Advanced Data Structures

Course Code	19CS4501A	Year	III	Semester	I
Course Category	Program Elective-1	Branch	CSE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Data Structures, Problem Solving and Programming
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 usage of various data structures such as queues, trees, Dictionaries, Graphs, Tries and their representations.	L2
CO2	Apply various tree operations for Balancing Trees.	L3
CO3	Apply the concept of Priority Queues for solving problems.	L3
CO4	Apply various data structures for text processing applications.	L3
CO5	Analyze the given scenario and choose appropriate Algorithm for solving Graph 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	3													
CO2	3												1	
CO3	3								3	3			1	
CO4	3											1		2
CO5		3										1		2

Syllabus

Unit No.	Contents	Mapped CO
I	**Dictionaries:** Sets, Dictionaries, Hash Tables, Open Hashing, Closed Hashing (Rehashing Methods), Hashing Functions (Division Method, Mid Square Method, Digital Folding Method), Skip Lists.	CO1
II	**Balanced Trees:** AVL Trees: Maximum Height of an AVL Tree, Insertions and Deletions. **2-3 Trees:** Insertion, Deletion.	CO1,CO2
III	**Priority Queues :** **Binary Heaps:** Insert and Delete min, Creating Heap. **Binomial Queues:** Binomial Queue Operations: Insertion and Deletion.	CO1,CO3
IV	**Graph algorithms :** Minimum-Cost Spanning Trees- Prim's Algorithm, Kruskal's Algorithm **Shortest Path Algorithms:** Dijkstra's Algorithm **All Pairs Shortest Paths Problem:** Warshall's Algorithm	CO1,CO5
V	**Pattern matching and Tries:** **Pattern matching algorithms-** the Boyer –Moore algorithm, the Knuth Morris-Pratt algorithm, Anagram Pattern Search **Tries:** Definitions and concepts of digital search tree, Binary trie, Patricia, Multi-way trie.	CO1,CO4

Learning Resources

Text Books

1. Data structures and Algorithm Analysis in C, Mark Allen Weiss, Second edition , Pearson.
2. Data Structures and Algorithms Made Easy by Narasimha Karumanchi, 2020, Career Monk Publications.

References

1. Fundamentals of DATA STRUCTURES in C, Horowitz, Sahani, Anderson-freed, Second edition, Universities Press.
2. Data Structures A Pseudocode Approach, Richard F Gilberg, Behrouz A Forouzan, Cengage.

e-Resources and other Digital Material

1. http://lcm.csa.iisc.ernet.in/dsa/dsa.html
2. http://utubersity.com/?page_id=878
3. http://freevideolectures.com/Course/2519/C-Programming-and-Data-Structures
4. http://freevideolectures.com/Course/2279/Data-Structures-And-Algorithms