I Year II Semester

Code: 17CS205

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OBJECT ORIENTED PROGRAMMING THROUGH C++

Course Objectives:
1. Understand object oriented programming concepts.
2. Be able to explain the difference between object oriented programming and procedural programming.
3. Be able to program using C++ features such as composition of objects, operator overloads,
4. Dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling, etc.
5. Be able to build C++ classes using appropriate encapsulation and design principles.
6. Be able to improve problem solving skills.
7. Be able to apply object oriented or non-object oriented techniques to solve bigger computing problems.

Course Out Comes:
1. After completion of this course, the students would be able to:
2. Gain the basic knowledge on Object Oriented concepts.
3. Develop applications using Object Oriented Programming Concepts.
4. Able to apply concepts of operator overloading, constructors and destructors.
5. Design classes and inheritances.
6. Implement features of object oriented programming to solve real world problems.
7. Identify, understand and analyze various sample development models.
8. Able to apply Exception Handling and Data handling through files.

Course Syllabus :

UNIT I :
Objectives: Exposure to basics of object oriented mode, C++ programming and I/O in C++
INTRODUCTION: Differences Between C And C++, The Object Oriented Technology , Disadvantage of Conventional Programming, Concepts of Object Oriented Programming, Advantages of OOP Structure of A C++ Program, Header Files And Libraries

INPUT AND OUTPUT IN C++ :
Introduction, Streams In C++ And Stream Classes, Pre-Defined Streams, Stream Classes, Formatted And Unformatted Data,Unformatted Console I/O Operations, Member Functions Of I stream Class, Formatted Console I/O Operations, Bit Fields, Flags Without Bit Field, Manipulators, User Defined Manipulators

UNIT II :
Objectives: Focus on Basic concept in C++ programming, Operators, control structures, functions, overloading, recursion

Tokens In C++, Variable Declaration And Initialization, Data Types, Operators In C And C++, Scope Access Operator, Namespace, Memory Management Operators, Comma Operator, Revision Of Decision Statements, Control Loop Statements

FUNCTIONS IN C++ : Introduction, Structure Of Function, Passing Arguments, Lvalues And Rvalues, Retrun By Reference, Returning More Values By Reference, Default Arguments, Const Arguments, Inputting Default Arguments, Inline Functions, Function Overloading, Principles Of Function Overloading, Recursion

UNIT III :

Objectives: Acquaintance with classes, objects and member functions

CLASSES AND OBJECTS: Introduction, Classes In C++, Declaring Objects, Access Specifiers And

Their Scope, Member Functions, Outside Member Function As Inline, Data Hiding or Encapsulation, Classes, Objects and Memory, Static Member Variables, Static Member Functions Static Object, Array Of Objects, Objects As Function Arguments, Friend Functions, The Const Member Functions, The Volatile Member Function, Recursive Member Function, Local Classes, Empty, Static And Const Classes, Member Function and Non- Member Function, Overloading Member Functions, Nested Class

UNIT IV :

Objectives: Focus on constructors , destructors, variants in them, operator overloading, type conversions **CONSTRUCTORS AND DESTRUCTORS :** Introduction, Characteristic Of Constructors & Destructors, Applications With Constructors, Parameterized Constructor, Overloading Constructors (Multiple Constructors), Array Of Objects Using Constructors, Constructors With Default Arguments, Copy Constructors, The Const Objects, Destructors, Calling Constructors And Destructors, Qualifier And Nested Classes, Anonymous Objects, Private Constructors And Destructors, Dynamic Initialization Using Constructors, Dynamic Operators and Constructors, Recursive Constructor, Constructor and Destructor With Static Members, Local Vs. Global Object **OPERATOR OVERLOADING AND TYPE CONVERSION :** Introduction, Overloading Unary Operators, Constraint on Increment And Decrement Operators, Overloading Binary Operators, Overloading With Friend Function, Overloading Assignment Operator (=), Type Conversion, Rules For Overloading Operators, One Argument Constructor And Operator Function, Overloading Stream Operators

UNIT V :

Objective: Concentration on inheritance, types of inheritance, polymorphism, virtual functions

INHERITANCE : Introduction, Reusability, Access Specifiers And Simple Inheritance, Protected Data With Private Inheritance, Types Of Inheritances(Single Inheritance, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Multipath Inheritance), Virtual Base Classes, Constructors, Destructors, And Inheritance, Object As A Class Member, Abstract Classes, Qualifier Classes And Inheritance, Constructor In Derived Class, Pointers And Inheritance, Overloading Member Function, Advantages Of Inheritance, Disadvantages Of Inheritance.

BINDING, POLYMORPHISM AND VIRTUAL FUNCTIONS: Introduction, Binding In C++, Static (Early) Binding, Dynamic (Late) Binding, Pointer To Base And Derived Class Objects, Virtual Functions, Rules For Virtual Functions, Array Of Pointers, Pure Virtual

Functions, Abstract Classes, Working Of Virtual Functions, Virtual Functions In Derived Classes, Object Slicing, Constructors And Virtual Functions, Virtual Destructors, Destructor And Virtual Functions.

UNIT VI :
Objectives: Focus on Files, File operations, generic programming, templates, function templates, Exception handling

APPLICATIONS WITH FILES: Introduction, File Stream Classes, File Opening Modes, File Pointers And Manipulators, Manipulators With Arguments, Sequential Access Files, Binary And ASCII Filesrandom Access Operation.

GENERIC PROGRAMMING WITH TEMPLATES : Introduction, Need Of Template, Definition Of Class Template, Normal Function Template, Working Of Function Templates, Class Template With More Parameters, Functions Templates With More Arguments, Overloading Of Template Functions, Member Function Templates, Recursion With Template Function, Class Template With Overloaded Operators, Class Template Revisited, Class Templates And Inheritance, Container Classes , Types Of Containers, ContainerAdaptors, Iterators

EXCEPTION HANDLING : Introduction, Principles Of Exception Handling,The Keywords Try, Throw And Catch , Exception Handling Mechanism, Multiple Catch Statements, Catching Multiple Exceptions, Rethrowing Exception, Specifying Exception, Exceptions In Constructor And Destructors, Controlling Uncaught Exceptions, Class Template With Exception Handling

TEXT BOOKS :
1. Programming In C++ , Ashok N Kamthane. Pearson 2 nd Edition.
2. Object Oriented Programming C++ , Joyce Farrell, Cengage
3. Mastering C ++, Venugopal, Rajkumar, Ravi kumar TMH
4. Object Oriented Programming with C++, 2 nd ed, Sourav Sahay, OXFORD

REFERENCE BOOKS:
1. The Complete Reference, C++, 4ed, Herbert Schildt, TMH