Module Title:	Mathematics 1
Language of Instruction:	English

Credits:	10

NFQ Level:	6

Module Delivered In	No Programmes

Teaching & Learning Strategies:	This module will be delivered using a mixture of lectures and tutorials. The Institute Managed Learning Environment will be used to interactively communicate with students e.g. tutorial sheets, on-line tests, discussion forums, reference information.

Module Aim:	To give the students the knowledge, competencies and skills necessary to support the mathematical procedures encountered in the other modules of this programme.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Apply fundamental algebra theory to solve different types of problems, equations and formulae.
LO2	Produce and interpret graphs; analyse various mathematical functions.
LO3	Prove trigonometric identities and solve triangles.
LO4	Solve problems using complex numbers and apply De Moivre's theorem.
LO5	Apply appropriate rules and methods to differentiate various functions and solve calculus 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
Basic Algebra • Apply rules of precedence in calculation • Use calculator • Apply rules of indices • Convert units and use prefixes • Add, subtract, multiply fractions and algebraic expressions • Factorise algebraic expressions • Solve simple equations, simultaneous and quadratic equations • Transpose formulae • Use log laws and solve log and exponential equations • Form Partial Fractions • Convert between the following number bases: decimal, binary, octal, hexadecimal • Represent negative numbers in the binary system • Use and apply permutations and combinations.
Graphs and Functions • Plot and note properties of straight line and quadratic graphs • Plot and note properties of log and exponential graphs • Prove laws using linear graphs • Use and apply graphs in engineering applications.
Trigonometry and Waveforms • Solve right-angled triangles using Pythagoras' theorem, trigonometric ratios sine, tangent and cosine and the inverse trigonometric functions • Use the sine and cosine rules in the solution of non-right angled triangles • Use degree and radian measure • Verify trigonometric identities involving all six trigonometric ratios, compound angle formulae and sums and products of sines and cosines • Apply identities e.g. electrical principles and communications • Sketch graphs of waves including amplitude, period, frequency, phase angle, wave addition • Use wave theory and apply it to electrical/electronic principles and mechanics.
Complex Numbers • Represent complex numbers in Cartesian and polar form • Convert from one form to the other • Understand phasors • Add, subtract, multiply and divide complex numbers in Cartesian form • Multiply and divide complex numbers in polar • Use De Moivre's Theorem for powers and roots of complex numbers.
Differential Calculus • Evaluate simple limits • Differentiate simple polynomial functions from first principles • Differentiate by rule algebraic, trigonometric, exponential and logarithmic functions using chain, product and quotient rules • Apply the derivative as a rate of change and as the slope of the tangent to a curve.

Assessment Breakdown	%
Continuous Assessment	30.00%
End of Module Formal Examination	70.00%

Continuous Assessment				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Other	Each student will be obliged to complete a continuous assessment programme for which 30% will be awarded. This will involve class tests and other assigned tasks.	1,2,3,4,5	30.00	n/a

No Project

No Practical

End of Module Formal Examination				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	Each student will sit a formal written examination at the end of the module for which 70% will be awarded.	1,2,3,4,5	70.00	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	Every Week	3.00
Independent Learning	Every Week	3.00
Tutorial	Every Week	1.00
	Total Hours	7.00