



PUNE DISTRICT EDUCATION ASSOCIATION'S

MAMASAHEB MOHOL COLLEGE

48/1A, Erandwane, Paud Road, Pune - 411038(Maharashtra) India

DEPARTMENT OF COMPUTER SCIENCE

COURSE OUTCOME

SUBJECT NAME: Discrete mathematics

CLASS – FY B.Sc. (COMPUTRE SCIENCE)

PAPER: - MTC -101

NAME OF SUBJECT TEACHER:- MS. PRIYANKA JAISWAL

Course outcome:-

- A) Power of mathematical ideas and tools , know how to use them by modeling , solving And interpreting
- B) Clear a concept of logic lattice and Boolean algebra.
- C) Explain relation statements rule and examples of counting principles, its application
- D) Explain and application of graph, operation on graphs
- E) Clear concept of trees and its type with application base examples

<u>COURCE –MTC 102</u>	<u>COURSE SPECIFY OUTCOMES:-</u>	<u>METHODOLOGY</u>	<u>REFERENCE BOOK</u>	<u>NO OF LECTUERS</u>
Unit1:- LOGIC Propositional Logic, Propositional Equivalences. Predicates and Quantifiers : Predicate, n-Place Predicate or ,n-ary Predicate, Quantification and Quantifiers, Universal Quantifier, Existential Quantifier, Quantifiers with restricted domains, Logical Equivalences involving Quantifiers. Rules of Inference : Argument in propositional Logic, Validity Argument(Direct and Indirect methods) Rules of Inference for Propositional Logic, Building Arguments.	a) Predicates and Quantifies type and examples b) Explain Rules of inference.	DEMOSTREATIO N, PPT,VIDEO LECTURES	John Clark and Derek Holton, A First Look at Graph Theory (Allied Publishers)	7



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UNIT 2 :- LATTICE AND BOOLEAN ALGEBRA: Poset, Hasse diagram. Lattices, Complemented lattice, Bounded lattice and Distributive lattice. Boolean Functions : Introduction, Boolean variable, Boolean Function of degree n, Boolean identities, Definition of Boolean Algebra. Representation of Boolean Functions : Minterm, Maxterm Disjunctive normal form, Conjunctive normal Form.	a) Explain lattice and its types, Boolean functions b) To find minsters conjunction in normal form	DEMOSTREATION	John Clark and Derek Holton, A First Look at Graph Theory (Allied Publishers)	10
Unit 3:- Counting Principles : Cardinality of Set: Cardinality of a finite set. Basics of Counting: The Product Rule, The Sum Rule, The Inclusion-Exclusion Principle. The Pigeonhole Principle: Statement, The Generalized Pigeonhole Principle, Its Applications. Generalized Permutations and Combinations : Permutation and Combination with Repetitions,	a) Basic of counting, product rule , Pigeonhole Principles. b) generalized permutations and combinations with solving problems	DEMOSTREATION	John Clark and Derek Holton, A First Look at Graph Theory (Allied Publishers)	10
Unit 4:- RECURRENCE RELATIONS: Recurrence Relations : Introduction, Formation. Linear Recurrence Relations with constant coefficients. Homogeneous Solutions. Particular Solutions	a) Solve linear recurrence relation with contact coefficients. b) Solve obtaining Homogenous, Particular, Total solutions.	DEMOSTREATION	John Clark and Derek Holton, A First Look at Graph Theory (Allied Publishers)	09
UNIT 5:- GRAPHS: Definition, Elementary terminologies and results, Graphs as Models. Special types of graphs. Isomorphism. Adjacency and Incidence Matrix of a Graph.	a) Basic concept of graph and its types b) solve and clear concept adjacent and incidence matrix of a graph.	DEMOSTREATION	John Clark and Derek Holton, A First Look at Graph Theory (Allied Publishers)	06
Unit 6:- Operations on Graphs	a) Solve examples onsub	DEMOSTREATION	John Clark and	04



