NIRMA UNIVERSITY
Institute of Technology
B. Tech. in Electrical Engineering
Semester – V

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2	0	2	3

Course Code	**2EEDE53**
Course Name	**Data Structures and Algorithms**

Course Outcomes (COs):

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

1. recognize the need of various data structures
2. analyse various data structures and their applicability
3. design and implement various techniques for searching, sorting and recurrence

Syllabus: **Teaching Hours: 30**

Unit 1: Introduction **4**

Types of Data Structures, Linear & non-linear Data Structures, Time and Space Complexity of algorithms, Asymptotic notations, Recursive algorithms and their importance in algorithmic complexity

Unit 2:Linear Data Structures & their sequential storage representation **13**

Storage Structures for arrays, introduction to stack, operations on stacks, applications of stack, Introduction to queue, operations on queue, types of queues, linked list-linked linear list-operation on linear list using singly linked storage structures, circularly linked list, doubly linked linear list, applications of linked linear list-polynomial manipulation

Unit 3: Sorting & Searching Algorithms **7**

Sorting-Notation and Concepts, Insertion Sort, Selection Sort, Bubble Sort, Merge Sort, Quick Sort, Radix Sort, Sequential & Binary Searching

Unit 4: Non-linear Data Structures **6**

Trees-Definitions and concepts, operations on Binary Trees, Storage Representation and Manipulation of Binary Trees-Linked & Threaded, Conversion of general Trees To binary trees, applications of Trees, Binary Search Trees, Heap structure

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.

A few case studies on Electrical Engineering applications may be discussed.

Suggested Readings:

1. Tremblay, Jean-Paul, and Paul G. Sorenson. An introduction to data structures with applications. McGraw-Hill Computer Science Series, New York: McGraw-Hill
2. Tanenbaum, Data Structures using C & C++, PHI.
3. Robert L. Kruse, Data Structures and Program Design in C, Pearson

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

w.e.f. academic year 2020-21 and onwards