

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme	Bachelor of Technology				Branch/Spec.	Computer Science & Engineering (BDA)			
Semester	VI				Version	1.0.0.1			
Effective from Academic Year			2022-23		Effective for the batch Admitted in			June 2019	
Subject code	2CSE607		Subject Name		DISCRETE MATHEMATICS				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	0	1	0	3	Theory	40	60	100
Hours	2	0	2	0	4	Practical	30	20	50
Pre-requisites:									
Engineering Mathematics, Data structures and Algorithms									
Learning Outcome:									
After learning the course, the students will be able to:									
<ul style="list-style-type: none"> ● Describe mathematical arguments using logical connectives and quantifiers. ● Identify the correctness of an argument using propositional, predicate logic and truth tables. ● Develop the ability to solve problems using counting techniques, combinatorics, recurrence relations, and generating functions in the context of discrete probability. ● Apply graphs and trees as tools to visualize various scenarios. 									
Theory syllabus									
Unit	Content								Hrs
1	Sets, Propositions, and Principles of Counting Introduction of sets and Proposition with real-life examples, Principles of Counting: the principle of inclusion-exclusion, the addition and multiplication rules, the pigeonhole principle, Permutation and combination, Binomial Coefficients								5
2	Relations and functions Properties of binary relations, equivalence relation, partitions, partial ordering, Functions: domain and range of a function, the identity function, one-to-one, onto and one-to-one correspondence functions, some discrete and Continuous variable examples, inverse function, composition of functions.								5

3	Graphs Basic terminology, Graph Representation, multi- and weighted graphs, paths, circuits, shortest path, subgraphs, pseudographs, connected graphs, bipartite graphs, Eulerian path, isomorphism, factors of a graph, planar graphs, theorems on Eulerian circuits and Eulerian trails, Hamiltonian cycles with examples	8
4	Discrete numerical functions manipulations of numerical functions, asymptotic behaviour, generating functions, combinatorial problems, recurrence relations	3
5	Group groups and sub-groups, generators, evaluation of powers, cosets, Lagrange's theorem, permutation group and Burnside's theorem, group codes, isomorphism, automorphism, homomorphism, normal subgroups, rings, integral domains and fields, ring homomorphism, polynomial rings	6
6	Lattices Lattices and algebraic systems, principle of duality	3

Practical content

Practical based on sets, functions, relations, counting techniques, combinatorics, graphs, trees, recurrence relations, generating functions, groups, rings, and lattices.

Text Books

1	"Elements of Discrete Mathematics", C.L. Liu, McGraw-Hill
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Reference Books

1	Modern Applied Algebra", Birkoff and Bartee, McGraw-Hill, CBS.
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2	"Discrete Mathematics - A Unified Approach", Stephen A. Wiitala, Computer Science Series, McGraw- Hill
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3	"Discrete Mathematics and Its Applications", Kenneth H. Rosen, McGraw-Hill Higher Education
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Course Outcomes:

COs	Description
CO1	Describe mathematical arguments using logical connectives and quantifiers.
CO2	Identify the correctness of an argument using propositional, predicate logic and truth tables.

C03	Develop the ability to solve problems using counting techniques, combinatorics, recurrence relations, and generating functions in the context of discrete probability.
C04	Apply graphs and trees as tools to visualize various scenarios.

Mapping of CO and PO:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	2	2	3	2	2	2	1	0	2	0	2
C02	2	3	2	2	1	2	1	0	0	2	0	2
C03	2	3	2	2	1	2	1	0	3	2	1	2
C04	2	3	1	2	3	3	3	0	1	2	3	3