**IT-2005 Object Oriented Programming Cr-3**

**Course Outcome** Upon completion of this course, students will be able to do the following:

1. Understand the differentiate between structure-oriented programming and object-oriented programming.
2. Use object-oriented programming language like C++ and associated libraries to develop object-oriented programs.
3. Apply various object-oriented features like class, object, inheritance, data abstraction, encapsulation and polymorphism to solve various computing problems using C++ language.
4. Understand and apply concepts of operator-overloading, contracture and destructtor
5. Understand the and apply exception handling and use built-in classes from STL
6. Implement, test and debug solutions in C++.

**Prerequisite: Programming Concept**

**Module-1: Introduction to Object Oriented Programming (8 Hr)**

**Object oriented programming concepts:** Objects, classes, encapsulation and abstraction, inheritance, polymorphism, dynamic binding, message passing

**C++ Programming basics:** Character set, Keyword, Constant, Variable, Data types, operator & expression, control structure (branching & looping), typecasting, array & strings, Streams based I/O, Type conversions and casting, name space, scope resolution operator (::).

**Function:** Parameter passing (i) by value, (ii) by address, (iii) by reference, inline function, function overloading, default arguments.

**Module-2: Class and Object (7 Hr)**

**Class and Object:** Defining class with functions and data members, Creating & deleting objects by using new and delete operators respectively, Array of Objects, Objects as function argument, Static Data members and member functions, Function with default arguments, function overloading

**Constructor and Destructors:** Definition of constructors and its uses**,** Types of constructors: default constructor, parameterized constructor, copy constructor, constructor with dynamic allocation, Dynamic Constructors, Constructor Overloading**,** Destructors.

**Module-3: Inheritance (6 Hr)**

**Concept of inheritance:** defining derived and base classes, Class hierarchies, public, private, and protected derivations

**Types of Inheritance**: Single Inheritance, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance,

**Virtual base class:** Function overriding, Constructors/Destructors in derived classes: Constructors invocation and data members initialization in derived classes,

**Member classes:** classes within classes

**Module-4: Polymorphism (6 Hr)**

**Operator overloading:** Overloading unary operators, binary operators, overloading binary operators using friend function and member function, Rules for overloading operators

**Polymorphism**: Introduction to pointers: Pointers to objects, pointer to derived class object, this pointer, Compile time polymorphism: Review of Function Overloading and Operator overloading

Run time polymorphism: virtual functions, pure virtual functions, abstract class, virtual constructors and destructors

**Module-5: Exception Handling, Templates, Files and Streams (9 Hr)**

**Exception Handling:** Basics of Exception Handling**,** Exception Handling Mechanism: The keyword try, throw and catch.

**Templates:** Need of template**,** Class Templates: Definition, Class Template with multiple parameters**,** Function Templates: Definition, Function Template with multiple parameters

**Files and Streams:** Introduction to file handling: text file Vs. binary file, Hierarchy of file stream classes: Functions of File Stream classes, Steps to process a File in a program. Different functions used in file, File modes(Sequential and random), File pointers and their Manipulations, Error handling during file operation

**Text Book**

1. Object Oriented Programming with C++, Reema Thareja, OXFORD University Press, Revised First Edition, 2018.

**Reference Books**

1. Object Oriented Programming with C++, E. Balaguruswamy, McGraw Hill Education; Seventh edition 2017.
2. C++ completes reference, Herbert Schildt, TMG Hill, 4th Edition, 2002.
3. C++ How to Program, Deitel and Deitel, Pearson Education Asia, 8th Edition, 2011.
4. Object Oriented Programming with Ansi and Turbo C++, Ashok N Kamthane, Pearson Education, 1st Edition, 2003

**Course Coordinator**