| 21CSE02 | DATA STRUCTURES | L | T | P | C |
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**Course Objectives:**

The course aims:

•To understand the various techniques of sorting and searching
•To design and implement arrays, stacks, queues, and linked lists
•To understand the complex data structures such as trees and graphs
•To increase the knowledge of usage of data structures in algorithmic perspective..

**Course Outcomes:**

On completion of the course, students should be able to

1. Develop understand linear data structures such as stacks, queues, linked lists, etc.
2. Apply the concept of trees and graph data structures in real world scenarios
3. Comprehend the implementation of sorting and searching algorithms

**Unit 1 - Linear Data Structures** **9**

Notations and Analysis– Arrays and its representations – Stacks and Queues – Linked lists – Linked list-based implementation of Stacks and Queues – Evaluation of Expressions – Linked list based polynomial addition.

**Unit 2 - Non-Linear Data Structures** **9**

Trees – Binary Trees – Binary tree representation and traversals – Threaded binary trees – Binary tree representation of trees – Application of trees: Set representation and Union -Find operations – Graph and its representations – Graph Traversals – Connected components.

**Unit 3 - Search Structures and Priority Queues** **8**

AVL Trees – Red-Black Trees – B-Tree, B+ - Tree – Splay Trees – Binary Heap –Leftist Heap

**Unit 4 - Sorting** **8**

Insertion sort – Merge sort – Quick sort – Heap sort – Sorting with disks – k-way merging – Sorting with tapes – Polyphase merge.

**Unit 5 - Searching and Indexing** **8** Linear Search – Binary Search - Hash tables – Overflow handling – Cylinder Surface Indexing – Hash Index – B-Tree Indexing.

**Unit 6 - Recent Trends** **3**

Recent trends in algorithms and data structures

**Total Hours: 45**

**Text Books**


1. Mark A. Weiss, Data Structures & Algorithm Analysis in C++, 3rd edition, 2008, PEARSON
2. Ellis Horowitz and Sartaj Sahni. Fundamentals of Data Structures. 2nd Edition, 2008
3. Thomas H. Cormen, C.E. Leiserson, R L.Rivest and C. Stein, Introduction to Algorithms, Third edition, MIT Press, 2009.


**Reference Books**


1. Jean-Paul Tremblay and Paul G. Sorenson, An Introduction to Data Structures with Applications, Second Edition, Tata McGraw -Hill, New Delhi, 1991.
2. Alfred V. Aho, John E. Hopcroft and Jeffry D. Ullman, Data Structures & Algorithms, Pearson Education, New Delhi, 2006