DEPARTMENT OF INFORMATION TECHNOLOGY

TEACHING PLAN

Course Code	Course Title	Semester	Branch	Contact Periods /Week	Academic Year	Date of commencement
20IT6E01	Design and Analysis of Algorithms	VI	IT	6	2022-2023	12-12-2022

COURSE OUTCOMES

1	Analyze the asymptotic runtime complexity of algorithms for real world problems developed using different algorithmic methods.
2	Identify the optimal solutions by using advanced design and analysis of algorithm techniques like Divide & conquer and greedy method.
3	Explain the fundamentals of Dynamic Programming methods along with its applications.
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.
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 algorithms	T1	1	Chalk & Board; Power point presentations; Assignment; Test
		1.2	Process of design and analysis of algorithms	T1	1	
		1.3	Pseudo code for expressing algorithms	T1	1	
		1.4	Performance Analysis, Space complexity	T1,R1	1	
		1.5	Time complexity	T1	1	
		1.6	Asymptotic Notations: Big oh notation, Omega notation	T1	1	
		1.7	Theta notation and Little oh notation, Probabilistic Analysis	T1,R1	1	
		1.8	Disjoint Sets - disjoint set operations	T1,R1	1	

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		1.9	Union and Find algorithms	T1	1	
		1.10	Spanning trees	T1	1	
		1.11	DFS and BFS	T1	1	
		1.12	Connected components and bi-connected components	T1	1	
Content beyond syllabus		1.13	Mathematical analysis for Recursive and Non-recursive algorithms	R1	1	
				Total	13	
II	CO – 2	2.1	Divide and conquer: Introduction	T1,T2	1	Chalk & Board Power point presentations Assignment Test
		2.2	General method	T1,T2	1	
		2.3	Applications- Binary search	T1,T2	1	
		2.4	Quick sort	T1,T2	1	
		2.5	Merge sort	T1,T2	1	
		2.6	Stassen's matrix Multiplication.	T1,T2	1	
		2.7	Greedy method: Introduction	T1,T2	1	
		2.8	General method	T1	1	
		2.9	Applications-Job sequencing with deadlines	T1	1	
		2.10	0/1 knapsack problem	T1,T3	1	
		2.11	Minimum cost spanning trees	T1	1	
		2.12	Single source shortest path problem	T1	1	
Content beyond syllabus		2.13	Bellman Ford Algorithm	T1	1	
				Total	13	
III	CO – 3	3.1	Dynamic programming: Introduction	T1,R1	1	Chalk & Board Power point presentations Assignment
		3.2	General method	T1,R1	1	
		3.3	Applications- Matrix chain multiplication	T1,R1	1	
		3.4	Matrix chain multiplication	T1,R1	1	
		3.5	Optimal binary search trees	T1,R1	1	
		3.6	Optimal binary search trees	T1,R1	1	
		3.7	0/1 knapsack problem	T1,R1	1	
		3.8	0/1 knapsack problem	T1,R1	1	
		3.9	All pairs shortest path problem	T1,R1	1	
		3.10	All pairs shortest path problem	T1,R1	1	

		3.11	Travelling sales person problem	T1,R1	1	Test
		3.12	Travelling sales person problem	T1,R1	1	
		3.13	Reliability design	T1,R1	1	
Content beyond syllabus		3.14	Resource Allocation Problem	R1	1	
				Total	14	
IV	CO – 4	4.1	Backtracking: Introduction	T1,T2	1	Chalk & Board Power point presentations Assignment Test
		4.2	General method	T1,T2	1	
		4.3	Applications			
		4.4	n-queen problem	T1,T2	1	
		4.5	Sum of subsets problem	T1,T2	1	
		4.6	Graph coloring	T1,T3	1	
		4.7	Hamiltonian cycles	T1,T3	1	
		4.8	Branch and Bound: Introduction	T1	1	
		4.9	General method	T1	1	
		4.10	Applications	T1	1	
		4.11	Travelling sales person problem	T1	1	
		4.12	Sales person problem			
		4.13	0/1 knapsack problem	T1	1	
		4.14	LC Branch and Bound solution	T1	1	
		4.15	Branch and Bound solution			
		4.16	FIFO Branch and Bound solution	T1	1	
Content beyond syllabus		4.17	Job Sequencing with deadlines	T1	1	
				Total	17	
V	CO – 5	5.1	NP Hard and NP Complete problems	T1,R1	1	Chalk & Board Power point presentations Assignment Test
		5.2	Basic concepts	T1,R1	1	
		5.3	Non-deterministic Algorithms	T1,R1	1	
		5.4	NP-Hard and NP-Complete classes	T1,R3	1	
		5.5	NP-Hard and NP-Complete problems	T1,R2	1	
		5.6	Cook's theorem.	T1,R1	1	
Content beyond syllabus		5.7	Approximation Algorithms & Randomized Algorithms	R4	1	
				Total	7	
			CUMULATIVE PROPOSED PERIODS		64	

Text Books:

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	Ellis Horowitz, SatrajSahni and Rajasekharam, Fundamentals of Computer Algorithms, Universities Press, 2012.
2	Narasimha Karumanchi, Algorithm Design Techniques, Career Monk, 2018.
3	T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein, Introduction to Algorithms, second edition, PHI Pvt. Ltd., 2016.

Reference Books:

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	Anany Levitin, Introduction to the Design and Analysis of Algorithms, PEA, 2018.
2	ParagHimanshu Dave, Himansu B Alachandra Dave, Design and Analysis of Algorithms, Pearson Education, 2016.
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., 2017.
4	Aho, Ullman and Hopcroft, Design and Analysis of algorithms, Pearson education., 2016

Web Details:

1	https://www.javatpoint.com/daa-tutorial
2	https://lecturenotes.in/notes/17784-note-for-design-and-analysis-of-algorithm-daa-by-shekharesh-barik?reading=true
3	https://www.tutorialspoint.com/design_and_analysis_of_algorithms/index.htm
4	https://www.geeksforgeeks.org/fundamentals-of-algorithms/#AnalysisofAlgorithms

		Name	Signature with Date
i	Faculty	Mr. Ch R K Raju	12/12/22
ii	Module Coordinator	Mr. Ch R K Raju	12/12/22
iii	Programme Coordinator	Dr. RVVSV Prasad	12/12/22

Principal