NIRMA UNIVERSITY Institute of Technology B. Tech. Computer Science and Engineering Open Elective

Course Code	2CSOE52
Course Title	Data Structures

Course Outcomes:

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

- 1. Illustrate various data structures for efficient data storage and retrieval
- 2. Correlate various data structure in algorithm design
- 3. Analyze various searching, sorting, and indexing algorithms.

Syllabus:	Teaching Hour
Introduction to Data Structures: Types of Data Structures, Linear & linear data structures	02
Unit II Linear data structures & their sequential storage representation: Storage Structures for arrays, introduction to stack, operations and applications of stack, Introduction to queue, operations of queue, operations and applications of queue, Linked list basics, types, operations and applications	06
Unit III Non Linear data structures: Trees-Definitions and concepts, operations on Binary Trees, Storage Representation and Manipulation of Binary Trees- Linked & Threaded, Conversion Of General Trees To Binary Trees, Sequential and other representations of trees, applications of Trees-the Manipulation of Arithmetic Expressions, Multi Linked Structures-Sparse Matrices.	06
Unit IV Graphs-Matrix: Graphs-Matrix representation of graphs, Breadth First Search, Depth First Search, Spanning Trees.	02
Unit V Sorting: Sorting-Notation and Concepts, Time and Space Complexity, Asymptotic behaviour, Sorting: Insertion Sort, Selection Sort, Bubble Sort,	04

Merge Sort, Tree Sort, Quick Sort, Shell Sort, Radix Sort, Address

Calculation Sort, Summary of Sorting.

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Unit VI Searching: Searching-Sequential & Binary Searching, Search Trees-Height	
Balanced, Weight Balance, 2-3 Trees, Tree Structures.	
Unit VII Hashing: Hash Table Methods-Introduction, Hashing Functions, and Collision-Resolution Techniques.	03
Unit VIII File Structure: Definition of Record, File, Blocking, Compaction and Database, introductory overview of Database Management System, Implementation and Traders of Sequential Access, Index Sequential Access,	04

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 applications of the above syllabus with minimum 10 experiments to be incorporated.

Suggested Readings^:

- 1. E. Balagurusamy, Data structures using C, McGraw Hill
- 2. Peter Brass, Advanced Data Structures, Cambridge University Press
- 3. Ellis Horowitz and Sartaj Sahni, Fundamentals of Data Structures in C, Silicon Press

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

Random Access, B-Trees, Inverted List and Multi list.

^this is not an exhaustive list