Discrete Structure and Graph Theory [DSGT]

S.E. Sem. III [CMPN]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical and Oral Exam	–	–
Oral Exam	–	–
Term Work	–	25

SYLLABUS

1. **Set Theory**
   Sets, Venn diagrams, Operations on sets; Laws of set theory, Power set and products; Partitions of sets, The Principle of Inclusion-Exclusions.

2. **Logic**
   Propositions and logical operations, Truth tables; Equivalence, Implications; Laws of logic, Normal Forms; Predicates and Quantifiers; Mathematical Induction.

3. **Relations, Diagraph and Lattices**
   Relations, paths and digraphs; Properties and types of binary relations; Manipulation of relations, closures, Warshall's algorithm; Equivalence and Partial ordered relations; Posets and Hasse diagram; Lattice.

4. **Functions and Pigeon Hole Principle**
   Definition and types of functions : injective, surjective and bijective; Composition, identity and inverse; Pigeon-hole principle.

5. **Graphs**
   Definition; Paths and circuits : Eulerian, Hamiltonian; Planer graphs, Graph coloring; Isomorphism of Graphs; Traveling salesperson problem

6. **Trees**
   Trees, Rooted tree and path length in rooted tree; Spanning tree and minimum spanning tree; Isomorphism of trees; Weighted Trees and Prefix Codes.

7. **Algebraic Structures**
   Algebraic structures with one binary operation-semigroups, monoids and groups; Product and quotient of algebraic structures; Isomorphism, homomorphism, automorphism; Cyclic Groups, Normal subgroup, Codes and group codes; Algebraic structures with two binary operations- rings, integral domains and fields; Ring Homomorphisms and Isomorphisms

8. **Generating Functions and Recurrence Relations**
   Series and Sequences; Generating functions; Recurrence relations; Applications: Solving Differential equations, Fibonacci

References :

1. Discrete and Combinatorial Mathematics (*Ralph P. Grimaldi, B. V. Ramana*) – Fifth Edision, Pearson Education.
2. Discrete Mathematical Structures (*Bernard Kolman, Robert C. Busby, Sharon Cutler Ross, Nadeem–ur–Rehman*) – Pearson Education.
3. Discrete Mathematical Structures (*D. S. Malik and M. K. Sen*), Thomson.
4. Discrete Mathematics and its Applications (*Kenneth H. Rosen*) – Tata McGraw Hill.
5. Discrete Mathematics for Computer Science (*Garry Haggard, John Schlipf, Sue Whitesides*) – Thomson.
6. Discrete Mathematics for Computer Scientist and mathematicians – (*Joe Mott, Abraham Kandel and Theodore Baker*) Second Edition PHI.
7. Discrete Mathematics – (*Richard Johnsonbaugh*) – Pearson Education.
8. Elements of Discrete Mathematics (*C. L. L_{iu}*) – Tata McGRAW Hill

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