

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	Integrated B.Tech.(CSE)-MBA
Course Code:	CSI0401
Course Title:	Data Structures and Algorithms
Course Type:	Core
Year of Introduction:	2021-22

Credit Scheme

L	T	Practical Component				C
		LPW	PW	W	S	
3	1	0	-	-	-	4

Course Learning Outcomes (CLO):

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

1. define static and dynamic data structures and related operations
2. demonstrate advantages and disadvantages of specific algorithms and data structures
3. select basic algorithms for sorting and searching based on application
4. identify the appropriate data structure to design efficient algorithm for the given application

Syllabus:

Total Teaching hours: 30

Unit	Syllabus	Teaching hours
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.	05
Unit-II	Linear Data Structures: Introduction, variations, operations and applications of array, queue, stack and linked list	05
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	08
Unit-IV	Indexing structure: Concepts and implementations of B-Tree, B+ tree	06
Unit-V	Searching and Sorting Algorithms: Linear search, Binary search, internal and external sorting algorithms, sorting without comparison.	06

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

Suggested Readings/References:

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

Suggested List of Experiments: -NA-

Suggested Case List: -NA-