# Data Structures and Algorithms

| Code | Credit Hours |
|---|---|
| CS250 | 3-1 |

## Course Description

An overview of data structure concepts, arrays, stack, queues, linked lists, trees, and graphs. Discussion of various implementations of these data objects, programming styles, and run-time representations. Course also examines algorithms for sorting, searching and some graph algorithms.

## Text Book:

1. Data Structures & Algorithms Using C++, Fourth or latest Edition, Nell Dale

## Reference Book:

1. Adam Drozdek. Data Structures and Algorithms in C++, sixth Edition (2016)
2. T. H. Cormen, Charles E. Leiserson, R. L. Rivest, Clifford S. Introduction to Algorithms, Third Edition (2009)
3. Mark A. Weiss, Data Structures and Algorithm Analysis in C++, Fourth Edition (2013)
4. Data Structures & Algorithms Using C++, Fourth or latest Edition, John Bullinaria (2019)

## Prerequisites

### ASSESSMENT SYSTEM FOR THEORY

| | |
|---|---|
| Quizzes | 10% |
| Assignments | 10% |
| Mid Terms | 30% |
| ESE | 50% |

### ASSESSMENT SYSTEM FOR LAB

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|---|---|
| Lab Tasks | 70% |
| Project | 30% |

**Teaching Plan**

| Week No | Topic | Learning Outcomes |
|---|---|---|
| 1 | Introduction | Introduction to Data Structures and Algorithms |
| 2 | Linear Data Structures | Array, Linked List, Singly Linked List |
| 3 | Linear Data Structures | Doubly Linked List, Circular Linked List |
| 4 | Linear Data Structures | Stacks, Queue, Priority Queue |
| 5 | Binary Data Structures | Introduction to Trees, Binary Search Trees |
| 6 | Binary Data Structures | Binary Search Tree Operations and Traversal |
| 7 | Binary Data Structures | AVL Trees |
| 8 | Binary Data Structures | Binary Heaps |
| | **MID TERM IN WEEK 9** | |
| 10 | Algorithms | Sorting Algorithms I |
| 11 | Algorithms | Sorting Algorithms II |
| 12 | Algorithms | Introduction to Graphs |
| 13 | Algorithms | Search Operations |
| 14 | Algorithms | Hash Tables |
| 15 | Algorithms | Recursion |
| 16 | Algorithms | Spanning Trees, Shortest Paths |
| 17 | Algorithms | Concept in Running Time Complexity, Function Growth |
| | **ESE in WEEK 18** | |