PVP SIDDHARTHA INSTITUTE OF TECHNOLOGY, KANURU, VIJAYAWADA
(AUTONOMOUS)
INFORMATION TECHNOLOGY

Data Structures
(Common to CSE & IT)

Course Code	20ES1305	**Year**	II	**Semester**	I
Course Category	ES	**Branch**	IT	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	Programming for Problem Solving
Continuous Internal Evaluation	30	**Semester End Evaluation**	70	**Total Marks**	100

Course Outcomes		
Upon successful completion of the course, the student will be able to		
CO1	Understand the basic concepts of algorithm complexities, recursion and data structures.	**L2**
CO2	Apply suitable searching, sorting algorithms for various applications.	**L3**
CO3	Apply suitable data structure to solve the problems.	**L3**
CO4	Analyze the problem to construct an algorithm using suitable data structure.(Assignment)	**L4**

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)

	PO1	**PO2**	**PO 3**	**PO4**	**PO 5**	**PO6**	**PO 7**	**PO 8**	**PO 9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3													
CO2	3								2	2		3	3	3
CO3	3								1	1		3	3	3
CO4		3							1	1		3	3	3

Syllabus		
Unit No	**Contents**	**Mapped CO**
I	**Introduction:** Algorithm Specification, Time complexity & space complexity and their notations. **Recursion:** What is Recursion, Why Recursion, Format of a Recursive function, Recursion andmemory, Recursion Vs Iteration, Examples. **Sorting and Searching:** Searching- Linear and Binary search algorithms. Sorting- Bubble, Insertion, Selection, Merge, Quick sort algorithms.	**CO1, CO2**
II	**Linked lists:** Single linked list, double linked list, circular linked list, and operations on linkedlists.	**CO1, CO3, CO4**
III	**Stacks:** Definition, operations: array implementation, linked list implementation and applications. **Queues:** Definition, operations: array implementation, linked list implementation and applications, Circular Queue.	**CO1, CO3, CO4**
IV	**Trees:** Introduction- Terminology, representation of trees, binary trees abstract data type, Properties of binary trees, binary tree representation, binary tree traversals In order, preorder, post order, Binary search trees Definition, searching BST, insert into BST, delete from a BST, Height of a BST.	**CO1, CO3, CO4**
V	**Graphs:** The Graph ADT Introduction, definition, graph representation, elementary graphoperations BFS, DFS, Minimum Spanning Tree – only: Prim's and Kruskal's MST.	**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.

e-Resources & 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
6. https://www.youtube.com/watch?v=zWg7U0OEAoE&list=PLBF3763AF2E1C572F
7. https://www.youtube.com/watch?v=S47aSEqm_0I&list=PLgj_V-ZKxRKrxgFyOutPJpoLFBaQMOpK-