UNIVERSITY of BRADFORD

Module Descriptor

Module Details	
Module Title	Electronics and Mechanics
Module Code	BIC4015-B
Academic Year	2022/3
Credits	20
School	UoB International College
FHEQ Level	FHEQ Level 4

Contact Hours	
Type	Hours
Directed Study	140
Lectures	50
Practical Classes or Workshops	10

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

Module Aims

The module enables students to develop an understanding of basic electrical and electronic circuits, mechanical power transmission and the laws which govern their behaviours. It also provides the student with a clear and thorough understanding of the theory and applications of engineering mechanics for dynamical systems. The student is able to consolidate the theoretical part of the module in lab work

Outline Syllabus

Electronics:

1. Basic electrical concepts: units, quantities, voltage, charge, current, energy and power, basic components and circuits, AC and DC sources.
2. Circuit variables and laws: Ohm's law, Kirchhoff's law.
3. Resistive circuits: series and parallel, combination.
4. Capacitors and RC circuits: charging/discharging.
5. Basic Magnetic principles: Flux, reluctance, magnetic circuits.
6. DC motors: power (torque & speed).
7. Semiconductor materials: diodes, LED,
8. Basic electronic sensors,
9. Bipolar junction transistor: Using the transistor as a switch.
10. Electrical safety and RoHS & WEEE legislation.

Mechanics:
1. Kinematics - Displacement, velocity, acceleration concept to solve various Dynamics Situations;
2. Newton Laws and their application to complex motion;
3. Force systems;
4. Spring force and friction;
5. Force and motion at linked bodies;
6. Angular motion;
7. Rotational solids;
8. Work, energy and power;
9. Non-conversed mechanical work and energy;
10. Momentum and impact

Learning Outcomes

Outcome Number	Description
01	Describe basic mechanical, electrical and electronic components and laws.
02	Describe and familiarise the design of simple mechanisms and be able to set up and solve equations of motion for a system of particles.
03	Application of basic electrical theory by evaluating simple problems both theoretically and practically.
04	Solve particle dynamic problems. Use the graphical method and analytical method to develop and analyse simple/planer mechanisms.
05	Systematically/scientifically/creatively problem solve; communicate; and interpret data.

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	Coursework - Written	Final, unseen examination on all topics studied during the module (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.
