UNIVERSITY of BRADFORD

Module Descriptor

Module Details	
Module Title	Foundation Mathematics 2
Module Code	ENM3002-B
Academic Year	2024/5
Credits	20
School	School of Engineering
FHEQ Level	RQF Level 3

Contact Hours	
Type	Hours
Laboratories	2
Lectures	48
Tutorials	24
Directed Study	126

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

Module Aims

1. Provide students with an understanding of the techniques and ideas of the key contributing academic disciplines of engineering study in mathematics.

2. Facilitate students to become independent learners with the problem-solving and critical thinking skills needed for resolving integrated and multidimensional engineering problems.

Outline Syllabus
General Mathematics * Further trigonometry including identities and the general solution of equations. * Further coordinate geometry including the parabola, ellipse and hyperbola. * Properties of exponential and logarithmic functions and their graphs. * Algebra: factorisation and long division of polynomials, partial fractions. * Introduction to matrices including linear transformations. * Numerical methods: non-calculus methods for finding the roots of equations. * Statistics: introduction to data analysis and probability, binomial series and distribution. Differentiation: * Derivatives of exponential, logarithmic and basic trigonometric functions. * Product, quotient, and function of a function rules. * Higher order derivatives. Use of tables. * Application to rates of change, the maximum and the minimum,. * Numerical methods: Newton-Raphson method to find the roots of equations. Integration: * Integration using simple substitution. * Definite integral as a limit of a sum. Use of tables. * Applications to include: area, volume, centroids, kinematics, and exponential growth and decay. * First and second order differential equations. * Numerical methods for the evaluation of definite integrals.

Learning Outcomes	
Outcome Number	Description
1.	Apply standard algebraic techniques, geometry and trigonometry when solving problems; use calculus to analyse systems and solve engineering problems.
2.	Apply different mathematical techniques to solve problems in engineering contexts; describe the capabilities and limitations of these techniques when solving engineering problems.
03.	Apply the skills and knowledge learnt to systematic problem solving; use these skills in a variety of engineering contexts.

Learning, Teaching and Assessment Strategy

Concepts, principles & practical calculations are developed and practised in mixed lecture/tutorial classes and are consolidated in tutorial group sessions.

Students have differing maths abilities, therefore, a diagnostic test (that does not contribute to the total mark) exists at the beginning of the semester to provide a profile of the mathematical strengths and weaknesses of the students. Then the students are offered to attend University maths support classes. This helps to strengthen the weaknesses and bring all students to the same level. The scheme of work together with the learning material is designed to reflect the Pure Maths (Core 3 / 4) and Statistics (S1). The Pearson Edexcel examining body specification for A-level Mathematics [Pearson Edexcel Level 3 Advanced GCE in Mathematics (9MA0)] is used together with their respective textbooks to teach this module.

Close book class tests (2x15%) will assess the development of the application of practical skills to the knowledge base of the strand, and the final close book examination will assess the wider learning outcomes expressed in the descriptor.

The classroom tests are designed to gradually build and test the students' skills and knowledge before the final exam. The classroom tests will help the students to prepare for the formal examination as each classroom test will cover part of the topics delivered in this module, while the formal examination will cover all the topics.

The main formulas and equations that might be used to solve the classroom tests and examination will be provided to the students, as the assessment will be on the application of these skills and formulas rather than memorising them. This will also support the development of the exam?s skills and confidence of the students. In all cases feedback is provided.

Cognitive and personal skills will be developed by problem solving and design exercises.

The students? attendance is monitored (electronically by attendance monitor readers) and reported on weekly basis to the module leader and personal academic tutors. If the student?s attendance is not satisfactory, he/she will be contacted to clarify the reason and get the required support if needed.

Mode of Assessment

Type	Method	Description	Weighting
Summative	Examination - Closed Book	Closed book examination	15%
Summative	Examination - Closed Book	Closed book examination	15%
Summative	Examination - Closed Book	Closed book examination	70%
Referral	Examination - Closed Book	Closed book examination	100%
Formative		Method - Short classroom based self-assessment worked examples Description - Students will be able to work through examples in class and to self-assess their performance as the answer is revealed to all students by the lecturer. Duration/Length - 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.

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