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Sub graphs, induced subgraphs, Vertex deletion, Edge deletion. Complement of a graph and self-complementary graphs. Union, Intersection and Product of graphs Fusion of vertices	graph complements of graph b) Obtain union intersections and product of graph, fusion of vertices		Derek Holton, A First Look at Graph Theory (Allied Publishers)	
Unit 7 :- Connected Graph: Walk, Trail, Path, Cycle : Definitions and elementary properties. Connected Graphs : definition and properties. Distance between two vertices, eccentricity, center, radius and diameter of a graph. Isthmus, Cutvertex : Definition and properties. Cutset, edge-connectivity, vertex connectivity. Weighted Graph and Dijkstra's Algorithm	a) Define and explain walk, trail, path, cycle, connected graph b) Solve and explain with UT application Dijkstra's algorithms	DEMOSTREATION	John Clark and Derek Holton, A First Look at Graph Theory (Allied Publishers)	<u>09</u>
Unit 8 :- Eulerian and Hamiltonian Graph: Seven Bridge Problem, Eulerian Graph : Definition and Examples, Necessary and Sufficient condition. Fleury's Algorithm. Hamiltonian Graphs : Definition and Examples, Necessary Condition. Introduction of Chinese Postman Problem and Travelling Salesman Problem	a) Solve seven bridge problems and Fleury's Algorithm. b) Define and solve Hamilton's graph	DEMOSTREATION	Kenneth Rosen, Discrete Mathematics and Its Applications (Tata McGraw Hill)	<u>05</u>
Unit 9 :- Tree : Definition, Properties of trees. Center of a tree. Binary Tree : Definition and properties. Tree Traversal : Ordered rooted Tree, Preorder traversal, inorder traversal and postorder traversal, Prefix Notation. Spanning Tree : Definition, Properties, Shortest Spanning Tree, Kruskal's Algorithm.	a) Explain and solve related properties of tree b) Examples on binary, spanning tree.	DEMOSTREATION	1 Kenneth Rosen, Discrete Mathematics and Its Applications (Tata McGraw Hill)	<u>06</u>



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Reference Books:

- 1) Kenneth Rosen, Discrete Mathematics and It's Applications (Tata McGraw Hill)
- 2) C. L. Liu ,Elements of Discrete Mathematics, (Tata McGraw Hill)
- 3) John Clark and Derek Holton, A First Look at Graph Theory (Allied Publishers)
- 4) NarsinghDeo, Graph Theory with Applications to Computer Science and Engineering, (Prentice Hall).



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COURSE OUTCOME

SUBJECT NAME : ALGEBRA AND CALCULUS

CLASS – FY B.Sc. (COMPUTER SCIENCE)

PAPER: - MTC -102

PATTERN – 2013

NAME OF SUBJECT TEACHER:- MS. PRIYANKA JAISWAL

Course Specify Outcomes:-

- a) Select relevant material in industry by analyzing its physical properties.
- b) To introduce binary operation group.
- c) To calculate GCD&LCM and define and explain properties of divisibility.
- d) Apply to solve differentiation by using continuous function.
- e) Using n^{th} derivatives solve examples by Leibnitz's theorem.
- f) Apply to solve liner system of equation.

<u>COURCE –MTC 102</u>	<u>Course Specify Outcomes:-</u>	<u>METHODOLOGY</u>	<u>REFERENCE BOOK</u>	<u>NO OF LECTUER S</u>
(1)<u>Relation and functions:-</u> 1 Ordered pairs, Cartesian product of Sets. Relations, types of relations, equivalence relations. Partial orderings. Equivalence Class, properties and partition of a set. Transitive closure and Warshall's Algorithm. Digraphs of relations, matrix representation and composition of relations. Definition of function as relation, types of functions (one-one, onto and bijective)	a) Solve a simple problem based on function. B) Introduce relation and its types.	PPT, VIDEO LECTURES, DEMOSTREATION	H. Anton and C. Rorres, Elementary Linear Algebra with Applications, Seventh Ed., Wiley, (1994).	11



