



C. U. Shah University, Wadhwan City

Faculty of Computer Science

Name of Program: Bachelor of Science in Information Technology  
(B.Sc.IT)

Semester : IV

W.e.f. June-2015

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	
2	4CS04IDS1	Introduction to Algorithms & Data Structure	4	-	-	4	4	30	1.5	70	3	-	-	-	100

**Objectives:** To introduce techniques for analyzing the efficiency of computer algorithms and to provide knowledge of various data structures and algorithms.

**Pre-requisites:** Student should aware about core java programming.

**Course Outline:**

Ch. No	Chapter Name	Topics	Lect. Hours
1	Algorithm Introduction	What is algorithm Characteristics of an Algorithm Problems, Available Tools & Algorithms Building Blocks of Algorithms Basic Actions & Instructions Control Mechanisms and Control Structures Procedure and Recursion	5
2	Some Pre-Requisites and Asymptotic Bounds	Some Useful Mathematical Functions & Notations ---Functions & Notations ---Modular Arithmetic/Mod Function Mathematical Expectation Principle of Mathematical Induction Concept of Efficiency of an Algorithm Well Known Asymptotic Functions & Notations	5
3	Divide and Conquer	Introduction, General Issues in Divide-and-Conquer Binary Search, Sorting, Merge Sort, Quick Sort, Randomization Quicksort, Finding the Median, Matrix Multiplication	8
4	Elementary Data Structures	Recursion, Stacks, Queues, Linked List, Double Ended Queues	10
5	Hash Tables	Direct-address tables: Hash Tables Hash functions: Open addressing, Perfect Hashing	5

6	Text Processing	String Operations, Pattern matching algorithm, Tries Text Comparison	5
7	Trees	The Tree abstract data type, Basic algorithm on Trees, Binary Trees, Binary Search Trees, AVL Trees, Red-Black Trees,AVL Trees	8
8	Greedy Techniques	Introduction, Minimum Spanning Tree, Prim's Algorithm, Kruskal's Algorithm, Dijkstra's Algorithm	5
9	Elementary Graph Algorithms	Representation of Graphs Breadth – first search Depth first Search Topological Sort Strongly Connected Components	4
		Total	55

**Reference Books:**

1. **Data Structures and Algorithms in Java By Michael T. Goodrich, Wiley Publication**
2. **Introduction to algorithms By Thomas H. Cormen, PHI Publication.**
3. **Object Oriented Data structures using Java By Daniel T. Joyce**
4. **Practical Guide to Data Structure and Algorithms, Wiley Publication.**
5. **The Complete reference Java, TMH Publication**