

Module code	SM-4325		
Module Title	Integral Equations		
Degree/Diploma	Bachelor of Science (Mathematics)		
Type of Module	Major Option		
Modular Credits	4	Total student Workload	10 hours/week
		Contact hours	4 hours/week
Prerequisite	SM-2203 Linear Algebra and its Applications		
Anti-requisite	None		
Aims			
To study properties of Fredholm Integral equations and methods of their solution.			
Learning Outcomes			
<i>On successful completion of this module, a student will be expected to be able to:</i>			
Lower order :	40%	- know basic principles of functional analysis	
Middle order :	40%	-find exact and approximate solutions for classes of integral equations	
Higher order:	20%	- investigate Fredholm properties and solvability of some classes integral equations	
Module Contents			
<ul style="list-style-type: none"> - Normed spaces. Completeness. Banach Spaces. Spaces with inner product. Hilbert Spaces. - Linear operators. Boundedness and continuity. Space of bounded linear operators $B(X)$. - Series in $B(X)$. Invertibility. Banach theorem. Spectral radius. Integral operators and their norms. - Fixed point theorem. Volterra integral equations. Solvability and uniqueness of solutions. - Connections between Volterra and Fredholm integral equations. - Fredholm equations with bounded kernels. Resolvent and iterated kernels. Equations with square summable kernels. Equations with degenerate kernels. Solution of Fredholm equations with degenerate kernels. - Fredholm theory for equations with degenerate kernels. Summable kernels. Hilbert-Schmidt theory. Integral equations with weakly singular kernels. 			
Assessment	Formative assessment	Tutorial and feedback.	
	Summative assessment	Examination: 60% Coursework: 40% - 1 class test (20%) - 1 assignment (20%)	