UNIVERSITY of BRADFORD

Module Descriptor

Module Details	
Module Title	Foundation Mathematics 2
Module Code	ENM3002-B
Academic Year	2021/2
Credits	20
School	Department of Civil and Structural 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

To develop the basic skills of algebra, geometry and trigonometry and to introduce the mathematics of engineering. To extend the knowledge base in algebra and geometry and to introduce concepts of statistics. To develop concepts in differential and integral calculus, together with basic analytical techniques and obtain experience in applications of calculus to 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
01	Apply standard algebraic techniques, geometry and trigonometry when solving problems; use calculus to analyse systems and solve engineering problems.
02	See how different mathematical techniques are needed to solve problems in engineering contexts; use appropriate knowledge, tools and applications when solving 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. 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. In all cases feedback is provided. Cognitive and personal skills will be developed by problem solving and design exercises.

Mode of Assessment

Type	Method	Description	Weighting
Summative	Examination - Closed Book	Closed Book Examination (2 Hours)	70%
Summative	Examination - Closed Book	Closed book exam (1 Hr)	15%
Summative	Examination - Closed Book	Closed book exam (1 Hour)	15%

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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