

Devi Ahilya University, Indore, India Institute of Engineering & Technology			MSc – I Year (Applied Mathematics) with Specialization in Computing & Informatics Semester- I				
Subject Code & Name	Instructions Hours per Week			Credits			
AM1PC2: Discrete Mathematics	L	T	P	L	T	P	Total
Duration of Theory Paper: 3 Hours	3	1	-	3	1	-	4

Objective: To provide the fundamentals of formal techniques for solve the problems in computational domain and algorithm development.

Prerequisite(s): NIL

COURSE OF CONTENTS

UNIT I

Set Theory: Operation and Algebra; Principle of Inclusion and Exclusion; Computer Representation.

Proposition Logic: Logic Connectives; Truth Tables; Propositional equivalences, predicates, Quantifiers, Method of Proof.

Mathematical induction: Strong induction; Well-ordering; Recursive definitions, Structural Induction.

UNIT II

Counting Techniques: Law of Product and Sum; Permutation, Combination, Pigeon Hole Principle; Tree Diagram. **Function:** Types of Functions; Hashing.

Application of Group theory: Group Coding.

UNIT III

Relations: Binary Relation and Properties; n-ary relation and their applications to Databases, Closures of relations; Equivalence, Partial ordered and Compatible relations, Lattices.

Boolean algebra: Gate Algebra; Logic Algebra; Switching Algebra.

UNIT IV

Graph Theory: Terminology; Graph Representation; Graph isomorphism; Connectedness; Euler and Hamilton Graphs; Shortest Paths, Planar graphs, Euler's formula, Kuratowski's theorem. Graph colouring, chromatic number,

Trees: Terminology; Tree Traversals; Prefix Codes; Spanning Trees.

UNIT V

Overview of the topics: Automata & Grammar; Analysis of algorithms; Fuzzy logic.

Recurrence Relations: Solution of Homogeneous and non-homogeneous recurrence relation with constant coefficients using Boole's operator method, method of undetermined coefficients and generating functions. Simultaneous recurrence relation.

BOOKS RECOMMENDED:

- [1] Kenneth H. Rosen, Discrete Mathematics and its Applications, 7th ed., Tata McGraw-Hill Edition 2007.
- [2] Kolman, Busby & Ross, Discrete Mathematical Structures, 6th edition, Pearson Education, 2008.
- [3] C.L.Liu, Introduction to Discrete Mathematics, McGraw Hill, 1986.
- [4] Trembley and Manohar, Discrete Mathematical structures for Computer Science, McGraw Hill, 1986.
- [5] Narsingh Deo, Graph Theory with Applications to Engineering. & Computer Science, 4th ed., Prentice Hall of India, 2004.