Module code	SM-1201			
Module Title	Mathematical Methods for the Sciences			
Degree/Diploma	Bachelor of Science (Mathematics)			
Type of Module	Major Core			
Modular Credits	4	**Total student Workload**	10	hours/week
		Contact hours	4	hours/week
Prerequisite	A-Level Mathematics or equivalent			
Anti-requisite	None			

Aims

This is a foundation courses in Mathematics which aims to broaden the concepts and techniques of A-level mathematics so as to provide an extensive toolkit for solving problems in applied mathematics and the physical sciences.

Learning Outcomes

On successful completion of this module, a student will be expected to be able to:

Lower order :	30%	-recall college-level pre-calculus algebra and functions.
		- define differentiation and integration.
Middle order :	60%	- manipulate complex numbers and use them to solve polynomial equations
		- apply vector algebra to solve problems involving lines and planes and other 3-dimensional geometry
		- manipulate and invert square matrices and use them to solve simple systems of linear equations
		- understand the precise definition of a limit, continuity and the derivative
		- calculate the limits of standard functions
		- show that a given function is continuous at a given point
		- apply the technique of differentiation to maximise and minimize functions and identify the important features of their graphs
		- apply the technique of integration to integrate a wide range of functions
Higher order:	10%	- apply and choose the appropriate mathematical methods to a wide variety of real–world problems especially in science
		- work independently

Module Contents

 - Revision of pre-calculus algebra and function theory
 - Complex numbers: modulus, argument and complex conjugate; multiplication and division of complex numbers; de Moivre's theorem and its applications in solving polynomial equations
 - Vector algebra: scalar, dot and cross products, norm and unit vectors; use of vectors to define lines, planes and spheres; finding distances from a point to a line, a point to a plane, a line to a line and a line to a plane
 - Matrices: matrix transpose and matrix inverse; determinant, systems of linear equations
 - Limits: limits of functions; continuous functions; one-sided limits; limits at infinity
 - Differentiation: standard derivatives, application to finding maxima and minima, curve tracing; l'Hopital's rule
 - Integration: integral as anti-derivative; integration by substitution and by parts; improper integrals

Assessment	Formative assessment	Tutorial and feedback	
	Summative assessment	Examination: 60%	
		Coursework: 40%	
		- 4 class tests (40%)	