



# **C. U. SHAH UNIVERSITY – WADHWAN CITY**

## **FACULTY OF TECHNOLOGY AND ENGINEERING DEPARTMENT OF COMPUTER ENGINEERING M. TECH. SEMESTER: - I**

**SUBJECT NAME: Computer Algorithm and Complexity theory (CAC)**

**SUBJECT CODE: 5TE01CAC1**

**Teaching & Evaluation Scheme: -**

Subject Code	Subject Name	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hours	Marks	Hours	Pr/Viva	TW	Pr	
5TE01CAC1	Computer Algorithm and Complexity theory	3	0	2	5	4	30	1.5	70	3.0	-	20	30	150

**Objectives:** Main Objective to study this subject is to get knowledge about whole algorithm analysis and designing process with its complexity.

**Prerequisites:** Basic Awareness of algorithm and C programming is required. Basic knowledge of Data Structure is required.

### **Course outline:**

Sr. No.	Course Contents
1	<b>Introduction:</b> Algorithms; analysis and design of algorithms, Type of recurrences.
2	<b>Sorting, Searching, Order Statistics:</b> Selection sort, Merge Sort, Quick Sort, Heap sort, Linear time sorting, Linear and Binary Search, medians and other statistics
3	<b>Advanced Data Structures:</b> Binary tree, AVL tree, RB tree, B-trees; binomial heaps; Fibonacci heaps; Data structures for disjoint sets.
4	<b>Advanced Design and Analysis Techniques:</b> Dynamic programming; greedy algorithms; amortized analysis
5	<b>Graph Algorithms:</b> Elementary graph algorithms; Minimum spanning trees; Single source Shortest paths; All- pairs shortest paths; Maximum flow; Backtracking; Topological sorting.
6	<b>Algorithms for Common Applications:</b> Sorting networks; Algorithms for parallel computers; Approximation

	Algorithms; Heuristic algorithms and String matching.
7	<b>Algebraic Simplifications and Transformations:</b> P, NP-Hard and NP-Complete problems.

**Learning Outcomes:**

1. A successful student will have acquired the skills to understand, develop, and analyze recognizers for programming languages.
2. The student will also be able to deploy efficient and methodical techniques for algorithmic designing and computing of complexity.

**Books Recommended:**

1. Computer Algorithms, **Coreman**, MIT Press
2. Design and Analysis of Computer Algorithms, **Aho,Hopcroft and Ullman**, Pearson
3. The Algorithm Design Manual, **Steve s. Skiena**
4. Fundamental of Algorithmic, **Bratt Ley**