Module Title:	Engineering Mathematics IV
Language of Instruction:	English

Credits:	5

NFQ Level:	8

Module Delivered In	1 programme(s)

Teaching & Learning Strategies:	Lectures, practicals, private study

Module Aim:	The aim of this module is to equip students with the skills to use vector and matrix methods to model and solve civil engineering problems.

Learning Outcomes
On successful completion of this module the learner should be able to:

LO1	Use vectors to model more complicated problems involving forces and motion.
LO2	Describe the nature and behaviour of scalar and vector fields.
LO3	Use matrix methods to solve systems of linear equations and linear differential equations.
LO4	Write simple programs using MATLAB.

Pre-requisite learning
Module Recommendations *This is prior learning (or a practical skill) that is recommended before enrolment in this module.*

10415	MATH C2502	Mathematics and Statistics II

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.*
No requirements listed

Module Content & Assessment

Indicative Content

Vector methods
(a) Review of material previously covered. (b) Scalar and vector products. (c) Calculus for vector functions of a variable. (d) Application of vector methods to modelling of forces and motion.

Scalar and vector fields
(a) Scalar and vector fields. (b) Gradient, divergence and curl. (c) Application to heat and fluid flow.

Matrix methods
(a) Review of material previously covered. (b) Types of solution sets for non-homogeneous systems and homogeneous systems, overdetermined and underdetermined systems. (c) Eigenvalues and eigenvectors. (d) Using eigenvalues and eigenvectors to solve systems of linear differential equations.

Introduction to programming with MATLAB
(a) Operators and arrays. (b) Script files. (c) Function files. (d) Plotting 2-D and 3-D graphs. (d) Relational and logical operators. (e) Conditional statements and Loops.

Assessment Breakdown	%
Continuous Assessment	60.00%
Practical	40.00%

Continuous Assessment

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Examination	Class Test 1	1,2	30.00	Week 8
Examination	Class Test 2	3	20.00	Week 13
Short Answer Questions	Quiz questions	1,2,3	10.00	Ongoing

No Project

Practical

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	Assessed Practical 1	1,2,4	20.00	Week 6
Practical/Skills Evaluation	Assessed Practical 2	3,4	20.00	Week 12

No End of Module Formal Examination

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	12 Weeks per Stage	2.00
Practicals	12 Weeks per Stage	2.00
Estimated Learner Hours	15 Weeks per Stage	6.00
	Total Hours	138.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_CMHCE_B	Bachelor of Engineering (Honours) in Civil Engineering	7	Mandatory