Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE I Year (Common to all branches) Semester- 2			
Subject Code & Name	**Instructions Hours per Week**			**Credits**			
	L	**T**	**P**	**L**	**T**	**P**	**Total**
COR2C5: **Computer Programming in C++**	**3**	**1**	**2**	**3**	**1**	**1**	**5**
Duration of Theory Paper: 3 Hours							

Learning Objectives:

- To learn to analyse a problem and construct a C++ program that solves it using C++ basic constructs and advanced constructs.
- To learn the syntax and semantics of the C++ programming language.
- To learn how to design C++ classes with constructors and class member functions.
- To understand the concept of data abstraction and encapsulation.
- To learn how to overload and override functions and operators in C++.
- To learn how containment and inheritance promote code reuse in C++.
- To learn how inheritance and virtual functions implement dynamic binding with polymorphism.
- To learn how to use exception handling in C++ programs.

Prerequisites: Basic knowledge of computer parts, algorithms, flowcharts, operators.

COURSE OF CONTENTS

UNIT-I

Introduction to flowcharts and problem solving. Types of programming languages, Programming with C++:- C++ Data Types:-auto, bool, int, char, float, double, void. Variables and Constants, Operators, Arithmetic and Logical Expressions, Assignment Statements and Type Casting. Control structures- Iteration statements, Jump Statements and Selective statements. Common C++ Header files, Generation of Random numbers in C++.

UNIT-II

Functions: Introduction - Call by Value and Call by Reference – return values – recursion – Arrays - Introduction to Arrays - Initialization of Array - Multi dimensional Arrays - passing arrays to functions – Strings - Arrays of Strings - Standard Library String Functions.
Structures: Structure elements, Nested Structures, Array of Structures, Array within structures and passing structures to functions.

Unit- III

Pointers:-Declaration and Initialization of Pointers, Dynamic Memory allocation/deallocation operators:-new and delete. Pointers and Arrays:-Array of Pointers, Pointer to an array, Function returning a pointer, Reference variables and use of alias. Invoking functions by passing pointers. Files – Introduction – File Structure - File handling functions - File Types - Error Handling.

UNIT-IV

Object Oriented Programming Paradigm - Basic Concepts of OOP - Benefits of OOP. Class and object fundamentals and various visibility modes in class, Object as function arguments-pass by value and pass by reference. Constructor:-Special Characteristics, Declaration and Definition of a Constructor, Default Constructor, Overloaded Constructor, Copy Constructor and Constructor with default arguments.
Function Overloading:-Need and restrictions of overloaded functions, Steps involved in finding the best match, Default arguments versus overloading.

Destructor:- Special Characteristics, Declaration and Definition of a Destructor. Friend function and its characteristics and friend class.

UNIT-V

Introduction to Operator overloading - Rules for Operator overloading – overloading of binary and unary operators - Introduction to inheritance – Types of inheritance - Abstract Classes - new Operator and delete Operator - Pointers to Objects – this Pointer - Virtual Functions - Pure Virtual Functions - Introduction to Class Templates - Function Templates - Member Function Templates - Basics of Exception Handling - Types of exceptions - Exception Handling Mechanism - Throwing and Catching Mechanism - Rethrowing an Exception - Specifying Exceptions.

Learning Outcomes:-

Upon completing the course, students will be able to:

- To develop C++ programs using basic and advanced constructs that will solve real life problems.
- The course aims to understand the features of C++ supporting object-oriented programming.
- Apply the major object-oriented concepts to implement object-oriented programs in C++i.e. encapsulation, inheritance and polymorphism.
- Understand advanced features of C++ specifically friends, pointers, virtualfunctions and operator overloading.

BOOKS RECOMMENDED:

[1] Coohoon and Davidson, C++ Program Design: An introduction to Programming and Object-Oriented Design (3rd edition), Tata McGraw Hill, New Delhi, 2003.
[2] Herbert Schildt, the Complete Reference, Tata McGraw Hill.
[3] E Balagurusamy, Object Oriented Programming with C++, McGraw Hill Education.
[4] Ravichandran, Programming With C++, Tata McGraw Hill.
[5] Dromey G, How to solve it by Computer, Prentice Halll – 1978.