Foundation Mathematics 2

Module Code: ENM3002-B
Academic Year: 2018-19
Credit Rating: 20
School: Engineering and Informatics (Faculty-wide)
Subject Area: Engineering Mathematics
FHEQ Level: FHEQ Level 3

Contact Hours

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
</tr>
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<tbody>
<tr>
<td>Lectures</td>
<td>48</td>
</tr>
<tr>
<td>Tutorials</td>
<td>24</td>
</tr>
<tr>
<td>Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>Directed Study</td>
<td>124</td>
</tr>
<tr>
<td>Examinations DO NOT USE</td>
<td>2</td>
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</table>

Availability Periods

<table>
<thead>
<tr>
<th>Occurrence</th>
<th>Location/Period</th>
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<tbody>
<tr>
<td>BDA</td>
<td>University of Bradford / Semester 2 (Feb - May)</td>
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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.

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 a 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.

Module Learning Outcomes

On successful completion of this module, students will be able to...

1 apply standard algebraic techniques, geometry and trigonometry when solving problems; use calculus to analyse systems and solve engineering problems.

2 see how different mathematical techniques are needed to solve problems in engineering contexts; use appropriate knowledge, tools and applications when solving problems.

3 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. Written classroom tests will assess the development of the application of practical skills to the knowledge base of the strand, and the formal examinations will assess the wider learning outcomes expressed in the descriptor. In all cases feedback is provided. Practical skills will be developed in laboratory sessions. Cognitive and personal skills will be developed by problem solving and design exercises.

Mode of Assessment
<table>
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<tr>
<th>Type</th>
<th>Method</th>
<th>Description</th>
<th>Length</th>
<th>Weighting</th>
<th>Final Assess'</th>
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<tbody>
<tr>
<td>Summative</td>
<td>Examination - closed book</td>
<td>Examination - closed book</td>
<td>2 hours</td>
<td>70%</td>
<td>Yes</td>
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<tr>
<td>Referral</td>
<td>Examination - closed book</td>
<td>Supplementary</td>
<td>3 hours</td>
<td>100%</td>
<td>No</td>
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<tr>
<td>Summative</td>
<td>Classroom test</td>
<td>2 1.00 hour tests under exam conditions with immediate feedback and reflection session</td>
<td>1 hour</td>
<td>30%</td>
<td>No</td>
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**Legacy Code (if applicable)**
ENG0301D

**Reading List**
To view Reading List, please go to [rebus:list](#).