SWARNANDHRA
COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
Accredited by National Board of Accreditation, AICTE, New Delhi, Accredited by NAAC with "A" Grade – 3.32 CGPA, Recognized under 2(f) & 12(B) of UGC Act 1956, Approved by AICTE, New Delhi, Permanent Affiliation to JNTUK, Kakinada
Seetharampuram, W.G.DT., Narsapur-534280, (Andhra Pradesh)

DEPARTMENT OF BASIC SCIENCES & HUMANITIES

TEACHING PLAN

Course Code	Course Title	Sem	Branches	Contact Periods /Week	Academic Year	Date of commencement of Semester
23BS3T03	DISCRETE MATHEMATICS &GRAPH THEORY	III	CSE ,CSE-CS,CSE-BS, CSE-DS,AIDS, AIML& IT	60/6	2024-25	30 -07-2024

COURSE OUTCOMES: Students are able to

1	Comprehend mathematical principles and logic(K3)
2	Apply the concepts and perform the basic operations related to sets ,relations and functions(K3))
3	Apply counting principles and Generating functions to formulate and solve complex problems (K3)
4	Apply fundamental concepts in graph theory (K3)
5	Apply graph theory concepts in data structures and network theory effectively. (K3)

UNIT	Out Comes / Bloom's Level	Topic No.	Topics/Activity	Text Book / Reference	Contact Hour	Delivery Method
I	CO1-Students are able to comprehend mathematical principles and logic(K4)		**MATHEMATICAL LOGIC**			
		1.1	Propositional Calculus: Statements and Notations Connectives	T_1 & T_2	1	Chalk & Talk, Active Learning, PPT & Tutorial
				T_1 & T_2	1	
		1.2	Well Formed Formulas, Truth Tables	T_1 & T_2	1	
		1.3	Tautologies	T_1 & T_2	1	
		1.4	Equivalence of formulae	T_1 & T_2	1	
		1.5	Duality law, tautological implications	T_1 & T_2	1	
		1.6	Normal Forms Disjunctive and Conjunctive normal forms	T_1 & T_2	1	

		1.7	Principal disjunctive and conjunctive normal forms	T_1 & T_2	1	
		1.8	Theory of Inference for Statement Calculus	T_1 & T_2	1	
		1.9	Consistency of Premises,	T_1 & T_2	1	
		1.10	Indirect Method of Proof	T_1 & T_2	1	
		1.11	Predicate Calculus: Predicates, Predicative Logic, Statement Functions	T_1 & T_2	1	
		1.12	Variables and Quantifiers, Free and Bound Variables	T_1 & T_2	1	
		1.13	Inference Theory for Predicate Calculus	T_1 & T_2	1	
				Total	**14**	
II	CO2-Students are able to apply the concepts and perform the basic operations related to sets ,relations and functions(K3)	**SET THEORY**				
		2.1	Sets: Operations on Sets	T_1 & T_2	1	Chalk & Talk, Active Learning, PPT & Tutorial
		2.2	Principle of Inclusion-Exclusion(without proof)	T_1 & T_2	1	
		2.3	Relations: Properties, Operations	T_1 & T_2	1	
				T_1 & T_2	1	
		2.4	Partition and Covering, Transitive Closure	T_1 & T_2	1	
		2.5	Equivalence Relation	T_1 & T_2	1	
				T_1 & T_2	1	
		2.6	Compatibility Relation	T_1 & T_2	1	
		2.7	Partial ordering Relation	T_1 & T_2	1	
		2.8	Hasse diagram	T_1 & T_2	1	
		2.9	Functions: Bijective	T_1 & T_2	1	
		2.10	Composite,Inverse Functions	T_1 & T_2	1	
		2.11	Permutation Function	T_1 & T_2	1	
		2.12	Recursive Function	T_1 & T_2	1	
				Total	**14**	

