

## MODULE DESCRIPTOR

### Module Title

Mathematics 3

Reference	EN3900	Version	6
Created	April 2023	SCQF Level	SCQF 9
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 advanced mathematics techniques to applied problems in engineering.

### Learning Outcomes for Module

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

- 1 Draw on eigen methods to identify the solution of problems in engineering.
- 2 Formulate solutions of partial differential equations by separation of variables and Fourier series.
- 3 Estimate solutions of partial differential equations by finite difference methods.
- 4 Using the vector differential operators grad, div and curl, formulate solutions to engineering problems.

### Indicative Module Content

Eigenvalues and eigenvectors of matrices and their relation to second order systems including degenerate systems. Development and solution of differential equations using eigen-methods. Partial differential equations using separation of variables and Fourier series to include heat flow in one dimension, one-dimensional vibration and Laplaces equation. Finite difference methods to solve PDEs. Div, grad and curl and their identities. Application of the vector operators to problems in Science and Technology.

### Module Delivery

Full-time students: The module is delivered using a series of lectures with associated tutorials where techniques can be applied. Part-time students: This module is delivered by a combination of lectures and tutorials online. It will be supported by online evening sessions.

**Indicative Student Workload**

	Full Time	Part Time
Contact Hours	48	48
Non-Contact Hours	102	102
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	150
<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: Coursework Weighting: 100% Outcomes Assessed: 1, 2, 3, 4  
 Description: Closed book examination.

**MODULE PERFORMANCE DESCRIPTOR****Explanatory Text**

Component 1 comprises 100% of the module grade. A minimum of Grade D is required to pass the module.

Module Grade	Minimum Requirements to achieve Module Grade:
<b>A</b>	A
<b>B</b>	B
<b>C</b>	C
<b>D</b>	D
<b>E</b>	E
<b>F</b>	F
<b>NS</b>	Non-submission of work by published deadline or non-attendance for examination

**Module Requirements**

Prerequisites for Module EN2901 Mathematics 2 or equivalent.  
 Corequisites for module None.  
 Precluded Modules None.

**INDICATIVE BIBLIOGRAPHY**

- 1 KREYSZIG, A., 2011. Advanced Engineering Mathematics. 10th ed. J Wiley.
- 2 STROUD, K.A. and BOOTH, D.J., 2011. Advanced Engineering Mathematics. 5th ed. Palgrave.