SEMESTER-1

St. Xavier's College (Autonomous), Ahmedabad

Syllabus of Semester – I of the following departments under Faculty of Computer Science based on Under Graduate Curriculum Framework to be implemented from the Academic Year 2025-26.

DEPARTMENT OF COMPUTER SCIENCE

BCA (Hons.)
Category – IV

Major Course – 1: Programming Concepts using C

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course Title & Code	Credit Distribution of The Course			Eligibility Criteria	Pre-Requisite(s) of theCourse (if any)
	Lecture	Tutorial	Practical / Practice		
Programming Concepts using C (BCAMC111C)	4	0	0	10 + 2 from a recognized board in any stream	Nil

Learning Objectives

This course introduces students to understand the concept, to get the detailed knowledge of C programming language.

Learning Outcomes

At the end of the course, a student will be able to:

- Discuss the concepts of introduction to programming languages and classification of computer language
- Acquire a basic understanding of the C Language

- Discuss the basic fundamentals of Console based I/O and related built- in I/O function
- Practice and demonstrate the basic fundamentals of C language operators and decision making
- Describe the working with control structure
- Describe and demonstrate the working with array
- Estimate the use and demonstrate of Character Arrays and Strings
- Estimate the use and demonstrate User Defined Functions

Syllabus of BCA-1501 Programming Concepts using C

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Unit-1: Fundamentals of Programming Techniques and C language Operators and Decision Making 15 Hours

Introduction to Programming Languages: Introduction to Machine level language, Assembly language, High- level language, Limitations and Features - Classification of Computer Language - Procedural Language and Non- Procedural Language.

Introduction of C Language: History of C, Basic Structure of C, Executing C program, Character set & C Tokens, Identifiers & Keywords, Data Types, Storage Class, Constants and Variables, Type Casting, Comments

Console based I/O and related built-in I/O function: Formatted functions: printf(), scanf() - Unformatted functions: getch(), getchar(), putchar(), getche( ), putch(), gets(), puts() - Concept of Header files and #include, #define

Operators & Expression: Types of Operators and Expression, Precedence & Associativity - Decision Making Structure-If, If-else, Nested If-else, Switch

Unit-2: Control Structure, Array, String & User Defined Functions 15 Hours

Loop Control Structure: While, Do-While, For, Nested loop
Other Statements: break, continue, goto, exit

Array: One, Two-Dimensional Arrays, Initialization and working with Array, Introduction to Multidimensional Arrays

Character Arrays and Strings: Initialization and working with String, Comparing and String Handling functions.
User Defined Functions: Introduction of UDF - Elements of UDF - Categories of UDF: No argument no return value, Arguments but no return value, No argument but returns a value, Arguments with return value, Recursion, Nesting Function, Variable Scope, Visibility and lifetime in function, Storage Classes

Unit-3: Structures, Unions, Pointer **15 Hours**

Structures: Defining a structure, declaring structure variables, Accessing a structure variable, Structure Initialization, Operations on structure members, Copying and comparing variables, Arrays of structure-Arrays within Structures-Structure within structure

Unions: Defining Unions

Pointer: Definition and Concept, Advantage of using pointer, Chain of Pointers, Null Pointer, Pointer Arithmetic-Pointer and character strings, Array of Pointers-Pointers and Functions-Pointers and Structures

Unit-4: Dynamic Memory Allocation, Link List & Files **15 Hours**

Dynamic Memory Allocation: Dynamic Memory Allocation Concept, Memory Allocation Function-malloc (), calloc() and realloc(), free()

Linked List: Concepts of Linked List-Advantages, Applications of Linked list, Overview of types of Linked list, Operations on Singly Linked List: Create and Display Linked List, Insert at first, Insert at last, Insert before/after a specific node, Delete at first, Delete at last-Delete a specific node, Traversal

Files: Concepts of File Management, Files Functions, fopen(), fclose(), fprintf(), fscanf(), fseek(), ftell(), rewind(),putc(),getc(),putw(),getw(),Error handling functions

Preprocessors: Types of Preprocessors, Macro substitution directives, File inclusion directives, Compiler control directives.

