Object Oriented Concepts using C++

Semester – IV	Subject Code: BS41601	Lectures: 60

Objectives:

The syllabus aims in equipping students,

- To acquire an understanding of basic object oriented concepts and the issues involved in effective class design
- To write C++ programs that use object oriented concepts such as information hiding, inheritance, polymorphism etc.

Unit 1: Object Oriented Concepts	8

1. Introduction to object oriented concepts

- Characteristics of object oriented language (object, class, encapsulation ,inheritance and polymorphism)
- Advantages and Applications of OOP

[**Ref. book 1**- Chapter 1]
[**Ref. book 2**- Chapter 1]

2. Introduction to C++

- Data types, new operators in C++ (scope resolution, member dereferencing) and keywords, using namespace concept
- Dynamic memory allocation operators (new and delete)
- Introduction to reference variables
- Simple C++ program (using cin and cout)
- Classes and Objects
- Access specifiers
- Defining Data members and Member functions, passing object to function, function returning object
- Array of objects
- Usage of 'this' pointer

[**Ref. book 1**- Chapter 2]
[**Ref. book 2**- Chapter 2,3,5]

Unit 2: Functions	18

3. Function in C++

- Introduction
- Call by reference, return by reference
- Function with default arguments, function overloading
- Inline function (defining inline function, making class function inline)

- Static class members and static member function
- Friend functions and friend class

[**Ref. book 1**- Chapter 3]
[**Ref. book 2**- Chapter 4]

4. Constructors and destructors

- Constructors
  - Definition
  - Rules of defining constructor
  - Invoking constructor
  - Types of constructor
  - Multiple constructors in a class
- Destructor
  - Definition
  - Rules for writing destructor function

[**Ref. book 2**- Chapter 6]

5. Operator overloading

- Concepts and rules
- Overloading Unary and Binary operators
- Overloading using member and friend function
- Overloading insertion and extraction operator(<<,>> operators)

[**Ref. book 1**- Chapter 8]
[**Ref. book 2**- Chapter 7]

Unit 3: Inheritance	**8**

6. Inheritance

- Inheritance
  - Definition
  - Creating a derived class
  - Types of inheritance with examples (use of protected keyword)
- Constructors and destructor in derived classes
- Pointer to derived class
- Virtual base classes, Virtual functions and Pure virtual function
- Abstract base class (definition with example)

[**Ref. book 1**- Chapter 9]
[**Ref. book 2**- Chapter 8,9]

Unit 4: Input/output Handling	**8**
7. Managing Input and Output using C++ • C++ stream classes • Formatted and unformatted console I/O (get(),getline(),read(),put(),write() and ios formatting functions) • Manipulators and user defined manipulators [**Ref. book** 1- Chapter 12] [**Ref. book 2**- Chapter 10] **8. Working with files** • File stream classes and methods • File operations on text files and binary files • Random access files [**Ref. book 1**- Chapter 12] [**Ref. book 2**- Chapter 11]	

Unit 5: Templates and Exception Handling	**6**
9. Templates • Introduction to templates • Class templates, function templates and overloading of function templates • Templates with multiple parameters [**Ref. book 1**- Chapter 14] [**Ref. book 2**- Chapter 12] **10. Exception Handling in C++** • Introduction • Exception handling mechanism (try, catch and throw primitives) • Multiple catch statements • Nested try catch block • Rethrowing Exceptions [**Ref. book 1**- Chapter 14] [**Ref. book 2**- Chapter 13]	

***Contact hours – 12 hours**

Recommended Books:

1. Robert Lafore ,***Object Oriented Programming with C++***, 4th Edition pearson
2. E. Balagurusamy,***Object Oriented Programming with C++***,5th Edition Mc Graw Hill
3. Herbert Schildt ,***The Complete Reference C++*** , 4th Edition TMH Pub.