MATH H3504: Advanced Mathematics II

Module Title:	Advanced Mathematics II
Credits:	10
NFQ Level:	7
Module Delivered In	1 programme(s)
Teaching & Learning Strategies:	Lectures Tutorials Private study
Module Aim:	The aims of the module are: (1) to equip students with the necessary mathematical skills to participate fully on the programme; (2) to extend students' mathematical knowledge in preparation for their further studies.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	use the concepts associated with series, including the nth term, convergence, divergence etc;
LO2	to use various interpolation formulae and to use various methods for finding the roots of equations;
LO3	to solve linear equations using matrix algebra;
LO4	to apply vector methods to the solution of simple problems in engineering
LO5	to solve problems involving differentiation, integration and differential equations;
LO6	to use the theory of sampling and to set up and carry out the Z, t and $\chi 2$ tests;

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

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Module Content & Assessment

Indicative Content
(1) Numerical Methods and Equation Theory (30 hours lectures) (a) The nth term (b) The sum of n terms of Arithmetic and Geometric series (c) Sum of terms to infinity, convergence and divergence (d) Limiting values (e) Power and Maclaurin's series (f) L'Hopital's rule (g) Factors and coefficients of polynomials (h) Remainder theorem (i) Relationship between roots (j) Interpolation (k) Newton- Raphsons method (l) Gregory -Newton method.
(2) Matrix Algebra (20 hours lectures) (a) Review of material previously covered (b) Solution of linear systems by Gaussian elimination (c) Applications.
(3) Vectors (10 hours lectures a) representation of vectors, addition and subtraction b) vectors in Cartesian components c) applications
(4) Calculus (30 hours lectures) (a) Review of material previously covered (b) Further Integration and differentiation (c) Solution to 1st order and 2nd order differential equations (d) Partial differentiation.
(5) Statistics (30 hours lectures) (a) Review of material previously covered (b) Sampling theory (c) Confidence intervals for Mean (d) Proportion (e) Difference in means and proportion (f) Hypothesis testing (g) Z-test, t-test and χ2-test

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*
Examination	Typically end of module examinations	1,2,3,4,5,6	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	1,2,3,4,5,6	60.00	End-of-Semester

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

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Module Workload

Workload: Full Time		
Workload Type	*Frequency*	*Average Weekly Learner Workload*
Lecture	30 Weeks per Stage	4.00
Estimated Learner Hours	30 Weeks per Stage	4.00
	Total Hours	240.00

Module Delivered In

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