



## FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2022-23

**Programme:** Bachelor of Technology (Information Technology)

**Semester:** I

**Course Code:** 202000110

**Course Title:** Computer Programming with C

**Course Group:** Engineering Science Courses

**Course Objectives:** Students will gain understanding of basics of computer, hardware, software, and programming language. Students will learn problem solving skills through C programming language.

### Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
03	00	02	04	50 / 18	50 / 17	25 / 9	25 / 9	150 / 53

\* J: Jury; V: Viva; P: Practical

### Detailed Syllabus:

Sr.	Contents	Hours
1	<b>Introduction to Computers and Programming:</b> Introduction to computer: Basic block diagram, Functions of various components of computer, Concepts of Hardware and software, Types of software Computer languages and programming: Concepts of Machine level, Assembly level and high-level languages, Compiler and interpreter, Flowcharts and Algorithms	05
2	<b>Fundamentals of C:</b> Features of C language, structure of C Program, comments, header files, data types, constants and variables, operators, expressions, evaluation of expressions, type conversion, precedence and associativity, I/O functions	06
3	<b>Control structure in C:</b> Decision making and Branching: Simple if, if-Else, Nesting of if-else, Else If ladder, Switch statement, The ? operator, goto statement Decision making and Looping: while statement, do statement, for statement, Jumps in loop, break and continue, Nesting of control structures	08
4	<b>Array and String:</b> Concepts of array: One- and two-dimensional arrays, declaration and initialization, operation on array, multidimensional arrays Character array and string: declaration and initialization, operations on string, Built-in string functions, table of strings	07



5	<b>Functions and Recursion:</b> Concepts of user defined functions: function declaration, function definition, function call, passing parameters, nesting of functions, Introduction to Recursion as a way of solving problems and examples	06
6	<b>Structures and Unions:</b> Basics of structure, structure members, accessing structure members, nested structures, array of structures, structure and functions, Introduction to Unions	04
7	<b>Pointers and File Management:</b> Basics of pointers, pointer to pointer, pointer and array, pointer to array, array to pointer, function returning pointer, structures, and pointers, Introduction to file management and its functions	04
<b>TOTAL</b>		<b>40</b>

### List of Practicals / Tutorials:

1	<ul style="list-style-type: none"><li>• Write a program to understand concepts of structure of C Program, scanf and printf.</li><li>• Write a program to declare, assign, read and print values of variables of different datatypes.</li><li>• Write a program to that performs as calculator (addition, multiplication, division, subtraction).</li></ul>
2	<ul style="list-style-type: none"><li>• Write a program to understand concepts of other operators (bitwise, increment/decrement, conditional, etc.).</li><li>• Write a program to find area of square, rectangle, triangle, and circle.</li><li>• Write a program to calculate simple interest (<math>i = (p*r*n)/100</math>). Where <math>i</math> = Simple interest, <math>p</math> = Principal amount, <math>r</math> = Rate of interest, <math>n</math> = Number of years</li></ul>
3	<ul style="list-style-type: none"><li>• Write a program to enter a distance in to kilometer and convert it in to meter, feet, inches, and centimeter.</li><li>• Write a program to compute Fahrenheit from centigrade (<math>f=1.8*c +32</math>).</li><li>• Write a program to read a number and check it is even or odd.</li></ul>
4	<ul style="list-style-type: none"><li>• Write a program to find that the accepted number is Negative, or Positive or Zero.</li><li>• Write a program to read three numbers from keyboard and find out maximum out of these three (Nested if else).</li><li>• Write a program to check whether the entered character is capital, small letter, digit or any special character.</li></ul>
5	<ul style="list-style-type: none"><li>• Write a program to read marks from keyboard and your program should display equivalent grade according to following table (if else ladder); Marks      Grade 100 - 80      Distinction 79 - 60      First Class 59 - 40      Second Class &lt; 40      Fail</li><li>• Write a program demonstrate functionality of calculator using switch-case.</li><li>• Write a program to find factorial of a given number.</li></ul>
6	<ul style="list-style-type: none"><li>• Write a program to reverse a number.</li><li>• Write a program to generate first n number of Fibonacci series.</li><li>• Write a program to find the sum and average of different numbers which are accepted by user as many as user wants.</li><li>• Write a program to check whether the given number is prime or not.</li></ul>



