

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme	Bachelor of Technology				Branch/Spec.	Computer Science and Business Systems			
Semester	I				Version	1.0.0.0			
Effective from Academic Year	2026-27				Effective from the batch admitted in	July 2026			
Course Code	2BSC1107				Course Name	Discrete Mathematics			
Course Category	Basic Science Courses (BSC)								
Teaching Scheme					Examination scheme (Marks)				
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	1	0	0	4	Theory	50	50	100
Hours	3	1	0	0	4	Practical	0	0	0
Pre-requisites:									
Elementary set theory, Elementary functions, Basic problem-solving skills, Mathematical maturity									
Course Outcomes									
COs	Description								
CO1	Design circuits by applying the principles of Boolean algebra.								
CO2	Apply basic principles of computing in solving combinatorial problems.								
CO3	To understand the various types of Graphs and Groups and use it to develop algorithms and coding in Computer Science.								
CO4	Construct logical proofs, understand logical arguments and validate them.								
Theory Syllabus									
Unit	Content								Hours
1	Boolean algebra: Introduction of Boolean algebra, truth table, basic logic gate, basic postulates of Boolean algebra, principle of duality, canonical form, Karnaugh map.								09
2	Abstract algebra: Set, relation, group, ring, field								09
3	Combinatorics: Basic counting, balls and bins problems, generating functions, recurrence relations. Proof techniques, principle of mathematical induction, pigeonhole principle.								09
4	Graph Theory: Graphs and digraphs, complement, isomorphism, connectedness and reachability, adjacency matrix, Eulerian paths and circuits in graphs and digraphs, Hamiltonian paths and circuits in graphs and tournaments, trees; Planar graphs, Euler's formula, dual of a planar graph, independence number and clique number, chromatic number, statement of Four-color theorem.								09
5	Logic: Propositional calculus - propositions and connectives, syntax; Semantics - truth assignments and truth tables, validity and satisfiability, tautology; Adequate set of connectives; Equivalence and normal forms; Compactness and resolution; Formal reducibility – natural deduction system and axiom system; Soundness and completeness.								09
Practical and Self Learning Content									
Practical, assignments, quiz, industrial visit, field survey and tutorials are based on the above syllabus.									
Text Books									

1	Topics in Algebra, I. N. Herstein, John Wiley and Sons.
2	Digital Logic & Computer Design, M. Morris Mano, Pearson.
3	Elements of Discrete Mathematics, (Second Edition) C. L. Liu McGraw Hill, New Delhi
4	Graph Theory with Applications, J. A. Bondy and U. S. R. Murty, Macmillan Press, London.
5	Mathematical Logic for Computer Science, L. Zhongwan, World Scientific, Singapore.
Reference Books	
1	Introduction to linear algebra. Gilbert Strang.
2	Introductory Combinatorics, R. A. Brualdi, North-Holland, New York.
3	Graph Theory with Applications to Engineering and Computer Science, N. Deo, Prentice Hall, Englewood Cliffs.
4	Introduction to Mathematical Logic, (Second Edition), E. Mendelsohn, Van-Nostrand, London.
ICT/MOOCs Reference	
1	https://nptel.ac.in/courses/106106094
2	https://nptel.ac.in/courses/111106113
3	https://nptel.ac.in/courses/111106155
4	https://nptel.ac.in/courses/111106102
5	https://nptel.ac.in/courses/111107127

Mapping of COs, POs, and PSOs														
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	2	1	2	0	2	0	0	2	3	3	1
CO2	3	3	0	2	1	1	0	1	0	0	2	3	2	1
CO3	3	3	2	2	1	2	0	2	0	0	2	3	3	2
CO4	3	3	2	2	1	1	0	2	0	0	2	3	3	1

Bloom's Taxonomy Level				
Unit	Unit Title	Aligned COs	Learning Hours	BTL Level
1	Boolean algebra	CO1	09	U, R, E
2	Abstract algebra	CO3	09	U, R, A
3	Combinatorics	CO2	09	U, R
4	Graph Theory	CO3	09	U, A, E
5	Logic	CO4	09	U, R, N

Note:

- Version 1.0.0.0 (First Digit= New syllabus/Revision in Full Syllabus, Second Digit=Revision in Teaching Scheme, Third Digit=Revision in Exam Scheme, Forth Digit= Content Revision)
- 1 Hour Lecture = 1 Credit, 1 Hour Tutorial = 1 Credit, 2 Hours Practical = 1 Credit, 2 Hours Internship/Project/Seminar = 1 Credit
- Bloom's Taxonomy Level (BTL): R: Remember, U: Understand, A: Apply, N: Analyze, E: Evaluate, and C: Create