20UDSM202	CORE IV: DATA STRUCTURES	SEMESTER - II

COURSE OBJECTIVES: **Note: Excluding Programs.**

The course aims to

- Know the fundamental concepts of Data Structures.
- Develop applications using algorithms.

Credits: 3		Total Hours: 50	
UNIT	**CONTENTS**	**HRS**	**CO**
I	**Introduction to Data Structures**: Introduction-Types of Data Structures-Abstract Data Type- Time and Space Complexity-Big-Oh Notation. **Arrays:** Introduction- Declaration of Arrays- Accessing Array Elements- Storing Values in Arrays- Calculating the Length of an Array -Operations on Arrays -Two-dimensional Arrays-Multi- dimensional Arrays.	10	CO1
II	**Linked Lists:** Introduction - Linked List Versus Arrays – Memory Allocation and De-Allocation for a Linked List - Singly Linked List- Polynomial Representation- Circular Linked List-Doubly Linked List.	10	CO2
III	**Stacks and Queues:** Stacks- Array Representation of Stacks-Operations on a Stack- Linked Representation of Stack-Operations on a Linked Stack- Infix, Postfix and Prefix Notation-Evaluation of an Infix Expression- Convert Infix Expression to prefix Expression-Applications of stack.**Queues:** Array Representation of Queues- Circular Queue- Linked Representation of Queue- Operation on a Queue- Deque -Priority Queues – Multiple Queues.	10	CO3
IV	**Trees:** Binary Trees-Expression Trees- Traversing of a Binary Tree.**Efficient Binary Trees:** Binary search Trees- Operations on	10	CO4

	Binary Search Trees. **Graphs:** Introduction- Representation of Graphs-Graph traversal Algorithms.		
V	**Graphs:** Shortest Path Algorithms- Minimum Spanning Tree- Prim's Algorithm- Kruskal's Algorithm- Dijkstra's Algorithm- Applications of Graphs. **Sorting:** Introduction- Bubble Sort- Insertion Sort- Selection Sort- Merge Sort- Quick Sort– Heap Sort.	**10**	**CO5**

TEXTBOOK:

1	*ReemaThareja.*2012.**Data Structures Using C.**[First Edition]. Oxford University Press, New Delhi.

REFERENCE BOOKS:

1	*A.K.Sharma. 2011.* **Data Structures Using C.** [Second Edition]. BPB Publications,NewDelhi
2	*Seymour Lipschutz.* 2010. **Data Structures with C.** [First Edition]. McGraw Hill, International Editions, Schaum's Outline Series, New Delhi.
3	*R.S.Salaria.***Data Structures and Algorithms Using C**. [Fifth Edition]. Khanna Publishing, New Delhi. Paperback - 2018
4	*G.A.V.Pai.* 2008. **Data Structures and Algorithms: Concepts, Techniques and Applications.** [First Edition]. McGraw Hill, International Editions, New Delhi. Paperback – 1 Jul 2017

WEB REFERENCES:

1.	https://www.geeksforgeeks.org/data-structures/
2.	https://www.edx.org/course/data-structures-fundamentals
3.	https://www.studytonight.com/data-structures/introduction-to-data-structures

COURSE OUTCOMES (CO):

After completion of the course, the students will be able to:

CO1	Attain the knowledge of linear and non-linear data structures and analyze the efficiency of the algorithms.
CO2	Handle operations like searching, insertion, deletion, traversing mechanism on linked list.
CO3	Understand the stack and queue with its applications.
CO4	Demonstrate different methods for traversing trees.
CO5	Demonstrate knowledge of various sorting and searching techniques.

MAPPING:

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	M	H
CO2	M	H	H	H	H
CO3	M	H	H	H	H
CO4	M	H	H	H	H
CO5	H	H	H	H	H

H-High;   M-Medium;   L-Low