10ABTEC22214: Object Oriented Programming with C++		
Course Frame Work		
Credits: L-T-P: 3 - 0 - 1		**Total Credits: 4**
Contact Hours/Week: 5	**Direct Teaching Hours: 45**	**Total Contact Hours: 75**

Course Learning Objectives:

The course aims to get an in-depth understanding of all the fundamentals needed for C++ Programming and enable them to learn Object-Oriented approaches to solve real world problems.

Course Outcomes: On completion of the course, student would be able to:

COs	Course Outcomes	RBT
CO1	Define the basic constructs of Object-Oriented Programming with C++	L1
CO2	Describe the classes, constructors to write C++ programs	L2
CO3	Explain inheritance and pointers using C++ programs	L2
CO4	Demonstrate the use of polymorphism and exception handling in C++	L2
CO5	Implement the features of Input/output streams, file handling to provide programmed solutions for problems.	L3

Syllabus	Hours
Module - 1	**09**

Introduction to Object Oriented Programming: An overview on Object Oriented Programming and Procedure oriented programming, Basic concepts of Object-Oriented Programming, Benefits of OOP.

Beginning with C++: Structure of a C++ program, Data types, C++ tokens, Identifiers, Variables, Constants, Operators, Control structures &Loops.

Module - 2	**09**

Classes and Objects: Introduction of Classes, Class Definition, Defining Members, Objects, Access Control, Class Scope, Memory Allocation for Objects, Static Data Members, Static Member Functions, Arrays of Objects, Friend Functions.

Constructors and Destructors: Introduction to Constructors, Default Constructors, Parameterized Constructors, Copy Constructors, Destructors.

Module - 3	**09**

Inheritance: Introduction to inheritance, Defining Derived Classes, Single Inheritance, Multiple Inheritance, Multi-level Inheritance, Hierarchical Inheritance, Hybrid Inheritance.

Pointers: Introduction to Memory management, new operator and delete operator, Pointers to objects, Pointers to Derived Classes

Module – 4	**09**

Virtual Functions and Polymorphism: Polymorphism, Compile time polymorphism: Overloading- Function Overloading, Operator overloading, Run time polymorphism, Virtual Functions.

Exception handling: Basics of Exception Handling, Types of exceptions, Exception Handing Mechanism, Throwing and Catching Mechanism.

Module – 5	**09**

I/O Operations and Files: C++ Stream Classes, Unformatted I/O Operations, Formatted I/O operations, Classes for File Streams, Opening and Closing a File: open() and close() functions.

Manipulators of File Pointers: seekg(), eekp(), tellg(), tellp() functions, Sequential Input and output Operations : put(), get(), write(), read() functions, Error handling File Operations : eof(), fail(), bad(), good().

Scheme of Evaluation:

A. Continuous Internal Assessment (CIA) Scheme:

Components	Lab	Game Development	Technical Aptitude	IAT	Preparatory	Total
Max. Marks	10	10	10	10	10	50

LAB (P = 1 Credit)				
Components	**Problem Solving**	**Debugging**	**Quiz**	**Lab Total**
Max. Marks	10	05	05	20

Note: To appear for ESE a student has to obtain a minimum of 40%.

B. End Semester Exam (ESE) Scheme: 50 marks

Question Paper Pattern:

a) Question paper shall have 5 main questions corresponding to 5 modules.
b) Each main question will have two full questions carrying 10 marks each.
c) A full question may have a maximum of four sub questions, covering the topics under a module.
d) The students will have to answer all 5 main questions, selecting one full question from each module.

Text Books:

1) Robert Lafore , Object-oriented programming in C++, fourth edition.
2) C++, the Complete Reference, 4th Edition, Herbert Schildt, TMH
3) Balagurusamy E, Object-oriented programming with C++, Tata McGraw Hill Education Pvt.Ltd ,Fourth Edition 2010

Reference Books:

1) Object Oriented Design by Rumbaugh (Pearson publication)
2) Bhushan Trivedi, "Programming with ANSI C++", Oxford Press, Second Edition, 2012.
3) C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
4) The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Educ

e-Material:

1) https://www.programiz.com/cppprogramming/oop
2) https://www.w3schools.com/cpp/cpp_oop.asp

Activity Based Learning/Practical Based Learning:

1) https://nptel.ac.in
2) https://swayam.gov.in

Beyond Syllabus

Copy Assignment operator, move constructor, move assignment operator, utilizing friend functions for accessing private members of a class, understanding function pointers and their application, understanding and using preprocessor directives, effective debugging techniques and tools

Object Oriented programming with C++ Lab Experiments

I. Experiments using C++ Basic Constructs

1. Write a C++ program to demonstrate use of arithmetic operators
2. Write a C++ program to print the month name using switch statement

II. Experiments using Class & Constructors

3. Write a Program to illustrate default constructor, destructor and copy constructors
4. Write a Program to Demonstrate Friend Function and Friend Class

III. Experiments using inheritance & pointers

5. Write C++ programs that illustrate how the following forms of inheritance are supported: a) Single inheritance b) Multiple inheritance c) Multi level inheritance d) Hierarchical inheritance
6. Write a Program to Invoking Derived Class Member Through Base Class Pointer.

IV. Experiments using Virtual Functions & Exception Handling

7. Write a Program to Demonstrate the i)Operator Overloading. ii) Function Overloading
8. Write a Program Containing a Possible Exception. Use a Try Block to Throw it and a Catch Block to Handle it Properly.

V. Experiments using I/O operations & Files

9. Write a C++ program to create a text file, check file created or not, if created it will write some text into the file and then read the text from the file
10. Write a C++ program to write and read time in/from binary file using fstream