

NIRMA UNIVERSITY
Institute of Technology
B. Tech. Computer Science and Engineering
Semester – III

L	T	P	C
3	0	2	4

Course Code	2CS301
Course Title	Data Structures and Algorithms

Course Learning Outcome:

At the end of the course, students will be able to -

1. analyse various data structures and their applicability
2. comprehend and implement various techniques for searching and sorting
3. identify the appropriate data structure to design efficient algorithm for the given application

Syllabus:

**Teaching
Hours:**
06

Unit I

Introduction to Data Structures: Basic Terminology, Elementary Data Structure Organization, Classification of Data Structures: Primitive and Non-primitive, Linear and Non-linear, Operations on Data structures, Asymptotic notations, Notion of recursive algorithms.

12

Unit II

Linear Data Structures: Introduction, variations, operations and applications of array, queue, stack and linked list

12

Unit III

Non Linear Data Structures: Concepts and types of trees, tree traversal algorithms, search trees, Priority queue implementation and applications, Representations of Graphs, Graph algorithms i.e. traversals, minimum spanning tree, shortest path, Traveling Salesman Problems

07

Unit IV

Indexing structure: Concepts and implementations of B-Tree, B+ tree, Hashing, Dictionary

08

Unit IV

Searching and Sorting Algorithms: Linear search, Binary search, internal and external sorting algorithms, sorting without comparison.

Self-Study:

The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

Laboratory Work:

Laboratory work will be based on above syllabus with minimum 10 experiments to be incorporated.

Suggested Readings[^]:

1. Jean-Paul Tremblay and Paul G. Sorenson, An Introduction to Data Structures with Applications, Tata McGraw Hill
2. Tanenbaum, Data Structures using C & C++, PHI
3. Robert L. Kruse, Data Structures and Program Design in C, PHI
4. Mary E.S. Loomis, Data Management and file processing, PHI

L = Lecture, T = Tutorial, P = Practical, C = Credit

[^] this is not an exhaustive list