

## CSE202:OBJECT ORIENTED PROGRAMMING

L:3 T:0 P:2 Credits:4

**Course Outcomes:** Through this course students should be able to

CO1 :: identify basic programming constructs and use the newly acquired skills to solve extensive programming problems.

CO2 :: discuss the mechanism of code reusability by creating own libraries of functions.

CO3 :: analyze the logic by designing code capable of passing various test cases.

CO4 :: interpret the principles of the object-oriented model and apply it in the implementation in C++ language.

CO5 :: categorize the theoretical knowledge and insights gained thus far to formulate working code

CO6 :: apply various programming constructs to build software applications

### Unit I

**Concepts and Basics of C++ Programming** : Reading and writing data using cin and cout, Creating classes, Class objects, Accessing class members, Differences between Structures, Unions, Enumerations and Classes, Inline and Non-inline member functions, Static data members and static member functions, Differences between procedural and object oriented programming paradigms, Features of Input/output Streams

**Functions** : Functions with Default parameters/arguments, Inline Functions, Manipulator Functions, Function overloading and Scope rules, Friend of a class (friend function and friend class), Reference variables, Differences between Call by value, Call by address and call by reference, Recursion (Function, Member Function)

### Unit II

**Pointers, Reference Variables, Arrays and String Concepts** : Void pointer, Pointer arithmetic, Pointer to pointer, Possible problems with the use of pointers - Dangling pointer, Wild pointer, Null pointer assignment, Classes containing pointers, Pointer to objects, this pointer, Array of objects, The Standard C++ string class-defining and assigning string objects, Member functions, Modifiers of string class, Differences between pointer and reference variables, Array declaration and processing of multidimensional arrays(inside main and inside class), Pointer to data member

### Unit III

**Data File operations** : Opening and closing of files, Modes of file, File stream functions, Reading/Writing of files, Sequential access and random access file processing, Binary file operations, Classes and file operations, Structures and file operation

**Constructors, Destructors and File Handling** : Manager functions (constructors and destructor), Default constructor, Constructor with default arguments, Destructors, Parameterized constructor, Copy constructor , Initializer lists

### Unit IV

**Operator Overloading and Type Conversion** : Operator Overloading (unary operator, binary operator overloading), Type conversions - basic type to class type, class type to basic type

**Inheritance** : Inheritance Basics – derived class and base class, Types (simple, multi-level, multiple and hierarchical), Modes (private, protected, public inheritance), Overriding member functions, Order of execution of constructors and destructors, Resolving ambiguities in inheritance, Virtual base class, Aggregation and Composition.

### Unit V

**Dynamic Memory Management and Polymorphism** : Dynamic memory allocation using new and delete operators, Virtual destructors, Compile and run time polymorphism, Virtual functions, Dynamic constructors, Abstract classes and concrete class, Introduction to Self-Referential class, Pure virtual functions, Early binding and late binding, Memory leak and allocation failures

### Unit VI

**Exception Handling, Templates and Standard Template Library (STL)** : Basics of exception handling, Exception handling mechanism, Throwing mechanism, Catching mechanism, Rethrowing an exception, Function template and class template, Class template with inheritance, Introduction to STL- Containers, Algorithms and iterators, Container - Vector and List

**List of Practicals / Experiments:**

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- Concepts and Basics of C++ Programming: Programs to define classes and structures, Program to demonstrate inline, non-inline member functions and Static function
- Functions :Program to implement function overloading, friend function and friend class, Program to demonstrate the difference between call by value, call by address and call by reference
- Pointers, Reference Variables, Arrays and String Concepts: Program to demonstrate the type of pointers, Program to process multidimensional array and array of objects
- Constructors, Destructors and File Handling: Program to demonstrate constructor, destructor and type of constructors
- Data File operations: Program to demonstrate the modes of file, Program to demonstrate type of files
- Operator Overloading and Type Conversion: Program to demonstrate the operator overloading and type conversion
- Inheritance: Program to demonstrate the type of inheritance, Program to demonstrate the ambiguities in inheritance
- Dynamic Memory Management and Polymorphism : Program to use new and delete for dynamic memory management, Program to demonstrate the compile time and run time polymorphism, Program to demonstrate abstract class and dynamic constructor
- Exception Handling, Templates and Standard Template Library (STL) :Program to demonstrate exception handling, Program to demonstrate function template and class template, Program to demonstrate STL- Containers, Algorithms and Iterators.

**Text Books:**

1. OBJECT ORIENTED PROGRAMMING IN C++ by ROBERT LAFORE, PEARSON

**References:**

1. PROGRAMMING WITH C++ by D RAVICHANDRAN, MCGRAW HILL EDUCATION
2. OBJECT ORIENTED PROGRAMMING IN C++ by E BALAGURUSAMY, MCGRAW HILL EDUCATION