high level of formative feedback. Student individual development needs will be identified and they will receive additional support. The summative assessment will be in two parts. Part 1 is a report describing the planning and results of the students applying experimentation that demonstrates the relationships between distance and time for linear motion, evaluating simple problems of relative motion, and implementing Newton's Laws of Motion. Part 2 of the summative assessment will use an exam to enable students to explain mathematical models, distinguish between scalar and vector quantities, describe work, energy and power, and justify the choice of suitable materials, based on their structure and properties, to solve engineering problems.

Mode of Assessment			
Type	Method	Description	Weighting
Summative	Coursework - Written	Report on planning and write up of experiments (1000 words)	30%
Summative	Examination - Closed Book	Unseen Examination (2 Hrs)	70%

Reading List
To access the reading list for this module, please visit https://bradford.rl.talis.com/index.html

Please note:

This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.

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