

15MA302	DISCRETE MATHEMATICS			L	T	P	C
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<i>Co-requisite:</i>	NOT APPLICABLE						
<i>Prerequisite:</i>	15 MA102 (or) 15MA205B						
<i>Data Book / Codes/Standards</i>	NA						
<i>Course Category</i>	B	CORE			MATHEMATICS		
<i>Course designed by</i>	Department of Mathematics						
<i>Approval</i>	-- Academic Council Meeting -- , 2016						

PURPOSE	To acquire knowledge in discrete mathematical structures as applied to the respective branches of Engineering						
INSTRUCTIONAL OBJECTIVES					STUDENT OUTCOMES		
At the end of the course, student will be able to							
1	To understand logic and mathematical reasoning to count or enumerate objects in systematic way.				a	e	
2	To understand set theory, relations and functions to read , understand and construct mathematical arguments.				a	e	
3	To understand recurrence relation, generating functions and algebraic systems.				a	e	
4	To understand how to apply the knowledge of graph theory to solve real world problems like minimum spanning tree - traversal of binary tree.				a	e	
5	To understand the concept of lattices and Boolean algebra.				a	e	

Session	Description of Topic	Contact Hours	C-D-I-O	IOs	Reference
	UNIT I – MATHEMATICAL LOGIC:	12			
1.	Propositions and Logical operators - Truth tables and propositions generated by a set	1	C,I	1	1,2,9
2.	Equivalence and Implications of statements	2	C,I	1	1,2,9
3.	Tautologies of statements	1	C,I	1	1,2,9
4.	Direct proofs - Conditional conclusions	2	C,I	1	1,2,9
5.	Indirect proofs	1	C,I	1	1,2,9
6.	Problems bases on Mathematical Induction	1	C,I	1	1,2,9
7.	The existential and universal quantifiers	2	C,I	1	1,2,9
8.	Predicate calculus including theory of inference	2	C,I	1	1,2,9
	UNIT II – SET THEORY:	12			
9.	Laws of Set theory	1	C	2	1,2
10.	Partition of a set	1	C,I	2	1,2
11.	The duality principle	1	C,I	2	1,2
12.	Relations – Properties - Equivalence relation and partial order relation	2	C,I	2	1,2
13.	Poset - Graphs of relations - Hasse diagram	1	C,I	2	1,2
14.	Matrices of relations	2	C,I	2	1,2
15.	Closure operations on relations - Warshall's algorithm	2	C,I	2	1,2
16.	Functions, Combinatorics - Pigeonhole Principle – Generalized Pigeon hole principle	2	C,I	2	1,2

	UNIT III – RECURRENCE RELATION & ALGEBRAIC SYSTEMS:	12			
17.	Recurrence relations - Solving a recurrence relation – Homogeneous and Non-homogeneous Recurrence relations	2	C,I	3	1,2,9
18.	Formation of Recurrence relations obtained from solutions	1	C,I	3	1,2,9
19.	Generating functions, Solution of a recurrence relation using generating functions	1	C,I	3	1,2,9
20.	Groups – Axioms of groups	2	C,I	3	1,2,9
21.	Cyclic groups and their axioms	2	C,I	3	1,2,9
22.	subgroups and their axioms	1	C,I	3	1,2,9
23.	Cosets – Lagrange’s Theorem	2	C,I	3	1,2,9
24.	Normal subgroup, group homomorphism	1	C,I	3	1,2,9
	UNIT IV – GRAPH THEORY:	12			
25.	Basic concepts - Basic Definitions – Some Special Graphs	2	C,I	4	1,2,7
26.	Matrix Representation of Graphs	1	C,I	4	1,2,7
27.	Paths and circuits	2	C,I	4	1,2,7
28.	Eulerian and Hamiltonian Graphs	1	C,I	4	1,2,7
29.	Connected graphs	2	C,I	4	1,2,7
30.	Trees - Spanning Trees - Rooted trees	2	C,I	4	1,2,7
31.	Binary Trees, Kruskal's algorithm - Traversals of Binary trees	2	C,I	4	1,2,7
	UNIT V – LATTICES AND BOOLEAN ALGEBRA:	12			
32.	Lattices, properties of lattices	2	C,I	5	1,2,7
33.	Lattices as algebraic system	1	C,I	5	1,2,7
34.	Sub-lattices	1	C,I	5	1,2,7
35.	Lattices –Properties of Lattices	2	C,I	5	1,2,7
36.	Some special lattices	2	C,I	5	1,2,7
37.	Boolean algebra : Definition and Examples, Basic laws of Boolean Algebra	2	C,I	5	1,2,7
38.	Expression of Boolean function by algebraic method	2	C,I	5	1,2,7
	Total Contact Hours	60			

LEARNING RESOURCES:	
Sl. No.	TEXT BOOKS
1.	Alan Doerr and Kenneth Levasseur, "Applied Discrete Structures for Computer Science", Galgotia Publications (P) Ltd, 1992.
2.	Tremblay J. P. and Manohar R., Discrete Mathematical Structures with applications to Computer Science, Tata Mc Graw Hill Publishing Co., 35 th edition,2008.
REFERENCE BOOKS/OTHER READING MATERIAL	
3.	V. Sundaresan, K.S. Ganapathy Subramanian and K. Ganesan, Discrete Mathematics, New Revised Edition, A. R. Publications, 2001

4.	Kolman and Busby, Discrete Mathematical Structures for Computer Science, Prentice Hall, 3 rd edition, 1997.
5.	Kenneth H. Rosen, Discrete Mathematics and its Application, Fifth edition, Tata McGraw-Hill Publishing company PVT .Ltd., New Delhi, 2003
6.	Lipschutz Seymour, Marc Lars Lipson, Discrete Mathematics, Mc Graw Hill Inc., 1992
7.	Narsing Deo, Graph Theory with applications to Engineering and Computer science, Prentice-Hall of India pvt. Ltd., New Delhi, 1987.
8.	C.L. Liu, Elements of Discrete Mathematics, 2nd Edition, McGraw Hill Publications, 1985.
9.	T.Veerarajan, Discrete Mathematics with Graph Theory and Combinatorics, Tata McGraw Hill, 2009.

Course nature				Theory			
Assessment Method (Weightage 100%)							
In-semester	Assessment tool	Cycle test I	Cycle test II	Cycle Test III	Surprise Test	Quiz	Total
	Weightage	10%	15%	15%	5%	5%	50%
End semester examination Weightage :							50%