MATHEMATICS III :

DISCRETE MATHEMATICS

Semester III

SUBJECT CODE: CC 301 B

Teaching Scheme (Credits and Hours)

Teaching scheme				Total Credit	Evaluation Scheme					
L	T	P	Total		Theory		Mid Sem Exam	CIA	Pract.	Total
Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	Marks
03	02	00	05	05	03	70	30	20	00	120

Total hours (Theory): 45

Total hours (Tutorial): 30

Total hours: 75

Detailed Syllabus

Unit No	Topics	Lectures (Hours)	Weightage
1	**Introduction and Pre-requisites:Set, Relation & Function** : Set-representation of a set, Operation on sets, Cartesian product, De' morgan 's law. Relation-Type of relation, composition and inverse of relation, Partial order relation Equivalence relation, Matrix and graph representation of a relation. Function-Classification of functions, Composition and inverse functions, Binary and n-ary function	4	5%
2	**Lattice theory** :Partially ordered sets,Hasse Diagrams, Lattices as poset, properties of lattices, Lattices as algebraic systems, sublattices, direct product and homomorphism, complete lattices, bounds of lattices, distributivelattice, complemented lattices.	8	15%
3	**Boolean Algebra and its Applications:**Introduction, definition and important properties of Boolean Algebra, Sub Booleanalgebra, direct product and homomorphism, join-irreducible, meet-irreducible, atoms, anti atoms, Stone's representation theorem. (Without Proof), Boolean expressions and their equivalence, Minterms and Maxterms, Sum of minterms (SoP), Product of Maxterms (PoS), Values of Boolean expression, canonical forms, Boolean functions, representation of Boolean function, Karnaugh maps, minimization of Boolean function, Quine Mccluskey algorithm	9	25%
4	**Group Theory :** Definition and examples of groups, abelian group, cyclic groups,permutation groups, subgroups & Homomorphism, Cosets and Lagrange's Theorem (without proof), Normal subgroups, Quotient Groups.	8	15%
5	**Graph Theory:** Basic concepts of Graph theory, definition of diagraph and undirected graph, sub graph, converse of diagraph, isomorphism of graphs, walk, paths and circuits, reachability and connectedness in diagraph, matrix representation of graph, trees. Graph algorithms- Dijkstra shortest path algorithm, Breadth-first search spanning tree algorithm, prim's algorithm for minimal spanning tree Networks and flow, maximal flow algorithm.	9	25%
6	**Finite Automata and formal languages**: Finite Automata and regular languages, Finite state machines with input and output, Grammars and languages.	7	15%
	Total	**45**	100%

Text Books:

1. “Discrete Mathematical Structures with Applications to Computer Science”, J. P. Tremblay and R.Manohar ,Tata McGraw-Hill.

2. “Discrete Mathematical Structure”, D. S. Malik, M. K. Sen, Cengage Learning.

3.“Elements of Discrete Mathematics ”, C L Liu, D P Mohapatra, Tata McGraw-Hill.

Reference Books:

1. “Discrete Mathematics and its applications”, 6th edition, K. H. Rosen. Tata McGraw-Hill

2. “Discrete Mathematical Structure”, Bernard Kolmann& others, Sixth Edition ,Pearson Education.

3. “ Discrete Mathematics with Graph Theory”, Edgar G. Goodaire, Michael M. Parmenter. PHI,

4. “Logic and Discrete Mathematics”, , J. P. Tremblay and W. K. Grassman, Pearson Education.

List of Tutorials

Sr. No.	Tutorial Content
1	Problem solving on "**Introduction and Pre-requisites:Set, Relation & Function".**
2	Problem solving on "**Lattice theory"**
3	Assignment on "**Boolean Algebraand its Applications".**
4	Assignment on "**Group Theory".**
5	Problem solving on "**Graph Theory"**
6	Assignment on **"Finite Automata and formal languages".**