III	CO3-The student should be able to apply counting principles and Generating functions to formulate and solve complex problems (K3)	COMBINATORICS AND RECURRENCE RELATIONS					
		3.1	Basis of Counting, Permutations	T_1 , T_2	1	Chalk & Talk, Active Learning, PPT & Tutorial	
		3.2	Permutations with Repetitions	T_1 , T_2	1		
		3.3	Circular and Restricted Permutations	T_1 , T_2	1		
		3.4	Combinations Restricted Combinations	T_1 , T_2	1		
		3.5	Binomial and Multinomial Coefficients and Theorems(without proof)	T_1 , T_2	1		
				T_1 , T_2	1		
		3.6	Generating Functions	T_1 , T_2	1		
		3.7	Function of Sequences, Partial Fractions	T_1 , T_2	1		
		3.8	Calculating Coefficient of Generating Functions	T_1 , T_2	1		
				T_1 , T_2	1		
		3.9	Recurrence Relations, Formulation as Recurrence Relations	T_1 , T_2	1		
		3.10	Solving Recurrence Relations by Substitution	T_1 , T_2	1		
		3.11	Solving Recurrence Relations by Generating Functions	T_1 , T_2	1		
		3.12	Solving Recurrence Relations by, Method of Characteristic Roots	T_1 , T_2	1		
		3.13	Solving Inhomogeneous Recurrence Relations	T_1 , T_2	1		

			Total		**15**	
IV	**GRAPH THEORY**					
	CO4-The student should be able to apply fundamental concepts in graph theory(K3)	4.1	Basic Concepts:Graph Theory and its Applications	T_1 & T_2	1	Chalk & Talk, Active Learning, PPT & Tutorial
		4.2	Subgraphs	T_1 & T_2	1	
		4.3	Graph Representations: Adjacency and Incidence Matrices	T_1 & T_2	1	
				T_1 & T_2	1	
		4.4	Isomorphic Graphs	T_1 & T_2	1	
		4.5	Paths and Circuits	T_1 & T_2	1	
		4.6	Eulerian Graphs	T_1 & T_2	1	
		4.7	Hamiltonian Graphs	T_1 & T_2	1	
			Total		**8**	
V	CO5-The student should be able to apply graph theory concepts in data structures and network theory effectively. (K3)	**MULTI GRAPHS**				
		5.1	Multigraphs, Bipartite and Planar Graphs	T_1 & T_2	1	Chalk & Talk, Active Learning, PPT & Tutorial
		5.2	Euler's Theorem	T_1 & T_2	1	
		5.3	Graph Colouring and Covering Chromatic Number	T_1 & T_2	1	
		5.4	Spanning Trees, Prim's Algorithm	T_1 & T_2	1	
				T_1 & T_2	1	
		5.5	Spanning Trees Kruskal's Algorithm	T_1 & T_2	1	
				T_1 & T_2	1	
		5.6	BFS Spanning Trees	T_1 & T_2	1	
		5.7	DFS Spanning Tree	T_1 & T_2	1	
			Total		**9**	
			CUMULATIVE PROPOSED PERIODS		**60**	

Text Books:

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
T1	J.P. Tremblay and R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, 2017.
T2	S. Santha, E.V.Prasad Mathematical Foundation for Computer Science, Cengage Publications,2011.

Reference Books:	
S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
R1	Joe L. Mott, Abraham Kandel and T. P. Baker, Discrete Mathematics for computer scientists & Mathematicians, 2/e, Prentice Hall of India Ltd, 2015.
R2	Dr.J.Rajendra Prasad,T.Rama Rao,A.Madhana Mohana Rao, Mathematical Foundation of Computer Science, ,University Science Press,2009.
Web Details	
1	https://onlinecourses.nptel.ac.in/noc16_ma01/preview
2	https://stanford.edu/~rezab/classes/cme305/W17/
3	https://nptel.ac.in/courses/106106094/
4	https://nptel.ac.in/courses/111107058/

		Name	Signature with Date
i.	Faculty I	Mr.Ch. Peddiraju	
ii.	Faculty II	Mr. M. Ravindra Babu	
iii.	Faculty III	Mr.T.V.Lakshmana Rao	
iv.	Faculty IV	Dr. E.M.Victoria	
v.	Faculty V	Mrs.P.Durga Bhavani	
vi.	Course Coordinator	Dr. E.M.Victoria	
vii.	Module Coordinator	Mr.Ch. Peddiraju	
viii.	Head of the Department	Dr. V.Swaminadham	
ix.	Faculty VI	K.D.N.Murthy	

Principal