

<b>COURSE TITLE</b>	<b>FINTECH PROGRAMMING LANGUAGE-II</b>
<b>COURSE CODE</b>	<b>05FN0304</b>
<b>COURSE CREDITS</b>	<b>4</b>

**Objective:**

- 1 The course aims to provide a comprehensive understanding of object-oriented programming principles.
- 2 Providing a thorough understanding of object-oriented programming principles with inheritance and polymorphism.
- 3 Understanding and implementing input/output operations in C++ programs.
- 4 Gaining a deep understanding of various C++ concepts and their applications in programming.
- 5 Developing skills in debugging and error handling to create reliable and maintainable C++ applications.

**Course Outcomes:** After completion of this course, student will be able to:

- 1 Students will demonstrate a solid grasp of object-oriented programming concepts such as encapsulation, abstraction, inheritance, and polymorphism.
- 2 Students will be able to implement and utilize these concepts in real-world programming scenarios.
- 3 Students will proficiently use C++ input/output streams to handle data input and output operations
- 4 Students will gain an in-depth knowledge of various C++ features and concepts, exception handling and able to solve complex programming problems effectively and efficiently.
- 5 Students will develop strong debugging and error-handling skills. They will be able to identify, diagnose, and fix errors in C++ programs, ensuring the creation of reliable and maintainable software applications.

**Pre-requisite of course:**C Programming

**Teaching and Examination Scheme**

<b>Theory Hours</b>	<b>Tutorial Hours</b>	<b>Practical Hours</b>	<b>ESE</b>	<b>IA</b>	<b>CSE</b>	<b>Viva</b>	<b>Term Work</b>
3	0	2	0	30	20	50	50

<b>Contents : Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
1	<b>Introduction to OOPS</b> Object-Oriented Terminology, Object-Oriented Paradigm Abstract Data Types , C++ Characteristics, Standard Template Library, Standard Input and Output Class, Objects, Defining Classes in C++, Classes and Encapsulation, Member Functions, Instantiating and Using Classes, Using Constructors, Multiple Constructors and Initialization Lists, Using Destructors to Destroy Instances, Friendship	11
2	<b>Programming with C++</b> Operator Overloading, Working with Overloaded Operator Methods, Initialization vs. Assignment, The Copy Constructor, Specialized Constructors and Methods, Constant and Static Class Members	11
3	<b>Inheritance &amp; Polymorphism</b> Introduction and benefits, Types of polymorphism, Access Specifier, Base and Derived class Constructors, Types of Inheritance, Down casting and up casting Function overriding, Virtual functions, Destructor overriding	12
4	<b>Input and Output in C++ Programs</b> C++ Class Hierarchy, File Stream, Text File Handling, Binary File Handling, Error handling during file operations, Exception Handling	11
<b>Total Hours</b>		<b>45</b>

#### Suggested List of Experiments:

<b>Contents : Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
1	<b>Unit-1</b> Write a C++ program to create a Student class with attributes (name, roll number, marks) and methods to input and display details, Implement a Bank Account system where the account balance is private, and deposit/withdrawal functions are used for transactions, Write a C++ program to implement multiple constructors and use an initialization list, Implement a friend function in C++ that accesses private data members of two different classes, Write a C++ program to demonstrate the working of a destructor by dynamically creating and deleting an object, Implement a program using STL vector to store and manipulate a list of numbers, Create a class that dynamically allocates memory for a string and releases it in the destructor	15

### Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
2	<b>Unit-2</b> Write a C++ program that overloads the + operator to add two user-defined objects, Implement a program to overload the << and >> operators for input and output operations of a class object, Write a program that demonstrates the difference between initialization and assignment in C++, Implement a copy constructor in a class and demonstrate deep copying, Create a class with a member function that returns an object and demonstrates the working of operator overloading	15
3	<b>Unit-3</b> Implement a base class and a derived class where the derived class inherits properties and methods of the base class, Write a program to demonstrate function overriding using a base class and a derived class , Implement a program to demonstrate upcasting and downcasting with pointers in an inheritance hierarchy, Write a program that uses virtual functions to achieve runtime polymorphism, Create an abstract class with a pure virtual function and implement it in a derived class	15
4	<b>Unit-4</b> a program that handles exceptions using try-catch blocks for arithmetic errors, Write a program that appends data to an existing file without overwriting its previous content, Implement a program to read and write objects to a binary file, Create a program that handles file errors, such as attempting to open a non-existent file	15
<b>Total Hours</b>		<b>60</b>

### Textbook :

- 1 Object-Oriented Programming with C++, E. Balagurusamy, McGraw-Hill Education, 2023
- 2 C++ Programming: From Problem Analysis to Program Design (8th Edition), D.S. Malik, Cengage Learning, 2017

### References:

- 1 C++ Primer, C++ Primer, Stanley B. Lippman, Josee Lajoie, and Barbara E. Moo,, Addison-Wesley Professional, 2020
- 2 C++ How to Program , C++ How to Program , Paul J. Deitel and Harvey M. Deitel, Pearson, 2022

### Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery

<b>Remember / Knowledge</b>	<b>Understand</b>	<b>Apply</b>	<b>Analyze</b>	<b>Evaluate</b>	<b>Higher order Thinking / Creative</b>
20.00	30.00	25.00	15.00	10.00	0.00

**Instructional Method:**

- 1 Board Work,PPT,Practicals

**Supplementary Resources:**

- 1 <https://www.cplusplus.com/>
- 2 <https://en.cppreference.com/>
- 3 <https://www.programiz.com/cpp-programming>
- 4 <https://www.learncpp.com/>
- 5 <https://nptel.ac.in/courses/106104062>
- 6 <https://cs50.harvard.edu/x/>
- 7 <https://learn.microsoft.com/en-us/cpp/cpp/?view=msvc-160>
- 8 <https://www.mygreatlearning.com/academy/learn-for-free/c-plus-plus-programming>
- 9 <https://www.sololearn.com/en/learn/cpp>
- 10 <https://developer.ibm.com/languages/cpp/>