DISCRETE MATHEMATICS AND GRAPH THEORY SYLLABUS

Module 1: Mathematical Logic

- Statements and Notation
- Connectives
- Tautologies
- Equivalence
- Implications
- Normal Forms
- Theory of Inference for the Statement Calculus
- Predicate Calculus
- Inference Theory of Predicate Calculus

Module 2: Algebraic Structures

- Semigroups and Monoids
- Groups
 - Subgroups
 - Lagrange's Theorem
 - Homomorphism Properties
 - Group Codes

Module 3: Counting Techniques

- Basics of Counting
- Exclusion Principle
- Pigeonhole Principle
- Permutations and Combinations
- Inclusion-Exclusion Principle
- Recurrence Relations

- Solving Recurrence Relations
- Generating Functions
- Solution to Recurrence Relations

Module 4: Lattices and Boolean Algebra

- Partially Ordered Relations
- Lattices as Posets
- Hasse Diagram
- Properties of Lattices
- Boolean Algebra
 - Properties of Boolean Algebra
 - Boolean Functions

Module 5: Fundamentals of Graphs

- Basic Concepts of Graph Theory
- Planar and Complete Graphs
- Matrix Representation of Graphs
- Graph Isomorphism
- Connectivity
- Cut Sets

Trees

- Euler and Hamilton Paths
- Shortest Path Algorithms

Module 6: Trees, Fundamental Circuits, Cut Sets

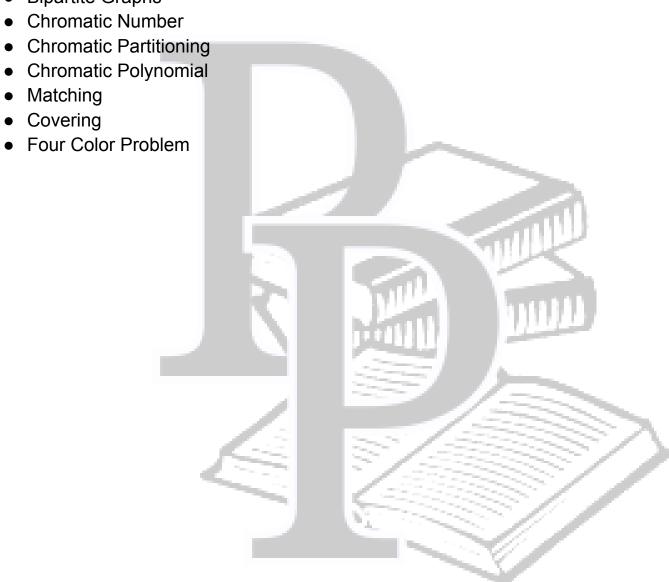
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- - Properties of Trees
 - Distance and Centers in Trees
 - Spanning Trees
 - Spanning Tree Algorithms
 - Tree Traversals

• Fundamental Circuits and Cut-Sets

Module 7: Graph Coloring, Covering, Partitioning





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