

Course Code	Course Name	Teaching Scheme (Hrs/week)			Credits Assigned			
		L	T	P	L	T	P	Total
CE41	Design and Analysis of Algorithms	3	--	--	3	--	--	3
		Examination Scheme						
		Theory Marks						
		ISE		MSE		ESE		
		10		30		100(60% weightage)		

Pre-requisite Course Codes	ES4 (Programming Methodology and Data structures) CE31 (Advanced Data Structures)
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At the end of successful completion of this course, student will be able to

Course Outcomes	CO1	Analyze time and space complexity of an algorithm
	CO2	Apply divide and conquer strategy to solve problems
	CO3	Design an algorithm to illustrate the concept of dynamic programming
	CO4	Apply the concept of greedy approach to solve problems
	CO5	Describe the idea of backtracking, branch and bound strategy to solve problems.
	CO6	Apply the concept of linear programming to optimize the solution

Module No.	Unit No.	Topics	Ref.	Hrs.
1	1.1	Introduction to analysis of algorithm Performance analysis , space and time complexity Growth of function – Big –Oh ,Omega , Theta notation Mathematical background for algorithm analysis, Analysis of selection sort, insertion sort.	1,2,3	10
	1.2	Recurrences: The substitution method Recursion tree method Master method	1	
	1.3	Divide and Conquer Approach: General method Analysis of Merge sort, Analysis of Quick sort, Analysis of Binary search, Finding minimum and maximum algorithm and analysis, Strassen's matrix multiplication.	1,5	
2	2.1	Dynamic Programming Approach: General Method Assembly-line scheduling 0/1 knapsack Travelling salesman problem	1,2,3	12

		Longest common subsequence		
	2.2	Greedy Method Approach: General Method Single source shortest path Knapsack problem Minimum cost spanning trees-Kruskal and prim's algorithm Hamming code Algorithm	1,2,3	
3		Backtracking and Branch-and-bound: General Method 8 queen problem(N-queen problem) Sum of subsets Graph coloring 15 puzzle problem, Travelling salesman problem.	1,4	06
4		Linear Programming Standard and slack forms Formulating problems as linear problems The simplex algorithm Duality The initial basic feasible solution	1	08
5		String Matching Algorithms: The naïve string matching Algorithms The Rabin Karp algorithm String matching with finite automata The knuth-Morris-Pratt algorithm	1,5	06
			Total	42

References:

1. T.H .Cormen, C.E. Leiserson, R.L. Rivest, C. Stein, "*Introduction to algorithms*", 3rd edition, PHI publication 2009.
2. Ellis Horowitz, Sartaj Sahni, S. Rajasekaran. "*computer algorithms*" 2nd edition, Computer Science Press, 1997
3. Sanjoy Dasgupta, Christos H. Papadimitriou, Umesh Vazirani, "*Algorithms*", 1st edition, Tata McGraw- Hill, 2006.
4. Jon Kleinberg, Eva Tardos, "*Algorithm Design*", 1st edition, Pearson, 2006.
5. Michael T. Goodrich, Roberto Tamassia, "*Algorithm Design and Application*", 1st edition ,Wiley Publication, 2015.