Course code	Course Name	Hours/week			Credit	Max. Marks
	Discrete Mathematical Structures	**L**	**T**	**P**	**C**	**100**
		3	0	0	3	
Pre-Requisite	Basics of truth table, sets and relation					
Evaluation Scheme	**Theory**				**Hours**	**Marks**
	External (End Semester Exam)				2	50
	Internal (1) Midterm – 20 Marks (2) CIA (Assignment/Certification/Quiz) - 25 Marks (3) Attendance -5 Marks					50

UNIT-I	**LOGICAL PROPOSITIONS**	**9**
Propositional Logic, Logical operators, Negation, Disjunction, Converse, Inverse, Contrapositive, Compound propositions, Precedence of logical operators, Tautology, Contradiction, Contingency, Logical Equivalence, Logical equivalence laws, English to logic conversion		
UNIT-II	**RECURRENCE RELATIONS**	**9**
Recurrence relation, modelling with recurrence relations, homogeneous linear recurrence relations with constant coefficients, generating functions, generating functions of sequence, solution of homogeneous recurrence relation using generating functions		
UNIT-III	**GRAPH THEORY-I**	**9**
Graph terminologies, path and connectivity for undirected and digraphs, special types of graphs (complete, cycle, regular, wheel, cube, bipartite and complete bipartite), representing graphs, adjacency and incidence matrix of directed and undirected graphs, graph isomorphism, Dijkstra's algorithm for shortest path problem		
UNIT-IV	**GRAPH THEORY-II**	**9**
Planner graphs, Euler and Hamilton paths, colouring of a graph and chromatic number, tree graph and its properties, rooted tree, spanning and minimum spanning tree, decision tree, tree traversal, infix, prefix, and postfix notation		
UNIT-V	**RELATIONS AND LATTICE THEORY**	**9**
Relations and their properties, different types of relations, combining relation, composition, representing relation using matrices and graph, equivalence relations, partial and total ordering relations, lattice, sub lattice, Hasse diagram and its components		
	Total hours	**45** periods

Course Outcomes: After completion of course, students would be able to:

COs	Statements	Bloom's Level
CO1	Understand basic concepts of propositional logic	**L2**
CO2	Solve recurrence relations using standard methods	**L3**
CO3	Represent and analyze different types of graphs and familiarize with their applications	**L4**
CO4	Apply graph algorithms and tree concepts	**L3**
CO5	Understand relations, lattices, and Hasse diagrams	**L2**

TEXT BOOK:

1 ROSEN, K. H. (2017). DISCRETE MATHEMATICS AND ITS APPLICATIONS (7TH ED.). MCGRAW-HILL EDUCATION.

2	RAMANA, B. V. (2007). HIGHER ENGINEERING MATHEMATICS. MCGRAW-HILL EDUCATION.
REFERENCES:	
3	BISHT, R. K., & DHAMI, H. S. (2015). DISCRETE MATHEMATICS (1ST ED.). OXFORD UNIVERSITY PRESS. ISBN: 9780199452798.
ONLINE REFERENCES:	
1	NPTEL: Computer Science and Engineering - Discrete Mathematical Structures
2	https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-042j-mathematics-for-computer-science-fall-2005/
3	https://www.coursera.org/specializations/discrete-mathematics

COURSE OUTCOMES WITH PROGRAM OUTCOMES:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1	2	1	–	–	–	–	–	–	–
CO2	3	3	2	3	1	–	–	–	–	–	–	–
CO3	3	2	3	3	2	–	–	–	–	–	–	–
CO4	2	2	2	3	1	–	–	–	–	–	–	–
CO5	2	2	1	2	1	–	–	–	–	–	–	–