



DEPARTMENT OF MATHEMATICS

Semester : V

Integrated M.Sc. Mathematics

Academic Year : 2019 -20

Subject : 060090505 Discrete Mathematics and Graph Theory

Teaching Schedule

Course Objectives: To illustrate Boolean algebra with various techniques of circuit verification, extend concepts of poset by study of lattice, study of automata theory and make use of graphs and trees for solving mathematics and computer science problems.

Course outcomes: Upon completion of the course, students shall be able to

C01: understand the fundamentals of Boolean algebra and learn various Boolean expression.

C02: simplify the digital circuit using logical operators of Boolean algebra.

C03: fetch data from database by applying the concept of Lattice.

C04: detect error and analyze the complexity level of algorithms in Finite Automaton.

C05: learn basics of graph theory and minimize the graph to obtain optimum network.

C06: understand the types, properties and components of discrete mathematical tree.

C07: learn the minimization of tree using Prim's and Kruskal's algorithm

C08: Apply propositional logic to related concept of artificial intelligent.

Unit	Sub Unit	No. of Lect.(s)	Topics	Reference Chapter/ Additional Reading	Teaching Methodology to be used	Active Learning Activities	Evaluation Parameter
Unit 1: Boolean Algebra							
[17]	1.1	2	Boolean functions, Boolean expressions and Duality	CH#10 Discrete Mathematics and Its Applications Rosen K. H	Chalk & Talk	For Slow Learner: At the completion of each techniques students solve the related examples in continuous way and teacher solves their difficulty with discussion. For Active Learner: At the end of unit student solve the problems given in the exercise of different books and their difficulties are resolved by personal interaction by teacher.	Unit Test -1 Assignment-1
	1.2	1	Representing Boolean functions				
	1.3	2	Sum-of-Products expansions				
	1.4	2	Product-of-Sums Expansions				
	1.5	1	Logic gates & Circuits				
	1.6	2	Minimization of circuits				
	1.7	4	Karnaugh maps				
	1.8	3	The Quine–McCluskey method				





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Unit 2: Lattices and Autometa Theory:							
[15]	2.1	2	Introduction to lattice, Duality	CH#9 Advanced Discrete Mathematics Rajput U. S	Chalk & Talk	For Slow Learner: At the completion of each techniques students solve the related examples in continuous way and teacher solves their difficulty with discussion. For Active Learner: At the end of unit student solve the problems given in the exercise of different books and their difficulties are resolved by personal interaction by teacher.	Unit Test -1 & 2 Assignment-2
	2.2	3	Types of lattices				
	2.3	2	Join Irreducible elements				
	2.4	1	Introduction to autometa	CH#8 Discrete mathematics with Graph Theory and Combinatorics T. Veerarajan			
	2.5	3	Finite state automaton				
	2.6	2	Types of automaton				
	2.7	2	DFA and NFA				
Unit 3: Graph Theory							
[17]	3.1	1	Definition Examples and basic properties of graphs	CH#8 Discrete Mathematics and Its Applications Rosen K. H	Chalk & Talk	For Slow Learner: At the completion of each techniques students solve the related examples in continuous way and teacher solves their difficulty with discussion. For Active Learner: At the end of unit student solve the problems given in the exercise of different books and their difficulties are resolved by personal interaction by teacher.	Unit Test -2 Assignment-3
	3.2	1	Pseudo graphs				
	3.3	1	Complete graphs				
	3.4	1	Bi-partite graphs				
	3.5	1	Isomorphism of graphs				
	3.6	2	Walk, Path and circuit				
	3.7	1	Euler Path and circuit				
	3.8	1	Hamilton path and circuit				
	3.9	1	The adjacency matrix				
	3.10	1	Weighted graph				
	3.11	2	Travelling Salesman's problem				
	3.12	2	Dijkstra's algorithm				
	3.13	2	Floyd-Warshall algorithm				
Unit 4: Tree							





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[10]	4.1	1	Definition and properties of trees	CH#9 Discrete Mathematics and Its Applications Rosen K. H	Chalk & Talk	For Slow Learner: At the completion of each techniques students solve the related examples in continuous way and teacher solves their difficulty with discussion. For Active Learner: At the end of unit student solve the problems given in the exercise of different books and their difficulties are resolved by personal interaction by teacher.	Internal Examination Assignment-4
	4.2	1	Pendent vertices in a tree				
	4.3	1	Distance between two vertices				
	4.4	2	Centre, Radius and diameter of a tree				
	4.5	1	Rooted and binary trees				
	4.6	1	Tree traversal				
	4.7	1	Searching and sorting				
	4.8	1	Representation of algebraic structure by binary trees				
	4.9	1	Binary search trees				
	4.10	1	Spanning tree				
	4.11	1	Minimum spanning tree				
	4.12	2	Prim's algorithm				
	4.13	2	Kruskal's algorithm				

Text books:

1. Rosen K. H., "Discrete Mathematics and Its Applications", 6thEd, McGraw-Hill,2006.
2. Rajput U. S., "Advanced Discrete Mathematics", PHI Learning Private Limited, New Delhi, 2012.

Reference books:

1. T. Veerarajan, "Discrete mathematics with Graph Theory and Combinatorics" , Tata Mcgrraw hill Companies.
2. Deo N., "Graph theory with applications to Engineering & Computer Science",Prentice Hall of India Pvt. Ltd., 2000.
3. Stanat D. F. and McAllister. D. F. "Discrete Mathematics in Computer Science",Prentice-Hall, Englewood Cliffs, New Jersey, 1977.





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Course Objectives and Course Outcomes Mapping:

- To illustrate Boolean algebra with various techniques of circuit verification, extend concepts of poset by study of lattice - CO1, CO2, CO3, CO4.
- Study of automata theory and make use of graphs and trees for solving mathematics and computer science problems – CO5, CO6, CO7, CO8.

Course Units and Course Outcomes Mapping:

Unit No.	Unit	Course Outcomes							
		CO1	CO2	CO3	CO4	CO5	CO6	CO7	CO8
1	Boolean Algebra	√	√						√
2	Lattices and Automata Theory			√	√				√
3	Graph Theory					√			
4	Tree						√	√	√

Programme Outcomes (PO)

PO1: Knowledge

Provides knowledge about the fundamentals of pure, applied and computing mathematics and its applications to students that creates the opportunities in industries and research centers.

PO2: Core Competence

Creates competency in science and mathematics to formulate, analyses and solve problem and/or also to pursue advanced study or research.

PO3: Breadth

Trains students having good knowledge in unearth core of academia and industry by the roots of mathematics.

PO4: Evaluation

Imparts in students to raise trial and error-based curiosity and problem-solving functionality with research based advanced tutorial for higher level decision makings tools.





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Programme Outcomes and Course Outcomes Mapping:

Programme Outcomes	Course Outcomes							
	C01	C02	C03	C04	C05	C06	C07	C08
P01	✓		✓		✓		✓	
P02		✓		✓				✓
P03	✓	✓						✓
P04		✓	✓	✓				✓

