MODULE DESCRIPTOR

Module Title

Engineering Mathematics

Reference	EN2108	Version	3
Created	February 2024	SCQF Level	SCQF 8
Approved	December 2020	SCQF Points	30
Amended	April 2024	ECTS Points	15

Aims of Module

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

Learning Outcomes for Module

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

1	Apply vectors and matrix techniques to problems in engineering.
2	Use techniques of differentiation and integration in solving differential equations involved in engineering applications.
3	Calculate and understand simple descriptive and summary statistics, and apply elementary probability theory to problems in engineering.
4	Apply Fourier series techniques and apply Laplace transform methods to problems involving simple linear systems.
5	Use a computational package to solve engineering mathematics problems.

Indicative Module Content

Vectors: Simple vector algebra. The scalar and vector products. Differential Calculus: Differentiation of elementary functions. The rules of differentiation: chain rule, product rule, quotient rule. Integral Calculus: Integration of elementary functions. Application to problems in engineering. Matrices: Simple matrix algebra. Determinants. Applications to the solution of simultaneous linear equations. Statistics: Simple descriptive statistics. Probability and reliability. Elementary probability distributions. Statistical inference: populations and samples, sampling distribution of the mean, point and interval estimation of population mean for large/small samples, one sample hypothesis testing 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. Multivariable calculus: Partial differentiation. Application to problems in Science and Engineering. Fourier Series: Decomposition of waveforms. Fourier series of simple functions. The use of a computer mathematics package for solving problems in engineering mathematics.

Module Ref:	EN2108 v3

Module Delivery

The module is delivered in Blended Learning mode using structured online learning materials/activities and directed study, facilitated by regular online tutor support. Workplace Mentor support and work-based learning activities will allow students to contextualise this learning to their own workplace. Face-to-face engagement occurs through annual induction sessions, employer work-site visits, and modular on-campus workshops.

Indicative Student Workload	Full Time	Part Time
Contact Hours	30	N/A
Non-Contact Hours	30	N/A
Placement/Work-Based Learning Experience [Notional] Hours	240	N/A
TOTAL	300	N/A
Actual Placement hours for professional, statutory or regulatory body	240	

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, 5
Description:	Logbook of solved tutorials and online tests.				

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

Module Requirements

Prerequisites for Module	Completion of EN1100, EN1106, EN1103, EN1102/EN1104 or equivalent.
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

1 STROUD, K.A. and BOOTH, D.J., 2013. Engineering Mathematics. 7th ed. Palgrave.

2 STROUD, K.A. and BOOTH, D. J, 2011. Advanced Engineering Mathematics. 5th ed. Palgrave.