

COURSE CODE	COURSE TITLE	L	T	P	C
1151CS102	DATA STRUCTURES	3	0	0	3

Course Category: Program Core

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:

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

C. Related Courses:

Sl. No	Course Code	Course Name
1	1151CS105	System Software
2	1151CS106	Design and Analysis of Algorithm
3	1151CS119	Introduction to Design and Analysis of Algorithms
4	1151CS107	Database Management System
5	1151CS108	Operating Systems
6	1151CS111	Computer Networks

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	Identify and explain user defined data types, linear data structures for solving real world problems.	K2
CO2	Design modular programs on non linear data structures and algorithms for solving engineering problems efficiently.	K3
CO3	Illustrate special trees and Hashing Techniques.	K2
CO4	Apply searching techniques in graph traversal	K3
CO5	Apply sorting techniques for real world problems.	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	M	M		M	M		M	M	M	L
CO2	M	M	M	M	L			M		M			M	M	L
CO3	M	M	M	L	L	M	L						M	M	M
CO4	M		M		L			M					M	M	H
CO5	M	M	M	L	L			M	M			M	M	M	H

H- High; M-Medium; L-Low

F. Course Content:

UNIT I LINEAR DATA STRUCTURE

L – 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

L – 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

L – 9

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

UNIT IV GRAPH

L – 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

L – 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/>