18CSC21 PROGRAMMING AND LINEAR DATA STRUCTURES

(Common to CSE & IT branches)

Category	L	T	P	Credit
PC	2	0	2	3

Preamble: This course provides an introduction to the advanced features of C language, basic concepts and applications of Linear data Structures like linked list, stack and queue.

Prerequisites	Problem Solving and Programming	
UNIT – I		
Pointers and Arrays, Pointers and Strings: Pointers- pointer basics – pointer operators – pointer arithmetic – NULL pointers – generic pointers – pointers and arrays: Pointers and 1D,2D arrays – passing an array to a function – returning an array from function – array of pointers – pointers and strings – two dimensional character array – array of pointers to strings – dynamic memory allocation		6
UNIT – II		
Pointers and Functions, Pointers and Structures: Function pointers – calling a function using a function pointer – array of function pointers – Structures – typedef and its use in structure declaration – nesting of structures - array of structures - Arrays within structure - structures and functions – passing structures to functions - structure pointers - self referential structures.		6
UNIT – III		
File Handling and Preprocessor Directives: Introduction - Operations on Files - opening and closing - Input and Output operations - Sequential and random access - Detecting the end-of-file - Renaming and Removing a file - Preprocessor directives – Macros - File Inclusion - Conditional Compilation – Command line Arguments.		6
UNIT – IV		
Data Structures and Linked List: Introduction to Data Structures – Classification – Introduction to linked lists - Linked lists Vs arrays – Memory allocation and deallocation for a linked list – different types of linked list – singly linked list – traversing – searching – inserting and deleting a node in a linked list		6
UNIT – V		
Stac.. and Queue: Introduction – Stack – Implementation of stack using array and linked list – Application of stack – Queue – Implementation of Queue using array and linked list– Other variations of Queue – Applications of Queue.		

List of Exercises / Experiments:

1. Program to access an array(1D and 2D) using pointers
2. Program to manipulate strings using pointers
3. Program to demonstrate dynamic memory allocation for 1D and 2D array
4. Program to pass an array as an argument to function and access the array using pointers
5. Programs using pointers and structures
6. Program to perform operations on files
7. Program using conditional preprocessor directives
8. Program to implement singly linked list
9. Program to implement stack using array and linked list
10. Program to implement Queue using array and linked list

Lecture:30, Practical:30, Total: 60

REFERENCES / MANUAL / SOFTWARE:

1. Sumitabha Das, "Computer Fundamentals and Programming", 1st Edition, McGraw Hill Education (India) Pvt. Ltd., 2018.
2. Yashavant Kanetkar, "Pointers in C", 4th Edition, BPB Publications, 2017.
3. Pradip Dey, Manas Ghosh, "Programming in C", 2nd Edition,Oxford University Press, 2011.