Name of Faculty	:	Faculty of Computer Science & Applications
Name of Program	:	Bachelor of Computer Application with Industry Collaboration
Course Code	:	1BCA02
Course Title	:	Computer Programming
Type of Course	:	Professional Course
Year of Introduction	:	2023-24

Prerequisite	:	**-**
Course Objective	:	This program empowers students by learning problem solving skills, development of algorithms and drawing flowcharts to solve simple problems, the process of compiling and executing a C program. Understanding various C tokens, datatypes, programming constructs, file, structure, pointers, and analyse how length of the source program can be reduced by using functions. Develop C Programs using various methods described above to solve real-world problems.
Course Outcomes	:	At the end of this course, students will be able to:
	CO 1	Demonstrate problem solving skills by developing algorithms and drawing flowcharts to solve simple problems, Understand the process of compiling and executing a C program and recognize various C tokens and datatypes
	CO 2	Understanding various programming constructs and applying it for the problemsgiven in hand.
	CO 3	Demonstrate the use of various data structures like array, file, and structure.
	CO 4	Applying the concepts of top-down modular programming to decompose problem and a program solution into smaller pieces and Analyse how length of the source program can be reduced by using functions.
	CO 5	Evaluate how pointers are effective in handling arrays, functions, and data tablesand how pointers support Dynamic memory management.
	CO 6	Develop C Programs using various methods described above to solve real-world problems.

Teaching and Examination Scheme

Teaching Scheme (Contact Hours)			Credits	Examination Marks				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	SEE	CIA	SEE	CIA	
2	0	4	4	50	25	50	25	150

Legends: ***L****-Lecture;* ***T****–Tutorial/Teacher Guided Theory Practice;* ***P*** *– Practical,* ***C*** *– Credit,* ***SEE*** *– Semester End Examination,* ***CIA*** *- Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations /MCQ Tests, etc.))*

Course Content

UNIT No.	Topics	No. of Lectures	Weightage	Mapping with CO
1	**Introduction to 'C' language:** Program, Software, Instruction, debugging, compilation and execution of C Program, Difference between Header files & library files, Compiler, and Interpreter, Procedure Oriented Language, Importance of C, Basic structure of C, Algorithms & Flowchart.	2	5%	CO 1 CO 2
2	**Constants, Variables & Data Types in 'C'**: Character set, C tokens, Keywords & Identifiers, Data types, Constants, Variables, Declaration of Variables, Assigning Values to Variables, Declaring a variable as Constant, Defining Symbolic constants.	3	6%	CO 1 CO 2
3	**Operators and Expression in 'C':** Classification of operators: Arithmetic, Relational, Logical, Assignment, Increment / Decrement, Conditional, Bitwise, Special Operators. Unary, Binary and Ternary Operators. Arithmetic expression, Evaluation, Type conversion: Implicit &Explicit, Precedence and Associativity, Various library functions from maths.h.	3	6%	CO 1 CO 2
4	**Managing Input & Output Operations:** Reading a Character, Writing a Character, Various library functions from ctype.h. Formatted Input, Formatted Output	1	2%	CO 1 CO 2
5	**Decision Making & Branching:** Decision making using simple if, if…else statement, nesting of if…else, else…if Ladder. Switch statements, conditional operator, goto statement.	3	6%	CO 2 CO 4
6	**Looping:** Need of looping, (pre-test) entry-controlled loop: while, for, (post-test) exit-controlled loop: do…while, difference between Counter- Controlled loops and Sentinel - controlled loops. Nesting of looping statements, use of break & continue, use of if…else in loop, infinite loop.	3	8%	CO 2 CO 4
7	**Arrays:** Need of array, Declaration & Initialization of 1D array, Programs of 1D. 2D array, Memory allocation of 1D and 2D array, 2D array basic programs.	4	8%	CO 3 CO 5
8	**Character Arrays and Strings:** Difference of character array with numeric array and importance of NULL character. Declaration, Initialization and various input and output methods of string, formatted output of string, arithmetic operations on characters. Various functions of string.h: strlen, strcat, strcmp, strcpy, strrev, strstr, etc. Two dimensional character array (table of strings).	5	10%	CO 3 CO 5

9	**User-Defined Function in 'C'**: Need of modularization, advantages, Introduction to user- defined function, Function Prototype, Function Call, Function Body. Call by value, Actual &Formal Arguments, return value, Categories of functions, Nesting of Functions, Recursion. Array as Function arguments, Storage Classes: Scope, Life of a variable in 'C'.	5	14%	CO 5
10	**Structures and Union:** Need of user-defined data type, Structure definition, Declaration and Initialization of variables, Array as member, Array of structure variables. Structure within structure, Structure as function arguments, Union.	3	8%	CO 5
11	**Pointers:** Introduction to pointer, declaration & initialization, access value using pointer, indirection (*) operator. Pointers in expressions, scale factor, 1D-array and pointer, pointer with strings, Array of pointers. Pointer as arguments in function, Call by address, Functions returning pointers, Pointers and structures, Chain of Pointers.	6	14%	CO 5
12	**File Management in 'C':** Introduction, Defining and Opening a file, closing a file, modes of file, read & write single character and integer to file, use of fprintf and fscanf functions. Error handling functions, random access of files using ftell, rewind, fseek, command line argument.	5	8%	CO 5 CO 6
13	**Dynamic Memory Allocation:** Introduction, memory allocation process. Use of functions: malloc ( ), calloc ( ), realloc ( ) and free ( ).	2	5%	CO 6

Suggested Distribution of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyse	Evaluate	Create
Weightage	**30**	**40**	**30**	**-**	**-**	**-**

NOTE: This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Suggested List of Experiments/Tutorials

Sr. No.	Name of Experiment/Tutorial	Teaching Hours
1	Write a C program to display "This is my first C Program".	2
2	Write a Program to calculate and display the volume of a CUBE having its height (h=10cm), width (w=12cm) and depth (8cm).	2
3	Write a C program to add two numbers (2 and 6) and display its sum.	2
4	Write a program to take input of name, roll_no and marks obtained by a student in 4 subjects of 100 marks each and display the name, roll_no with percentage score secured.	2
5	Write a program to print whether a given number is even or odd.	2

6	Write a program to find whether a character is consonant or vowel using. **switch** statement.	2
7	Write a program to print positive integers from 1 to 10.	2
8	Write a program to display the following pattern. * * * * * * * * * * * * * * *	2
9	Write a program to display the following pattern. * * * * * * * * * * * * * * * * * * * * *	2
10	Write a program to insert 5 elements into an array and print the elements ofthe array.	2
11	Write a program to calculate factorial of a number using recursion.	2
12	Write a program to find biggest among three numbers using pointer.	2
13	Write a program to add two 2 X 2 matrix using pointers.	2
14	Write a C program to create, declare and initialize structure.	2
15	Write a program to store information of 5 students in structure and display	2
16	Write a program to declare, initialize an UNION.	2
17	Write a program to create a file called emp. rec and store information abouta person, in terms of his name, age and salary.	2
18	Write a program to illustrate how a file stored on the disk is read.	2

Major Equipment/ Instruments and Software Required

Sr. No.	Name of Major Equipment/ Instruments and Software
1	DEV C++ , Microsoft C , Turbo C

Suggested Learning Websites

Sr. No.	Name of Website
1	https://www.programiz.com/c-programming
2	https://www.javatpoint.com/c-programming-language-tutorial

Reference Books

Sr. No.	Name of Reference Books
1	Head First C by David Griffiths and Dawn Griffiths
2	C How to program, 7/E by Deitel & Deitel, Prentice Hall
3	C: The Complete Reference by Herbert Schildt