Semester I

(B.CA.,)

Mathematical Foundations for Computer Science

Unit I :Set theory

Introduction-Set and its Elements-Set Description-Types of sets-Venn-Euler Diagrams- Set operations & Laws of set theory-Fundamental products-partitions of sets- Algebra of sets and Duality-Inclusion and Exclusion principle

Unit II :Propositional Logic

Introduction- propositional logic–Basic logical operations- Tautologies-Contradiction-Argument-Method of proof- Predicate calculus.

Unit III: **Mathematical Induction and Recurrence Relations**

Mathematical induction-Recurrence-An Introduction-Recurrence Relations-Solution of finite order homogenous (Linear) relations.

Unit IV: **Algebraic System**

Introduction to Algebraic system-Binary operations – Group-sub groups - Order of a group– cyclic group-permutation group (simple problems)-Lagrange's theorem-Normal Sub group

Unit V :Graph Theory

Basic terminology – paths, cycle & Connectivity – Sub graphs - Types of graphs – Representation of graphs in computer memory - Trees – Properties of trees – Binary trees – traversing Binary trees – Spanning trees (Definition only) - Minimal Spanning Tree –PRIM's and Kruskal's Algorithm - Shortest path problem -Dijkstra's Algorithm.

Text Books:

1. P.R. Vittal, Mathematical Foundations, Margham Publications, Chennai
2. Kenneth H.Rosen, Discrete Mathematics and its Applications, 6th Edition, Tata McGraw Hill, New Delhi (2007)

3. M.K. Venkataraman, N.Sridharan, N. Chandarasekaran, Discrete Mathematics, The National Publishing Company , Chennai.

References:

1. J.P.Tremblay R. Manohar, Discrete Mathematics Structures with Applications to Computer Science, McGraw Hill International Edition.
2. Srimanta Pal, Subodh C. Bhunia, Engineering Mathematics, Oxford University Press
Free online resources available.