7	<ul style="list-style-type: none"><li>Write a program to evaluate the series <math>1^2+2^2+3^2+\dots+n^2</math></li><li>Write a program to find <math>1+1/2!+1/3!+1/4!+\dots+1/n!</math>.</li><li>Write a program to display following patterns using asterisk (*). *</li><li>Write a C program to display following patterns. 1 2 3 4 5      A A A A A      1   2 3 4 5      B B B B      0 1     3 4 5      C C C      1 0 1       4 5      D D      0 1 0 1         5      E      1 0 1 0 1</li></ul>
8	<ul style="list-style-type: none"><li>Write a program to read array of integers and print it in reverse order.</li><li>Write a program that adds two 1-dimensional array &amp; store into third array.</li><li>Write a program to insert and delete an element to/from desired position in an array.</li><li>Write a program to sort a given array in ascending order (Use Bubble Sort algorithm).</li></ul>
9	<ul style="list-style-type: none"><li>Write a program for multiplication of two matrices.</li><li>Write a program to find length of string without using library function.</li><li>Write a program to concatenate two strings without using library function.</li></ul>
10	<ul style="list-style-type: none"><li>Write a program that reads a string and counts occurrences of a given character.</li><li>Write a program convert character into Toggle character.</li><li>Write a program that checks whether the string is palindrome or not using string library function.</li></ul>
11	<ul style="list-style-type: none"><li>Write a program to demonstrate the use of inbuilt string functions.</li><li>Write a function power that computes x raised to the power y for integer x and y and returns double type value.</li><li>Write a calculator program (add, subtract, multiply, divide). Prepare user defined function for each functionality.</li></ul>
12	<ul style="list-style-type: none"><li>Write a program to find sum of elements of 1-D Array using Function.</li><li>Write a program that use user defined function swap() to interchange the value of two variable.</li><li>Write a program to find factorial of a number using recursion.</li><li>Write a program to generate Fibonacci series using recursion.</li></ul>
13	<ul style="list-style-type: none"><li>Write a function which takes a two integer array as argument and give sum of these arrays.</li><li>Define a structure to enter enrolment number, name of student and marks of the student in three subjects. Enter data for 5 students. Display grade cards of all students. Display student who has top rank in the class.</li><li>Define a structure called cricket that will describe the following information: Player name, Team name, Batting average Declare an array player. Write a program to print name &amp; team of those players whose batting average is greater than given value.</li></ul>
14	<ul style="list-style-type: none"><li>Write a program to demonstrate the concept of union.</li><li>Write a program using pointer and function to determine the length of string.</li><li>Write a program to demonstrate the concept of pointer.</li><li>Write a program to add elements of array using pointer.</li></ul>



15	<ul style="list-style-type: none"><li>• Write a program to copy the content one file into another file.</li><li>• Write a program to demonstrate ftell() and fseek() for file handling.</li><li>• Write a program that compares two files and returns 0 if they are equal and 1 if they are not.</li></ul>
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### Reference Books:

1	Programming in ANSI C, Eighth Edition by E. Balagurusamy, McGraw Hill Education
2	Let us C, by Yashavant Kanetkar, BPB Publications
3	Fundamentals of Computing and Programming in C, by Pradip Dey, Manas Ghosh, Oxford University Press
4	How to Solve it by Computer, by R. G. Dromey, Pearson Education

### Supplementary learning Material:

1	NPTEL course / tutorials
2	Vlabs.iitb.ac.in
3	Open online courses from www.coursera.org, www.udacity.com, etc.

### Pedagogy:

- Direct classroom teaching
- Assignments/Quiz
- Continuous assessment
- Seminar/Poster Presentation
- Course Projects

### Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
20%	30%	30%	20%	-	-	

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

### Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Formulate algorithm and/or flowchart for a given problem.	10
CO-2	Translate algorithm and/or flowchart into C program using correct syntax and execute it.	10
CO-3	Write programs using control structures, arrays, functions, structures.	40
CO-4	Decompose a problem and formulate solutions using functions.	20
CO-5	Apply concepts of array, pointer, structure, functions, recursion and file management to solve engineering and/or scientific problems.	20

### Curriculum Revision:

Version:	2.0
Drafted on (Month-Year):	June-2022
Last Reviewed on (Month-Year):	-
Next Review on (Month-Year):	June-2025