Essential / Recommended Readings:

- Programming in ANSI C. (6th Ed.) – Balagurusami - Tata McGraw Hill Publication
- Programming In C (2nd Ed.) - Ashok N. Kamthane - Pearson Education

Suggestive Readings:

- The C Programming Language - DENNIS M. RITCHIE- AT&T Bell Laboratories Murray Hill, New Jersey
- Let us C – (15th Ed.) - Yashwant Kanetkar - BPB Publications
- Programming in C - Reema Thareja - Oxford University Press

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DEPARTMENT OF COMPUTER SCIENCE

BCA (Hons.)
Category – IV

Major Course – 2: Programming Concepts using C Practical

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course Title & Code	Credit Distribution of The Course			Eligibility Criteria	Pre-Requisite(s) of theCourse (if any)
	Lecture	Tutorial	Practical / Practice		
Programming Concepts using C Practical (BCAMC112L)	0	0	4	10 + 2 from a recognized board in any stream	Nil

Learning Objectives

This course introduces students to understand the concept, to get the detailed practical knowledge of C programming language which includes arrays and functions.

Learning Outcomes

At the end of the course, a student will be able to:

- Implement the basic fundamentals of Console based I/O and related built- in I/O function
- Practice and perform the basic fundamentals of C language operators and decision-making concepts
- Work with control structure
- Understand and perform the programs with array
- Demonstrate of Character Arrays and Strings
- Implement the use and demonstrate User Defined Functions

Syllabus of BCA-1502L Programming Concepts using C

Unit-1 Fundamentals of Programming Techniques and C language Operators and Decision Making: 30 Hours

1. Find the Simple Interest. Inputs are principal amount, period in year and rate of interest.
2. Find the area and perimeter of square and rectangle. Input the side(s) through the keyboard.
3. Write a program to enter the temperature in Fahrenheit and convert it to Celsius. [C = ((F-32)*5)/9]
4. Write a program to store and interchange two numbers in variables a and b.
5. Write a program to enter two numbers and find the smallest out of them. Use conditional operator.
6. Write a program to enter text with gets() and display it using printf() statement also find the length of the text.
7. Write a program to check given year is a Leap year or not.
8. Write a C program to find the maximum from given three numbers (Using Nested IF).
9. Take marks from the user and print grade accordingly (>=75 marks – Distinction, <75 and >=60 marks – First, <60 and >=50 – Second, <50 and >=35 – Pass, <35 – Fail) using if … else if….else statement and also by using logical operators).
10. Write a program to accept number of seconds and display its corresponding hours, minutes and seconds.
11. Write a program to check whether the blood donor is eligible or not for donating blood. The conditions laid down are as under. Use if statement.
    a) Age should be above 18 yrs but not more than 55 yrs.
12. Write a program to calculate bill of a job work done as follows. Use if else statement.a) Rate of typing 3 Rs/pageb) Printing of 1st copy 5Rs/pages & later every copy 3Rs/page. The user should enter the number of pages and print out copies he/she wants.

Unit-2: Control Structure, Array, String & User Defined Functions: 30 Hours

1. Write a program to find sum of N numbers. (Using while loop)
2. Write a program to print 1,2,3,….N where N number scanned by user. (Using while loop)
3. Write a program to find factorial of given number.
4. Write a program to find reverse of a given number.
5. Write a program to find the sum of first 100 odd nos. and even nos.
6. Write a program to find maximum from given N inputs by user.
7. Write a program to find sum of the digits entered by the user.
8. Write a program to generate Fibonacci series up to N numbers.
9. Write a program to find GCD and LCM of given 2 numbers.
10. Write a program to check whether given number by the user is Palindrome or not.
11. Write a program to check whether the given number is Prime or not.
12. Write a C program to find x1+x2+x3+x4+ …. + xn.
13. Write a program to print following pyramid.

```
    *
   * *
  * * *
 * * * *
```

14. Write a program that accepts an integer N, if the integer N = 4, then print the pyramid:

```
   1
  121
 12321
1234321
```

15. Write a program which will take 10 numbers from user and stored it in the array. It will print all the numbers, their sum and average of it.
16. Write a program to find binary of given number.
17. Write a program to sort and array.
18. Write a program to search an element from the array.
19. Write a program to find addition of two matrices of 3*3.
20. Take two strings from the user and check whether the string is palindrome or not.
21. Write a program to find sum, average of two numbers passed to user defined functions called sum(int,int) and average(int,int).
22. Write a program to print Fibonacci series using recursive UDF.
23. Write a program to find length of the given string (without including string.h).
24. Write a program which will accept two strings from the user and print the message that the strings are same or not.
25. Write a program that uses function digit(N,k) that return the value of the kth digit from the right of the number N. For eg. The function call digit (254693,2) should return 9.

