



C. U. Shah University, Wadhwan City

Faculty of Computer Science

**Name of Program: Master of Science in Information Technology
(Web Technology)**

Semester : I

W.e.f. June – 2016

Teaching & Evaluation Scheme

Sr. No	Subject Code	Subject Name	Teaching Hours/Week				Credits	Evaluation Scheme/Semester							
			Th	Tu	Pr	Total		Theory				Practical			Total Marks
								Sessional Exam		University Exam		Internal		Uni.	
								Marks	Hrs	Marks	Hrs	Pr	TW	Pr	
1	5CS01WAA1	Design & Analysis of Algorithms	4	-	-	4	4	30	1.5	70	3	-	-	-	100

Objectives:

- To introduce techniques for analyzing the efficiency of computer algorithms
- To provide knowledge of various data structures and algorithms.
- To develop proficiency in problem solving and programming.
- To be able to carry out the Analysis of various Algorithms for mainly Time and Space Complexity.
- To get a good understanding of applications of Data Structures.
- To develop a base for advanced study in Computer Science.

Pre-requisites: Student should aware about any programming languages like C/C++/JAVA

Course Outline:

Ch. No	Chapter Name	Course Contents	Lect. Hours
1	Algorithm Introduction	1.1 What is algorithm and Data Structure 1.2 The role of Algorithms in Computing 1.3 Characteristics of an Algorithm 1.4 Problems, Available Tools & Algorithms 1.5 Designing algorithms and Common functions 1.6 Analyzing algorithms 1.7 Asymptotic notations 1.8 Order of Growth	8
2	Divide and Conquer	2.1 Introduction General Issues in Divide-and-Conquer 2.2 Binary Search 2.3 Merge Sort 2.4 Quick Sort 2.5 Strassen's Matrix Multiplication	7
3	Heap Sort	3.1 Heaps 3.2 Maintaining the heap property 3.3 Building a heap 3.4 The heapsort algorithm	5

4	Greedy Techniques	4.1 Introduction 4.2 Minimum Spanning Tree 4.3 Prim's Algorithm 4.4 Kruskal's Algorithm 4.5 Dijkstra's Algorithm 4.6 Huffman coding	7
5	Dynamic Programming	5.1 Matrix-chain multiplication 5.2 Elements of dynamic programming 5.3 Longest common subsequence	7
6	Elementary Data Structures	6.1 Stacks 6.2 Queues 6.3 Double Ended Queues 6.4 Linked List	8
7	Trees	7.1 The Tree abstract data type 7.2 Basic algorithm on Trees 7.3 Binary Trees 7.4 Binary Search Trees 7.5 AVL Trees 7.6 Red-Black Trees,AVL Trees	8
8	Elementary Graph Algorithms	8.1 Introduction/Graph Terminology 8.2 Representation of Graphs 8.3 Breadth – first search 8.4 Depth first Search 8.5 Topological Sort 8.6 Strongly Connected Components	5
TOTAL			55

Reference Books:

1. **Introduction to algorithms By Thomas H. Cormen, PHI Publication.**
2. **Practical Guide to Data Structure and Algorithms, Wiley Publication.**
3. **Parag Dave & Himanshu Dave, "Design and Analysis of Algorithms", Pearson Education**
4. **Michel Goodrich, Roberto Tamassia, "Algorithm design-foundation, analysis & internet examples", Wiley.**