Course Title : Data Structures			
Course Code : P18CS33	Semester : 3	L :T:P:H : 4:0:0:4	Credits: 3
Contact Period: Lecture: 52 Hrs, Exam: 3 Hrs		Weightage: CIE:50%, SEE:50%	

Course Content

Unit-1

Pointers: Pointers and character strings, array of pointers, pointers as function arguments, functions returning arguments, pointers to functions, pointers and structures.
Introduction to data structures-Definition, Classification of Data Structures.
Stacks: Representing stack in C- Implementation of Push, Pop and display operations using arrays and pointers. Applications of Stacks: Infix, Postfix, Prefix, Infix to postfix, prefix to postfix, evaluation of postfix.
Self Study Component : Structures concepts, Programmes on structures

10 Hours

Unit-2

Recursion: Definition,Writing Recursive programs-Factorial Numbers, Fibonacci Numbers and Tower of Hanoi Problem
Queues: Definition, Representation, operations, implementation using arrays and linked lists. Different types of queues, Basic operations on - Linear queue, Circular queue, Priority Queue and Double ended Queue (Using SLL), Applications of Queues
Self Study Component : Recursive programmes on Multiplication of natural numbers, GCD of two numbers.

10 Hours

Unit-3

Linked Lists: Static Memory Allocation and Dynamic Memory Allocation, Basic operations on SLL, DLL, Circular SLL and Circular DLL: insertion, deletion and display. Implementation of SLL with Header nodes
Applications of Linked Lists: Merging, Reversing, Searching, Addition of two polynomials using SLL.
Self Study Component : Conversion from Infix to Prefix expression, Postfix to Prefix expression.

10 Hours

Unit-4

Trees: Introduction-Definition, Tree Representation, Properties of Trees, Operations on Binary tree, Binary Search Tree [BST] - Definition, searching BST, Insertion to BST, Deletion from BST, Display BST. Tree and their Applications- Tree Traversal, General Expression as a tree, Evaluating an Expression Tree; Threaded Binary Trees-Threads, Inorder Traversal of a Threaded Binary Tree, Inserting a Node into a Threaded Binary Tree
Self Study Component : Different traversal techniques using iterative approach

12 Hours

Unit-5

Sorting Techniques: Address calculation sort, Binary tree sort, Radix sort.
Searching Techniques: Sentinel search, probability search, ordered list search (Text Book-2)
Self Study Component : Sorting methods – Quick sort, Merge sort, Searching methods – Binary search, Indexed sequential search

10 Hours

Text Books:
1. Data Structures using C and C++ by Yedidyah Langsam and Moshe J. Augenstein and Aaron M.Tenanbaum, PHI, 2nd Edition.
2. Data Structures – A pseudo code Approach with C – Richard F Gilberg and Behrouz A forouzan, 2nd Edition.
3. Programming in ANSI C, C.Balaguruswamy, 6th edition 2013.

Reference Book:
1. Fundamentals of Data Structures in C -Horowitz, Sahani, Anderson-Freed, 2nd Edition, University Press. 2nd Ed. Understand primitive and derived data structure.

Course Outcomes

After learning all the units of the course, the student is able to:

1. **Design** and Implement standard data structures like stack using recursion

2. **Design** and implement operations on linked list.

3. **Develop** programs to implement different queues.

4. **Design and** implement dìffèrent tree traversal techniques using iteraton and recursion.

5. **Implement** sorting and searching techniques

CO-PO Mapping

Semester: 3		Course code : P18CS33					Title : Data Structures								
CO	**Statement**	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO 303.1	**Solve** the given problems using the concepts of stacks	2	2	2		2				2					3
CO 303.2	**Apply** the concepts of linked list	2	2	2		2				2					3
CO 303.3	**Apply** the concepts of queues	2	2	2		2				2					3
CO 303.4	**Design** different types of trees for a given problem.	2	2	2		2				2					3
CO 303.5	**Apply** sorting and searching techniques	2	2	2		2				2					3
C303		**2**	**2**	**2**		**2**				**2**					**3**