

COURSE CODE	COURSE TITLE	L	T	P	C
1154CS106	DATA STRUCTURES	3	0	0	3

Course Category: University Elective

A. Preamble:

This course provides an introduction to the basic concepts and techniques of Linear and nonlinear data Structures and Analyze the various algorithm.

B. Prerequisite Courses:

SI No	Course Code	Course Name
1	1150CS201	Problem solving using C

C. Related Courses:

SI No	Course Code	Course Name
1	1156CS701	Project

D. Course Outcomes:

Upon the successful completion of the course, students will be able to:

CO Nos.	Course Outcomes	Knowledge Level (Based on revised Bloom's Taxonomy)
CO1	Develop Abstract Data Types (ADT) for linear data structures and implement the same.	K3
CO2	Implement non-linear data structures such as trees	K3
CO3	Illustrate some of the special trees and Hashing Techniques.	K2
CO4	Construct solutions for various real life applications using graphs and apply BFS and DFS to traverse a graph	K3
CO5	Demonstrate knowledge of sorting algorithms and their run-time complexity.	K3

E. Correlation of COs with POs:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	H	M		M	L								M	M	
CO2	H	M	L	M	L								M	M	M
CO3	M	M		M	L								M		
CO4	H	H	H	M	L	L		L	L		L	L	M	M	M
CO5	H	H	L	M	L				L				M		L

H- High; M-Medium; L-Low

F. Course Content:

UNIT I LINEAR DATA STRUCTURE 9

Introduction - Time and space complexity analysis - Abstract Data Type (ADT) – The List ADT – Array Implementation – Linked List Implementation– the Stack ADT – The Queue ADT – Applications of Stack, Queue and List.

UNIT II TREES 9

Introduction to trees - Tree Traversal - Binary Trees - Definitions – Expression Tree – Binary Tree Traversals - The Search Tree ADT – Binary Search Trees - AVL Tree.

UNIT III SPECIAL TREES & HASHING 9

Splay Tree – B-Tree - Priority Queue - Binary Heap –. Hashing - Separate Chaining – Open Addressing – Linear Probing – Quadratic Probing – Double Hashing –Rehashing

UNIT IV GRAPH 9

Introduction to Graphs - Topological Sort – Shortest-Path Algorithms – Unweighted Shortest Paths –Dijkstra’s Algorithm – Minimum Spanning Tree – Prim’s Algorithm- Kruskal’s Algorithm – Breadth first search – Depth-First Search – Undirected Graphs – Biconnectivity.

UNIT V SORTING & SEARCHING 9

Sorting algorithm- Insertion sort- Selection sort- Shell sort-Bubble sort- Quick sort- Heap sort-Merge sort- Radix sort - Searching – Linear search - Binary search.

Total: 45 Periods

G. Learning Resources

i. Text Books:

1. M. A. Weiss, “Data Structures and Algorithm Analysis in C”, Second Edition , Pearson Education, 2007.

ii. Reference:

1. A. V. Aho, J. E. Hopcroft, and J. D. Ullman, “Data Structures and Algorithms”, Pearson Education, First Edition Reprint 2003.
2. R. F. Gilberg, B. A. Forouzan, “Data Structures”, Second Edition, Thomson India Edition, 2005.
3. Ellis Horowitz, SartajSahni, Dinesh Mehta, “Fundamentals of Data Structure”, Computer Science Press, 1995.

iii. Online resources

1. <http://simplenotions.wordpress.com/2009/05/13/java-standard-data-structures-big-o-notation/>
2. <http://mathworld.wolfram.com/DataStructure.html/>.