

Course Description:**Batch :** S3 BCA**Pre-requisite:** High School Mathematics, Foundations in Applied Mathematics part 1 and 2

Discrete Mathematics is regarded as the language of computer science. Anyone who aspires to excel in fields like data science, machine learning & software engineering should be fluent in this. Through a blended learning approach, students are taught in detail about Combinations, graph theory, logical statements, algebraic structures, and number theory which form the basis for many daily computations.

Syllabus:**Unit-I: Logic and Counting**

Logic: Propositional – Predicate – Truth tables - Sequences and summations - Proof methods

Counting: Sum and product rule – Inclusion exclusion principle - Pigeonhole principle – Permutations – Combinations

Unit-II: Sets and Relations

Sets: Basic operations – Union – Intersection – Cartesian product – Difference Relations: Properties of relations – Equivalence of relations – Hasse diagram

Unit-III: Graph Theory

Definition of graph – Undirected graph– Directed graph – Complete graph – Bipartite graph - Connectivity - Partitioning – Clustering – Coloring - Heuristics – Cuts – Modularity – Trees.

Unit-IV: Group

Definition of groups – Generators – Cosets – Definition of rings – Definition of Fields.

Unit-V: Number Theory

Modular arithmetic – Euclids algorithm – Prime number factorization – Inverse calculation – Chinese remainder theorem.

Textbook:

1. Rosen, Discrete Mathematics and its Applications, 7th edition, Mc Graw hill international editions.

References:

1. R. P. Grimaldi, “Discrete and Combinatorial Mathematics”, Pearson Education, Fifth Edition, 2007.
2. Thomas Koshy, “Discrete Mathematics with Applications”, Academic Press, 2005.
3. Burton, Elementary Number Theory, 7th edition, Mc Graw hill India

