SCHEME OF COURSE WORK

Department of Information Technology

Course Details:

COURSE TITLE	Design & Analysis of Algorithms		
COURSE CODE	**15CT1107**	L T P C	3 1 0 4
PROGRAM	B.TECH		
SPECIALIZATION	CSE, IT		
SEMESTER	IV		
PRE REQUISITES	Data Structures		
COURSES TO WHICH IT IS A PRE REQUISITE			

Course Outcomes (COs):

1	Analyse complexity of Algorithm
2	Apply Divide & Conquer and Greedy method
3	Apply Dynamic programming technique
4	Use backtracking
5	Discuss concepts of NP problem

Course Outcome versus **Program Outcomes:**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3			3				2		2	2
CO2	3	2			3							3
CO3	3	2			3							3
CO4	3	2			3							3
CO5	3											3

3 - Strongly correlated, 2 - Moderately correlated, Blank - No correlation

Course Outcome versus **Program Specific Outcomes:**

COs	PSO1	PSO2	PSO3
CO1	2		
CO2	2		
CO3	2		
CO4	2		
CO5	2		

Assessment Methods	Assignment / Quiz / Mid-Test

Teaching- Learning & Evaluation

Week	Topic/ Contents	Course Outcomes	Sample questions	Teaching learning strategy	Assessment method & schedule
1	Basic analysis frame work, pseudo conventions, time and space complexities, asymptotic notations- Theta Notation	CO1	Discuss various asymptotic notations	Lecture Discussion	Assignment-1, Test- 1 Quiz-1
2	Big oh, Big Omega, little oh and little omega notations, simple disjoint set union algorithms	CO1	Write the algorithm for simple union	Lecture Discussion	Assignment-1, Test- 1 Quiz-1
3	Algorithms for simple find, weighted union and collapsing rule for find, spanning trees, Krushkals' algorithm	CO1	How weighted union and collapsing rule for find are better over simple union and find algorithms	Lecture Discussion	Assignment-1, Test- 1 Quiz-1
4	Depth first spanning trees, bi- connectivity of the graphs, Divide and Conquer: General method	CO1, CO2	Define articulation point. How to delete articulation points using depth first spanning trees Solving different problems using recurrence relations	Lecture Discussion	Assignment-1, Test- 1 Quiz-1
5	Binary Search- Recursive and Iterative methods for binary search, merge sort, quick sort	CO2	State merge sort algorithm and use it to sort some set of integers State quick sort algorithm and use it to sort some set of integers	Lecture Discussion	Assignment-1, Test- 1 Quiz-1
6	Strassen's multiplication, 0/1 knapsack problem	CO2	Explain Strassen's multiplication with an example Explain 0/1 knapsack problem with an example	Lecture Discussion	Assignment-1, Test- 1 Quiz-1
7	Minimum cost spanning trees, single source shortest routing problem, Dynamic programming	CO2, CO3	Explain optimal binary search trees Write single source shortest path problem	Lecture Discussion	Assignment-1,2, Quiz-1, Test-1, 2
8	Matrix chain multiplication, optimal binary search trees, 0/1 knapsack problem	CO3	Find the optimal Binary search tree for the identifier set (a1, a2, a3) = (do, if, while) with equal probabilities p(i) = q(i) = 1/7, for all i	Lecture Discussion	Assignment-2, Test- 2, Quiz-2
9	TEST-1				

10	All pair shortest path problems, travelling sales person problem,	CO3	Explain reliability design Given the cost matrix, solve the traveling sales man	Lecture Discussion	Assignment-2, Test- 2, Quiz-2

	reliability design		problem using branch and bound technique? Draw the state space tree.		
11	Back tracking, n queens problem, sum of subsets problem	CO 4	Explain the procedure of 8-queens problem	Lecture Discussion	Assignment-2, Test- 2, Quiz-2
12	Graph coloring problem, Hamiltonian cycles problem	CO4	Write an algorithm for m-coloring of a graph?	Lecture Discussion	Assignment-2, Test- 2, Quiz-2
13	Branch and bound, travelling sales person problem	CO4	Write the procedure for travelling sales person problem with respect to back tracking	Lecture Discussion	Assignment-2, Test- 2, Quiz-2
14	0/1 knapsack problem, LC Branch and bound	CO4	Write the procedure for LC branch and Bound solution. Explain 0/1 Knapsack problem with respect to Dynamic programming	Lecture Discussion	Assignment-2, Test- 2, Quiz-2
15	FIFO branch and bound solution, NP-Hard and NP-Complete problems: Basic concepts	CO4, CO5	Write the procedure for FIFO branch and bound solution	Lecture Discussion	Assignment-2, Test- 2, Quiz-2
16	Non deterministic algorithms,	CO5	Write short notes on NP complete problem	Lecture Discussion	Assignment-2, Test- 2, Quiz-2
17	NP hard and NP complete problems, Cooks Theorem	CO5	Write short notes on cooks theorem Discuss SAT problem	Lecture Discussion	Assignment-2, Test- 2, Quiz-2
18	TEST-2				