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	TG-1101 Mathematics for Engineering I ZZ-1104 Essential Mathematics for Digital Science			

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%)