Course Title:	**Introduction to C++ Programming**	Semester	I /II
Course Code	**BPLCK105D /205D**	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:2:0	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03

Course Learning Objectives

CLO 1. Recall object-oriented programming Concepts.

CLO 2. Understand the capability of a class to rely upon another class and functions.

CLO 3. Realize about constructors & destructors which are special type of functions.

CLO 4. Create and process data in files using file I/O functions

CLO 5. Use the generic programming features of C++ including Exception handling

Teaching-Learning Process

Teaching-Learning Process

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes and make Teaching –Learning more effective

1. Chalk and talk
2. Online demonstration
3. Hands on problem solving

Module-1: (8 hours)

Introduction to Object Oriented Programming: Computer programming background- C++ overview. First C++ Program -Basic C++ syntax, Object Oriented Programming: What is an object, Classes, methods and messages, abstraction and encapsulation, inheritance, abstract classes, polymorphism.

Textbook 1: Chapter 1(1.1 to 1.8)

Applications: Elementary for writing C++ programs

(RBT Levels: L1, L2 and L3)

Module-2: (8 hours)

Functions in C++: Tokens – Keywords – Identifiers and constants – Operators in C++ – Scope resolution operator – Expressions and their types – Special assignment expressions – Function prototyping – Call by reference – Return by reference – Inline functions -Default arguments – Function overloading.

Textbook 2: Chapter 3(3.2,3.3,3.4,3.13,3.14,3.19, 3.20) , chapter 4(4.3,4.4,4.5,4.6,4.7,4.9)

Applications: Writing modular C++ programs and other OOP Concepts
(RBT Levels: L1, L2 and L3)

Module-3 : (8 hours)

Inheritance & Polymorphism: Derived class Constructors, destructors-Types of Inheritance- Defining Derived classes, Single Inheritance, Multiple, Hierarchical Inheritance, Hybrid Inheritance.

Textbook 2: Chapter 6 (6.2,6.11) chapter 8 (8.1 to,8.8)

Applications: Use of various Inheritance & Polymorphism in writing Programs
(RBT Levels: L1, L2 and L3)

Module-4: (8 hours)

I/O Streams: C++ Class Hierarchy- File Stream-Text File Handling- Binary File Handling during file operations.

Textbook 1: Chapter 12(12.5) , Chapter 13 (13.6,13.7)

Applications: I/O Streams usage
(RBT Levels: L1, L2 and L3)

Module-5: (8 hours)

Exception Handling: Introduction to Exception - Benefits of Exception handling- Try and catch blockThrow statement- Pre-defined exceptions in C++

Textbook 2: Chapter 13 (13.2 to13.6)

Applications: How to handle exceptions
(RBT Levels: L1, L2 and L3)

Course outcome

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

CO1 Able to understand and design the solution to a problem using object-oriented programming concepts.

CO2 Able to reuse the code with extensible Class types, User-defined operators and function Overloading.

CO3 Achieve code reusability and extensibility by means of Inheritance and Polymorphism

CO4 Implement the features of C++ including templates, exceptions and file handling for providing programmed solutions to complex problems.

Course Assessment and Evaluation Details (both CIE and SEE)

Continuous Internal Evaluation: 50 marks		
Theory Assessment Tool	**Marks**	**Reduced marks**
IAT-1	25	25
IAT-2	25	

Assessment -1(activity based)	25	25
Assessment-2(activity based)	25	
Semester End Examination (SEE) : 50 marks		
SEE	**Marks**	**Reduced marks**
Course end examination (Answer any one question from each unit – Internal choice)	100	50

Activity Based Learning / Practical Based learning

- Assign small tasks to Develop and demonstrate using C++

Programming Tasks:

1. Write a C++ program to sort the elements in ascending and descending order.

2. Write a C++ program to find the sum of all the natural numbers from 1 to n.

3. Write a C++ program to swap 2 values by writing a function that uses call by reference technique.

4. Write a C++ program to demonstrate function overloading for the following prototypes.
add(int a, int b)
add(double a, double b)

5. Create a class named Shape with a function that prints "This is a shape". Create another class named Polygon inheriting the Shape class with the same function that prints "Polygon is a shape". Create two other classes named Rectangle and Triangle having the same function which prints "Rectangle is a polygon" and "Triangle is a polygon" respectively. Again, make another class named Square having the same function which prints "Square is a rectangle". Now, try calling the function by the object of each of these classes.

6. Suppose we have three classes Vehicle, FourWheeler, and Car. The class Vehicle is the base class, the class FourWheeler is derived from it and the class Car is derived from the class FourWheeler. Class Vehicle has a method 'vehicle' that prints 'I am a vehicle', class FourWheeler has a method 'fourWheeler' that prints 'I have four wheels', and class Car has a method 'car' that prints 'I am a car'. So, as this is a multi-level inheritance; we can have access to all the other classes methods from the object of the class Car. We invoke all the methods from a Car object and print the corresponding outputs of the methods.
So, if we invoke the methods in this order, car(), fourWheeler(), and vehicle(), then the output will be
I am a car
I have four wheels I am a vehicle
Write a C++ program to demonstrate multilevel inheritance using this.

7. Write a C++ program to create a text file, check file created or not, if created it will write some text into the file and then read the text from the file.

8. Write aC++ program to write and read time in/from binary file using fstream

9. Write a function which throws a division by zero exception and catch it in catch block. Write a C++ program to demonstrate usage of try, catch and throw to handle exception.

10. Write a C++ program function which handles array of bounds exception using

C++.

Suggested Learning Resources:

Text Books

1. Bhushan Trivedi, “Programming with ANSI C++”, Oxford Press, Second Edition, 2012.
2. Balagurusamy E, Object Oriented Programming with C++, Tata McGraw Hill Education Pvt.Ltd , Fourth Edition 2010.

Web links and Video Lectures (e-Resources):

Weblinks and Video Lectures (e-Resources):

- Basics of C++ - https://www.youtube.com/watch?v=BClS40yzssA
- Functions of C++ - https://www.youtube.com/watch?v=p8ehAjZWjPw

Tutorial Link:

- https://www.w3schools.com/cpp/cpp_intro.asp
- https://www.edx.org/course/introduction-to-c-3

COs and POs Mapping (CO-PO mappings are only Indicative)

COs	POs					
CO1						
CO2						
CO3						
CO4						

Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped, Level 0- Not Mapped