



FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2022-23

Programme: Bachelor of Technology (Electrical Engineering)

Semester: I

Course Code: 202000110

Course Title: Computer Programming with C

Course Group: Engineering Science Course

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)				Total		
Lecture	Tutorial	Practical		Theory		J/V/P*				
				Internal	External	Internal	External			
03	00	02	04	50/18	50/17	25/09	25/09	150/53		

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

Detailed Syllabus:

Sr.	Contents	Hours
1	Introduction to Computers and Programming: 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	Fundamentals of C: 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	Control structure in C: 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	Array and String: 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	Functions and Recursion: 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	Structures and Unions: Basics of structure, structure members, accessing structure members, nested structures, array of structures, structure and functions, Introduction to Unions	04
7	Pointers and File Management: 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

List of Practicals / Tutorials:

1	Write a C program to understand concepts of structure of C Program, scanf and printf. Write a C Program to declare, assign, read and print values of variables of different datatypes. Write a program to that performs as calculator (addition, multiplication, division, subtraction).										
2	Write a program to understand concepts of other operators (bitwise, increment/decrement, conditional, etc.). Write a program to find area of square, rectangle, triangle, and circle. Write a program to calculate simple interest ($i = (p \cdot r \cdot n) / 100$). Where i = Simple interest p = Principal amount r = Rate of interest n = Number of years										
3	Write a C program to enter a distance in to kilometer and convert it in to meter, feet, inches, and centimeter. Write a program to compute Fahrenheit from centigrade ($f = 1.8 \cdot c + 32$) Write a C program to read a number and check it is even or odd.										
4	Write a C program to find that the accepted number is Negative, or Positive or Zero. Write a program to read three numbers from keyboard and find out maximum out of these three. (nested if else) Write a C program to check whether the entered character is capital, small letter, digit or any special character.										
5	Write a program to read marks from keyboard and your program should display equivalent grade according to following table (if else ladder) <table><thead><tr><th>Marks</th><th>Grade</th></tr></thead><tbody><tr><td>100 - 80</td><td>Distinction</td></tr><tr><td>79 - 60</td><td>First Class</td></tr><tr><td>59 - 40</td><td>Second Class</td></tr><tr><td>< 40</td><td>Fail</td></tr></tbody></table> Write a C program demonstrate functionality of calculator using switch-case. Write a C program to find factorial of a given number.	Marks	Grade	100 - 80	Distinction	79 - 60	First Class	59 - 40	Second Class	< 40	Fail
Marks	Grade										
100 - 80	Distinction										
79 - 60	First Class										
59 - 40	Second Class										
< 40	Fail										



6	<p>Write a program to reverse a number. Write a program to generate first n number of Fibonacci series. Write a C program to find the sum and average of different numbers which are accepted by user as many as user wants. Write a program to check whether the given number is prime or not.</p>																																			
7	<p>Write a program to evaluate the series $1^2 + 2^2 + 3^2 + \dots + n^2$ Write a C program to find $1 + 1/2! + 1/3! + 1/4! + \dots + 1/n!$ Write a C program to display following patterns using asterisk (*).</p> <table data-bbox="252 559 1036 686"><tr><td>*</td><td>*</td><td>*</td><td>*</td><td>*</td></tr><tr><td>* *</td><td>* *</td><td>* *</td><td>*</td><td>*</td></tr><tr><td>* * *</td><td>* * *</td><td>* *</td><td></td><td></td></tr><tr><td>* * * *</td><td>* * * *</td><td>*</td><td></td><td></td></tr></table> <p>Write a C program to display following patterns.</p> <table data-bbox="252 728 1068 910"><tr><td>1 2 3 4 5</td><td>A A A A A</td><td>1</td></tr><tr><td>2 3 4 5</td><td>B B B B</td><td>0 1</td></tr><tr><td>3 4 5</td><td>C C C</td><td>1 0 1</td></tr><tr><td>4 5</td><td>D D</td><td>0 1 0 1</td></tr><tr><td>5</td><td>E</td><td>1 0 1 0 1</td></tr></table>	*	*	*	*	*	* *	* *	* *	*	*	* * *	* * *	* *			* * * *	* * * *	*			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
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8	<p>Write a program to read array of integers and print it in reverse order. Write a program that adds two 1-dimensional array & store into third array. Write a program to insert and delete an element to/from desired position in an array. Write a program to sort a given array in ascending order. (Use Bubble Sort algorithm)</p>																																			
9	<p>Write a program for multiplication of two matrices. Write a program to find length of string without using library function. Write a program to concatenate two strings without using library function.</p>																																			
10	<p>Write a program that reads a string and counts occurrences of a given character. Write a program convert character into Toggle character. Write a program that checks whether the string is palindrome or not using string library function.</p>																																			
11	<p>Write a C Program to demonstrate the use of inbuilt string functions. Write a function power that computes x raised to the power y for integer x and y and returns double type value. Write a calculator program (add, subtract, multiply, divide). Prepare user defined function for each functionality.</p>																																			
12	<p>Write a program to find sum of elements of 1-D Array using Function. Write a program that use user defined function swap() to interchange the value of two variable. Write a program to find factorial of a number using recursion. Write a program to generate Fibonacci series using recursion.</p>																																			



13	Write a function which takes a two integer array as argument and give sum of these arrays. 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. 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 & team of those players whose batting average is greater than given value.
14	Write a program to demonstrate the concept of union. Write a program using pointer and function to determine the length of string. Write a program to demonstrate the concept of pointer. Write a program to add elements of array using pointer.
15	Write a program to copy the content one file into another file. Write a program to demonstrate ftell() and fseek() for file handling. Write a program that compares two files and returns 0 if they are equal and 1 if they are not.

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

Internal Evaluation:

The internal evaluation comprised of written exam (40% weightage) along with combination of various components such as Certification courses, Assignments, Mini Project, Seminar, Unit test, Quiz, Class Participation etc. where individual component weightage should not exceed 20%.

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%	0%	0%	

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