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 INFORMATION TECHNOLOGY
TEACHING PLAN

Course Code	Course Title	Semester	Branch	Contact Periods /Week	Academic Year	Date of commencement of Semester
20IT6E01	DESIGN AND ANALYSIS OF ALGORITHMS	VI	IT	6	2024-25	18-11-2024

COURSE OUTCOMES

1	Analyze the asymptotic runtime complexity of algorithms for real world problems developed using different algorithmic methods. (K4)
2	Identify the optimal solutions by using advanced design and analysis of algorithm techniques like Divide & conquer and greedy method. (K3)
3	Illustrate the fundamentals of Dynamic Programming methods along with its applications. (K2)
4	Apply the search space and optimization problem techniques like backtracking and branch and bound method to solve problems optimally where advanced algorithm design techniques fail to find solution. (K3)
5	Distinguish the problems and its complexity as polynomial and NP problems and can formulate some real world problems to abstract mathematical problems.

UNIT	Out Comes / Bloom's Level	Topics No.	Topics/ Activity	Text Book/ Reference	Contact Hour	Delivery Method
I	CO – 1	1.1	Introduction to Algorithm	T1,T2	1	Chalk & Board; Power point presentation; Assignment; Test
		1.2	Pseudo code for expressing Algorithm	T1,T2	1	
		1.3	performance analysis- space complexity	T1,T2	1	
		1.4	Time Complexity analysis	T1,T2	1	
		1.5	Asymptotic Notations	T1,T2	1	
		1.6	probabilistic analysis	T1,T2	1	
		1.7	disjoint set operation	T1,T2	1	
		1.8	union and find algorithms	T1,T2	1	
		1.9	spanning trees	T1,T2	1	
		1.10	spanning trees	T1,T2	1	
		1.11	connected components	T1,T2	1	
		1.12	biconnected components	T1,T2	1	
				Total	12	

II	CO – 2	2.1	Divide and Conquer: The General Method	T1,R1	1	Chalk & Board Power point presentation Assignment Test
		2.2	Binary search	T1,R1	1	
		2.3	Quick Sort methodology with example	T2,R2	1	
		2.4	Quick Sort algorithm analysis	T2,R2	1	
		2.5	Merge Sort methodology with example	T2,R2	1	
		2.6	Merge Sort algorithm analysis	T2,R2	1	
		2.7	Strassen's matrix multiplication	T2,R2	1	
		2.8	Greedy Method: General Method, applications	T1,T2	1	
		2.9	Job Sequencing with deadlines	T1,T2	1	
		2.10	Knapsack Problem- General Methodology	T1,T2	1	
		2.11	Examples for Knapsack Problem	T1,T2	1	
		2.12	Minimum cost spanning trees – Prim's algorithm	T1,T2	1	
		2.13	Minimum cost spanning trees – Kruskal's algorithm	T1,T2	1	
		2.14	Single Source Shortest Paths	T1,T2	1	
				Total	14	
III	CO – 3	3.1	Dynamic Programming: General Method, Applications	T1,T2	1	Chalk & Board Power point presentation Assignment Test
		3.2	Matrix chain multiplication	T1,T2	1	
		3.3	Optimal Binary Search Trees	T1,T2	1	
		3.4	Optimal Binary Search Trees	T1,T2	1	
		3.5	Optimal Binary Search Trees	T1,T2	1	
		3.6	0/1 Knapsack problem	T1,T2	1	
		3.7	0/1 Knapsack problem	T1,T2	1	
		3.8	All pairs shortest paths	T1,T2	1	
		3.9	Single Source Shortest Paths– General Weights (Bellman Ford Algorithm)	T1,T2	1	
		3.10	Single Source Shortest Paths– General Weights (Bellman Ford Algorithm)	T1,T2	1	
		3.11	Travelling Salesperson problem	T1,T2	1	
		3.12	Travelling Salesperson problem	T1,T2	1	
		3.13	Travelling Salesperson problem	T1,T2	1	

		3.14	relaibility design	T1,T2	1	
		3.15	relaibility design	T1,T2	1	
Content beyond syllabus		3.16	Reliability design problem using Dynamic Programming	T1,T2	1	
				Total	16	
IV	CO – 4	4.1	Backtracking: General Method	T1,T2	1	Chalk & Board Power point presentation Assignment Test
		4.2	8-Queens Problem constraints	T1,T2	1	
		4.3	State space tree for 8-Queens Problem	T1,T2	1	
		4.4	Sum of Subsets problem	T1,T2	1	
		4.5	Graph Coloring	T1,T2	1	
		4.6	Hamiltonian cycles	T1,T2	1	
		4.7	Branch and Bound: The General Method	T1,T2	1	
		4.8	0/1 Knapsack Problem	T1,T2	1	
		4.9	0/1 Knapsack Problem	T1,T2	1	
		4.10	Travelling Salesperson problem LC Branch and Bound solution	T1,T2	1	
		4.11	Travelling Salesperson problem LC Branch and Bound solution	T1,T2	1	
		4.12	Travelling Salesperson problem FIFO Branch and Bound solution	T1,T2	1	
		4.13	Travelling Salesperson problem FIFO Branch and Bound solution	T1,T2	1	
Content beyond syllabus		4.14	Hamiltonian cycles	T1	1	
				Total	14	
V	CO – 5	5.1	NP Hard and NP Complete Problems	T1,R1	1	Chalk & Board Power point presentation Assignment Test
		5.2	Basic Concepts of NP Hard and NP Complete Problems	T1,R1	1	
		5.3	Cook's theorem	T1,R1	1	
		5.4	non deterministic algorithms	T1,R1	1	
		5.5	non deterministic algorithms	T1,R1	1	
		5.6	NP Hard Graph Problems	T1,R1	1	
		5.7	NP Hard Graph Problems	T1,R1	1	
		5.8	Clique Decision Problem (CDP)	T1,R1	1	
		5.9	Clique Decision Problem (CDP)	T1,R1	1	

		5.10	Chromatic Number Decision Problem (CNDP)	T1,R1	1	
		5.11	Chromatic Number Decision Problem (CNDP)	T1,R1	1	
				Total	11	
				CUMULATIVE PROPOSED PERIODS	67	

Text Books:

S. No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1. 2.	Ellis Horowitz, SatrajSahni and Rajasekharam, Fundamentals of Computer Algorithms, Universities Press. Steven S. Skiena, The Algorithm Design Manual, 2nd edition, Springer.
3	T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein, Introduction to Algorithms, second edition, PHI Pvt. Ltd.

Reference Books:

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	AnanyLevitin, Introduction to the Design and Analysis of Algorithms, PEA
2	2. Parag Himanshu Dave, Himansu B Alachandra Dave, Design and Analysis of Algorithms, Pearson Education.
3	3. R.C.T. Lee, S.S.Tseng, R.C.Chang and T.Tsai, Introduction to Design and Analysis of Algorithms A strategic approach, McGraw Hill.
4	4. Aho, Ullman and Hopcroft, Design and Analysis of algorithms, Pearson education.

Web Details:

1	https://www.tutorialspoint.com/advanced_data_structures/index.asp
2	http://peterindia.net/Algorithms.html
3	Abdul Bari, Introduction to Algorithms (youtube.com)

		Name	Signature with Date
i.	Faculty	Mrs. V.Sivani	
ii.	Module Coordinator	Mr. K.Raja	
iii.	Programme Coordinator	Dr. RVVSV Prasad	

Principal