

Module Details	
Module Title	Mechanical Principles
Module Code	BIC4016-B
Academic Year	2022/3
Credits	20
School	UoB International College
FHEQ Level	FHEQ Level 4

Contact Hours	
Type	Hours
Directed Study	140
Lectures	40
Laboratories	20

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Non-Standard Academic Year
BDA	University of Bradford / Semester 3

Module Aims
The aim of this module is to provide students with a clear understanding of the concepts of Mechanical Engineering. This is to be achieved through ensuring that the student gains an appropriate background in the principles of Mechanical Sciences and their uses in the solutions of a range of engineering problems.

Outline Syllabus

Materials:

1. Ferrous and non-ferrous alloys.
2. Tensile testing.
3. Polymers and Ceramics: structures, properties and applications.
4. Bonding: types and effects.
5. Mechanical properties of metals, polymers and ceramics: yield and bend strengths.
6. Sustainability: energy intensive production, waste products, re-usability, standards

Fluid mechanics:

1. Properties of fluids.
2. Hydrostatics and buoyancy rates.
3. Fluids in motion: laminar and turbulent flows.

Thermodynamics:

1. Energy and thermodynamics.
2. First Law of Thermodynamics.
3. Systems, energy, work, heat.
4. Energy conservation: Bernoulli's equation.
5. Conservation of momentum.

Stress analysis.

Introduction to Mechatronics.

Learning Outcomes

Outcome Number	Description
01	Demonstrate an understanding of the properties of materials and relate to their uses, applications and suitability.
02	Demonstrate knowledge of fluid flow and energy balances in a range of engineering contexts and components.
03	Explain the principles of thermodynamics and fluid mechanics and apply these to the analysis of simple processes.
04	Demonstrate data collection and interpretation and problem solving skills in an engineering context.
05	Present laboratory reports containing results and offering critical analysis.

Learning, Teaching and Assessment Strategy

Students are taught this course in a group of up to 18. Delivery is divided between tutor-led seminars which are classroom-based and focus on theory, and laboratory-based sessions, where theory can be illustrated and tested through practical work. The teaching approach places considerable emphasis on interactivity between teacher and students and between individual students within the group. This is facilitated by the range of activities introduced into classes, the use of group and pair work, particularly in practical work, and of the further opportunities for interactivity provided.

Students are encouraged throughout to reflect on their own performance and skills development.

Within the practical element of the course students are able to learn about the laboratory environment and the importance of following laboratory rules and procedures so that everyone can work safely.

Student progress is closely monitored by both subject staff and each student's Personal Tutor. Tutors hold one to one sessions with students during which they are encouraged to reflect on their own progress in meeting their objectives which is particularly valuable in the context of this particular course. Out of this monitoring comes the provision, as necessary, of learner support in specific, identified weaker areas or where students are making limited, unsatisfactory progress.

In terms of summative assessment, lab reports are submitted after two practical sessions. At the end of the course students sit an unseen examination covering all aspects of the course.

The lab reports and final examination are spread through the term of study and supplemented by a range of shorter-term preparatory exercises. These do not contribute to the final course assessment but are marked and used to provide detailed feedback to assist the students to prepare for the lab reports and examination which contribute to the summative assessment.

During the course students are encouraged to reflect on their own progress in the theoretical and practical elements of their studies, and the level of formative assessment with which they are provided is intended to support them in this. It also gives the information required by tutors to provide the students with additional support in areas of weakness and to signpost them towards more challenging tasks in stronger areas.

Mode of Assessment

Type	Method	Description	Weighting
Summative	Coursework - Written	Lab reports from 2 practical sessions (1000 words)	30%
Summative	Examination - Closed Book	Examination drawing together all theoretical aspects of the course (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.