UNIVERSITY of BRADFORD

Module Descriptor

Module Details	
Module Title	Foundation Mechanics
Module Code	MAE3001-B
Academic Year	2024/5
Credits	20
School	School of Engineering
FHEQ Level	RQF Level 3

Contact Hours	
Type	Hours
Laboratories	9
Lectures	42
Tutorials	21
Directed Study	128

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Academic Year

Module Aims

1. Engineers are required to solve problems that affect all aspects of life, and to do this effectively a strong and fundamental knowledge of Mechanics is vital. Mechanics considers the effects of forces on objects, including any motion as a result of these forces. It bridges mathematics and physics. Study of mechanics allows engineers to consider effective, efficient and sustainable approaches to withstanding or utilising forces.

2. This module provides the theoretical knowledge of types and effects of forces and explores the application of these theories to real engineering scenarios including our built environment, design of objects and vehicles we use, methods of manufacturing the resources we need to live, and consideration of the effects in and on living bodies.

3. In this module students are supported to develop the analytical skills necessary to understand and contextualise data, to use that data appropriately in applying the scientific principles to solve engineering problems and to present and communicate the outcomes clearly.

Outline Syllabus
* Context: historical development of theories; bias. * Vectors: Basic algebra, components. * Concept of force: Resultant, equilibrant. * Concurrent forces: 3 force systems. * Moment of a force: Couples, principle of moments. * Coplanar and parallel forces: Implications. * Friction: Static friction. * Hydrostatics: Hydrostatic pressure. * Displacement, velocity, constant acceleration. * Circular motion: angular measure; angular frequency; angular acceleration. * Kinetics: force, mass, momentum; Newton's Laws of Motion; Work/energy equation; Power; Impulse/momentum equation.

Learning Outcomes	
Outcome Number	Description
01	Understand scalar and vector algebra in association with the principles of statics.
02	Apply the principles of statics to problems set in an engineering context.
03	Understand principles of kinematics and the laws of motion associated with one- and two-dimensional motion of objects.
04	Apply the principles of dynamics to problems set in an engineering context.
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Learning, Teaching and Assessment Strategy

* Theories and worked examples that contextualise the theories are presented during lectures. Students are required to spend time during those classes applying the theories to examples that are then discussed and explained by tutors. This provides an environment that appropriately bridges the style of teaching that students are typically familiar with before enrolment on foundation year, while helping them to develop the skills of self-regulated learning.

* The lectures are supported by tutorial sessions ? in advance of a tutorial students will be tasked to complete problems and examples, and the solutions are then discussed during the tutorials. This allows students to progress at an individual pace relevant to their own understanding, while also ensuring that each topic is covered in a timely manner to help comprehension of lecture content. Students can complete part or all the problem sheet before class depending upon their own understanding and confidence, and after the class will have additional time to complete any outstanding questions. Tutors have opportunities to repeat explanations and/or increase the challenge depending upon individual student needs.

* Each Semester students participate in hands-on laboratory experiment in small groups, permitting additional understanding of the topics and demonstrating applications of the theories. Different learning styles, pace and prior knowledge are accommodated by this combination of methods.

Mode of Assessment

Type	Method	Description	Weighting
Summative	Examination - Closed Book	Semester 1 Examination: Statics	40%
Summative	Examination - Closed Book	Semester 2 Examination: dynamics	40%
Summative	Coursework - Written	Experimental logbooks	20%
Formative		Method - Classroom Test Description - Preparing for examinations by practising questions with solutions explained during tutorials. Length/Duration - As needed by the lecture.	N/A

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.
