Course Name: Data Structures
Course Code: TE7960
Faculty: Engineering
Course Credit: 3
Course Level: 3
Sub-Committee (Specialization): Computer Science
Learning Objectives:

The students will be able to:
Implement and compare different searching sorting techniques.
Use knowledge of dynamic data structure and constructs in link list programs.
Implement set operations on the link list
Demonstrate different types of tree data structure and use algorithms for tree traversals.
Implement different graph algorithms and its applications.
Illustrate AVL tree to solve problems and understand symbol table.

Books Recommended:

Book	Author	Publisher
A practical data structure and algorithm research on drawing and editing vector graphics	Information Computing and Telecommunications (YC-ICT), 2010 IEEE Youth Conference on	NA
Data structure & Algorithm Analysis in C++, ISBN-032144146X,3rd Edition 2007.	Weiss, Mark Allen	Addison Wesley
Data structure using C,ISBN 9788131702291, 9th Edition 2009	AM Tanenbaum, Y Langsam & MJ Augustein	Pearson Prentice Hall India
Data structures & Program Design in C,ISBN 9780132883665, 4th Edition 2009.	Robert Kruse, C.L.Tondo, Bruce Leung	Pearson
Data Structures: A pseudo code approach with C, ISBN 9780534390808, 2nd Edition October 11, 2004.	R. Gilberg,B. Forouzan	Cenage Learning
Fundamentals of Data Structures in C, ISBN 10:8173716056, 2nd Edition 2007.	E. Horowitz, S.Sahani and S.Anderson-Freed	University Press
Let us C & Pointer in C, ISBN 9788183331630, 13thEdition 2013 .	Yashwant Kanitkar	BPB
Research of shortest path algorithm based on the data structure	Software Engineering and Service Science (ICSESS), 2012 IEEE 3rd International Conference on	NA

Course Outline:

Sr. No.	Topic	Actual Teaching Hours	Contact Hours Equivalence
1	**Need of sorting and searching, Sorting and searching techniques using array, General sort concepts sort order, sorting order stability in sorting. Concept of internal and external sorting. Searching methods: Algorithms for Sequential search, Binary search Sorting methods: Bubble, insertion, selection, merge and quick sort**	**10**	**10**

2	**Linked lists: Linear list concepts, list v/s array, different types of linked lists. Singly linked lists: create a list, insert node empty list, beginning, middle, end, delete node first, last, middle, reverse and concatenation. Stack and queue using a singly link list. Circularly-linked list: create la ist, insert node empty list, beginning, middle, end, delete node first, last, middle, reverse and concatenation. Doubly linked list: create a list, insert node empty list, beginning, middle, end, delete node first, last, middle reverse and concatenation**	**10**	**10**
3	**Tree: Difference in linear and non-linear data structure, trees and binary trees-concept and terminology, binary tree as an ADTAbstract Data Type, algorithm for tree traversals recursive and non-recursive, conversion of general tree tobinary tree, binary search trees, concept of threaded binary tree, Different types of threaded binary tree, preorder, inorder traversals of threaded binary search tree**	**10**	**10**
4	**Graph:Graph as an ADT, representation of graphs using adjacency matrix, adjacency list, Depth First Search and Breadth First Search, algorithms for minimal spanning tree Prims and Kruskalsand shortest path-Dijkstras algorithm, application of these algorithms**	**10**	**10**
5	**Symbol tables and dynamic trees:The notion of the symbol table, AVL Adelson-Velskii and Landis Trees, Balanced Imbalanced AVL Tree Problem Solving**	**5**	**5**
	Total	**45**	**45**

Pre Requisites:

Knowledge of C/C, Basics of data structures and file handling.

Evaluation:

Assignment
Seminar
Quiz
Examination
Viva
Mini Project
Experiential Learning

Pedagogy:

Classroom teaching
Hacker rank

Expert:

Dharmendra Shahi,Devops Architect,IBM India