Module Title:	Advanced Mathematics IV
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 aim of this module is to further 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	apply statistical methods in the analysis of risk and reliability of engineering systems.
LO2	formulate and solve certain types of initial value and boundary value problems encountered in a civil engineering context.
LO3	use MATLAB and write MATLAB programmes to model and solve civil engineering problems.

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.*	
No requirements listed	

Module Content & Assessment

Indicative Content
(1) Statistics (a) Linear correlation (b) Linear regression, confidence intervals and prediction intervals.
(2) Ordinary Differential Equations (a) First order differential equations. (b) Linear second order differential equations and initial value problems. (c) Free and forced vibrations, resonance and damping. (d) Boundary value problems. (e) Systems of linear first order equations.
(3) Partial Differential Equations (a) Introduction to partial differential equations. (b) Solution of boundary value problems.
(4) Numerical methods (a) Numerical solution of ordinary differential equations using MATLAB and/or Excel. (b) Introduction to finite element methods using MATLAB. (c) Numerical integration.

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 exercises.	1,2,3	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	No Description	1,2	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	1.00
Estimated Learner Hours	30 Weeks per Stage	1.50
Practicals	30 Weeks per Stage	1.00
	Total Hours	105.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_CMHCE_B	Bachelor of Engineering (Honours) in Civil Engineering - Ab Initio	7	Mandatory
CW_CMCEN_B	Bachelor of Engineering (Honours) in Civil Engineering - Add On	3	Mandatory

Module Delivered In

Programme Code	Programme	Semester	Delivery