Program	MASTER OF SCIENCE (INFORMATION TECHNOLOGY) - INTEGRATED (IMSc-IT)	**Semester - 1**
Type of Course	Multidisciplinary	
Prerequisite		
Rationale	-	
Effective From A.Y.	2025-26	

Teaching Scheme (Contact Hours)				Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
Lecture	Tutorial	Lab	Credit	SEE	IAT	SEE	CCE	
3	-	-	3	70	30	-	-	100

***SEE** - Semester End Examination, **IAT** - Internal Assessment Test, **CCE** - Continues & Comprehensive Evaluation*

Course Content

T - Teaching Hours | **W** - Weightage

Sr.	Topics	T	W
1	**Set and Function** **Set:** Basic Concepts of Set Theory: Definitions, Representation, Inclusion, Equality of Sets. Types of Set, Operations on Sets. Venn Diagrams, Cartesian product. **Functions:** Introduction & definition, Co-domain, range, image value of a function. Types of Functions. Identity map, Composition of functions, Properties of Composite functions. Condition of a function to be invertible, Inverse function, Inverse of composite functions	8	15
2	**Matrices** Basic concept of Matrices, Order and properties of Matrices, Types of Matrices, Operation on Matrices, Elementary row and column operations on a matrix, Rank of matrix, Normal form, Inverse of a matrix using elementary operations, Consistency and solutions of systems of linear equations using elementary operations.	8	15
3	**Determinant** Determinants and their properties, Cramer's rule.	2	10
4	**Eigen Values, Eigen Vectors, Canonical form and Diagonalization** Characteristic roots and vectors of a matrix, Caley-Hamilton theorem and its applications, Complex matrices, Hermitian and Unitary Matrices, Reduction to diagonal form, Reduction of a quadratic form to canonical form, orthogonal transformation and congruent transformation, Diagonalization.	10	25
5	**Introduction to Calculus** Basic concepts of Limit, Continuity and Derivatives, Derivatives of Composite and Implicit functions. Trigonometric functions and its derivatives, Second ordered Derivatives.	8	15
6	**Differential Calculus** Rolle's theorem; Mean value theorem; Taylor's and Maclaurin's theorems with remainders, Expansions; Indeterminate forms; Functions of several variables, Partial Differentiation, Total Differentiation, Euler's theorem and generalization, maxima and minima of functions of several variables (two and three variables).	9	20
	Total	45	100

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application	Analyze	Evaluate	Create
Weightage	15	35	50	0	0	0

NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes

At the end of this course, students will be able to:	
CO1	Recall and define fundamental concepts of set theory and explain the concept of functions.
CO2	Apply matrix operations to solve problems involving types and properties of matrices.
CO3	Apply properties of determinants to simplify computations and solve systems of linear equations using Cramer's Rule.
CO4	Apply concept of linear algebra such as eigenvalue, eigen vector, Canonical from, Diagonalization.
CO5	Learn the concept of Limit, Continuity, Differentiability.
CO6	Compute the power series expansion of a function and the maxima and minima of function of two variables.

Reference Books

1.	**Advanced Engineering Mathematics** By H. K. Dass | S. Chand
2.	**Advanced Engineering Mathematics** By Kreyszig, Erwin | John Wiley & Sons. INC.
3.	**Discrete Mathematical Structures with Applications to Computer Science** By J. P. Tremblay and R. Manohar | Tata McGraw-Hill
4.	**A Text Book of Discrete Mathematics** By Swapan Kumar Sarkar | S. Chand
5.	**Higher Engineering Mathematics** By B. S. Grewal | Khanna Publication