Physical Sciences – Multidisciplinary 3 cores
DSC01: Programming fundamentals using C++

S. No.	Unit Name	Chapters	References	Weeks
1.	Unit 1 Introduction to C++	1, 2 Pg 10 – 17 Pg 20 – 22	[2] [1] [3]	1
2.	Unit 2 Programming Fundamentals	3 (3.1 – 3.5, 3.9 – 3.13, 3.15, 3.18 – 3.22, 3.24 – 3.25) 4 (except 4.9 and 4.11) 11 (11.10)		2 – 5
3.	Unit 3 Object Oriented Programming	5 (except 5.2, 5.15, 5.18) 6 (except 6.8) 8 12	[2]	6 – 8
4.	Unit 4 Pointers and References	9		9 – 11
5.	Unit 5 Exception and File handling	13 (upto Pg 383 – before 'Catching Class Types as Exceptions') 11 (upto Pg 329)		12 – 15

Essential/recommended readings

1. Stephen Prata, *C++ Primer Plus*, 6th Edition, Pearson India, 2015.
2. E. Balaguruswamy, *Object Oriented Programming with C++,*8th edition*,* McGraw-Hill Education, 2017.
3. D.S. Malik, *C++ Programming: From Problem Analysis to Program Design*, 6th edition, Cengage Learning, 2013

Sample Practical List

1. Write a program to compute the sum of the first n terms of the following series:

   $S = 1 - 2^n + 3^n - 4^n + ...$

   The number of terms n is to be taken from the user through the command line. If the command line argument is not found then prompt the user to enter the value of n.

2. Write a program to display the following pattern:

A
BA

CBA

DCBA

The number of rows n, is to be taken from the user.

3. Write a program to compute the factors of a given number using the default argument.

4. Write a menu driven program to perform the following operations on an array:
   a) Find the minimum, maximum and average of the array elements
   b) Search an element in the array using linear and binary search
   c) Display the address of every element of the array

5. Write a menu driven program to perform the following operations on a string:
   a) Calculate length of the string (use pointers)
   b) Check whether the first character of every word in the string is in uppercase or not
   c) Reverse the string
   d) Display the address of every character in the string

6. Create a class Triangle. Include overloaded functions for calculating the area of a triangle.

7. Create a template class TwoDim which contains x and y coordinates. Define default constructor, parameterized constructor and void print() function to print the coordinates. Now reuse this class in ThreeDim adding a new dimension as z. Define the constructors and void print() in the subclass. Implement main() to show runtime polymorphism.

8. Copy the contents of one text file to another file and display the number of characters copied.