

B. Sc. (Information Technology)		Semester – III	
Course Name: Applied Mathematics		Course Code: USIT305	
Periods per week (1 Period is 50 minutes)		5	
Credits		2	
		Hours	Marks
Evaluation System	Theory Examination	2½	75
	Internal	--	25

Unit	Details	Lectures
I	<p>Matrices: Inverse of a matrix, Properties of matrices, Elementary Transformation, Rank of Matrix, Echelon or Normal Matrix, Inverse of matrix, Linear equations, Linear dependence and linear independence of vectors, Linear transformation, Characteristics roots and characteristics vectors, Properties of characteristic vectors, Caley-Hamilton Theorem, Similarity of matrices, Reduction of matrix to a diagonal matrix which has elements as characteristics values.</p> <p>Complex Numbers: Complex number, Equality of complex numbers, Graphical representation of complex number(Argand's Diagram), Polar form of complex numbers, Polar form of $x+iy$ for different signs of x,y, Exponential form of complex numbers, Mathematical operation with complex numbers and their representation on Argand's Diagram, Circular functions of complex angles, Definition of hyperbolic function, Relations between circular and hyperbolic functions, Inverse hyperbolic functions, Differentiation and Integration, Graphs of the hyperbolic functions, Logarithms of complex quality, $j(=i)$ as an operator(Electrical circuits)</p>	12
II	<p>Equation of the first order and of the first degree: Separation of variables, Equations homogeneous in x and y, Non-homogeneous linear equations, Exact differential Equation, Integrating Factor, Linear Equation and equation reducible to this form, Method of substitution.</p> <p>Differential equation of the first order of a degree higher than the first: Introduction, Solvable for p (or the method of factors), Solve for y, Solve for x, Clairaut's form of the equation, Methods of Substitution, Method of Substitution.</p> <p>Linear Differential Equations with Constant Coefficients: Introduction, The Differential Operator, Linear Differential Equation $f(D) y = 0$, Different cases depending on the nature of the root of the equation $f(D) = 0$, Linear differential equation $f(D) y = X$, The complimentary Function, The inverse operator $1/f(D)$ and the symbolic expiration for the particular integral $1/f(D) X$; the general methods, Particular integral : Short methods, Particular integral : Other methods, Differential equations reducible to the linear differential equations with constant coefficients.</p>	12
III	<p>The Laplace Transform: Introduction, Definition of the Laplace Transform, Table of Elementary Laplace Transforms, Theorems on Important Properties of Laplace Transformation, First Shifting</p>	12

	Theorem, Second Shifting Theorem, The Convolution Theorem, Laplace Transform of an Integral, Laplace Transform of Derivatives, Inverse Laplace Transform: Shifting Theorem, Partial fraction Methods, Use of Convolution Theorem, Solution of Ordinary Linear Differential Equations with Constant Coefficients, Solution of Simultaneous Ordinary Differential Equations, Laplace Transformation of Special Function, Periodic Functions, Heaviside Unit Step Function, Dirac-delta Function(Unit Impulse Function),	
IV	Multiple Integrals: Double Integral, Change of the order of the integration, Double integral in polar co-ordinates, Triple integrals. Applications of integration: Areas, Volumes of solids.	12
V	Beta and Gamma Functions – Definitions, Properties and Problems. Duplication formula. Differentiation Under the Integral Sign Error Functions	12

Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	A text book of Applied Mathematics Vol I	P. N. Wartikar and J. N. Wartikar	Pune Vidyathi Graha		
2.	Applied Mathematics II	P. N. Wartikar and J. N. Wartikar	Pune Vidyathi Graha		
3.	Higher Engineering Mathematics	Dr. B. S. Grewal	Khanna Publications		