Unit-3: Structures, Unions, Pointer **30 Hours**

1. Write a program to define structure with tag state with fields' state name, number of districts and total population. Read and display the data.
2. Write a program to create a list of books details. The details of a book include title, author, publisher, publishing year, number of pages, and price.
3. Define a structure called Item with members: Item_code , Item_name, Price. Create an array of five Items. Create a function which accepts the Item array and modifies each element with an increase of 10% in the price.
4. Create a program that compare two given dates. To store a date, use a structure that contains three members namely day, month and year. If dates are equal then display a message as same otherwise not same.
5. Define a structure that can describe a hotel. It should have members that include name, address, grade, room charges, grade and no of rooms. Write a function to print out all hotel details with room charges less than a given value.
6. Write a program to accept records of different states using array of structures. The structure should contain char state and number of int engineering colleges, int medical colleges, int management colleges and int universities. Calculate total colleges and display the state, which is having highest number of colleges.
7. Write a program to accept records of different states using array of structures. The structure should contain char state, int population, int literacy rate and int suitable data. Display the state whose literacy rate is highest and whose per capita income is highest.
8. Define a structure employee with members employee name, basic pay, dearness allowance, house rent, net salary. Declare an array of 5 employees. Write a function which calculates the net salary of employees and prints all employee details in descending order of their net salary.
9. Define a structure with tag population with fields Men and Women. Create structure with in structure using state and population structure. Read and display the data.
10. Write a program to create, initialize, assign and access a pointer variable.
11. Write a program in C to demonstrate the use of & (address of) and * (value at address) operator
12. Program to demonstrate example of double pointer (pointer to pointer).
13. Program to demonstrate example of NULL pointer.
14. Write a program to calculate the square and cube of an entered number using pointer of a variable containing the entered number.
15. Write a program to Swap Numbers in Cyclic Order Using Call by Reference.
16. Write a program to create an array that will store integer pointers. (Array of pointers)
17. Write a program to demonstrate an example of pointer to an array.

Unit-4: Dynamic Memory Allocation, Link List & Files **30 Hours**

1. Write a program to create a Singly Linked List with following functionalities:
2. Write a program to insert an element at the end of the list.
3. Write a program to insert an element at the beginning of the list.
4. Write a program to delete an element from the list.
5. Write a program to display all the elements of the list.
6. Write a program to insert an element before key value.
7. Write a program to insert an element after key value.
8. Write a program to sort a list.
9. Write a program to display contents of file on the screen. The program should ask for file name. Display the contents in capital case. Also find the size of the file.
10. Write a program to combine contents of two files in a third File. Add line number at the beginning of each line.
11. Write a program to display number 1 to 100. Redirect the Output of the program to text file.
12. Write a program to count numbers of lines, words and characters in a file and write contents of that file in reverse into another file.
13. Write a program to create a file called dictionary.dat that contains the information such as Name, Surname, City and Phone number. Write a program to accept a city from user and list details of persons having the given city.
14. Write a program to copy one file to another. While doing so, all extra spaces in a file should be squeezed to one. For e.g. If a file contains line "I am learning converted to "I am learning C".
15. Write a program that counts the frequency of a word from a text file. The program should accept file name as command-line argument. Program should continue to ask word and display its frequency in a file till the Enter key is pressed without entering any word
16. Write a Program to insert the following contents in a file named "File1".

Customer No.	Account Type	Balance
101	Savings	2000
102	Current	5000
103	Savings	3000
104	Current	10000

Append the contents of "File1" in another file "File2". Also display the contents of File2 on screen.

Essential / Recommended Readings:

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