MODULE DESCRIPTOR

Module Title

Mathematics 2

Reference	EN2901	Version	5
Created	August 2021	SCQF Level	SCQF 8
Approved	June 2002	SCQF Points	15
Amended	August 2021	ECTS Points	7.5

Aims of Module

To provide the student with the ability to apply advanced level mathematics to engineering problems.

Learning Outcomes for Module

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

1	Solve first and second order ordinary differential equations by algebraic methods and apply Laplace transform methods to problems involving simple linear systems.
2	Carry out partial differentiation and apply it to problems in Science and Engineering.
3	Apply Fourier series techniques to periodic signals.
4	Calculate eigenvalues and eigenvectors of small matrices and apply diagonalisation in order to solve simultaneous ordinary differential euqations.
5	Use computational packages in support of the other Learning Outcomes.

Indicative Module Content

The syllabus will include: Solution of first and second order ordinary differential equations: separation of variables. Integrating factor method. Complementary function and particular integrals. Laplace Transforms: Definition of Laplace transform and its inverse. Use of tables to calculate Laplace transforms of elementary functions. The solution of ordinary differential equations. The step function and impulse function. Multivariable calculus: Partial differentiation. Application to problems in Science and Engineering. Fourier Series: Decomposition of waveforms. Fourier series of simple functions. The use of symmetry. Amplitude spectra. Eigenvalues and eigenvectors: Application to systems of differential equations. Further application 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.

Module Ref:	EN2901 v5

Indicative Student Workload	Full Time	Part Time
Contact Hours	60	N/A
Non-Contact Hours	90	N/A
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	N/A
Actual Placement hours for professional, statutory or regulatory body		

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 is worth 30% and C2 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	Mathematics 1 (EN1902) or equivalent.
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

1	STROUD, K.A. and BOOTH, D.J., 2020. Advanced Engineering Mathematics. 6th ed. Red Globe Press.
2	STROUD, K.A. and BOOTH D.J., 2020. Engineering Mathematics. 8th ed. Basingstoke: Palgrave.
3	KREYSZIG, A., 2011. Advanced Engineering Mathematics. 10th Ed. Wiley