

COURSE CODE	COURSE TITLE	L	T	P	C
1153CS104	DATA STRUCTURES USING C	3	0	0	3

Course Category: Allied Elective

A. Preamble:

This course introduces the basic concepts and techniques of Linear and nonlinear data Structures and Analyze the various algorithm.

Prerequisite Courses:

Sl. No	Course Code	Course Name
1	1150CS201	Problem Solving using C

B. Related Courses:

Sl. No	Course Code	Course Name
		Nil

C. Course Educational Objectives:

Learners are exposed to

- Be exposed to the concepts of ADTs
- Learn linear data structures – list, stack, and queue.
- Learn non-linear data structures – Tree, graph etc
- Be exposed to sorting, searching, hashing algorithms

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	Understand the user defined data types and the representation of linear data structures for solving real world problems.	K2
CO2	Implement the concepts of self-balancing Binary Search Trees for solving the real world scenarios.	K3
CO3	Describe the hash function concepts of collision and its resolution methods	K2
CO4	Compute the complexity of various algorithms to solve the problem by involving graphs and trees	K3
CO5	Apply Algorithm for solving problems by using sorting, searching, insertion and deletion of data	K3

E. Correlation of COs with POs:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	H	M	L		L								L	H	
CO2	M	M	L		L								L	L	
CO3	M	M			L								M	L	
CO4	M	H	L	M	L							L	L	H	L
CO5	M	M	L	M	L								L	H	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 Hours

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, Sartaj Sahni, 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/>.