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| **B. TECH 2nd SEMESTER** | **L** | **T** | **P** | **C** |
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| **16CS2T01: Object Oriented Programming Through C++** | | | | |

**COURSE DESCRIPTION**

This course is a comprehensive hands-on introduction to object oriented programming in C++ for students. Emphasis is placed on the features of C++ that support effective modeling of the problem domain and reuse of code and provides in-depth coverage of object-oriented programming principles and techniques using C++. Topics include classes, overloading, data abstraction, information hiding, encapsulation, inheritance, polymorphism, file processing, and exceptions.

**PREREQUISITES**

Knowledge of C programming.

**COURSE OBJECTIVES**

* 1. To enable the student to learn Object oriented technology.
  2. To enable the student to understand concepts of objects and their importance in real world.
  3. To Design classes and inheritances
  4. To know how to handle Data through files
  5. To know how to handle exceptions.
  6. To provide practical, hands-on training in C++ programming.

**COURSE OUTCOMES**

**The student will be proficient in the following:**

* 1. Principles of object oriented technology.
  2. The Evolution and Purpose of Object Oriented Programming.
  3. Mastering in basic Object Oriented programming concepts and logic implementations.
  4. Knowledge in file I/O operations and exceptions
  5. Ability to identify and implement appropriate Solution for a given Problem.\
  6. Know the terms "Object oriented Programming", “Class” ,”Object” ,"Constructor", “Destructor”, “friend”, “static” , “Data Abstraction”, “Encapsulation”, ” Inheritance”,” Polymorphism”,” File I/O”,” Exceptions” and where they are applicable.

**Syllabus**

**UNIT I INTRODUCTION**

The Object Oriented Technology, Disadvantages of Conventional Programming, Advantages of OOP. Structure of a C++ Program, Differences between C and C++, Header Files and Libraries.

**INPUT AND OUTPUT IN C++**

Streams, Stream Classes Hierarchy, Bit Fields, Manipulators.

**UNIT II**

Tokens in C++, Variable Declaration and Initialization, Data Types, Constants, L Value and R Values, Operators in C and C++, Scope Access Operator, Comma Operator, This Operator, Reference Variable, Decision and Loop Statements.

**Functions in C++**

Structure of a Function, Passing Arguments, Return by Reference, Default Arguments, Const Arguments, Inputting Default Arguments, Inline Functions, Function Overloading, Recursion.

**UNIT III CLASSES AND OBJECTS**

Class Definition, Declaring Objects, Access Specifiers and their scope, Member functions, Outside member functions as inline, Data Hiding or Encapsulation, Memory for Class and Objects, Static Member variables, Static Member Functions, Static Object, Array of Objects, Objects as Function Arguments, Friend Functions, Friend class, Local class, Empty Class, Qualifiers and Nested Classes, Member Function and Non-Member Function.

**UNIT IV CONSTRUCTORS AND DESTRUCTORS**

Introduction of Constructor, Characteristics, Applications, Parameterized Constructors, Overloading Constructors, Constructor with Default Arguments, Copy Constructor and Destructors.

**OPERATOR OVERLOADING**

Introduction of Overloading, Overloading Unary Operators, Constraint on Increment and Decrement Operators, Overloading Binary Operators, Overloading with Friend Functions, Overloading Assignment Operator, Rules for Overloading Operators.

**UNIT V INHERITANCE**

Introduction of Inheritance, Access Specifiers, Protected Data with Private Inheritance, Types of Inheritances, Virtual Base Class, Constructors and Destructors in Inheritance, Constructor and Destructor in Derived Class, Advantages and Disadvantages of Inheritance.

**POLYMORPHISM**

Polymorphism, Types, Pointer and Inheritance, Virtual and Pure Virtual Functions, Abstract Classes.

**UNIT VI APPLICATIONS WITH FILES**

File Stream Classes, File Opening Modes, File Pointers and Manipulators, Sequential Access Files, Binary and ASCII Files, Random Access Files.

**EXCEPTION HANDLING**

Principles of Exception Handling, Keywords, Exception Handling Mechanism, Multiple Catch Statements, Catching Multiple Exceptions.

**Text Books**

1. Programming in C++, Ashok N Kamthane, Pearson 2nd Edition

**References Books**

1. Object Oriented Programming C++, Joyce Farrell, Cengage.

2. Mastering C++, Venugopal, Raj Kumar, Ravi Kumar TMH.

3. Object Oriented Programming with C++, 2nd Ed, SouravSahay, and OXFORD.