CSE202: OBJECT ORIENTED PROGRAMMING

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

Course Outcomes: Through this course students should be able to

- Identify basic programming constructs and use the newly acquired skills to solve extensive programming problems
- Discuss the mechanism of code reusability by creating own libraries of functions
- Validate the logic building and code formulation by designing code capable of passing various test cases
- Interpret the principles of the object-oriented model and apply it in the implementation in C ++ language
- Develop accurate, reliable and efficient software applications
- Apply the knowledge acquired to develop software applications

Unit I

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

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: Differences between pointer and reference variables, 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, Pointer to data member, Array declaration and processing of multidimensional arrays(inside main and inside class), Array of objects, The Standard C++ string class-defining and assigning string objects, Member functions, Modifiers of string class.

Unit III

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

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 operations.

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.

Unit V

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

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, Introduction to STL- Containers, Algorithms and iterators, Container - Vector and List.

List of Practicals / Experiments:

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