B.Tech. II (CO) Semester - 3	L	T	P	C
MH203 : DISCRETE MATHEMATICS (IS-III)	3	1	0	4

COURSE OUTCOMES

After successful completion of this course, student will be able to

- Understand discrete mathematical preliminaries.
- Apply discrete mathematics in formal representation of various computing constructs
- Recognize the importance of analytical problem solving approach in engineering problems.

COURSE CONTENT

- **Graph Theory** **(08 Hours)**

Graphs, Definition & basic concepts of finite & infinite graph, Incidence & Degree, Isomorphism, Subgraph, Walk, Path & circuits, Operations on graphs, connected graph, Disconnected graph & components, Complete graph, Regular graph, Bipertite graph, Euler's graph, Hamiltonian paths & Circuits, Weighted graphs, Applications, Directed & Undirected graphs, Connectivity of graphs.

- **Trees** **(06 Hours)**

Definition & properties of trees, Pendent vertices in a tree, Distance between two vertices Centre, Radius & diameter of a tree, Rooted & binary trees, Representation of Algebraic structure by Binary trees, Binary search trees, Spanning trees & fundamental circuits.

- **Relation & Lattices** **(08 Hours)**

Definition & Basic properties, Graphs of relation, Matrices of relation, Equivalence relation, Equivalence classes, Partition, Partial ordered relation, Posets, Hasse diagram, Upper bounds, Lower bound, GLB & LUB of sets, Definition & properties of Lattice, Sub lattice, Distributive & modular lattices, complemented & Bounded Lattices, complete lattices & Boolean algebra

- **Group theory** **(08 Hours)**

Basic properties of Group, Groupoid, semigroup & monoid, Abelian group, Subgroup, Cosets, Normal subgroup, Lagrange's theorem, Cyclic group, Permutation group, Homomorphism & Isomorphism of groups, Basic properties, error correction & detection code.

- **Mathematical logic and Program verification** **(12 Hours)**

Propositions, logical operators & propositional algebra, Predicates & quantifiers, Interaction of quantifiers with logical operators, Logical interference & proof techniques, Formal verification of computer programs (elements of Hoare logic).

- Tutorials will be based on the coverage of the above topics separately **(14 Hours)**

(Total Contact Time: 44 Hours + 14 Hours = 58 Hours)

BOOKS RECOMMENDED

1). Rosen K.H., "Discrete Mathematics and Its Applications", 6/E, MGH, 2006.
2). Kolman B., Busby R.C. & Ross S., "Discrete Mathematical Structure", 5/E, PHI, 2003.
3). Tremblay J. P. & Manohar R., "Discrete Mathematical structure with applications to computer science", MGH, 1999.
4). Deo Narsingh., "Graph theory with applications to Engineering & Computer Science", PHI, 2000.
5). Liu C.L., "Elements of Discrete Mathematics", MGH, 2000.