Faculty of Engineering & Technology
Bachelor of Technology (B. Tech)
(W. E. F.: 2023-24)

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Name of Faculty	:	Faculty of Engineering & Technology
Name of Program	:	Bachelor of Technology (B. Tech)
Course Code	:	2BCT02
Course Title	:	Program and Logic Building
Type of Course	:	Professional Core
Year of Introduction	:	2023-24

Prerequisite	:	Basic of 'c' Programming
Course Objective	:	• To Understand the fundamentals of programming. • To Learn the syntax and semantics of the C programming language. • To Develop problem-solving skills. • To Understand the principles of procedural programming.
Course Outcomes	:	At the end of this course, students will be able to:
	CO1	Understanding the basic principles of computer programming and logic building, and how they apply to the C programming language.
	CO2	Developing the ability to write and debug simple C programs using the basic programming constructs, such as variables, loops, conditionals, and functions.
	CO3	Understanding how to use arrays and pointers in C to manipulate data and create more complex programs.
	CO4	Understanding the importance of data types, operators, and expressions in programming, and how to use them effectively in C.
	CO5	Developing the ability to write and use functions in C to organize code, improve reusability, and simplify complex tasks.
	CO6	Understanding how to use libraries and APIs in C to extend the functionality of programs and perform common tasks.
	CO7	Developing the ability to use debugging tools and techniques to identify and fix errors in C programs.
	CO8	Understanding how to use C to create simple command-line applications and interact with the operating system.

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	
3	0	2	4	70	30	30	20	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

Module No.	Topics	Teaching Hours	Weightage (%)	Mapping with COs
1	Intoduction to Programming Environment:- Introduction to C & algorithms, Installing the C compiler using windows/MAC/Linux Building Blocks of C:-Preprocessor directive, Single line & Multiline comments, Importance of main function & return statement in main, Hello world program Formatting of output:-New Line, tab, carriage return, beep, formatting the characters,printf a) Practice of Output Questions Reading the input from the console:-Varibles, Constants & Datatypes, Scanf, Input format specifiers in C with all the data types a) Practice of Output Questions	5	17%	CO1 CO2
2	Operators:-Arithmatic, Logical, Relational, Bitwise, Sizeof, Type casting, Prefix & Postfix, conditional operator(Ternary Operator), Operator precedence a) Practice of Output Questions Conditional Statements:-Deep Dive into if, if-else, Nested IF, if-elseif-else & switch statements with the help of flow charts Looping:-While, Do-while, for loop,Nested loops, Use cases of while, Do-while & for loop;Loop control statements break, continue, exit and goto,why goto is is avoided	5	17%	CO2 CO3
3	Arrays:-One dimensional, Two dimensional &	5	17%	CO1

	Multidimensional array, Dynamic arrays, Operations on array Functions:-Defining Functions, Passing an argument in the function, Return type of the function, Call by value, Call by reference a)Practice output questions Project-Create a Tic-Tac-Toe Game			CO3 CO4
4	Strings & String Functions:-Introduction to strings, Built in string functions Introduction to Storage Classes:-Concept of Storage Classes, How storage classes are used to describe the feature of a varaible & function, Types of Storage Classes, Auto, Register, Extern, Static, Stack & Heap, Practical Applications of storage classes Program to demonstrate different storage classes Pointers:-Introduction to pointers, Null pointer, Void pointers, Differentiate Null from Void, Pointers as parameter, Problem of Dangling Pointers, Problem of Memory Leak, is Meomry leak harmful?	4	13%	CO3 CO4
5	Array & Pointers:-Relationship between Arrays & Pointers, Pointers to 1-D arrays, 2-D arrays and 3-D arrays, Syntax Representing Array in Terms of Pointers in C a) Demonstrate array & pointers relation b) program to print the values and address of the array elements c) printing array elements using a pointer to array Array & Function:-Need of passing array to a function a) Demonstrate Array & Function b) Program to calculate Standard Deviation Recursion:-Recursive functions, Real time examples of Recursion, Use cases of Recursion	4	13%	CO4 CO5

6	Structures:-Introdution to Structures in C, Where to use Struct data type, How to create structure, Decleration of structure variables, Initialization of structure members, Access structure elements, Dynamic memory allocation of struct a) Demonstrate Initialization b) Demostrate array of structure c) Add two complex numbers by passing structures to a function d)Storing information of n students using structures e) C Program to Store Information of Students Using Structure f) Program to Store Student Records as Structures and Sort them by Name g) Program to Add N Distances Given in inch-feet System using Structures h) Program to Store Student Records as Structures and Sort them by Age or ID	3	10%	CO4 CO5 CO6
7	Struct & Pointers:-Use of pointers to access members to structs a)Demonstrate Pointers to struct b) Demonstarte Access Members using Pointer c) Practice Questions Struct & Functions:-Understand Passing Struct to function a)Demonstrate Passing struct to the function b) Demonsrate return structure from a function c) Passing struct by reference d) C Program to Calculate Difference Between Two Time Periods e) h)Program to Add Two Complex Numbers by Passing Structure to a Function	2	7%	CO6 CO7 CO8
8	Union:-Introduction to Union, Union vs Structure, Define union & create variables of union, a) Demonstrate accessing members of Union b) Demonstrate the difference between Struct & Union	2	6%	CO6 CO7 CO8

