303: Introduction To Algorithms

OBJECTIVES

- To introduce basic concepts of algorithms
- To introduce mathematical aspects and analysis of algorithms
- To introduce searching and Sorting algorithms
- To introduce sequential storage algorithms

Unit: 1 **[20%]**

Basic Concepts of Algorithms

Algorithm Fundamental:

Introduction – Notion of Algorithm – Fundamentals of Algorithmic Solving – Important Problem types – Fundamentals of the Analysis Framework – Asymptotic Notations and Basic Efficiency Classes.

Basic Concepts of Flowchart, Algorithm.

Array, Pointer, Union, Structure: Structure and Pointer, Structure and Array, Structure within Structure.

Unit :2 **[20%]**

Mathematical Aspects and Analysis of Algorithms

Mathematical Analysis of Non-recursive Algorithm – Mathematical Analysis of Recursive Algorithm – Example: Fibonacci Numbers – Empirical Analysis of Algorithms – Algorithm Visualization.

Unit : 3 **[30%]**

Searching and Sorting Algorithms

Linear Search and Binary Search.

Internal Sorting Algorithms: Bubble Sort, Quick Sort, Straight Selection Sort, Heap Sort, Simple Insertion Sort, Shell Sort

External Sorting Algorithms : Merge Sort, Radix Sort.

Unit : 4 **[30%]**

Sequential Storage Algorithms

Data Types : Primitive and Compound

Data Structure : Simple, Linear and Non Linear

Stack Implementation , Stack Application

Queue Implementation, Single, Double,Circular and Priority Queue.

Text Book:

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithm", Pearson Education Asia, 2003.

Reference Book:

1. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, "Introduction to Algorithms", PHI Pvt. Ltd., 2001
2. Sara Baase and Allen Van Gelder, "Computer Algorithms - Introduction to Design and Analysis" Pearson Education Asia, 2003.
3. A.V.Aho, J.E. Hopcroft and J.D.Ullman, "The Design and Analysis Of Computer Algorithms", Pearson Education Asia, 2003.
4. An Introduction to Data Structures with Application By Tremblay & Sorenson McGraw-Hill 1984
5. Data Structure using C and C++ By Tenenbaum, Prentice Hall India. 2nd Edition 1997.
6. Sorting and Sort Systems By H. Lorin Addison-wesley 1975