

## MODULE DESCRIPTOR

### Module Title

Mathematics 1B

|           |             |             |        |
|-----------|-------------|-------------|--------|
| Reference | EN1912      | Version     | 4      |
| Created   | March 2023  | SCQF Level  | SCQF 7 |
| Approved  | June 2002   | SCQF Points | 15     |
| Amended   | August 2023 | ECTS Points | 7.5    |

### Aims of Module

To provide the student with the ability to apply introductory level calculus and statistics to engineering problems.

### Learning Outcomes for Module

On completion of this module, students are expected to be able to:

- 1 Employ matrix techniques to solve simultaneous linear equations.
- 2 Apply simple descriptive and summary statistics and elementary probability theory to problems in engineering.
- 3 Implement algebraic and numerical techniques for simple first order ordinary differential equations.
- 4 Apply calculus to problems in engineering mathematics.
- 5 Implement computational packages in support of the other Learning Outcomes.

### Indicative Module Content

The syllabus will include: Matrices: Simple matrix algebra. Determinants. Applications to the solution of simultaneous linear equations. Differential Equations: Solution of 1st order ODEs by separation of variables and integration factor methods. Power series for elementary functions. Partial differentiation. Statistics: Simple descriptive statistics. Probability and reliability. Elementary probability distributions. Applications to problems in engineering. The use of a computer mathematics package for solving problems in engineering mathematics.

### Module Delivery

The module is delivered using a series of lectures with associated tutorials and computer laboratories where techniques can be applied.

| <b>Indicative Student Workload</b>   | Full Time | Part Time |
|--|-----------|-----------|
| Contact Hours  | 40        | N/A       |
| Non-Contact Hours  | 110       | N/A       |
| Placement/Work-Based Learning Experience [Notional] Hours                    | N/A       | N/A       |
| TOTAL  | 150       | N/A       |
| <i>Actual Placement hours for professional, statutory or regulatory body</i> |           |           |

### ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

#### Component 1

Type: Practical Exam Weighting: 30% Outcomes Assessed: 5  
 Description: Computer based laboratory test.

#### Component 2

Type: Examination Weighting: 70% Outcomes Assessed: 1, 2, 3, 4  
 Description: Closed book examination.

### MODULE PERFORMANCE DESCRIPTOR

#### Explanatory Text

The module has 2 components and to gain an overall pass a minimum D grade must be achieved in each component. The component weighting is as follows: C1 (y-axis) is worth 30% and C2 (x-axis) is worth 70%.

|              |    | Practical Exam:  |   |   |   |   |   |    |
|--------------|----|--|---|---|---|---|---|----|
|              |    | A  | B | C | D | E | F | NS |
| Examination: | A  | A  | A | B | B | E | E |    |
|              | B  | B  | B | B | C | E | E |    |
|              | C  | B  | C | C | C | E | E |    |
|              | D  | C  | C | D | D | E | E |    |
|              | E  | E  | E | E | E | E | F |    |
|              | F  | F  | F | F | F | F | F |    |
|              | NS | Non-submission of work by published deadline or non-attendance for examination |   |   |   |   |   |    |

### Module Requirements

|                          |       |
|--------------------------|-------|
| Prerequisites for Module | None. |
| Corequisites for module  | None. |
| Precluded Modules        | None. |

### INDICATIVE BIBLIOGRAPHY

|   |  |
|---|--|
| 1 | STROUD, K.A. and BOOTH, D.J., 2020. Engineering Mathematics. 8th ed. Red Globe Press |
| 2 | SINGH, K., 2011, Engineering Mathematics Through Applications, 2nd ed., Palgrave     |
| 3 | James, G. and DYKE, P., 2020, Modern Engineering Mathematics, 6th ed., Palgrave      |