DISCRETE MATHEMATICAL STRUCTURES

B.Tech. II Year I - Semester

Common for CSE & IT

[R-15 Regulation]

Credits	Periods			Exam Hrs.	Sessional Marks	Exam Marks	Total Marks
	Theory	Tutorial	Lab				
4	3	1	-	3	40	60	100

Course Objective:

The knowledge of Mathematics is necessary for a better understanding of almost all the Engineering and Science subjects. Here our intention is to make the students acquainted with the concept of basic topics from Mathematics, which they need to pursue their engineering degree in different disciplines.

Course Outcomes : At the end of the course, the student will be able to

1	Understand set theory, relations , mathematical logic , mathematical reasoning and to study about the validity of the arguments.
2	Apply basic counting techniques to solve combinatorial problems.
3	Understand Recurrence Relation, Generating functions and solving problems involving recurrence equations.
4	Familiarize the different types of binary relations and related algorithms on transitive closure.
5	Familiarize with the applications of graphs , trees and algorithms on minimal spanning tress.

CO – PO Mapping :

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO-1	**3**	**2**										**1**
CO-2	**3**	**2**										**1**
CO-3	**3**	**2**										**1**
CO-4	**3**	**2**										**1**
CO-5	**3**	**2**										**1**

SYLLABUS

UNIT-I : MATHEMATICAL LOGIC (15 Periods)

Sets – Operations on sets – Relations – Functions – Fundamentals of logic – Logical inferences – Methods of proof of an implication – First order logic and other methods proof – Rules of inference for quantified propositions – Mathematical induction.

UNIT-II: ELEMENTARY COMBINATORICS (08 Periods)

Basics of counting – Combinations and permutations – Their enumeration with and without repetition – Binomial coefficients – Binomial and multinomial theorems – The principle of inclusion – exclusion.

UNIT-III: RECURRENCE RELATIONS (08 Periods)

Generating functions of sequences – Calculating their coefficients – Recurrence relations – Solving recurrence relations – Method of characteristic roots – Non-homogeneous recurrence relations and their solutions.

UNIT-IV: RELATIONS AND DIGRAPHS (09 Periods)

Relations and directed graphs – Special properties of binary relations – Equivalence relations – Ordering relations – Lattices and enumeration – Operations on relations – Paths and closures – Directed graphs and adjacency matrices.

UNIT V : GRAPHS (20 Periods)

Introduction to graphs – Types of graphs – Graphs basic terminology and special types of simple graphs – Representation of graphs and graph isomorphism – Euler paths and circuits – Hamilton paths and circuits – Planar graphs – Euler's formula.

Introduction to trees and their properties – Spanning trees – Depth first search(DFS), Breadth first search(BFS) – Minimum spanning trees – Kruskal's algorithm and Prim's algorithm.

TEXT BOOK:

1). **Joe L. Mott, Abraham Kandel & T. P. Baker**, "*Discrete Mathematics for Computer Scientists & Mathematicians*" , Prentice Hall of India Ltd, New Delhi.

REFERENCE BOOKS:

1) **Keneth. H. Rosen**, "*Discrete Mathematics and its applications*", Tata McGraw- Hill Publishing Company, New Delhi

2) **Richard Johnsonbaug,** "*Discrete Mathematics*", Pearson Education, New Delhi.