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<p>(2) <u>Binary Operations and Group</u>:- Definition of binary operation, examples, properties of binary operations. Definition of Monoid, semigroup, examples. Definition of group and examples, finite and infinite groups, permutation groups,</p>	<p>a) Binary operations and its properties. b) Define and solve algebraic systems and semi group. c) Introduce group, its type, permutations and related examples.</p>	<p>DEMOSTREATION</p>	<p>H. Anton and C. Rorres, Elementary Linear Algebra with Applications, Seventh Ed., Wiley, (1994).</p>	<p>09</p>
<p>(3) <u>Divisibility in integers</u>:- Well ordering principle First and second Principle of Mathematical Induction, Examples Division Algorithm (without proof) Divisibility and its properties, prime numbers. Definition G.C.D and L.C.M., Expressing G.C.D. of two integers as a linear combination of the two integers. Euclidean Algorithm (Without proof).Relatively prime integers, Euclid are Lemma and its generalization.</p>	<p>a) Explain and related examples on Division Algorithm, Euclidean Algorithm. b) Examples on Euclid lemma. c) Examples on Fermats and Euler's Theorem.</p>	<p>DEMOSTREATION</p>	<p>H. Anton and C. Rorres, Elementary Linear Algebra with Applications, Seventh Ed., Wiley, (1994).</p>	<p>16</p>
<p>Unit 4: Continuity and Differentiability: 1Continuity and Properties of continuous functions defined on $[a, b]$ and examples. Differentiability Theorem – Differentiability implies continuity but not conversely. Left hand derivative and Right hand derivative. Intermediate value theorem Rolle's theorem Lagrange's Mean Value Theorem Cauchy's Mean Value Theorem.</p>	<p>a) Explain and related examples on Continuity and Properties of continuous functions defined on $[a, b]$, Differentiability implies continuity but not conversely. b) Apply to solve Rolle's Theorem, Lagrange's Mean Value Theorem,</p>	<p>DEMOSTREATION</p>	<p>Calculus and Analytical Geometry- Thomas Finny</p>	<p>12</p>



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	Cauchy's Mean Value Theorem.			
Unit 5: Successive Differentiation: The n th derivatives of standard functions. Leibnitz's Theorem (with proof).	a) Apply to solve The n th derivatives of standard functions b) Explain and related examples on Leibnitz's Theorem	DEMOSTREATION, VIDEO LECTURES	Calculus and Analytical Geometry-Thomas Finny	05
Unit 6: Taylor's and Maclaurin's Theorems: Taylor's and Maclaurin's Theorems with Lagrange's and Cauchy's form of remainders. Taylor's and Maclaurin's Series.	a) To calculate Taylor's and Maclaurin's Theorems with Lagrange's and Cauchy's form of remainders b) Apply to solve Successive Differentiation by using Taylor's and Maclaurin's Theorems c) Explain and related examples on Taylor's and Maclaurin's Series.	DEMOSTREATION	Calculus and Analytical Geometry-Thomas Finny	05
Unit 7 : Matrices and System of Linear Equations: Revision: Elementary operations on matrices. Echelon form of matrix System of linear equations: Gauss Elimination Method, Gauss –Jordan Elimination Method, L.U. Decomposition Method Rank of matrix, Row rank, Column rank	a) Apply to solve System of Linear Equations by using matrix . b) Solve a simple problem Gauss Elimination Method, Gauss – Jordan Elimination Method, L.U. Decomposition Method c) Use of rank to know the given matrix is consistence or inconsistency	DEMOSTREATION	Calculus and Analytical Geometry-Thomas Finny	14



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Reference Books:

- 1) Calculus and Analytical Geometry- Thomas Finny
- 2) J.B. Fraleigh, A. First Course in Abstract Algebra, Third Ed., Narosa, New Delhi, 1990
- 3) H. Anton and C. Rorres, Elementary Linear Algebra with Applications, Seventh Ed., Wiley, (1994).