UNIVERSITY OF MADRAS
MASTER OF COMPUTER APPLICATIONS (MCA) DEGREE PROGRAMME
SYLLABUS WITH EFFECT FROM 2023-2024

Title of the Paper	**Discrete Mathematics**		
Core - I Theory	I Year & I Semester	Credit:4	435C1A

Course Objective

- To know the concepts of relations and functions
- To distinguish among different normal forms and quantifiers
- To solve recurrence relations and permutations & combinations
- To know and solve matrices , rank of matrix & characteristic equations
- To study the graphs and its types

Unit I: Relations- Binary Relations-Operations on relations- properties of binary relations in a set – Equivalence relations— Representation of a relation by a matrix -Representation of a relation by a digraph – Functions-Definition and examples-Classification of functions-Composition of functions-Inverse function

Unit II: Mathematical Logic-Logical connectives-Well formed formulas – Truth table of well formed formula –Algebra of proposition – Quine's method- Normal forms of well formed formulas- Disjunctive normal form-Principal Disjunctive normal form-Conjunctive normal form-Principal conjunctive normal form-Rules of Inference for propositional calculus – Quantifiers-Universal Quantifiers- Existential Quantifiers

Unit III: Recurrence Relations- Formulation - solving recurrence Relation by Iteration- solving Recurrence Relations- Solving Linear Homogeneous Recurrence Relations of Order Two-Solving Linear Non homogeneous Recurrence Relations. Permutations-Cyclic permutation-Permutations with repetitions- permutations of sets with indistinguishable objects-Combinations- Combinations with repetition

Unit IV: Matrices- special types of matrices-Determinants-Inverse of a square matrix-Cramer's rule for solving linear equations-Elementary operations-Rank of a matrix-solving a system of linear equations-characteristic roots and characteristic vectors-Cayley-Hamilton Theorem-problems.

Unit V: Graphs - Connected Graphs - Euler Graphs - Euler line - Hamiltonian circuits and paths - planar graphs - Complete graph - Bipartite graph-Hyper cube graph-Matrix representation of graphs

Text book

1. N.Chandrasekaran and M.Umaparvathi, Discrete Mathematics, PHI Learning Private Limited, New Delhi, 2010.

Reference Book

1. Kimmo Eriksson &Hillevi Gavel, Discrete Mathematics & Discrete Models, Studentlitteratur AB, 2015.

2. Kenneth H. Rosen Discrete Mathematics and applications, Mc Graw Hill, 2012

Course Outcomes

On the successful completion of the course, students will be able

CO1	To understand the concepts of relations and functions distinguish among normal forms	K2	IO
CO2	To analyze and evaluate the recurrence relations	K4,K5	HO
CO3	To distinguish among various normal forms and predicate calculus	K5	HO
CO4	To solve and know various types of matrices	K1	LO
CO5	To evaluate and solve various types of graphs	K5	HO

K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5- Evaluate, K6- Create

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	M	S	S	S	S	M
CO2	S	S	S	M	S	S	S	S	S	S
CO3	S	M	S	S	M	S	M	S	S	M
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	S	S	S	S	S	S	M

S- Strong; M-Medium; L-Low