Module Title:	Advanced Mathematics III
Language of Instruction:	English

Credits:	5

NFQ Level:	8

Module Delivered In	2 programme(s)

Teaching & Learning Strategies:	Lectures; Practical Work; Private Study

Module Aim:	The aims of this module are: (1) to introduce students to the mathematical concepts and techniques that they will encounter in the various engineering disciplines that form part of a civil engineering degree course; (2) to develop an awareness of the role of mathematics in the solution of engineering problems.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	solve problems involving differentiation and integration;
LO2	solve systems of linear equations using matrix methods;
LO3	apply vector methods to the solution of simple problems in statics and structures;
LO4	use MATLAB and write MATLAB programs to model and solve civil engineering problems;
LO5	apply statistical methods in the analysis of risk and reliability of engineering systems.

Pre-requisite learning
Module Recommendations *This is prior learning (or a practical skill) that is recommended before enrolment in this module.*
No recommendations listed
Incompatible Modules *These are modules which have learning outcomes that are too similar to the learning outcomes of this module.*
No incompatible modules listed
Co-requisite Modules
No Co-requisite modules listed
Requirements *This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.*
Bachelor of Engineering (Ordinary) in Civil Engineering

Module Content & Assessment

Indicative Content
Calculus revision (1) Product, quotient, chain rules for differentiation; (2) Implicit, parametric and logarithmic differentiation; (3) Integration using substitution, partial fractions and parts; (4) Partial differentiation.
Linear Algebra (1) Matrices and matrix operations; (2) Matrix inverses, determinants and ranks; (3) Solution of systems of linear equations; (4) Eigenvalues, eigenvectors, diagonalisation.
Vectors and Vector Calculus (1) Scalar and vector products; (2) Vector differential calculus; (3) Gradient, divergence and curl.
MATLAB (1) Introduction to MATLAB; (2) Linear algebra and matrices using MATLAB.
Statistics (1) Probability concepts and the axioms of probability; (2) Binomial, Poisson and geometric distributions; (3) The normal, exponential and uniform distributions.

Assessment Breakdown	%
Continuous Assessment	40.00%
End of Module Formal Examination	60.00%

Continuous Assessment				
Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Other	Typically end of module examinations and practical assessments.	1,2,3,4,5	40.00	n/a

No Project

No Practical

End of Module Formal Examination				
Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	Exam	1,2,3,5	60.00	End-of-Semester

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time		
Workload Type	*Frequency*	*Average Weekly Learner Workload*
Lecture	30 Weeks per Stage	2.00
Practicals	30 Weeks per Stage	1.00
Estimated Learner Hours	30 Weeks per Stage	2.00
	Total Hours	150.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_CMHCE_B	Bachelor of Engineering (Honours) in Civil Engineering - Ab Initio	5	Mandatory
CW_CMCEN_B	Bachelor of Engineering (Honours) in Civil Engineering - Add On	1	Mandatory