UNIVERSITY of BRADFORD

Module Descriptor

Module Details	
Module Title	Mathematics for Engineering and Informatics
Module Code	BIC4009-B
Academic Year	2022/3
Credits	20
School	UoB International College
FHEQ Level	FHEQ Level 4

Contact Hours	
Type	Hours
Directed Study	80
Lectures	110
Practical Classes or Workshops	10

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Academic Year
BDA	University of Bradford / Semester 2

Module Aims

This module provides the students with sound knowledge and command of mathematics with emphasis on engineering applications. It also provides students with a grounding in computational thinking and mathematical structures underpinning programming and data structures.

The module contains the well-recognised elements of classical engineering mathematics which universally underpin the formation of the professional engineer. The principal aim of this module is to bring students up to a common standard in mathematics in order to facilitate their entry into second year studies.

Outline Syllabus

The module concentrates on;
(a) understanding mathematical concepts associated with engineering applications
(b) applying the mathematical skills and techniques to solve engineering problems.

Module content in outline:

* Algebra: powers, matrices, vectors, and complex numbers
* Concepts of Boolean algebra and Karnaugh maps in solving logic problems
* Calculus: differentiation and integration of functions with one variable
* Algorithms: construction and applications
* Numerical methods: Newton-Raphson scheme and Simpson?s rule
* Ordinary differential equations: first and second orders
* Probability: basic concepts, empirical, discrete and continuous distributions
* Introduction and use of graphs and digraphs
* Building Venn diagrams
* Computational analysis using MATLAB.

Learning Outcomes

Outcome Number	Description
01	Describe the fundamental mathematical principles which underpin engineering and informatics-related disciplines.
02	Use the language and methods of mathematics in the description and analysis of engineering and computational systems.
03	Explain why the application of certain mathematical rules to a calculation produces the appropriate result.
04	Apply mathematical methods, tools and notations proficiently in the analysis and solution of engineering and computational problems

Learning, Teaching and Assessment Strategy

Students will be taught this module in a group of up to 18 students. Delivery of the module's theoretical content will be by formal classes in which materials are presented, explained and illustrated. There will, however, be considerable emphasis on interactivity between teacher and students and between individual students within the group. Delivery will be over two 10 week terms, with 6 contact hours per week and so 120 in all.

Students will be expected to spend a minimum of a further 80 hours in self-study, reviewing and consolidating the topics studied, preparing for their Phase tests and end of term examination.

Summative assessment will consist of two interim tests, one towards the end of the first term of study and the second about half-way through the second. A final, end of module examination covering all topics studied during the module completes the summative assessment.

Student progress will be closely monitored by both subject staff and each student's personal tutor. Regular formative assessments will be set and used to support students in their preparation for their summative assessments. These formative assessments will be marked and will generate detailed and supportive individual feedback. Tutors hold one to one sessions with students during which they are encouraged to reflect on their own progress in meeting the objectives of the module. Out of this monitoring will come provision, as necessary, of learner support in specific weaker areas or where students are making limited progress. This might result in a student being considered "at risk" and a formal plan for improvement put in place to be monitored by the personal tutor.

Mode of Assessment			
Type	Method	Description	Weighting
Summative	Classroom test	Interim Test (1 Hr)	25%
Summative	Classroom test	Interim Test (1 Hr)	25%
Summative	Examination - Closed Book	End of module examination (2 Hrs)	50%

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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