Object Oriented Programming through C++

Course Code	20CS3302	Year	II	Semester	I
Course Category	PCC2	**Branch**	CSE	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	Programming for Problem Solving
Continuous Internal Evaluation:	30	**Semester end evaluation:**	70	**Total Marks:**	100

Course Outcomes		
Upon successful completion of the course, the student will be able to		
CO1	Understand the principles of OOPs and key features of C++	**L2**
CO2	Apply object oriented concepts to develop solution for the given problem.	**L3**
CO3	Apply functions as per the problem requirement.	**L3**
CO4	Analyze the given scenario and choose appropriate generic programming aspects/ exception handling mechanism to solve the problem.	**L4**

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2	3									1				
CO3												1		
CO4		3							1	1		1		

Syllabus		Mapped CO
Unit No.	**Contents**	
I	**Introduction:** Difference between C and C++, Evolution of C++, Programming Paradigms, Key concepts of OOP, Advantages of OOP, Usage of OOP. **I/O in C++:** Pre-defined streams, stream classes, Scope access operator, Name space, memory management operators. **Functions:** Introduction, Parts of a function, Passing arguments, Return by reference, Returning more values by reference, Default arguments, const arguments, Inline functions, Function overloading.	**CO1, CO3**

II	**Classes and Objects :** classes in C++, Declaring objects, Access specifiers and their scope, Defining Member Functions, Characteristics of member functions, Outside member function as inline, rules for Inline functions, static member variables, static member functions, static objects, object as function arguments, Friend Function. **Constructors and Destructors:** Constructors and Destructors, characteristics of constructors and destructors, Applications with constructors, Parameterized constructors, Multiple constructors, copy constructors, destructors, calling constructors and destructors. **Operator Overloading:** The keyword operator, Overloading Unary Operators, Overloading binary operators, Rules for Overloading operators, Overloading Friend function.	**CO1, CO2, CO3**
III	**Inheritance:** Access specifiers and simple inheritance, protected data with private inheritance, Types of Inheritance: Single, Multilevel, Multiple, Hierarchical, Hybrid and Multipath, Virtual Base Classes. **Pointers:** void pointer, wild pointer, The this pointer. **Binding, Polymorphism, and Virtual Functions:** Binding in C++, Pointer to Base and Derived class, Virtual Function, Rules for Virtual functions, Pure Virtual Functions, Abstract Class.	**CO1, CO2, CO3**
IV	**Files**: Introduction, File stream classes, Steps for file operations, Checking for errors, Finding end of file, File opening modes, File pointers and manipulators. **Exception Handling:** Principles of Exception Handling, The Keywords try, throw and catch, Guidelines for Exception Handling, Multiple catch statements, Catching Multiple Exceptions, Re-Throwing Exceptions, Specifying Exceptions.	**CO1, CO2, CO3, CO4**
V	**Generic Programming with Templates:** Need for Templates, Definition of class Templates, Function Template, Working of Function Templates, Class Template with more parameters, Function Template with more parameters. **Standard Template Library:** Introduction to STL, STL Programming model, containers, sequence container: vector, list; Associative containers: set, map; Algorithms: sort, search, find; Iterators.	**CO1, CO2, CO3, CO4**

Learning Resources
Text Books
1. Programming in C++, Ashok N. Kamthane, Second Edition, 2013, Pearson.
References
1. The C++ Programming Language, BjarneStroustup, Fourth Edition, 2013, Addison-Wesley. 2. Object-Oriented Programming Using C++ Paperback, Joyce Farrell, Fourth Edition, 2013, Cengage.
e-Resources and other Digital Material
1. ttps://www.learncpp.com/ 2. https://onlinecourses.nptel.ac.in/noc21_cs02/preview 3. https://www.educative.io/courses/learn-object-oriented-programming-in-cpp 4. https://www.youtube.com/watch?v=wN0x9eZLix4 (Learn Object Oriented Programming in C++, Beau Carnes, February 2021) 5. https://www.geeksforgeeks.org/the-c-standard-template-library-stl/