Paper Code   : DSC:203
Paper Name   : Data Structure in C

Teaching Hours (Per Week)		Examination Scheme		
TH. (hours)	Pr. (hours)	Internal	External	Total
		Th. (marks)	Th. (marks)	100 (marks)
4		30	70	

Lectures   =   68 Hours

"Data Structures is a subject of primary importance to the discipline of Computer Science. Organization or structuring data is vital to the design and implementation of efficient algorithm and program development. In fact any discipline in Science requires efficient problem solving using computers."

Detailed Syllabus

UNIT I
Introduction   5Hrs.
Definition of data structure, data structure operations. Algorithms : Complexity, Time Space tradeoff, Complexity of Algoritms, Asymptotic Notations for Complexity of Algorithms, Subalgorithms, Variables, data.

UNIT II
Arrays, Linked Lists, Stacks and Queue   25 Hrs.
Introduction, Linear arrays, Representation of linear arrays in memory, Address calculation of using row and column major ordering, Traversing linear arrays, Inserting and Deleting, Multidimensional arrays: Representation of Two-Dimensional arrays in memory, Pointers: Pointers arrays, Matrices, Sparse Matrices.

Linear Lists:
Linked Lists, Representation of Linear Lists in memory, Traversing a Linked List, Searching a linked List, Memory allocation: Garbage collection, overflow and underflow, Insertion into a linked list, Deletion from linked list, Circular linked lists, Doubly linked lists, Header linked lists.

Stacks and Queue
Stacks : Definition, Array representation of stacks, Linked representation of stacks, Polish notation, Evaluation of a Postfix Expression, Transforming Infix Expressions into Postfix Expressions.
Queues : Definition, Array representation of Queues, Linked representation of Queues, Circular queues, Priority Queue and D-Queue.

UNIT III
Trees   13 Hrs.
Introduction and Definition of Trees, Tree Terminology, Binary Tree, Representing Binary Tress in Memory, Traversing Binary Tree: Preorder, In-order, Post-ordered traversal, Traversal algorithms using

stacks, Headed nodes: Threads (definition only), Binary Search trees, Searching and Inserting in Binary Search trees, Deleting in a Binary search tree. AVL trees, m-trees and B-Trees (definition only).

UNIT IV

Graphs 13 Hrs.

Introduction, Graph theory terminology: Graph and multigraphs. Directed Graphs, Sequential representation of graphs: Adjacent matrix, Path matrix, Linked representations of a Graph, Operations on Graphs: Searching in a Graph, Inserting in a graph, Traversing a graph : Breadth- First search, Depth-Final search, Spanning tree (definition only).

UNIT V

Sorting and Searching 12 Hrs.

Sorting, Bubble Sort, Insertion sort, Quick Sort, Selection sort, Merging, Merge-sort. Searching : Sequential and binary searches, Indexed search, Hashing Schemes

RECOMMENDED BOOKS

Main Book:

1. Seymour Lipchutz, "Theory and Problems of Data Structures", Tata Mc Grew

Reference Book:

1. Robert Kruse, C.L Tondo and Bruce Leung, "Data Structure and Programming in C", Pearson Education.

2. Yedidyah Langsam, Moshe J. Augenstein, and Aaron M. Tenenbaum, "Data Structure using C and C++", Pearson Education 2nd Edition.

3. Seymour Lipschutz and G A Vijayalakshmi Pai, "Data Structures", Tata Mc Grew Hills

4. Robert Lafore, " Sams Teach Yourself Data Structures and Algorithms in 24 Hours", Sams Techmedia

5. Alfred V Aho, John E Hopcroft and Jeffery D Ullman, " Data Structures and Algorithms", Pearson Education.

6. Samiran Chattopadhyay, Debabrata Ghosh Dastidar and Matagini Chattopadhyay, " Data Structures through C Language", BPB Publication.