UNIVERSITY of BRADFORD

Module Descriptor

Module Details	
Module Title	Foundation Mathematics 2
Module Code	BIC3007-A
Academic Year	2022/3
Credits	10
School	UoB International College
FHEQ Level	RQF Level 3

Contact Hours	
Type	Hours
Directed Study	50
Lectures	50
Lectures	The module will be taught to small classes (max 18) and with a highly interactive approach to learning and teaching. During the module, there will be formative assignments set used to provide students with detailed and helpful feedback. The students are encouraged throughout to reflect on their own performance and the feedback they receive informs sessions with their personal tutor. The personal tutor monitors student performance and supports suggestions for improvement. The personal tutor can draw the senior team's attention to a struggling student through the 'at risk' process.
Lectures	There are two summative assessment activities. The first is an interim test on the first part of the module, regarding the application of standard algebraic techniques, geometry and trigonometry when solving problems (LO1). At the end of the module, the students sit an unseen examination which presents them with several engineering problems to resolve using the mathematical methods and techniques (LO2, LO3, LO4).
Lectures	Further trigonometry including identities and the general solution of equations. Further coordinate geometry including the parabola, ellipse and hyperbola. Application of straight lines to linear programming. 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 function rules. Higher-order derivatives. Use of tables. Application to rates of change, maximum and minimum, series approximations and kinematics. 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.

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

Module Aims

This module will extend the students' knowledge of algebra and geometry. It will also introduce concepts of statistics. The module will develop students' understanding of differential and integral calculus and basic analytical techniques. The students will obtain experience in the application of calculus in relation to engineering problems.

Outline Syllabus

Further trigonometry including identities and the general solution of equations.
Further coordinate geometry including the parabola, ellipse and hyperbola.
Application of straight lines to linear programming.
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 function rules.
Higher-order derivatives. Use of tables.
Application to rates of change, maximum and minimum, series approximations and kinematics.
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.
2	Explain how different mathematical techniques are needed to solve problems in engineering contexts by using appropriate knowledge, tools, and applications.
3	In a variety of engineering contexts, apply the skills and knowledge learnt to systematic problem-solving.

Learning, Teaching and Assessment Strategy

The module will be taught to small classes (max 18) and with a highly interactive approach to learning and teaching. During the module, there will be formative assignments set used to provide students with detailed and helpful feedback. The students are encouraged throughout to reflect on their own performance and the feedback they receive informs sessions with their personal tutor. The personal tutor monitors student performance and supports suggestions for improvement. The personal tutor can draw the senior team?s attention to a struggling student through the ?at risk? process.

There are two summative assessment activities. The first is an interim test on the first part of the module, regarding the application of standard algebraic techniques, geometry and trigonometry when solving problems (LO1). At the end of the module, the students sit an unseen examination which presents them with several engineering problems to resolve using the mathematical methods and techniques (LO2, LO3, LO4).

Mode of Assessment

Type	Method	Description	Weighting
Summative	Classroom test	Interim Test on applying standard algebraic techniques, geometry and trigonometry when solving problems (1 Hr)	30%
Summative	Examination - Closed Book	Unseen exam presenting several engineering problems to resolve using the mathematical methods&techniques (2hrs)	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.