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	a) Find the area of a Triangle/Rectangle/Circle b)Find the size of a variable c)Demonstrate the use of converting a char to int & vice versa d)Demonstrate the loss of data due to auto type conversion(From bigger data type variable to smaller datatype variable) e)Demonsrate the declaration of the constant & check its datatypes & size f)Write a code to illustrate the usage of various operators g) Illustrate the concept of L value & R value through code	**4**
2	:-a) Find the greatest of two characters b)Find the greatest of three numbers c)Find whether the year is leap or not d)Demonstrate the amount of total salary using different conditions on the salary using components(HRA, DA, TA & Tax) e)Write a C program to read temperature in centigrade and display a suitable message according to temperature state below : Temp < 0 then Freezing weather Temp 0-10 then Very Cold weather Temp 10-20 then Cold weather Temp 20-30 then Normal in Temp Temp 30-40 then Its Hot Temp >=40 then Its Very Hot e)Write a program in C to read any digit, display in the word f)Code to create a simple calculator h)Program for Boolean to String Conversion i)Program for string to Long Conversion j)Program for Binary to Decimal Conversion & Vice Versa	**4**
3	a)Guess the number b)Print the table of a number c)Factorial of a number d)Whether a number is prime or not e)whether a number is Armstrong or not f)Whether a number is palindrome or not g)Write a program in C to display the multiplication table vertically from 1 to n h) Write a program in C to make such a pattern like a pyramid with numbers increased by 1 1	**4**

	2 3 4 5 6 7 8 9 10 i) C Porgram to print hallow star pyramid j)Program to print all Floyd's Pattern Traingle Pyramid	
4	a) Inserting and deleting an element in/from an array b) Find GCD of given numbers in an array c) Merging two arrays into new array d)Sorting an array e)Searching an element in an array f)Finding the sum of diagonal elements of a matrix g)Finding the sum of upper & lower triangle elements of an array h)Finding the sum of two metrices i)Mutiply the two metrices j)Code to perform array rotation k)Code to perform determinant of the matrix l)Code to perform transpose of the matrix k)Code to rotate the lements of the matrix by two elements l)Code to find normal & trace of the matrix m)Perform vertical flip of a matrix n)Perform horizontal flip of a matrix	**4**
5	a)Guess the number b)Print the table of a number c)Factorial of a number d)Whether a number is prime or not e)whether a number is Armstrong or not f)Whether a number is palindrome or not g)Write a program in C to display the multiplication table vertically from 1 to n h) Write a program in C to make such a pattern like a pyramid with numbers increased by 1 1 2 3 4 5 6 7 8 9 10 i) C Porgram to print hallow star pyramid j)Program to print all Floyd's Pattern Traingle Pyramid	**4**
6	a) Inserting and deleting an element in/from an array b) Find GCD of given numbers in an array c) Merging two arrays into new array d)Sorting an array e)Searching an element in an array f)Finding the sum of diagonal elements of a matrix g)Finding the sum of upper & lower triangle elements of an array h)Finding the sum of two metrices i)Mutiply the two metrices j)Code to perform array rotation k)Code to perform determinant of the matrix l)Code to perform transpose of the matrix	**4**

	k)Code to rotate the lements of the matrix by two elements l)Code to find normal & trace of the matrix m)Perform vertical flip of a matrix n)Perform horizontal flip of a matrix	
7	a)Guess the number b)Print the table of a number c)Factorial of a number d)Whether a number is prime or not e)whether a number is Armstrong or not f)Whether a number is palindrome or not g)Write a program in C to display the multiplication table vertically from 1 to n h) Write a program in C to make such a pattern like a pyramid with numbers increased by 1 1 2 3 4 5 6 7 8 9 10 i) C Porgram to print hallow star pyramid j)Program to print all Floyd's Pattern Traingle Pyramid	**4**

Major Equipment/ Instruments and Software Required

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

Suggested Learning Websites

Sr. No.	Name of Website
1.	https://www.tutorialspoint.com/data_structures_algorithms/data_structures_algorithms_tutorial.pdf

Textbooks

Sr. No.	Name of Textbooks
1	Gilberg and Forouzan, "Data Structure- A Pseudo code approach with C" , Thomson publication
2	Tanenbaum, "Data structure in C", PHI / Pearson publication.
3	Pai, "Data Structures & Algorithms; Concepts, Techniques & Algorithms, Tata McGraw Hill

Reference books

Sr. No.	Name of Reference Books
1	Jean-Paul Tremblay & Paul G. Sorenson, An Introduction to Data Structures with Applications, Tata McGraw Hill.
2	Ten Baum, Data Structures using C & C++, Prenctice-Hall International.
3	Horowitz, Sahni, Fundamentals of Computer Algorithms, Galgotia Pub. 2001 ed.