

Module Details	
Module Title	Principles of Computer Aided Engineering
Module Code	BIC4014-B
Academic Year	2022/3
Credits	20
School	UoB International College
FHEQ Level	FHEQ Level 4

Contact Hours	
Type	Hours
Directed Study	140
Lectures	30
Practical Classes or Workshops	30

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Semester 1
BDA	University of Bradford / Semester 2

Module Aims
The course teaches the key elements of the design process and shows how design is an integrative subject that encompasses all disciplines of engineering. In research, designing and realisation students from various engineering disciplines are introduced to industry standard software tools that are specific to the design needs and requirements of their own discipline. The student will experience collaborative and individual design from problem formulation through to manufacture of a product. The module will show how any modern engineer has to tackle a range of issues and produce cost-effective solutions while keeping a weather-eye on product life-cycle with a view to maintaining sustainability and avoiding irreversible environmental damage.

Outline Syllabus

Problem-solving skills: producing viable solutions to a design problem. Students develop an appreciation of the nature of the materials they will select to realise the product that they have been called upon to design and visualise.

How to conduct research from printed and on-line sources including the interpretation and referencing of their research.

Preliminary 2D sketches and 3D simulations utilising specialised CAD software, such as AutoCAD and SolidWorks to design and visualise a product relevant to their own particular engineering discipline.

Project manage the design and realisation process, working within set parameters including timescale and budgetary considerations. While engaged in this process they will need to work collaboratively with a group of their fellow students and with a number of College and University staff.

Using MATLAB to undertake computational analysis of the engineering problems they encounter.

Suitability of their product - its sustainability over time and its impact on the environment in production and use all need to be taken into account.

Legal, ethical, safety and quality control issues: managing risk and ensuring compliance.

Product visualisation/presentation.

Learning Outcomes

Outcome Number	Description
01	Formulate an engineering design problem.
02	Apply an understanding of the properties of materials in the context of resolution of the design problem.
03	Produce an effective realisation and project management plan.
04	Show the ability to utilise specialised CAD software to produce sketches and blueprints of components.
05	Demonstrate an understanding of the importance of team working and managing the legal, ethical, safety and quality issues in the design and manufacturing context.
06	Visualise a finished article and demonstrate how it might be produced within time and budgetary constraints

Learning, Teaching and Assessment Strategy

Students are taught this course in a group of up to 18. Delivery is divided equally between tutor-led seminars and workshop-based activity with considerable emphasis on interactivity between teacher and students and between individual students within the groups they will form to undertake their coursework task. Smart Board technology will help facilitate the briefing and planning process and industry standard specialised CAD technology to aid in the design and manufacturing process. Students used MATLAB to develop their computational skills in resolving the mathematical problems that their design and visualisation project may entail.

This course provides students with multiple opportunities for developing a range of skills and they are encouraged throughout to reflect on their own performance and how well this skills development is proceeding.

The focus of the course is squarely on the range of activities that the students need to undertake in their groups to tackle the problem set, research and evaluate potential solutions, select the one which they prefer and design their product. Within this scenario the tutor takes on the roles of guide and facilitator, supporting the students as they consider and tackle the various stages of the task they have been given.

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, the students identify a problem within their specialised engineering discipline and project manage a design solution which proffers a resolution through a practical solution. The first element in the summative assessment is the planning, research and design stages and the second the visualisation of the design.

Mode of Assessment

Type	Method	Description	Weighting
Summative	Coursework - Written	Identify a problem, devise a solution and draw up a project plan (1000 words)	30%
Summative	Coursework - Written	Solving a problem scenario through the design and visualisation of a article or device, utilising specialist software	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.