ADSP Mandal's

Mahavir Mahavidyalaya, Kolhapur

Department of Computer science

B.Sc- I(Entire)

Course Title: Mathematics Discrete Mathematics for Computer Science

Algebra

Course Teacher: Prof. Harshada K Patil
Teaching Plan 2025-26

Month	Theory Component	Practical Component
July 2025	**Admission process**	
August 2025	**Discrete Mathematics:** Functions (Definition, Types of Mapping, Injective, Surjective, Bijective), Inverse & Composition, Counting Principles (Addition, Multiplication, Permutation). **Discrete Mathematics:** Combination, Cardinality of Finite Sets, Cardinality of Union, Inclusion-Exclusion Principle, Combinatorial Arguments, Pigeonhole Principle.	Practice problems on functions & permutations. Euclidean algorithm problems. Combinatorial problems practice Assignment 1
September 2025	. **Discrete Mathematics:** Recurrence Relation (Linear, Homogeneous, Particular & Total Solution), Logic (Propositions, Truth Tables, Tautology, Logical Equivalence, Rules of Inference, Methods of Proof). **Algebra:** Congruence Relations, Fermat's Theorem (Statement), Residue Classes (mod n operations).	Proof using Truth Tables & Laws of Inference. Fermat's theorem examples. C Program: Euclidean Algorithm. Class Test + Assignment 2.
October 2025	**Algebra:** Divisibility, Division Algorithm (Statement), GCD, LCM, Euclidean Algorithm, Prime Numbers, Euclid's Lemma, Fundamental Theorem of Arithmetic. **Algebra:** Relations (Types, Equivalence, Partial Order), Digraphs, Matrix Representation, Transitive Closure (Warshall Algorithm), Boolean Algebra, Lattices, DNF & CNF.	Recurrence relation problems. Warshall algorithm practice. DNF & CNF problems C Program: GCD & LCM, Prime numbers.. C Program: Warshall Algorithm, Euler ϕ Function. Final Test / Internal Exam (CI
Course Title: Graph theory , Group and Coding theory (Sem-II)		

November	ESE Related Work	
December 2025	**Graph Theory (Unit 1):** Definition of Graphs, Types of Graphs, Isomorphism, Matrix Representation (Adjacency & Incidence), Subgraphs, Complement of Graph, Self Complementary Graphs. **Group Theory (Unit 1):** Binary Operation, Group Definition & Examples, Elementary Properties, Order of Group & Element, Examples of $(Z_n, +)$ and $(U(n), \times)$.	Problems on graph types & matrix representation. Basic group problems. C Program: Convert graph into matrix form. Assignment 1
January 2026	**Graph Theory:** Graph Operations (Union, Intersection, Ring Sum), Walk, Trail, Path, Circuit, Connected & Disconnected Graphs, Dijkstra's Shortest Path Algorithm, Connectivity (Isthmus, Cut-Vertex, Edge & Vertex Connectivity). **Group Theory:** Subgroups, Finite Subgroup Test, Subgroups of Z_n, Generator, Cyclic Groups, Finding Generators of Z_n.	Dijkstra algorithm problems. Subgroup & generator problems. C Program: Parity check (odd/even). Class Test
February 2026	**Graph Theory (Unit 2):** Trees – Definition, Properties, Theorems, Centre of Tree, Spanning Tree, Fundamental Circuit & Cut-set, Binary Trees. **Group Theory (Unit 2):** Permutation Groups (Cycle form, Order, Inverse, Even/Odd), Cosets, Lagrange Theorem (Statement), Rings, Integral Domain, Field.	Tree & spanning tree problems. Permutation problems. C Program: Cipher text conversion. Assignment 2 + MCQ Test
March 2026	**Graph Theory:** Kruskal's Algorithm, Revision of Graph Concepts. **Group Theory & Coding:** Coding Theory (Error Detection, Decoding, Public Key Cryptography), Revision of Groups.	Kruskal algorithm practice. Programs: Warshall / advanced graph problems. Final Practical + Internal Exam
April 2026	**Exam Related Work**	

Course Teacher: Prof. Harshada K Patil
Teaching Plan 2025-26

Month	Theory Component	Practical Component
July 2025	**Admission process**	
August 2025	**Vedic Maths:** Introduction to Vedas, History, Basic Techniques (Multiplication – Series of 9, Series of 1), Basic Operations (Addition, Subtraction, Tables).	Basic Vedic maths calculations. Assignment 1
September 2025	**Vedic Maths:** Advanced Techniques (Vertically Crosswise, Base Method), Division, Digital Roots, Divisibility Tests.	Class Test + Assignment 2.
October 2025	**Vedic Maths:** Squares, Cubes, Roots, Quadratic & Simultaneous Equations, Competitive Aptitude Techniques.	Final Test / Internal Exam