

Module code	SM-1202		
Module Title	Advanced 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	SM-1201 Mathematical Methods for the Sciences		
Anti-requisite	TG-2101 Mathematics for Engineering II		
Aims			
This is the second of two foundation courses in Mathematics which aim 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			
<i>On successful completion of this module, a student will be expected to be able to:</i>			
Lower order :	30%	<ul style="list-style-type: none"> - identify sequences and series - recall the techniques of finding limits and use them to calculate the limits of a wide range of sequences - understand what is meant by double integrals 	
Middle order :	60%	<ul style="list-style-type: none"> - apply a number of standard tests to identify convergent and divergent infinite series - generate the Taylor series and Fourier series corresponding to standard mathematical functions - apply various advanced techniques to evaluate an extensive range of proper and improper integrals specifically methods of partial fraction and t-substitution for rational function - evaluate double integrals in Cartesian coordinates and apply it in finding areas and volume - reverse the order of integration in double integrals 	
Higher order:	10%	<ul style="list-style-type: none"> - to perform the correct methods for test of convergence of infinite series - apply and choose the appropriate mathematical methods to a wide variety of real-world problems especially in science - work independently 	
Module Contents			
<ul style="list-style-type: none"> - Sequences: limits of sequences; monotone sequences and bounded sequences; squeezing theorem - Series: convergence of infinite series; power series; Taylor Series - Fourier Series: determining Fourier coefficients; identification of odd and even functions - Further techniques of integration: method of partial fraction and t-substitution; areas of surfaces of revolution and volumes of solids of revolution - Double integrals: Double integrals over rectangular regions; double integrals over non-rectangular regions; changing the order of integration; application to areas and volumes 			
Assessment	Formative assessment	Tutorial and feedback.	
	Summative assessment	Examination: 60% Coursework: 40% - 4 class tests (40%)	