MATH H2507: Advanced Mathematics I

Module Title:	Advanced Mathematics I

Credits:	10

NFQ Level:	6

Module Delivered In	1 programme(s)

Teaching & Learning Strategies:	Lectures, Tutorials and Private study

Module Aim:	The aim of the module is to further develop students' mathematical and statistical skills and reasoning and to enable them to apply these skills to engineering applications.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Evaluate the determinants and determine the inverses of 2nd and 3rd order matrices and use the matrix inverse to solve linear systems.
LO2	Describe basic concepts in statistics and apply statistical skills to explore data numerically and graphically.
LO3	Calculate probabilities and interpret and apply probability distribution functions to appropriate experiments.
LO4	Apply calculus to a variety of engineering applications such as calculation of volumes, summations, local maxima and minima etc.

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) Matrices & Determinants (25 hours lectures) (a) Evaluation of 2nd & 3rd order determinants (b) Inverse of 2nd & 3rd order matrices (c) Solving linear systems using these theories
(2) Regression Analysis (15 hours lectures) (a) Calculations of the correlation coefficient and the regression line equation. Plotting scatter points and the regression line, Interpolating and Extrapolating using the equation and or the regression line. Using Excel to generate regression lines and correlation data. (b) Draw and interpret the shape of histograms, ogives and boxplots. Calculate and interpret the variance and standard deviation.
(3) Probability (25 hours lectures) (a) Use the laws of probability. Interpret contingency tables. Calculate conditional probability. (b) Describe Normal, Binomial and Poisson distributions and determine probabilities for appropriate experiments/events using them as an appropriate model.
(4) Calculus (25 hours lectures) (a) Differentation using the product rule, quotient rule and chain rule. (b) Applications of differentiation to practical engineering problems. (c) Integration of the more common engineering functions using the tables (d) Integration by substitution, parts and partial fractions (e) Basic engineering applications of 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	Continuous Assessment	1,2,3,4	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	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	3.00
Estimated Learner Hours	30 Weeks per Stage	5.33
	Total Hours	250.00

Module Delivered In

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