

## B.A. (Prog) with Computer Science as Non-Major

### CATEGORY-III

#### DISCIPLINE SPECIFIC CORE COURSE: PROGRAMMING FUNDAMENTALS USING C++

#### CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Introduction to Programming using C++	4	3	0	1	Class XII pass	Nil

#### Learning Objectives

This course is designed to:

- Introduce programming concepts using C++ to students.
- Develop structured as well as object-oriented programming skills using C++ programming language.
- Achieve competence amongst its students to develop correct and efficient C++ programs to solve problems spanning multiple disciplines.

#### Learning outcomes

On successful completion of the course, students will be able to:

- Write simple programs using built-in data types of C++.
- Implement arrays and user defined functions in C++.
- Solve problems spanning multiple disciplines using suitable programming constructs in C++.
- Solve problems spanning multiple disciplines using the concepts of object oriented programming in C++.

#### SYLLABUS OF DSC - 1

##### Theory

##### Unit – 1

(3 hours)

##### Introduction to C++

Need and characteristics of Object-Oriented Programming, Structure of a C++ Program (main () function, header files, output, input, comments), compile and execute a simple program

##### Unit – 2

(9 hours)

##### Data types and Expressions

Keywords, built in data types, variables and constants, naming convention, Input-Output statements, operators and their precedence, expressions, typecasting, library functions

**Unit – 3 (12 hours)**

**Control Constructs in C++**

Decision making using selection constructs, iteration using looping constructs.

**Unit – 4 (6 hours)**

**Arrays, Pointers and User Defined Functions**

Defining and initializing single and multi-dimensional arrays, user defined functions, passing arguments to functions, returning values from functions, inline functions, default arguments, introduction to pointers

**Unit – 5 (15 hours)**

**Classes and Objects**

Need and implementation of abstraction, encapsulation, inheritance and polymorphism, creating classes, objects as function arguments, modifiers and access control, constructors and destructors.

**Practical (30 hours)**

**List of Practicals:**

1. Write a program to find the largest of n natural numbers.
2. Write a program to find whether a given number is prime or not.
3. Write a program that takes a positive integer n and the produce n lines of output as shown:  
\*  
  
\* \*  
  
\* \* \*  
  
\* \* \* \*  
  
(for n = 4)
4. Write a menu driven program for following:
  - a. to check whether a given number is odd or even.
  - b. display a fibonacci series
  - c. compute factorial of a number
5. Write a program to accept a number, reverse it and print the sum of its digits.
6. Write a program using functions to print the series and its sum:  
 $1 + 1/2! + 1/3! + \dots + 1/n!$
7. Write a program to perform the following operations on an input string
  - a. Print length of the string
  - b. Find frequency of a character in the string
  - c. Print whether characters are in uppercase or lowercase
  - d. to check whether a given string is palindrome or not.

8. Write a program that will prompt the user for a list of 5 prices. Compute the average of the prices and find out all the prices that are higher than the calculated average.
9. Design a class named Vehicle, having registration number and year as its private members. Define a suitable constructor and a method to print the details of a vehicle. Write a C++ program to test the above class.
10. Inherit a class Car from the Vehicle class defined above. Add model to the Car class. Define a suitable constructor and a method to print the details of a car. Write a C++ program to test inheritance of this class.

### **Essential Readings**

- E. Balaguruswamy, Object Oriented Programming with C++, 7th edition, McGraw-Hill Education, 2017.
- 2. Robert Lafore, Object Oriented Programming in C++, 4th edition, SAMS Publishing, 2008.

### **Suggestive Reading**

- D.S. Malik, C++ Programming: From Problem Analysis to Program Design, 6th edition, Cengage Learning, 2013.
- (ii) Herbert Schildt, C++: The Complete Reference, 4th Edition, McGraw Hill, 2003.

**Note:** Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.