

Course Code	Course Name	Teaching Scheme (Hrs/week)			Credits Assigned			
		L	T	P	L	T	P	Total
MCA43	Design and Analysis of Algorithms	3	1	--	3	1	--	4
		Examination Scheme						
		ISE		MSE		ESE		
		10	30	100 (60% Weightage)				

Pre-requisite Course Codes	Data Structure and C++	
Course Outcomes	CO1	Analyze basic, approximation and divide & conquer algorithms.
	CO2	Apply greedy and dynamic method to given problem.
	CO3	Evaluate backtracking and branch and bound techniques.
	CO4	Apply graph and string matching algorithms to a given problem.

Module No.	Unit No.	Topics	Ref.	Hrs.
1		Introduction to analysis of algorithm	1,2	4
	1.1	The Role of Algorithms in Computing		
	1.2	Growth of Functions		
	1.3	The substitution method		
	1.4	Recursion tree method		
	1.5	Master method		
2		Approximation Algorithm	3	4
	2.1	P and NP complete problem. P and NP hard problem.		
	2.2	The Vertex-Cover Problem		
	2.3	The set-covering Problem		
3		Divide and Conquer	1	4
	3.1	Binary Search		
	3.2	Merge sort analysis		
	3.3	Quick sort analysis		
4		Greedy Method & Dynamic Programming	3,2	7
	4.1	Introduction to Greedy method		
	4.2	Knapsack problem		
	4.3	Minimum cost spanning tree- kruskal and prims algorithm		
	4.4	Introduction to Dynamic programming		
	4.5	0/1 Knapsack problem		
	4.6	Matrix Multiplication		
	4.7	Longest Common Subsequence		
	4.8	Optimal Binary Search Tree		
5		Backtracking	1	5
	5.1	Introduction to Backtracking method		
	5.2	8 queen problem		
	5.3	Graph coloring		
	5.4	Hamiltonian cycles		
	5.5	The subset sum problem		

6		Branch and Bound	1	4
	6.1	Introduction to Branch and bound technique.		
	6.2	Bounding and FIFO branch and bound		
	6.3	Least Cost search branch and bound .		
	6.4	15 puzzle problem		
	6.5	Travelling salesman problem		
7		Graph algorithm	1,2	8
	7.1	Single source shortest path- Dijkstra's algorithm, Bellman Ford Algorithm		
	7.2	All pair shortest path-Floyd Warshall algorithm, Johnson's Algorithm		
	7.3	Max Flow Algorithm: Ford-Fulkerson method, Maximum Bipartite Matching, Push-relabel algorithm		
8		String Matching Algorithm	3	6
	8.1	Brute Force String matching		
	8.2	Rabin Carp string matching		
	8.3	Knuth-Morris-Pratt algorithm		
	8.4	String Matching with Finite Automata		
			Total	42

References:

- [1] T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein, "Introduction to Algorithms", MIT Press/McGraw Hill, 2012 Version, 2/E, PHI Learning, 3rd Edition,
- [2] S. Baase, S and A. Van Gelder, "Computer Algorithms: Introduction to Design and Analysis", Addison Wesley, 2000, 3rd edition.
- [3] Michael Gooddrich & Roberto Tamassia, "Algorithm design foundation, analysis and internet examples", Second edition , wiley student edition.