PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY
(Autonomous)
KANURU, VIJAYAWADA-520007
I B. Tech – II Sem (Common to CSE, IT, CSE (AI & ML), CSE (Data Science))

DATA STRUCTURES

Course Code:	23DS3201	Year:	I	Semester:	II
Course Category:	Professional Core	Branch:	CSE (Data Science)	Course Type:	Theory
Credits:	3	L-T-P:	3-0-0	Prerequisites:	Introduction to Programming
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

COURSE OUTCOMES		
Upon successful completion of the course, Student will be able to:		
CO1	Describe different linear and non-linear data structures.	**L2**
CO2	Make use of linear data structures to implement searching, sorting algorithms.	**L3**
CO3	Apply suitable linear and non-linear data structures to solve the various problems.	**L3**
CO4	Analyze suitable data structures to solve various problems.	**L4**

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3: Substantial, 2: Moderate, 1: Slight)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1													
CO2	2													
CO3	3													
CO4		2										2		

Unit No.	COURSE CONTENTS	Mapped CO
UNIT-1	**Introduction to Linear Data Structures:** Definition and importance of linear data structures, Abstract data types (ADTs) and their implementation, Overview of time and space complexity analysis. **Searching Techniques:** Linear & Binary Search. **Sorting Techniques:** Bubble sort, Selection sort, Insertion sort.	**CO1, CO2**
UNIT-II	**Linked Lists:** Singly linked lists: representation and operations, doubly linked lists, representation and operations and circular linked lists: representation and operations, Comparing arrays and linked lists.	**CO1, CO3, CO4**

UNIT-III	**Stacks:** Introduction to stacks: properties and operations, implementing stacks using arrays and linked lists, Applications of stacks: infix to postfix conversion, expression evaluation, balanced parentheses.	**CO1, CO3, CO4**
UNIT-IV	**Queues:** Introduction to queues: properties and operations, implementing queues using arrays and linked lists. **Circular Queue:** Introduction, representation, properties and operations on circular queue.	**CO1, CO3, CO4**
UNIT-V	**Trees:** Introduction to Trees, Binary Tree, Binary Search Tree – Insertion, Deletion & Traversal (Recursion Only). **Hashing:** Brief introduction to hashing and hash functions, Collision resolution techniques: chaining and open addressing.	**CO1, CO3, CO4**

Learning Resources
Text Books
1. Data Structures and Algorithm Analysis in C, Mark Allen Weiss, Second Edition, 2002, Pearson.   2. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Third Edition, 2010, PHI.   3. Data Structures and Algorithms Made Easy by Narasimha Karumanchi, 2020, CareerMonk Publications.
References
1. Fundamental of Data Structures in C, Horowitz, Sahani, Anderson-Freed, Second Edition, 2008, Universities Press.   2. Classic Data Structures, Debasis Samantha, Second Edition, 2009, PHI.   3. Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and Peter Sanders.   4. C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E. Hopcroft.   5. Problem Solving with Algorithms and Data Structures" by Brad Miller and David Ranum.   6. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein.   7. Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms" by Robert Sedgewick.
e-Resources and other Digital Material
1. http://cse.iitkgp.ac.in/pds/   2. http://cmpe.emu.edu.tr/bayram/courses/231/LectureNotesSlides/IQBAL/Lecture%20Notes   3. https://www.geeksforgeeks.org/data-structures/   4. https://www.programiz.com/dsa   5. https://www.tutorialspoint.com/data_structures_algorithms/index.htm