Course Category : **Major Core**
Course Name : **Programming in C**
Course Code : **UCS1003**
L-T-P : **3-0-2**
Semester : **I**
Batch : **2024-28**

Syllabus

Prerequisite:

The student should understand:

- Simple Mathematics & basic comprehension skills.

Course Outcomes:

At the end of the course, students will be able to:

CO1	Develop Simple Algorithms for Arithmetic and Logical Problems.
CO2	Apply loop, decision making constructs to solve a given problem.
CO3	Implement arrays, structures, and union to formulate algorithms and programs and apply it for searching and sorting problems.
CO4	Decompose a Problem into Functions and Synthesize a Complete Program Using Divide and Conquer Approach.
CO5	Apply the concept of pointers to develop algorithms and programs.

Unit No	Topics	CO No.	No. of Lecture
1	Introduction to Components of a Computer System: Memory, Processor, I/O Devices, Storage, Operating System, Concept of Assembler, Compiler, Interpreter, Loader and Linker. Idea of Algorithm: Representation of Algorithm, Flowchart, Pseudo Code with Examples, From Algorithms to Programs, Source Code. Programming Basics: Structure of C Program, Writing and Executing the First C Program, Syntax and Logical Errors in Compilation, Object and Executable Code. Components of C Language. Standard I/O in C , Fundamental Data types, Variables and Memory Locations, Storage Classes.	**1**	**8**

2	Arithmetic Expressions and Precedence : Operators and Expression Using Numeric and Relational Operators, Mixed Operands, Type Conversion, Logical Operators, Bit Operations, Assignment Operator, Operator precedence and Associatively. Conditional Branching: Applying if and Switch Statements, Nesting if and Else and Switch. Iteration and Loops: Use of While, do While and for Loops, Multiple Loop Variables, Use of Break, Goto and Continue Statements.	**2**	**8**
3	Arrays: Array Notation and Representation, Manipulating Array Elements, using Multi-Dimensional Arrays. Character Arrays and Strings, Structure, union, Enumerated Data types, Array of Structures Basic of searching and Sorting Algorithms: Linear Search , Bubble Sort	**3**	**8**
4	Functions: Introduction, Types of Functions, Functions with Array, Passing Parameters to Functions, Call by Value, Call by Reference, Passing Arrays to Functions. Recursive Functions.	**4**	**8**
5	Pointers – Declarations – Passing pointers to functions – Operation in Pointers - Pointers Arrays – Arrays of pointers – Structures and pointers	**5**	**8**

Text Book:

1. B.W. Kernighan and D.M. Ritchie, The C Progamming Language, 2nd Edition, PHI, 1988.
2. Kanethkar Y., Let us C, BPB Pub., New Delhi. 1999.

Reference Book:

1. Computer Concepts and Programming in C, E Balaguruswami, McGraw Hill
2. Computer Concepts and Programming in C, R.S. Salaria, Khanna Publishing House

List of Programs

Lab Course Outcomes:

At the end of the course, students will be able to:

CO1	Apply the branching and looping constructs to execute the basic C programs.
CO2	Execute the programs based on Array and Structure,
CO3	Execute programs based on functions and pointers.

S. No.	Programs	CO No.
1	**Write a Program to print different data types in 'C' and their ranges.**	1
2	**Write a C program to find the sum and average of three numbers.**	1
3	**Write a program to swap the values of two variables with and without using the third variable.**	1
4	Write a Program to read radius value from the keyboard and calculate the area of circle and print the result in both floating and exponential notation.	1
5	Write a program to find whether the given year is a leap year or not.	1
6	**Write a program that checks whether the two numbers entered by the user are equal or not.**	1
7	**Write a program to find the greatest of three numbers.**	1
8	Write a program that finds whether a given number is even or odd.	1
9	Write a program that tells whether a given year is a leap year or not.	1
10	Write a program that accepts marks of five subjects and finds percentage and prints grades according to the following criteria: Between 90-100%-----Print 'A' 80-90%----------Print 'B' 60-80%----------Print 'C' Below 60%----------Print 'D'	1
11	Write a program that takes two operands and one operator from the user, perform the operation, and prints the result by using Switch statement.	1
12	Write a program to print the sum of all numbers up to a given number.	1
13	Write a program to find the factorial of a given number.	1
14	Write a program to print sum of even and odd numbers from 1 to N numbers.	1
15	Write a program to print the Fibonacci series.	1
16	Write a program to check whether the entered number is prime or not using function	3
17	Write a program to find the reverse of a number using a function.	1
18	Write a program to print Armstrong numbers from 1 to 100 using a function.	3
19	Write a recursive function to calculate the factorial of a given number.	3
20	Write a program that simply takes elements of the array from the user and finds the sum of these elements using function.	3
21	Write a program that inputs two arrays and saves the sum of corresponding elements of these arrays in a third array and prints them.	2

22	Write a program to find the minimum and maximum element of the array.	2
23	Write a program to search an element in an array using Linear Search.	2
24	Write a program to sort the elements of the array in ascending order using Bubble Sort technique.	2
25	Write a program to add and multiply two matrices of order **n x n.**	2
26	Write a program that finds the sum of diagonal elements of a **m x n** matrix.	2
27	Write a program to implement strlen (), strcat (),strcpy () using the concept of Functions.	2
28	Write a program Define a structure data type TRAIN_INFO. The type contains Train No.: integer type Train name: string Departure Time: aggregate type TIME Arrival Time: aggregate type TIME Start station: string End station: string The structure type Time contains two integer members: hour and minute. Maintain a train timetable and implement the following operations: a. List all the trains (sorted according to train number) that depart from a particular section. b. List all the trains that depart from a particular station at a particular time. c. List all the trains that depart from a particular station within the next one hour of a given time. d. List all the trains between a pair of start station and end station	2
29	Write a program to swap two elements using the concept of pointers.	3